

BIRTHSONG

# MIDWIFERY WORKBOOK

6th Edition

BASIC LEVEL STUDY GUIDE  
& COLORING BOOK

Daphne Singingtree, CPM

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**6th Edition**



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**Written by:** Daphne Singingtree, CPM

**Illustrations by:** Patricia Edmonds, Bonnie Gruenberg, Jennifer Buccilli, Rich Hall, Ruth Simer, Lavana Appletree, Wahaba Heartsun, Parker Ogborn, John Stagnaro, and Susan Smith Cameron Scales,

**6th Edition edited by:** Ellen Klowden, MSW

**Graphic Design Assistance by:** Keith Van Norman

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## **Dedication**

To all my midwifery students over the last 35 years who continue to encourage and inspire me with their enthusiasm, idealism, passion and dedication to mothers and babies.



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<b>Chapter 1 Midwifery – Yesterday &amp; Today.....</b>	<b>1</b>
Why Midwifery?.....	2
History of Midwifery.....	4
Current Trends in Midwifery.....	18
What Do Midwives Do?.....	20
MANA Core Competencies for Basic Midwifery Practice.....	21
Midwifery in the United States.....	26
International Definition of a Midwife.....	32
Midwifery Student Bill of Rights.....	35
MANA Standards and Qualifications.....	36
Self-Test.....	37
<b>Chapter 2 Studying Midwifery.....</b>	<b>38</b>
Studying Midwifery.....	39
Learning Domains.....	41
Whole Brain Learning .....	44
Memory Tricks .....	45
Gardener’s Seven Intelligences Model.....	46
Tips for Textbook Study.....	48
Time Management .....	50
Self-Test .....	52
<b>Chapter 3 Terminology for Midwives .....</b>	<b>53</b>
Medical Terminology .....	54
General Medical Abbreviations .....	61
Anatomical Directions.....	62
Anatomical Movement.....	63
OB Acronyms, Abbreviations & Terms.....	65
Self-Test .....	68
<b>Chapter 4 Reproductive Anatomy &amp; Physiology.....</b>	<b>69</b>
The Pelvis.....	70
Female Reproductive Anatomy .....	72
Vulva.....	73
Vagina.....	74
Muscles of the Perineum.....	75
Uterus .....	78
Ovaries.....	80
Ovulation .....	84
Menstruation .....	85
Male Reproductive System.....	89
Self-Test .....	92

<b>Chapter 5 The Beginning of Life.....</b>	<b>94</b>
Cells.....	95
Conception.....	105
Development of the Fertilized Ovum.....	106
Decidua.....	107
Fetal Development.....	110
Amniotic Fluid.....	111
Fetal Circulation.....	114
Self-Test.....	116
<b>Chapter 6 Normal Pregnancy.....</b>	<b>118</b>
Normal Pregnancy.....	119
Length of Gestation.....	120
Signs and Symptoms of Pregnancy.....	121
Physiological Changes During Pregnancy.....	123
Common Discomforts of Pregnancy.....	134
Emotional and Psychological Aspects of Pregnancy.....	147
Sexuality During Pregnancy.....	152
Self-Test.....	154
<b>Chapter 7 Supporting a Healthy Pregnancy.....</b>	<b>156</b>
Nutrition in Pregnancy.....	158
Herbs During Pregnancy.....	175
Herbs to Avoid During Pregnancy.....	180
Glossary of Herbal Preparation Terminology.....	182
Prenatal Fitness & Exercise.....	186
Self-Test.....	189
<b>Chapter 8 Preventing Infection.....</b>	<b>190</b>
Midwifery and Infection Control.....	191
Types of Infections Seen in Midwifery Practice.....	192
Chain of Infection.....	195
Standard Precautions for Midwives.....	197
10 Easy Steps to Proper Hand-Washing Technique.....	200
Types of Gloves.....	201
How to Put on Sterile Gloves.....	202
How to Safely Remove and Dispose of Gloves.....	203
Self-Test.....	205

<b>Chapter 9 Prenatal Care .....</b>	<b>207</b>
The Midwife's Role in Prenatal Care .....	208
First Prenatal Visit .....	215
Physical Exam for Initial Prenatal Visit .....	223
Prenatal Exam Skills .....	232
Subsequent Prenatal Exams .....	237
Blood Types and Rh Factor .....	244
Antenatal Diagnosis or Prenatal Testing.....	246
Self-Test .....	252
<b>Chapter 10 Normal Labor &amp; Birth.....</b>	<b>254</b>
Normal Labor .....	255
The Passage.....	256
The Passenger.....	258
The Powers.....	265
The Psyche .....	277
Monitoring Fetal Well-Being.....	278
A Midwife's Role in Normal Labor at Home .....	287
Self-Test .....	296
<b>Chapter 11 Placenta &amp; Postpartum .....</b>	<b>298</b>
The Placenta.....	300
Normal Third Stage Care.....	302
Normal Fourth Stage Care.....	304
Postpartum Physiology.....	305
Perineal Care.....	308
Maternal Postpartum Assessment.....	311
Postpartum Adjustment.....	316
Self-Test .....	321
<b>Chapter 12 Normal Newborn.....</b>	<b>323</b>
Midwifery Care of the Newborn .....	324
Bonding .....	334
The Newborn Exam.....	335
Common Procedures with Newborns .....	344
Neonatal Follow-up Care .....	348
Newborn Parenting Education .....	351
Self-Test .....	352

<b>Chapter 13 Breastfeeding.....</b>	<b>354</b>
Midwifery Support of Breastfeeding .....	355
Anatomy of Lactation.....	358
Physiology of Lactation.....	359
Techniques for Successful Breastfeeding.....	362
Pumping and Storing Breast Milk .....	367
Self-Test .....	371
<b>References.....</b>	<b>373</b>



Daphne's youngest son Terran, at two days old, 4/11/1981



## Introduction

This is a basic level workbook intended as a study guide for further learning. It is intended to be a supplement to use with other texts, classes and learning materials. Most of the answers to the exercises will NOT be found in the workbook; other texts and resources will be needed. Many of the illustrations are composed in the style of a coloring book. Accompanying each drawing is the name of the body part or explanation written in HOLLOW LETTERS. With felt tip pen or colored pencils, color in the name of each part; and using the same color pen, color in the part or organ. Use a different color for each part.

When the First Edition was written in 1984, there was very little in the way of direct entry midwifery education or resources. I was an apprentice trained midwife with a busy home birth practice, teaching an informal series of classes from my living room. I had no formal education other than a GED, having left home and started midwifery very young. Over the years the classes evolved into more established midwifery training programs, my writing improved, and only just this year I got my Bachelors Degree and am now working on a Masters. Had I come from an academic background, this book might have been a traditional text or workbook, but it was an odd combination of both. The workbook has evolved over the six editions, but it has kept at its core, the philosophy and practice of a home birth midwife. The informal style has not changed much since the eighties; however, each edition has provided updated information. Knowledge about lactation, in particular, has changed over recent years and the Sixth Edition offers updated information on the anatomy which should reflect more recent research.

In my journey as a midwife, teacher, and student, I have been humbled by the amount there is learn, and by the different approaches to learning it. This book can be your first steps in learning midwifery. Think of it as one tool among many, use it critically, and know that like any book, the information may not always be 100% up-to-date or accurate. As a midwife you will learn from different teachers, there are often no right or wrong answers, but different approaches that work in different situations. One thing that differentiates midwifery from medicine is the individual care we tailor to each woman. Midwifery education is the same way.

Today my focus is on Aviva Institute, a distance education college for midwives that brings the heart of midwifery into a program of academic rigor. The profession of midwifery is changing; and the training of midwifery needs to change with it. While I believe in strong academics, the qualities that make a good midwife – dedication, reliability, sweetness, love for mothers and babies – can't be learned in school. The *science* of midwifery is protecting the health of mothers and babies; the *art* of midwifery comes from supporting the birth process in a way that empowers women and strengthens families.



# Chapter 1

## Midwifery: Yesterday & Today

### OBJECTIVES

*After completing this chapter, the student should be able to:*

1. Identify who, historically, has attended women in labor and birth.
2. Describe and identify similarities and patterns in birth among diverse cultures.
3. Describe how midwives have been viewed at different points in history.
4. Name organizations that have influenced the public's view of midwives.
5. Describe how groups have worked to suppress midwives.
6. Identify key events and people in midwifery history that affect how we practice today.
7. Identify the important aspects of the current international definition of a midwife.
8. Name organizations and individuals who have transformed childbirth in this century.
9. Define the Midwives Model of Care.
11. Define the roles and responsibility of a midwife and clinical apprentice.
12. Define and explain the functions of MEAC, MANA, and NARM.
13. Define CPM, CNM, LDM, LM, DEM, and CM.
14. Explain the different ways to become a midwife in the US.
15. Identify key components in the MANA Core Competencies for basic midwifery practice.



## WHY MIDWIFERY?

Midwifery is not merely a job or a career; it is a life-style, a philosophy, and a way of life. Attending such a special and unique event as a birth gives one a deeper appreciation of the inner strength of women. In addition, newborn babies have a very special energy and presence; being the first to touch a new life as it emerges into the world is truly an honor.

Midwifery is a path of service, and the woman who walks this path dedicates herself to a lifetime of commitment, education, and training. The serious responsibility of helping life come safely into the world is a challenge that only the most dedicated can meet. Indeed, it may be said that we do not choose midwifery; midwifery chooses *us*.

The rewards and joys of midwifery are many. Midwifery is a path filled with the special beauty of life; however, it requires sacrifice. Babies choose their own time to be born into this world and often when it is inconvenient for the midwife. Births take priority over family, friends, recreation, and sleep. The midwife knows that she can rarely travel out of town. She must often wait for a phone call that never comes or comes when she least expects it. Some midwives have rotating call systems, while many home birth midwives are on call twenty-four hours a day, seven days a week. The midwife's responsibility requires that she be ready and able to give 100% of herself when her clients need her. Births do not always occur on schedule, and all midwives have had the experience of being called to a new birth having had little or no time to recover from the last one. Midwives often lose sleep, miss important family events such as holidays or school functions, and deal with their frustrated families. Many "burn out" and quit; but the special magic of birth keeps most midwives hooked.

Midwifery is the path of careful planning and responsibility. The midwife needs to remain drug and alcohol free. Her car must be maintained and in good repair, her telephone and cell phone always turned on. If she has children, she has arranged for reliable child care to be available at all times, even when her children are sick. Then, when labor begins, she is able to put aside personal plans and family needs. While attending a birth that may last for hours — or even days — she is able to completely focus on the woman in labor.

Finally, midwifery is the way of the guardian. Midwives are the guardians of normal births, offering women choices in childbearing, choices that give women more control over their bodies and birth experiences. They work in the midwifery model of care which supports the normalcy of birth, respects women and family choices, individualizes client care, and promotes education and informed decision-making. It includes minimizing technological interventions, while identifying and referring women who require the services of an obstetrician. Midwives often use nutrition, herbs, massage, and other holistic methods to promote optimal health and as a means of reducing complications.

Midwives are important members of the maternal health care team. While many deliver babies at home, they refer women to physicians and hospitals when needed. Home birth is more of a philosophy than a place, and midwifery care brings that philosophy wherever she goes, home, birth center or hospital.

The midwifery model respects the spiritual aspects of birth. Many people believe that, in the first few minutes and hours following birth, newborns are imprinted with a set of messages which they carry with them throughout their lives. Midwives can help ensure that those imprints will be peaceful, loving, and joyful. The bonding that occurs between newborn, mother, and other family members at birth helps to create an emotional tie that can help strengthen the family for a lifetime.

## MIDWIFERY EXERCISE

1. Why do you want to be a midwife?
2. What life experiences do you have that you feel will be assets to you in midwifery?
3. Explain how a specific person, philosophy, or author has influenced your ideas in midwifery.
4. What are the qualities you possess that will be assets to you as a midwife?

## HISTORY OF MIDWIFERY

The word midwife means “*with woman.*” Midwifery evolved from women simply being with other women as they gave birth. The older women who had many children and witnessed many births were turned to for advice in difficult births. Nearly every village, clan, or community had a “wise woman” whom they respected and trusted. Midwifery is an ancient tradition that is present in almost every culture all over the world.



Birth is a normal process. Until relatively recently however, high infant and maternal mortality rates were also normal. Survival of the fittest was the rule. For example: women with small pelvises generally died in childbirth (and did not, therefore, bear children with small pelvises), as did women who were prone to serious obstetric complications. Premature or sickly babies did not live. Only the hardiest survived, and it was not unusual for a woman who had borne eight or ten children to see fewer than half of them reach adulthood. Midwives have always been the women who tried to change the odds, saving the mothers and babies who long ago frequently died.

The earliest recorded history bears witness to the fact that midwives have played a significant role worldwide. Egyptian hieroglyphics, early Chinese and Hindu writings, and the Bible all refer to them. In the book of Exodus, the story is told of the Pharaoh of Egypt, who, wanting to reduce the number of Israelites, ordered two midwives, Shiph'rah and Pu'ah, to kill all of the Hebrew male babies at birth. In the first recorded act of civil disobedience, the midwives refused. Instead they told the Pharaoh that the Hebrew women were stronger than the Egyptian women and had their babies quickly before the midwives could get there.



In early history midwives were respected and honored. Birth was considered a sacred mystery; women were respected for having the power to give birth. Goddesses were often portrayed pregnant or giving birth.



*The Venus of Willendorf, c. 24,000-22,000 BCE, one of the earliest representations of art showing how pregnancy and birth were revered among the ancients.*

*The Aztec goddess of Childbirth, Tlazolteotl*

Stone Carving of a woman preparing for birth shows the early emphasis on birthing women as sacred.





Terracotta relief of childbirth scene from the tomb of a midwife in the Isola Sacra cemetery of Ostia.

Midwife (who is turned toward us, showing that she is the owner of the tomb) and her assistant tend a naked woman seated in a birthing chair. Statement of status and identity from a woman who regarded herself as an expert professional.  
circa 420 BCE

The birth of Erichthonius, first king of Athens, is part of a series of legendary births depicted on bases throughout Attica. Gaia (the Earth), half-emerging from the ground, holds out her child to the goddess Athena, in the presence of Erichthonius' father, Hephaestus, and Aphrodite.



The birth of the prophet Mohammed from the 13th Century illustration Jame3 II Tawareekh, shows midwives and helpers.

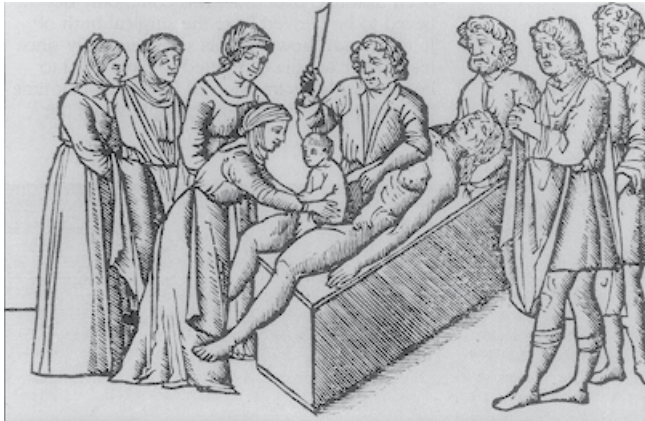


The Celtic Sheel-na-gig of the Church of St. Mary and St. David in Herefordshire, UK



Birth scene from the Ufftenheimer Altar, 1480, with midwives swaddling the Christ child and warming the receiving blankets, indicating the role of midwives during that period

As civilization evolved, midwifery became an honored and respected profession. Hippocrates wrote that male physicians were called upon to assist with difficult births, but that the management of normal labor was the realm of midwives. Socrates' mother was a midwife. Aristotle speaks of the wisdom and intelligence of the midwives of Greece.



One of the earliest printed illustrations of Cesarean section. Purportedly the birth of Julius Caesar. A live infant being surgically removed from a dead woman. From Suetonius' Lives of the Twelve Caesars, 1506 woodcut.

Cesarean section was named after Julius Caesar, who was thought to have been born in this manner.

A woman surgeon performs a Cesarean in this medieval tapestry.



Prior to the 1600's almost all deliveries were done by midwives who used and understood herbs and were often the only health care providers for a village. In addition to delivering babies and helping the sick, they often attended the dying, helping and comforting the families as well as "laying out" the dead.



Illustration from one of the first textbooks for midwives, published in Germany in 1513, by Eucharius Roslin *The Pregnant Woman's and Midwife's Rosegarden*



Three midwives assist a woman in labor, from the textbook *The Birth of Mankind* by Jakob Rueff, 1544



Delivery with midwives; in the background two astrologers cast the baby's horoscope. Rueff, 1544



Birth room scene with midwife washing the baby, Rueff, 1544



During the Middle Ages, midwives were often targets for accusations of witchcraft because of their knowledge of healing and the mystery of birth. The Inquisition, which prosecuted midwives, was the primary political presence, and strong-minded women (as midwives tend to be) were often called witches to silence them. Midwives were respected members of the community, but if they spoke out against injustices by the ruling class they were likely to be accused of witchcraft. Any midwife who used herbs for birth control or abortion was denounced as a witch. In the general hysteria of the times, anyone who was not a “Good Christian” was considered in league with the devil. Unfortunately, that definition was all a matter of interpretation.

Thousands of midwives accused of witchcraft were discredited, disgraced, and arrested. Many were tortured or put to death by being burned at the stake, hanged, or drowned.



Many midwives were hanged, tortured, and burned at the stake for suspected witchcraft during the Middle Ages



During the fifteenth through the seventeenth centuries, midwives delivered almost all of the babies. Male physicians were called in only in rare life-threatening cases. Women, especially in the lower classes, were rarely taught to read and had little or no access to the emerging knowledge of the anatomy and physiology of obstetrics. Midwives continued to learn their craft through the time-honored apprenticeship model. Older midwives passed their knowledge, experience, and wisdom on to their younger apprentices. The only field of medicine that was really open to women for centuries was midwifery, and many made significant contributions.

One of the first midwifery textbooks, printed in 1609, was written by a famous French midwife, Louise Bourgeois Boursier. In addition to being a midwife, she was a skilled physician and surgeon. Midwife to the Royal Court for twenty seven years, she delivered the future Louis XIII and six children of King Henry IV. She promoted the use of the podalic version, a procedure which, at the time, was a dramatic advance in saving the lives of mothers and babies. Jane Sharp was the first English midwife to write a book on midwifery, *The Midwives Book or the Whole Art of Midwifery Discovered*, first printed in 1671.



Louise Bourgeois Boursier (1563-1636)



Madame Du Courdray (1712-1789)

Another notable French midwife was Madame Le Boursier Du Courdray. Louis XVI gave her permission to go into the provinces and give free instruction to midwives. She invented a life-size mannequin for teaching purposes, permitting her to demonstrate the position of the baby and techniques of delivery. Other French midwives of note were Marie Duges, chief midwife at the time of the French revolution and mother of the famous midwife Louise La Chapelle, born 1769.

In the late 1500's and early 1600's, the Chamberlen family played an important historical role. Peter Chamberlen, the elder, was one of the few male physicians interested in midwifery. He was an advocate for the professionalization of midwifery and state support for the education of midwives. He invented the obstetric forceps. This was considered a major medical advancement, as the device made it possible in many cases for women with contracted pelvises to give birth without resorting to a cesarean, which was nearly always fatal to the mother. Instead of sharing this knowledge he kept it as a family secret with his son and other family members using it for professional advancement and personal gain. After his grandson's death, the forceps were discovered hidden in the floor of a closet. The use of such instruments, which were lifesaving in some cases, contributed to the growing acceptance of male physicians in birth. Obstetrics had become recognized as a branch of medicine. Although midwives still attended the majority of poor women's births, the upper classes demanded the services of the "accoucheurs" (the new doctors) many of whom were barbers and butchers attempting to supplement their income.



Peter Chamberlen  
(1601-1683)



The demand for modesty was so extreme that men were not allowed to look upon the bodies of the women they attended: they were forced to perform many of their deliveries by touch alone, the woman being hidden under blankets.



Catharina Schader was a Dutch midwife who, when she retired in 1745, had delivered over 3000 babies. She left a diary detailing her experiences which provides us an insightful and rare look at the midwifery techniques used during that time.

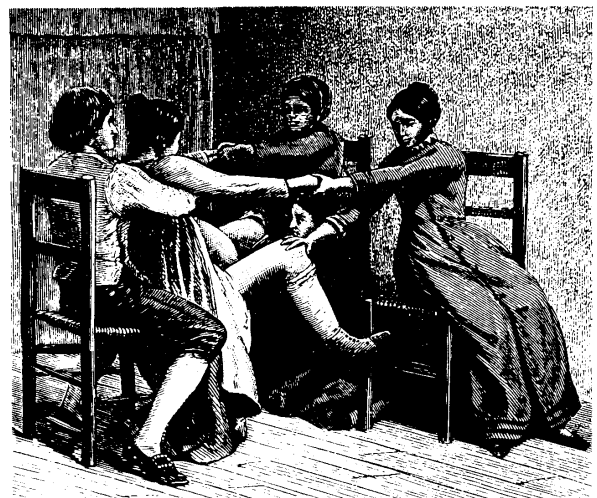
*Catharina Schader (1693-1745)*

During the seventeenth century, midwifery began to be recognized as a profession, and midwifery schools were established in Europe. In the "New World", the colonists continued using professional midwives. Brigit Lee Fuller was the midwife who attended three births on the Mayflower, and she continued to have a well-respected practice in colonial America. Martha Ballard (1785-1812) was a colonial midwife whose diary detailed her everyday activities delivering babies and caring for the sick. It earned a Pulitzer Prize for the author who published it and became the subject of a PBS movie.

In 1762, America's first midwifery school was opened in Philadelphia. Most midwives still practiced at home and in rural areas, but some now began to work independently in maternity hospitals, calling upon obstetricians only in cases with serious complications.

Beginning in this period, maternity or "lying-in" hospitals began to become fashionable. Although the maternal mortality rate was nearly 20% in these hospitals, women began to utilize hospitals with their attendant male doctors. Sanitary conditions were almost nonexistent. Midwives mostly attended the lower class women; the physicians, the upper classes. Although midwives had lower literacy rates, they continued to have a much lower infant and maternal mortality rate than physicians. These striking differences were rationalized away by the belief that upper-class women were much more delicate and sensitive than their lower-class counterparts.

Maternal mortality remained high during this time, largely due to puerperal fever (also called childbed fever). Although puerperal fever was rampant in hospitals, very little was understood about the disease. While obstetricians developed better forceps, instruments, and intervention tools, they wasted precious years by virtually ignoring the vast loss of life due to the fever.



In 1855, Oliver Wendel Holmes published a paper on the contagious nature of puerperal fever, suggesting that the doctors themselves carried the contagion from one patient to another. Holmes was severely ridiculed by the existing medical community. Finally in 1861, Ignaz Phillip Semmelweis published the classic study on the concept, cause, and prophylaxis of puerperal fever which clearly showed the source and transmission of the disease.

Semmelweis made an important discovery while working in a Viennese hospital which housed two clinics for maternity patients. In the first clinic, women were delivered by doctors and medical students; in the second clinic, midwives performed the deliveries. The death rate was substantially higher in the first clinic. Doctors would frequently go directly from performing an autopsy to delivering a baby without washing their hands or changing their clothes. Similarly, they might go from examining an infected mother to a healthy one. Semmelweis spent years studying the various techniques of midwives, trying to locate the cause of puerperal fever. It was not until a pathology assistant nicked his finger while performing an autopsy on a victim of the fever and died after exhibiting fever symptoms, that the cause and method of the transmission of puerperal fever were finally found. Semmelweis subsequently required all physicians and medical students to wash their hands in a chloride of lime solution after attending autopsies and before delivering or examining women. In seven months, the mortality rate in the first clinic was reduced from 12% to less than 3%. Even with such convincing proof, Semmelweis was ostracized by the medical community and ultimately forced out of Vienna. He died in 1865, his life's work unrecognized. Soon after his death, the work of Pasteur and Lister vindicated Semmelweis's conclusions, and asepsis or sterile technique became an accepted practice in hospitals.



Ignaz Phillip Semmelweis  
(1818-1865)

As the maternal mortality rates dropped, more women began to opt for hospital births. Independent midwives in both Europe and America practiced in hospitals, using doctors only as backup in emergencies. Midwifery schools flourished, and the trained midwife began to achieve professional recognition in Europe and Great Britain.



Queen Victoria

The introduction of anesthesia into obstetrics was heralded as a great achievement by some as a way for women to finally get free from the pain of childbirth. It also met an initial storm of controversy by religious leaders who felt the pain of childbirth was God's punishment on Eve and that it was a sin to do anything to alleviate it. However, when Queen Victoria opted for anesthesia during her delivery, it quickly became accepted, even fashionable, to go to doctors and hospitals to receive the latest anesthesia.

In 1902 in England, the first Midwives' Act was passed. It created a licensing board and standards for professional midwives. Many babies before that time were delivered by "handywomen," who not only delivered babies but also washed and scrubbed the house before the birth, helped with the sick, and the laying out of the dead. With the passage of this act, there was now a mechanism by which very experienced midwives could be recognized and get licensed.

This was a time of tension between the traditional birth attendant, the "handywoman," and the new professional midwife, much like the modern problems between lay midwives and Certified Nurse Midwives today. During this period of time in England, professional midwives



often called themselves nurses to distinguish themselves from the handywomen or traditional midwives who were not licensed. However, midwifery in England has always been independent from nursing, keeping a long tradition of direct entry professional midwifery alive. By the turn of the century, more women went to doctors and hospitals. In 1918 the Maternity Center Association was founded in New York and was staffed by public health nurses and physicians who wished to lower maternal and infant mortality. In the 1930's it was instrumental in creating the nurse-midwifery model in which physicians closely supervised midwives.

*An English "handywoman" and a professional midwife  
photo from The Midwife's Tale, by Leap & Hunter*

In America, the medical associations began to amass a power base. As more and more doctors entered obstetrics, they perceived midwives as a threat to their income. As a result, midwifery schools were closed and hospital births, previously reserved only for the upper classes, began to gain broader acceptance. Midwives still performed large numbers of rural home births, and immigrants in the large cities frequently employed immigrant midwives who continued to care for their communities.

Since many of these midwives were illiterate (not uncommon in that era), they had little knowledge of asepsis or anatomy and physiology. This, combined with the fact that the majority of their clients were poor women living under harsh conditions, resulted in high infant and maternal mortality rates. Obstetricians, by and large, decried the "midwife problem," working actively to eliminate midwives through school closures and legislation. Public perception of modern doctors being safe and midwives being old-fashioned and dangerous contributed to increasing numbers of women delivering in hospitals with doctors.

The practice of midwifery became almost exclusively associated with care of the very poor, very rural, foreign-born, or the nonwhite. In 1915, 40% of all US births were attended by midwives. However, by 1935, that number had decreased to 10.7%, of whom 54% were nonwhite.

In the rural south, the traditional care providers for most black women were midwives, often called granny midwives. Granny midwives trained through apprenticeship. In addition to delivering babies, they often were community health care providers dispensing herbs, health care advice, and helping with the sick and the dying. Many granny midwives of the time had low literacy skills, although they were usually experienced and very competent.

In many areas of the US, health departments made efforts to educate and train already practicing granny midwives in the advancing knowledge of obstetrics. By the 1930's, however, pressure from medical lobbies had virtually outlawed midwifery in most states. The exception was in the rural south, where midwives were often the only care available to blacks. Hospitals were often whites only, and doctors who served the black population were rare.



*Onnie Lee Logan (1910-1995)  
Author of MotherWit*

In 1936 Mary Breckenridge, after researching different models, opened the Frontier Nursing Service in Hyden, Kentucky, a school for the training of nurse-midwives. She created a model of training inspired by the British professional midwife. Her clinic treated the poor in the hills of Appalachia, often traveling by horseback. After their service opened, the infant and maternal mortality rates dropped dramatically for the rural population it served. Mary Breckenridge was the central figure in the creation of the profession of Nurse Midwives. To this day, the Frontier Nursing Service offers public health service and innovative midwifery training for nurses.

By the 1940's, even fewer babies were born at home; independent midwives had all but ceased to exist, except in very rural areas, mainly in the South. Hospitals were considered the only safe place to give birth, and midwives were considered a relic of the past. The medical community condemned home birth, based on a few studies which showed that the practice resulted in high infant mortality rates. Omitted from these studies of mortality rates were the effects of poverty, poor nutrition, and harsh living conditions, as well as the fact that, with few midwifery training programs left, many of the granny midwives had little or no access to education, training, or equipment.

In the 1950s, the Health Department in Florida recruited and trained midwives to serve in rural communities when there was no other care available to poor families. One special midwife who trained in this program was Gladys Milton, a midwife who practiced for 35 years in the tiny community of Flowersview, Florida. She delivered thousands of babies and



Gladys Milton (1929-1999)

was well respected in her community. A book written about her life, *Why Not Me* by Wendy Bovard & Gladys Milton, describes her life and her struggles to continue to practice midwifery.

The worst abuses in the US childbearing system took place during the 1940's and 1950's when most women were drugged or given forms of anesthesia of questionable safety. Because they were either unconscious or numb from the waist down, women were unable to push their babies out in a natural manner. Forceps were often used, frequently with disastrous results. In addition, women were separated from their partners and families, shaven, given enemas,



Infant Nursery in the 1940s, babies were routinely separated from their mothers.



Mary Breckenridge (1881-1965)

strapped to tables, and given huge, and completely unnecessary, episiotomies. As soon as the baby was born, it was immediately separated from its mother. Frequently, the mother was so drugged that she did not even know she had given birth. Sometimes, she was not permitted to see her baby for three or four days. She was discouraged from breastfeeding and allowed very little contact with her baby for the week to ten days that she was in the hospital.

Cold, impersonal staff enforced policies and routines that revolved around the doctor's and hospital's convenience, rather than the comfort and safety of mother and child.

The 1960's saw the beginning of a return to more natural methods of childbirth. Early pioneers in the field, such as obstetricians Fernand Lamaze and Grantly Dick-Read, suggested that anesthesia was not necessary, and even detrimental. The idea that women could give birth without drugs or anesthesia grew. Parents began questioning hospital procedures; eventually hospitals and doctors began to give reasonable and responsible answers to those questions. Fathers become more involved in births, although the majority of hospitals would not allow fathers into delivery rooms until the mid 1970's.

The home birth movement developed in the late sixties and early seventies, as more people began to seek alternatives to the medical model of childbirth. Many women started delivering their own babies at home, aided by just a few books, or perhaps a friend who had a baby. By the early 1970's, midwives had begun to re-emerge, filling a need for couples who were committed to home birth. Many of these new midwives had begun their practice by having their own babies at home, attending friends' births, and reading and learning as best they could.

During this time nurse-midwives gained greater acceptance and worked as employees of hospitals and public health clinics. Physicians were just beginning to hire nurse-midwives in their practices. However, almost all home births were attended by the self-taught, "lay" midwife. There were very few midwifery books, classes, and even fewer midwifery schools. Apprenticeship became the only way to get midwifery training outside of nursing school.

Several books were published in the seventies that made an impact in the midwifery movement. *Spiritual Midwifery* by Ina May Gaskin is probably one of the most significant. In addition to stories of births, it gave instructions to midwives and remains a cornerstone of the American home birth movement. The "Gaskin Maneuver," for the treatment of shoulder dystocia, is the first obstetric maneuver named for a midwife. Considered the mother of modern midwifery in the US, Ina May Gaskin continues to be a leader in midwifery.

Other books were published that inspired families to challenge the medical system, to choose home birth, and to become midwives. *Immaculate Deception* by Suzanne Arms exposed some of the abuses in the childbearing system of the time. *The Birth Book* by Raven Lang was one of the first books which showed how a group of self-taught midwives



Ina May Gaskin (r) and Daphne Singingtree (l) delivered babies at home. March 1998 at MEAC/MANA/NARM joint meeting



"Midwives Old & New" depicts a '70's era midwife going to a birth with her 19th century counterpart in her shadow.

Consumer demand began to create changes in hospital procedures and policies. Women had much better experiences with midwives, and as a result, more nurse-midwives began working in hospitals and birth centers. In most states nurse-midwives are required to work under the supervision of an MD. The amount of control physicians have over nurse-midwifery practice varies. As nurse-midwives have grown both in number and in political power, they have sought more independence, gaining the right to third-party billing, prescription writing, and independent hospital admitting privileges.

Direct-entry midwives are also beginning to organize politically, but not without controversy, even among themselves. In situations where there are fetal or maternal deaths, hospital transports with inadequately trained midwives reflect badly on home birth in general and midwives in particular. Consequently, there is fierce opposition to legalization of direct-entry midwives in some areas. Responsible direct-entry midwives, however, are creating guidelines and standards of safe practice, training, education, and experience. Some are working on promoting legislation to enact these requirements into law.

Direct-entry midwives created their own certification process through their state organizations and through MANA. This establishes guidelines and requirements to protect consumers, while still allowing the self-taught midwife to practice. This is a viable alternative to restrictive laws which tend to favor the heavily financed medical lobbies.

Historically, however, mandatory licensure or certification in any medical field creates an elitist system in which only those who are able to afford the training and devote years to the system are able to become licensed. Under a system of mandatory licensure, the power and knowledge of midwifery would once again be concentrated in the hands of an elite few. This would force midwives who are denied entry into the system into substandard education and training opportunities. This is particularly true of some CNM programs, which require a master's degree in order to practice midwifery. A certification process which offers midwives an apprenticeship component and recognizes alternative methods of training may achieve the best compromise. This process would protect consumers by providing safety standards for midwives, while still allowing the public freedom of choice in practitioners.

#### LICENSING EXERCISE

1. In what ways do consumers benefit from programs or legislations that licenses and/or regulation midwives?
2. In what ways do midwives themselves benefit from licensing and/or regulations?
3. What potential problems may emerge when licensing and/or regulations is required?



## HISTORY EXERCISE

1. Give examples of ways midwives of today are similar to their historical predecessors.
2. Give examples of ways midwives of today are different from their historical predecessors.
3. How did the birthing mother's role changed in birth when men have become the primary birth attendants?
4. List components of the Midwifery and Medical Models of Care:

Midwifery Model	Medical Model

## HISTORY EXERCISE

*List Three:*

Individuals who have made a significant contribution to maternal/child health prior to the 18<sup>th</sup> century.

Individuals who have made a significant contribution to maternal/child health in the 19<sup>th</sup> century.

Individuals who have made a significant contribution to maternal/child health in the 20<sup>th</sup> and 21<sup>st</sup> century.

## CURRENT TRENDS IN MIDWIFERY

In the last twenty-five years there has been one overriding factor which has changed the way that obstetric care has been provided. It is not new technology or advances in perinatal care, nor the growing awareness of family-centered births, although these factors have had an impact. The biggest change has been brought about by the effects of malpractice lawsuits. Medical protocols and policies are now determined by health insurance companies, not health care practitioners. Obstetric decisions and protocols are often made by factoring in the threat of a lawsuit. In many states, laws are being passed to put caps on the multimillion dollar awards that are given to victims of malpractice, but this has done very little to change the climate of fear.

The high cost of insurance has caused many family practice physicians as well as obstetricians to quit doing births, and those who remain are less open to providing backup services for midwives. Many are concerned about liability, and few want to take any chances. Many practice “defensive medicine,” keeping the possibility of a lawsuit in mind.

Like doctors, midwives have to deal with the issue of malpractice. Very few insurance companies will write policies for direct entry midwives. Midwives usually rely upon an open and honest relationship with clients as well as informed consent documents. This is a written agreement which outlines the midwives` training and certification, and the possible risks of home births. While some informed consent agreements are very specific and detailed, they can be very general. Some states require specific information in them. While these documents will reduce the possibility of lawsuits, parents can never sign away their (or their children’s) right to sue.

Malpractice is determined by what is considered the standard of care in any given community. If, for example, it is standard practice to order a non-stress test on every woman at forty weeks, you will have opened yourself up to charges of malpractice if you don’t order one and later encounter problems with meconium aspiration or postmaturity. Midwives have to conform to the same standard of care as physicians (although direct entry midwives have greater flexibility since they don’t have to worry about losing their insurance, or worry that their premiums may go up). Unfortunately, standards of care are determined more by factors based on the fear of lawsuits than on medical evidence. A myriad of additional tests and procedures are now standard practice in medicine. In order to protect themselves, midwives need to be very careful and thorough in their charting, recognizing that “Risk Management” is a part of professional midwifery.

Most midwives use informed consent documents. These are written explanations of each midwife's training and qualifications, the laws in her state, financial considerations, responsibilities of the parent, and the risks of having a baby outside of a hospital. Some informed consent documents are very detailed, some even prepared by the midwife's attorney. Informed consent documents can never prevent you from being sued; however, they are good protection, in case that happens. Some licensing and certification rules require all midwives to have their birthing families sign specific informed consent documents.

It can be very difficult to balance the standard of care of the medical model with intuition and respect for the natural birth process and parents’ choices. One of the arts of midwifery is creating that balance.

## INFORMED CONSENT EXERCISE

1. What are the components of a good informed consent document?
2. What legal protection, if any do they give you in case of lawsuits?
3. Does any certifying or licensing body require a midwife to have informed consent?
4. In addition to a written informed consent document, what other ways will you inform your pregnant families of possible risks?

## WHAT DO MIDWIVES DO?

Midwives provide prenatal, intrapartum, and postpartum care for normal, healthy women and their babies. Midwives also provide prenatal and parenting education, labor coaching, and postpartum counseling. Some also offer well-baby/well-woman care and contraception services. Good prenatal care screens out high-risk births, which are referred to a physician. Midwives deliver at home, in birth centers, and in hospitals (although in the USA, mostly Certified Nurse-Midwives deliver in hospitals). Some midwives work in public health clinics doing maternal/child health care. Midwives are able to give their clients much more time and personal attention than is usually possible in a busy obstetric practice.

Part of the care that a midwife provides is screening for and preventing complications. Good prenatal care is a cornerstone of normal birth. Educating women on ways to improve their health and eliminate risk factors, such as alcohol and tobacco consumption, are integral parts of prenatal care. During labor, careful observation and non-invasive monitoring techniques are used to spot any potential problems well in advance. An important function of the midwife is the ability to ascertain whether all is progressing smoothly. Postpartum and newborn care are also parts of a midwife's responsibilities. A midwife's training also enables her to respond to many emergency complications. Like other health care professionals, many midwives are continually expanding upon their training and education in order to keep up with medical advances in midwifery and neonatal care.

Depending upon her degree of training and experience, a midwife may carry and use emergency medications, perform an episiotomy, suture, intubate, do fetal monitoring, and use resuscitative measures. Midwives usually do not deliver high-risk births at home (i.e., diabetic mothers, premature babies), and they never perform Cesarean sections.

Midwives can provide a bridge between the technological advances of obstetrics and the sole reliance upon nature. By learning medical technology, a midwife has available the tools of today to use in the small number of emergencies she encounters, while still emphasizing and trusting the natural birth process that works so well most of the time. The role of midwives goes beyond assuring the physical safety of the mother and baby. It involves education and counseling for the mother and her entire family. Parents who are well-educated about childbirth can make informed choices about their birth, experience less fear, and have a more empowering birth experience.

### The Midwives Model of Care

The Midwives Model of Care is based on the fact that pregnancy and birth are normal life processes.

The Midwives Model of Care includes:

- Monitoring the physical, psychological, and social well-being of the mother throughout the childbearing cycle
- Providing the mother with individualized education, counseling, and prenatal care, continuous hands-on assistance during labor and delivery, and postpartum support
- Minimizing technological interventions
- Identifying and referring women who require obstetrical attention

The application of this woman-centered model of care has been proven to reduce the incidence of birth injury, trauma, and cesarean section.

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**MANA CORE COMPETENCIES FOR BASIC MIDWIFERY PRACTICE**

APPROVED BY MANA BOARD, OCTOBER 3, 1994

**I. Guiding Principles of Practice:**

The midwife provides care according to the following principles:

- A. Midwives work in partnership with women and their chosen support community throughout the care-giving relationship.
- B. Midwives respect the dignity, rights, and the ability of the women they serve to act responsibly throughout the care giving relationship.
- C. Midwives work as autonomous practitioners, collaborating with other health and social service providers when necessary
- D. Midwives understand that physical, emotional, psycho-social and spiritual factors synergistically comprise the health of individuals and affect the childbearing process.
- E. Midwives understand that female physiology and childbearing are normal processes, and work to optimize the well-being of mothers and their developing babies as the foundation of care giving.
- F. Midwives understand that the childbearing experience is primarily a personal, social and community event.
- G. Midwives recognize that a woman is the only direct care provider for herself and her unborn baby; thus the most important determinant of a healthy pregnancy is the mother herself.
- H. Midwives recognize the empowerment inherent in the childbearing experience and strive to support women to make informed decisions and take responsibility for their own well-being.
- I. Midwives strive to ensure vaginal birth and provide guidance and support when appropriate to facilitate the spontaneous processes of pregnancy, labor, and birth, utilizing medical intervention only as necessary.
- J. Midwives synthesize clinical observations, theoretical knowledge, intuitive assessment and spiritual awareness as components of a competent decision-making process.
- K. Midwives value continuity of care throughout the childbearing cycle and strive to maintain continuous care within realistic limits.
- L. Midwives understand that the parameters of “normal” vary widely and recognize that each pregnancy and birth are unique.

**II. General Knowledge and Skills:**

The midwife provides care incorporating certain concepts, skills, and knowledge from a variety of health and social sciences, including, but not limited to:

- A. Communication, counseling, and teaching skills.
- B. Human anatomy and physiology relevant to childbearing.
- C. Community standards of care for women and their developing infants during the childbearing cycle, including midwifery and bio-technical medical standards and the rationale for and limitations of such standards.
- D. Health and social resources in her community.
- E. Significance of and methods for documentation of care through the childbearing cycle.
- F. Informed decision-making.
- G. The principles and appropriate application of clean and aseptic technique and universal precautions.

- H. Human sexuality, including indication of common problems and indications for counseling.
- I. Ethical considerations relevant to reproductive health.
- J. The grieving process.
- K. Knowledge of cultural variations.
- L. Knowledge of common medical terms.
- M. The ability to develop, implement and evaluate an individualized plan for midwifery care.
- N. Woman-centered care, including the relationship between the mother, infant, and their larger support community.
- O. Knowledge and application of various health care modalities as they apply to the childbearing cycle.

### III. Care During Pregnancy:

The midwife provides health care, support, and information to women throughout pregnancy. She determines the need for consultation or referral as appropriate. The midwife uses a foundation of knowledge and/or skill which includes the following:

- A. Identification, evaluation, and support of maternal and fetal well-being throughout the process of pregnancy.
- B. Education and counseling for the childbearing cycle.
- C. Preexisting conditions in a woman's health history which are likely to influence her well-being when she becomes pregnant.
- D. Nutritional requirements of pregnant women and methods of nutritional assessment and counseling.
- E. Changes in emotional, psycho-social and sexual variations that may occur during pregnancy.
- F. Environmental and occupational hazards for pregnant women.
- G. Methods of diagnosing pregnancy.
- H. Basic understanding of genetic factors which may indicate the need for counseling, testing, or referral.
- I. Basic understanding of the growth and development of the unborn baby.
- J. Indications for, risks, and benefits of bio-technical screening methods and diagnostic tests used during pregnancy.
- K. Anatomy, physiology, and evaluation of the soft and bony structures of the pelvis.
- L. Palpation skills for evaluation of the fetus and uterus.
- M. The causes, assessment and treatment of the common discomforts of pregnancy.
- N. Identification of, implications of, and appropriate treatment for various infections, disease conditions and other problems which may affect pregnancy.
- O. Special needs of the Rh- woman.

### IV. Care During Labor, Birth, and Immediately Thereafter:

The midwife provides health care, support, and information to women throughout labor, birth, and the hours immediately thereafter. She determines the need for consultation or referral as appropriate. The midwife uses a foundation of knowledge and/or skill which includes the following:

- A. The normal process of labor and birth.
- B. Parameters and methods for evaluating maternal and fetal well-being during labor, birth, and immediately thereafter, including relevant historical data.

- C. Assessment of the birthing environment, assuring that it is clean, safe and supportive, and that appropriate equipment and supplies are on hand.
- D. Emotional responses and their impact during labor, birth, and immediately thereafter.
- E. Comfort and support measures during labor, birth, and immediately thereafter.
- F. Fetal and maternal anatomy and their interactions as relevant to assessing fetal position and the progress of labor.
- G. Techniques to assist and support the spontaneous vaginal birth of the baby and placenta.
- H. Fluid and nutritional requirements during labor, birth, and immediately thereafter.
- I. Assessment of and support for maternal rest and sleep as appropriate during the process of labor, birth, and immediately thereafter.
- J. Causes of, evaluation of, and appropriate treatment for variations which occur during the course of labor, birth, and immediately thereafter.
- K. Emergency measures and transport for critical problems arising during labor, birth, or immediately thereafter.
- L. Understanding of and appropriate support for the newborn's transition during the first minutes and hours following birth.
- M. Familiarity with current bio-technical interventions and technologies which may be commonly used in a medical setting.
- N. Evaluation and care of the perineum and surrounding tissues.

#### V. Postpartum Care:

The midwife provides health care, support, and information to women throughout the postpartum period. She determines the need for consultation or referral as appropriate. The midwife uses a foundation of knowledge and/or skill which includes but is not limited to the following:

- A. Anatomy and physiology of the mother during the postpartum period.
- B. Lactation support and appropriate breast care including evaluation of, identification of, and treatments for problems with nursing.
- C. Parameters and methods for evaluating and promoting maternal well-being during the postpartum period.
- D. Causes of, evaluation of, and treatment for maternal discomforts during the postpartum period.
- E. Emotional, psycho-social, and sexual variations during the postpartum period.
- F. Maternal nutritional requirements during the postpartum period including methods of nutritional evaluation and counseling.
- G. Causes of, evaluation of, and treatments for problems arising during the postpartum period.
- H. Support, information, and referral for family planning methods as the individual woman desires.

#### VI. Newborn Care:

The entry-level midwife provides health care to the newborn during the postpartum period and support and information to parents regarding newborn care. She determines the need for consultation or referral as appropriate. The midwife uses a foundation of knowledge and/or skill which includes the following:



- A. Anatomy, physiology, and support of the newborn's adjustment during the first days and weeks of life.
- B. Parameters and methods for evaluating newborn wellness including relevant historical data and gestational age.
- C. Nutritional needs of the newborn.
- D. Community standards and state laws regarding indications for, administration of, and the risks and benefits of prophylactic bio-technical treatments and screening tests commonly used during the neonatal period.
- E. Causes of, assessment of, appropriate treatment, and emergency measures for neonatal problems and abnormalities.

### VII. Professional, Legal and Other Aspects:

The entry-level midwife assumes responsibility for practicing in accord with the principles outlined in this document. The midwife uses a foundation of knowledge and/or skill which includes the following:

- A. MANA's documents concerning the art and practice of Midwifery.
- B. The purpose and goal of MANA and local (state or provincial) midwifery associations.
- C. The principles of data collection as relevant to midwifery practice.
- D. Laws governing the practice of midwifery in her local jurisdiction.
- E. Various sites, styles, and modes of practice within the larger midwifery community.
- F. A basic understanding of maternal/child health care delivery systems in her local jurisdiction.
- G. Awareness of the need for midwives to share their knowledge and experience.

### VIII. Woman Care & Family Planning:

Depending upon education and training, the entry-level midwife may provide family planning and well-woman care. The practicing midwife may also choose to meet the following core competencies with additional training. In either case, the midwife provides care, support, and information to women regarding their overall reproductive health, using a foundation of knowledge and/or skill which includes the following:

- A. Understanding of the normal life cycle of women.
- B. Evaluation of the woman's well-being including relevant historical data.
- C. Causes of, evaluation of, and treatments for problems associated with the female reproductive system and breasts.
- D. Information on, provision of, or referral for various methods on contraception.
- E. Issues involved in decision-making regarding unwanted pregnancies and resources for counseling.



## MIDWIFERY IN THE UNITED STATES

### ACNM--MANA--NARM

The **American College of Nurse Midwives** (ACNM) is the professional association for both Nurse Midwives and those direct entry midwives who attend programs recognized by the ACM Division of Accreditation.

Certified Nurse Midwives can practice legally anywhere in the U.S. Each state has a licensing board to govern nurse midwives. CNM's must work with a MD, and there is some variation from state to state concerning how much direct physician supervision is required.

The **Midwives' Alliance of North America** (MANA) is a national organization which consists of all types of midwives. Their goals are: to expand communication and support among North American midwives; to form an identifiable and cohesive organization representing the profession of midwifery on a regional, national, and international basis; to promote guidelines for the education of midwives, and to assist in the development of midwifery education programs; to promote research in the field of midwifery as a quality health care option; to promote and support a woman's right to choose her care provider and place of birth; and to promote public education and midwifery advocacy.

The **North American Registry of Midwifery** (NARM) offers a credentialing and certification process to become a Certified Professional Midwife (CPM). A Certified Professional Midwife (CPM) is an independent practitioner who has met the standards for certification set by NARM. The NARM certification process recognizes multiple routes of entry into midwifery and includes verification of knowledge and skills and the successful completion of both a Written Examination and Skills Assessment. The CPM credential requires training in out-of-hospital settings.

## OPTIONS IN BECOMING A MIDWIFE

There are several methods of becoming a midwife. The route you choose may depend upon many factors: the location in which you wish to practice, your finances, family, time commitments, or willingness to relocate. A careful study of the pros and cons of each method will help in choosing the path that is best for you. Examining your heart and searching out your motives for wanting to become a midwife are important parts of this process. If you are looking for a career that will enable you to support your family, nurse-midwifery is your best bet at this time. If, on the other hand, you believe in home birth and want to practice without a lot of medical technology or years of hospital training, you would do well to look into direct entry training routes.

*Currently, options in the US to become a midwife are:*

1. **Direct-Entry Midwife** – DEM – (also called Lay Midwife; some midwives are uncomfortable with the term “lay,” as it refers to untrained midwives.) While in the past DEMs were usually trained by apprenticeship, self-study, and practical experience, today many attend private midwifery schools. They practice in home or birth center settings, although in some states, Licensed Midwives do have hospital privileges. Although this is a non-nurse entry route for midwifery, nurses are not excluded. In the United States, direct-entry midwifery is legally recognized in the majority of states. In some states, however, direct-entry midwifery is considered practicing medicine without a license and is prosecuted as a felony.

2. **Licensed Midwife – LM – (LDM or LDEM)** A direct-entry midwife who is licensed by her state. Some states require graduation from an accredited school. She must show that she meets or exceeds the minimum requirements for the practice of midwifery by documenting experience and passing written exams. In 1998, licensure, certification, or registration became available in seventeen states, and Medicaid reimbursement became available in six states. Many insurance companies reimburse licensed or certified midwives for birth center and home births. Licensed Midwives generally do not have hospital or prescriptive privileges, but can legally use some medications.
3. **Certified Professional Midwife – CPM** – A Certified Professional Midwife (CPM) is an independent practitioner who has met the standards for certification set by the North American Registry of Midwives (NARM) and is qualified to provide the Midwives Model of Care. The NARM certification process recognizes multiple routes of entry into midwifery and includes verification of knowledge and skills and the successful completion of both a written examination and a skills assessment. The CPM credential requires training in out-of-hospital settings.
4. **Certified Nurse Midwife – CNM** – A Registered Nurse who has completed an approved program of study accredited by the American College of Nurse Midwives (ACNM). CNMs are trained in both nursing and midwifery. Programs are either a one-year Certificate Program or a two-year Master's Program. Some states are requiring a Master's Degree for a CNM to practice. Many CNM programs are now requiring RNs to have a BSN or Bachelor of Science degree in order to be admitted. In some states CNMs are also required to be nurse practitioners. It takes three to six years to become a CNM. CNMs are required to work with physicians. Some are employees and others are able to work independently in a collaborative or co-management relationship with a physician. If a midwife is able to find a supportive physician, she may work in a birth center or in a home birth practice.
5. **Certified Midwife – CM** – A direct-entry midwife who has completed a program accredited by the American College of Nurse-Midwives. Currently there are few programs and a small number graduates. CMs have the same rights and privileges as CNMs. Prior to the ACNM using the term CM, some state midwifery organizations used CM for their certification process for direct-entry midwives.

## BECOMING A CNM

There are many advantages to becoming a CNM, and for those who are able to go this route, it is an excellent choice. A CNM can practice legally almost anywhere, provided she can find an M.D. to back her up. She can accept insurance and third-party payments, earning much more money than other types of midwives. She can legally obtain and use medication and medical equipment. She can work in hospitals or birth centers as well as attend home births, *if* she can find a doctor willing to back her up. She also receives excellent medical and obstetrical training, enabling her to provide a high degree of quality care to her clients. The primary drawbacks are the expense and time commitment the training requires and the necessity of having to work under a medical doctor. Because of the latter requirement, many CNMs are unable to do home births.

A CNM must first become a registered nurse (R.N.). This may require four years of training or more, as many midwifery schools require a bachelor's degree in nursing as a prerequisite.

In addition, some schools now require two or more years' experience as a nurse.

Nursing school is very expensive and time consuming, making it difficult for mothers with small children to attend. However, loans and grants for tuition are available. Some nursing programs are very difficult to get into; they have long waiting lists or lottery systems. To become a CNM, you need to feel comfortable working in hospitals and within the current medical system.

One aspect of being a CNM is the opportunity to train or work in culturally diverse, inner city, and high-volume practices. Here you will encounter a broader range of problems (drugs, HIV, poor nutrition, etc.) than you would with a typical home birth practice.

*Should you decide to become a CNM, from which to choose:*

1. You can become an RN at your local community college, then apply to one of the CNM programs across the country. Some programs will accept graduates from certification programs, while others require a bachelor's or master's degree.
2. Some schools integrate a nursing degree into their CNM program, allowing non-nurses to get their R.N. in the process of getting their CNM degree.
3. Some local community colleges and medical schools have Physician's Assistant (PA) programs. As a PA, you can take an enrichment program that will allow you to practice as a Certified Midwife.

There are distance education programs for nurse-midwives that will make it easier for mothers and those unable to relocate to become CNM's. One such model, developed by Frontier Nursing Service, allows you to become a CNM through independent study, apprenticeship with a local CNM; Internet study, and only several weeks (and several weekends) in Kentucky.

## BECOMING A CPM

To become a CPM, students need either to graduate from a program accredited by the Midwifery Education and Accreditation Council (MEAC), or to go through the Portfolio Evaluation Process (PEP), which documents and validates alternative educational methods such as the apprenticeship model.

A Certified Professional Midwife (CPM) is an independent practitioner who has met the standards for certification set by NARM. The NARM certification process recognizes multiple routes of entry into midwifery and includes verification of knowledge and skills and the successful completion of both a written examination and a skills assessment. The CPM credential requires training in an out-of-hospital setting.

*For direct-entry midwife to become a CPM, they must:*

1. Pass the NARM educational requirements by being:
  - a graduate of a program accredited by the Midwifery Education Accreditation Council (MEAC);
  - a midwife certified by the ACNM Certification Council (ACC), Inc. as a CNM or as a CM; and
  - candidate who has completed NARM's competency-based portfolio evaluation process called the PEP Program.

2. Document a clinical component of at least one year in duration, and including a minimum of 1350 clinical contact hours under the supervision of one or more preceptors. *This needs to include:*
- Verified attendance at a minimum of 40 births, 20 as an active participant and 20 in the role of Primary Midwife (may be under supervision);
  - A minimum 10 of the 20 births attended as Primary in out-of-hospital settings;
  - Attend a minimum of 3 of the 20 births as Primary under supervision must be with women for whom the applicant has provided primary care during at least 4 prenatal visits, birth, newborn exam, and 1 postpartum exam;
  - Attend a minimum of 75 prenatal exams, including 20 initial exams; 20 newborn exams, and 40 postpartum exams.

## BECOMING A LICENSED MIDWIFE

The benefits and drawbacks of licensing vary from state to state. Licensing is a state-regulated process that has the advantage of legal protection, third party reimbursement, and accountability for consumers. This route also allows midwives the flexibility of training, while assuring that the birth family receives quality care. Another primary advantage is the continued ability to do home births. Most state-licensed midwives can accept third party payments as well as obtain and use emergency medications or procedures. Acceptance by the medical community and backup still varies, but that's improving.

Disadvantages vary, depending on licensing laws. For example, some states have very restrictive and complex laws which dictate how the midwife should practice. Strict protocols, such as not being able to do VBAC's or use herbs, are two examples of such restrictive laws.

Many states now have voluntary certification programs, while others register midwives through the health department. While neither certification nor registration has the same advantages as licensing, it can be a viable option for many. As licensing looks to be the future trend, let's hope that we can preserve the ideals of the apprenticeship model, maintain high standards of academic training, and still keep the individual freedom of choice in childbirth options.

## BECOMING A DIRECT ENTRY MIDWIFE

One advantage of being a direct-entry midwife (DEM) is that, for those who are dedicated to homebirth, it offers the most freedom of practice. Because the direct entry midwife is not required to work under a medical doctor, she is free to use alternative and/or holistic methods such as herbal therapy or massage in her practice. It is easier to practice under the guidelines you set for yourself as opposed to guidelines set by a medical model unresponsive to women's individuality or feelings. Other advantages are not having to spend two or three years becoming a nurse, working in hospitals, studying subjects unrelated to birth, and working in a medical system with which one disagrees. Direct-entry midwifery is an accessible route for women who do not wish to or are unable to become a CNM due to finances, inability to relocate, or other reasons.

The training period can be shorter – an average of two or three years as opposed to four or five. While apprenticeship, in which you are paired one-on-one with an experienced midwife, used to be the most common method of training, today schools, correspondence courses, and distance training programs – all of which give students the academic preparation for apprenticeship – are also becoming more popular. Some schools now offer birth or clinical experience as well.

There are drawbacks to this route. The legal status of a direct-entry midwife varies from state to state and is subject to change. It can be difficult to obtain medical backup and acceptance within the medical community. It may also be illegal to obtain or use emergency medications or procedures. Financially, there are real disadvantages. Most DEMs are self-employed, and it can be hard to earn a living as one because it is difficult to accept all third-party payments.

Many direct-entry midwives choose to become Certified Professional Midwives, a national credential offered by the North American Registry of Midwives. This credential is rapidly becoming recognized by many states and private insurers, making direct-entry midwifery a viable career option for many women.

## APPRENTICESHIP

The age-old method of learning midwifery is through apprenticeship with a more experienced practitioner. This provides the student with a wealth of practical knowledge while enabling her to learn by helping at births. Birth is such a unique event, with each birth so different from the last, that it is impossible to learn midwifery solely from classes, books, and films. The apprenticeship model of training is incorporated into many direct-entry midwifery schools to provide the practical experience needed to accompany the theoretical knowledge learned from books or classes. For those women who do not attend an established midwifery school, apprenticeship is incorporated into a path of self-directed learning.

Finding an apprenticeship position is not always easy. If there are no midwives in your area, you can sometimes apprentice with MD's, chiropractors, or naturopaths who do home births or birth center births. If you volunteer your services, and are responsible, knowledgeable and competent, there are many opportunities available. One advantage of attending a more formal school is they incorporate clinical training as part of their curriculum.

If you are unable to find someone willing to take you on as an apprentice, there are other ways to gain that much needed experience. Attending births in whatever capacity you can will give you valuable experience. Offer your services to take pictures, help labor coach, or do child care at any home or hospital births you can. There are La Leche League groups throughout the country; attending their meetings will connect you with pregnant women. By volunteering at a local teen parent program you may find young, single mothers who need a coach for their births. Become a childbirth educator; this is an excellent way to build on your experience and training.

Many apprentices find that they can solve two problems at once by starting their own Doula Service. A doula (Greek for "servant or slave") has come to mean someone who helps women before and after their births with help and support. Birth Doulas help during labor and delivery and postpartum doulas provide support, housecleaning, cooking, and child care. As a postpartum doula, you can earn money for living expenses while gaining experience with new mothers. While washing someone's dishes and doing their laundry might not be what you had in mind when you decided to be a midwife, learning humility and patience is key to becoming a truly good midwife.

As an apprentice, you may be on call twenty-four hours a day for weeks at a time. This carries the same commitment and degree of responsibility as if you were the primary midwife. Part of the responsibility of being on call is abstention from any drugs (including alcohol) that may affect your judgment. You must have a reliable car which always has a full tank of gas. If you have children, you will need twenty-four-hour child care available, even when your children are sick. You must carry a cell/pager and be available twenty-four hours a day.

An apprentice will need an independent source of income as most apprentices are not paid

or are paid very little. It is very difficult to work another job while apprenticing or practicing midwifery unless you have a work situation which has extremely flexible hours. While a busy practice is stressful, you learn much more and can complete your training faster.

In apprenticeship, as well as midwifery in general, you must be willing to serve unconditionally and be willing to perform humble and sometimes disagreeable tasks. If the sight or smell of blood, urine, feces, or vomit makes you feel faint, perhaps you should consider another path.

During apprenticeship be prepared to come early to births and labor-sit when not much is going on. Also be prepared to stay late and do postpartum care. Helping to clean, pack, and sterilize equipment is a usual part of an apprentice's duties. Apprentices and midwives need to remain calm in crisis situations as well as maintain composure in high stress and demanding situations, acting in a professional and competent manner.

In spite of the trials and difficulties of apprenticeship, for most the rewards of being present at births compensate for any hardships. Every birth is a learning experience.

## **RESPONSIBILITIES OF MIDWIFERY STUDENTS IN CLINICAL PLACEMENTS**

1. Treat clients, staff, and midwives with courtesy and respect, including medical professionals
2. Be punctual; call if lateness is unavoidable.
3. Be accessible during on-call times; keep pagers/cell phones charged and with you at all times.
4. Do not use substances that could impair judgment.
5. Keep agreements about fees, required work, time commitments and other responsibilities.
6. Behave in a professional manner, including dress, hygiene, and language.
7. Report sickness and absence immediately, and give advance notice for planned leaves.
8. Provide and track all documentation relating to the clinical placement.
9. Provide specific learning objectives or skills to learn during clinical placement.
10. Complete course work or research projects as assigned.
11. Follow recommendations given by preceptors.
12. Recognize preceptors' knowledge and wisdom, even if it differs from what you were taught.
13. Be clear about clinical experience and limitations and do not accept a position of more responsibility than is appropriate for your skill level.



## INTERNATIONAL DEFINITION OF A MIDWIFE

A midwife is a person who, having been regularly admitted to a midwifery educational programme, duly recognised in the country in which it is located, has successfully completed the prescribed course of studies in midwifery and has acquired the requisite qualifications to be registered and/or legally licensed to practise midwifery.

The midwife is recognised as a responsible and accountable professional who works in partnership with women to give the necessary support, care and advice during pregnancy, labour and the postpartum period, to conduct births on the midwife's own responsibility and to provide care for the newborn and the infant. This care includes preventative measures, the promotion of normal birth, the detection of complications in mother and child, the accessing of medical care or other appropriate assistance and the carrying out of emergency measures.

The midwife has an important task in health counselling and education, not only for the woman, but also within the family and the community. This work should involve antenatal education and preparation for parenthood and may extend to women's health, sexual or reproductive health and child care.

A midwife may practise in any setting including the home, community, hospitals, clinics or health units.

Adopted by the International Confederation of Midwives Council meeting, 19th July, 2005, Brisbane, Australia. Supersedes the ICM "Definition of the Midwife", 1972 and its amendments of 1990.

### MANA/ICM Exercise

1. List components that are the same in the MANA Standards and Qualifications and the ICM Definition of a Midwife.
2. What are the fundamental differences in the MANA Standards and Qualifications and the ICM Definition of a Midwife?

## CREDENTIAL EXERCISE

Identify the following credentials and the usual route of entry to practice:

LM \_\_\_\_\_

LDEM \_\_\_\_\_

CNM \_\_\_\_\_

CPM \_\_\_\_\_

CM \_\_\_\_\_

RM \_\_\_\_\_

ND \_\_\_\_\_

RNC \_\_\_\_\_

PA \_\_\_\_\_

FNP \_\_\_\_\_

Define the following organizations, and state the purpose of each:

MANA \_\_\_\_\_

MEAC \_\_\_\_\_

ACNM \_\_\_\_\_

ACOG \_\_\_\_\_

CFM \_\_\_\_\_

ICEA \_\_\_\_\_

NARM \_\_\_\_\_

DONA \_\_\_\_\_

ICM \_\_\_\_\_

WHO \_\_\_\_\_

TRAINING EXERCISE				
<i>Answer questions about your own state or province:</i>				
	<b>CNM</b>	<b>CPM</b>	<b>LM</b>	<b>DEM</b>
Average Training Time				
Approximate Training Cost				
Local Training Available				
Accepts Private Insurance				
Accepts Medicaid				
Hospital Privileges				
Requires Master Degree				
Requires MD Supervision				
Prescription Privileges				
Home Births Allowed				
Independent Practitioner				
Herbs and Alternatives Used				
Approximate Yearly Salary				
Legal in your State or Province				
Health Insurance Benefits				
Practice Restrictions <i>(such as no water births or VBAC)</i>				

Practice Restrictions  
*(such as no water births or VBAC)*

## MIDWIFERY STUDENT BILL OF RIGHTS

### MIDWIFERY STUDENTS HAVE THE RIGHT TO:

1. Be free from discrimination on the basis of sex, race, color, religion, national origin, ancestry, age, marital status, sexual orientation, or disability.
2. Receive high-quality training in an environment committed to their mentoring and education, which will prepare them to become competent, compassionate, and ethical midwives.
3. Have participation in the content of their education, both academic and clinical.
4. Have representation in the development of administrative policies that concern their education.
5. A clear and complete explanation of policies and procedures regarding admissions, grading, graduation requirements, time commitments, grounds for dismissal, grievance policy, transfer options, credits, and educational objectives.
6. A clear and complete explanation and description of both academic and clinical offerings and the approximate time normally required to meet graduation requirements.
7. Receive a clear and accurate account of all financial requirements and a reasonable estimation of the full cost to meet graduation requirements.
8. Have freedom of discussion and learn in an environment where expression of views is encouraged and protected, including the freedom to dissent, disagree or protest.
9. Expect confidential, timely, and fair systems for evaluation/feedback regarding academic and clinical performance and to address grievances without fear of recrimination, dismissal, or retribution.
10. Expect grades would be determined only by academic achievement consistent with the objectives provided. Instructors should make known the factors that will be considered in determining the grade, such as attendance, participation, papers, examinations, projects and/or presentations.
11. Be informed of policies and procedures regarding the confidentiality of their records, including the right to know what personal information is collected about them, why it is being collected, and how they may review their files and correct any errors.
12. If a student feels that her rights have been violated in the process of attempting to resolve a grievance, after following an established grievance procedure, she has the right to submit her grievance to the appropriate governing bodies.

*This was written by Daphne Singingtree in 1999 for MEAC. It may have been adapted and changed since that time for use of specific agencies or programs.*

## MANA STANDARDS AND QUALIFICATIONS

REVISED & APPROVED OCTOBER 2005

The midwife practices in accord with the *MANA Standards and Qualifications for the Art and Practice of Midwifery* and the *MANA Statement of Values and Ethics*, and demonstrates the clinical skills and judgments described in the *MANA Core Competencies for Midwifery Practice*.

1. Skills: Necessary skills of a practicing midwife include the ability to:

- Provide continuity of care to the woman and her newborn during the maternity cycle. Care may continue throughout the woman's entire life cycle. The midwife recognizes that childbearing is a woman's experience and encourages the active involvement of her self-defined family system.
- Identify, assess and provide care during the antepartal, intrapartal, postpartal and newborn periods. She may also provide well woman and newborn care.
- Maintain proficiency in life-saving measures by regular review and practice.
- Deal with emergency situations appropriately.
- Use judgment, skill, and intuition in competent assessment and response.

2. Appropriate equipment and treatment: Midwives carry and maintain equipment to assess and provide care for the well-woman, the mother, the fetus, and the newborn; to maintain clean and/or aseptic technique; and to treat conditions including, but not limited to, hemorrhage, lacerations, and cardio-respiratory distress. This may include the use of non-pharmaceutical agents, pharmaceutical agents, and equipment for suturing and intravenous therapy.

3. Records: Midwives keep accurate records of care for each woman and newborn in their practice. Records shall reflect current standards in midwifery charting, and shall be held confidential (except as legally required). Records shall be provided to the woman on request. The midwife maintains confidentiality in all verbal and written communications regarding women in her care.

4. Data Collection: It is highly recommended that midwives collect data for their practice on a regular basis and that this be done prospectively, following the protocol developed by the MANA Division of Research. Data collected by the midwife shall be used to inform and improve her practice.

5. Compliance: Midwives will inform and assist parents regarding public health requirements of the jurisdiction in which the midwifery service is provided.

6. Medical Consultation, Collaboration, and Referral: All midwives recognize that there are certain conditions for which medical consultations are advisable. The midwife shall make a reasonable attempt to assure that her client has access to consultation, collaboration, and/or referral to a medical care system when indicated.

7. Screening: Midwives respect the woman's right to self-determination. Midwives assess and inform each woman regarding her health and well-being relevant to the appropriateness of midwifery services. It is the right and responsibility of the midwife to refuse or discontinue services in certain circumstances. Appropriate referrals are made in the interest of the mother or baby's well-being or when the required or requested care is outside the midwife's personal scope of practice as described in her practice guidelines.

8. Informed Choice: Each midwife will present accurate information about herself and her services, including but not limited to:
- her education in midwifery
  - her experience level in midwifery
  - her practice guidelines
  - her financial charges for services
  - the services she does and does not provide
  - her expectations of the pregnant woman and the woman's self-defined family system.

The midwife recognizes that the woman is the primary decision maker in all matters regarding her own health care and that of her infant. The midwife respects the woman's right to decline treatments or procedures, and properly documents these choices. The midwife clearly states and documents when a woman's choices fall outside the midwife's practice guidelines.

9. Continuing Education: Midwives will update their knowledge and skills on a regular basis.
10. Peer Review: Midwifery practice includes an on-going process of case review with peers
11. Practice Guidelines: Each midwife will develop practice guidelines for her services that are in agreement with the *MANA Standards and Qualifications for the Art and Practice of Midwifery*, the *MANA Statement of Values and Ethics*, and the *MANA Core Competencies for Midwifery Practice*, in keeping with her level of expertise.
12. Expanded scope of practice: The midwife may expand her scope of practice beyond the MANA Core Competencies to incorporate new procedures that improve care for women and babies consistent with the midwifery model of care. Her practice must reflect knowledge of the new procedure, including risks, benefits, screening criteria, and identification and management of potential complications.

### Exercise - Test yourself

#### True/False

1. \_\_\_\_\_ MANA Guidelines require all midwives to keep records.
2. \_\_\_\_\_ CPMs routinely have hospital privileges in case of emergency.
3. \_\_\_\_\_ MANA Guidelines require all midwives to participate in data collection.
4. \_\_\_\_\_ Midwives traditionally helped "lay out" the dead.
5. \_\_\_\_\_ MANA Core Competencies state all midwives must know lab work
6. \_\_\_\_\_ Most states are requiring Master's Degrees to become a CNM.
7. \_\_\_\_\_ CPMs are recognized as legal all over the US.
8. \_\_\_\_\_ In order to be a CPM you must graduate from a MEAC-accredited school.
9. \_\_\_\_\_ A CM has the same privileges as a CNM.
10. \_\_\_\_\_ To become a Certified Midwife (CM), you must go to nursing school.

Answers: 1-true;2-false;3-true;4-true;5-true;6-true;7-false;9-true;10-false.

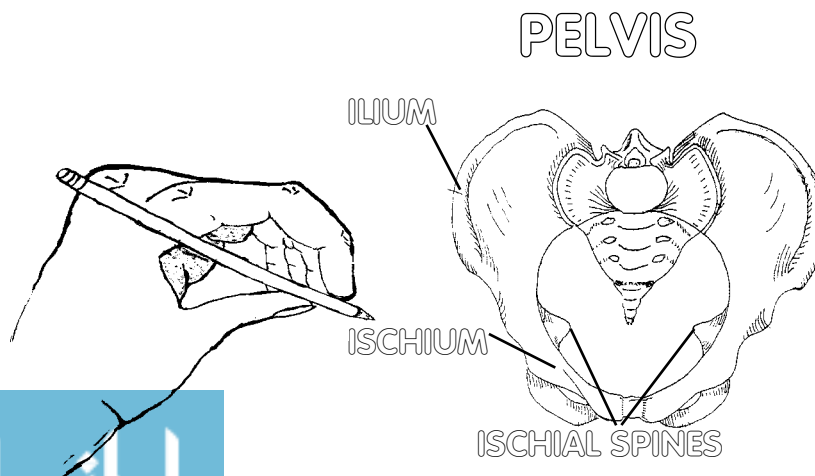
# Chapter 2

## Studying Midwifery

### OBJECTIVES:

*After completing this chapter, the student should be able to:*

1. List reasons why study skills are important in good midwifery care.
2. Plan an appropriate personal study schedule.
3. Illustrate examples of study techniques using each of the seven intelligences described by Howard Gardener.
4. Identify her own learning style.
5. Identify differences in left- and right-brain thinking.
6. Explain time management strategies.
7. Describe how to use study time effectively.
8. Demonstrate a variety of memorization tricks.
9. Give examples of learning methods for visual, auditory, and kinesthetic learners.
10. Define the SQ4R method of studying.
11. Define the 5-P Reading System.
12. Define Pedagogy and Andragogy and differentiate between the two.



## Studying Midwifery

Historically women learned midwifery through apprenticeship, learning from more experienced midwives, from the wise woman traditions handed down from generation to generation. Learning was individualized and woman-centered. Cultural traditions and spiritual practices were integrated into midwifery learning and practice. In many countries, midwives are still trained this way. In the United States, as midwifery reemerged from near extinction, there were few methods of becoming a midwife -- become a nurse, then a Certified Nurse Midwife; learn on your own; or be lucky enough to find someone to train you. If you wanted to do home births, apprenticeship was the only way to learn midwifery. In some parts of the US, this is still true. However, over the last 30 years, midwifery education has changed. There is a wide range of choices and options for midwifery students. They may choose a traditional route of nursing school or an accredited direct-entry program. Those programs have structured learning objectives and specific graduation requirements. They provide a road map that is pretty straightforward to follow. Other students choose to apprentice, self-study, or go to smaller programs to prepare for certification or independent practice. While all midwifery students need to be highly motivated, those who choose the less structured path need to be self-directed, disciplined, and highly organized.

There are many wonderful resources for students of all kinds to improve their study skills. The first step for any midwifery student should be to get a number of text books on midwifery, you can check the book lists provided on the midwifery schools websites to see what they are recommending. While there may be some special skill sets for midwifery students in clinical settings, studying midwifery is the same as any other kind of college-level studying.

In many education programs, academic subjects are studied, learned and too often quickly forgotten. Most people don't use a lot of what they learned in college in their everyday work. Midwifery is different; lives may depend on the knowledge learned. While life or death situations rarely occur, clients do commonly ask questions needing somewhat obscure responses. For example, a client may ask you what week the fetus develops fingers or may want a detailed explanation of a blood test.

Studying does not stop when the student begins her practice; studying is life-long, and continuing education is integral to good midwifery care. Learning the principles of adult education, developing good study habits, and learning good study skills will not only help the student learn midwifery, but she will become a better educator herself. Midwives are teachers. One of our primary jobs is teaching clients, about birth and what to expect, about nutrition, healthy choices, newborn care, and many other areas. The knowledge of basic educational principles is necessary to be an effective teacher. Understanding the various learning styles and ways to utilize them will help midwives to develop more effective client education.

Midwives train other midwives. Few midwives work alone or just with Birth Assistants. Most have apprentices or students in the clinical part of their training. However, being a good midwife does not make you a good teacher; it is a process of learning a new skill like anything else. Your study of educational principles can help you become a better student and a better teacher.

There is a tremendous amount of theories of education about how people learn best. Some of the early work focused on the Bloom's Taxonomy of Intellectual Behavior (1956) which defines the three overlapping learning domains; cognitive, affective and psychomotor. Further research by Howard Gardener (1983) proposed the Theory of Multiple Intelligences using seven styles of learning: Verbal/linguistic, Logical/mathematical, Visual, Kinesthetic, Musical, Interpersonal, and Intrapersonal. A more modern approach focuses on only four types of learners: Visual, Aural (hearing), Read/Write, and Kinesthetic.



The preference of educators all over the world is that students know their learning style and use that to help them study; it can result in improved learning as well as better retention. There is additional focus on the theories of Hemispheric Dominance, research about how the right or left sides of our brains affect learning.

Some midwifery programs are being written to utilize woman-centered learning, which is more empathic and connected. It involves the learner in the process and is less hierarchal. Many of the concepts in woman-centered learning are also present in *constructivism*, the belief that people actively construct new knowledge as they interact with their environment. When people take notes, use learned material practically, restate, or teach, they learn it better.

One method of examining teaching and learning styles is to consider differences in adult and child learning – andragogy and pedagogy. The term Pedagogy (Greek for child learning), has historically been used to apply to all teaching; the term andragogy was introduced to highlight the differences between learning and teaching in adults and children. Pedagogy is teacher-centered – the teacher decides what is taught and how it is taught. The focus is to build a foundation of knowledge that may be useful later. Andragogy, or the adult learning style, is learner-centered. Learners take a much more active role in directing what they need. Midwifery students typically are andragogy learners; they take responsibility for their education, are highly motivated, and are self-directed.

	PEDAGOGY	ANDRAGOGY
Concept of the learner:	Dependent	Self-directed
Focus of learning:	Foundation	Application
Learning orientation:	Knowledge for later	Competency today
Role of teacher:	Director/ Expert	Facilitator/ Resource

## CONSTRUCTIVISM

A constructivist (Bruner, 1990) perspective views learners as actively engaged in making meaning, and teaching with that approach looks for what students can analyze, investigate, collaborate, share, build and generate based on what they already know, rather than what facts, skills, and processes they can parrot. Some of the tenets of constructivism in pedagogical terms include:

- Students come to class with an established world-view, formed by years of prior experience and learning.
- Even as it evolves, a student's world-view filters all experiences and affects their interpretations of observations.
- For students to change their world-view requires work.
- Students learn from each other as well as the teacher.
- Students learn better by doing.
- Allowing and creating opportunities for all to have a voice promotes the construction of new ideas.

## LEARNING DOMAINS

*adapted from Bloom's Taxonomy of Intellectual Behavior (1956)*

Learners show three overlapping domains; cognitive, affective and psychomotor.

### Cognitive

The cognitive domain involves knowledge and the development of intellectual skills. comprehending information, organizing ideas, analyzing and synthesizing data, applying knowledge, choosing among alternatives in problem solving, and evaluating ideas or actions There are six major categories, which are listed in order below, starting from the simplest behavior to the most complex. The categories can be thought of as degrees of difficulty. That is, the first one must be mastered before the next one can take place.

**Knowledge** -- observation and recall of information

- knowledge of dates, events, places
- knowledge of major ideas
- mastery of subject matter

**Comprehension** -- understanding information

- grasp meaning
- translate knowledge into new context
- interpret facts, compare, contrast
- order, group, infer causes
- predict consequences

**Application** -- use information

- use methods, concepts, theories in new situations
- solve problems using required skills or knowledge

**Analysis** -- seeing patterns

- organization of parts
- recognition of hidden meanings
- identification of components

**Synthesis** -- use old ideas to create new ones

- generalize from given facts
- relate knowledge from several areas
- predict, draw conclusions

**Evaluation** -- compare and discriminate between ideas

- assess value of theories, presentations
- make choices based on reasoned argument
- verify value of evidence
- recognize subjectivity

### COGNITIVE LEARNING DOMAINS EXERCISE

*Give an example of cognitive learning that you would use in your midwifery studies or in client teaching.*

### Affective

This domain includes the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes. The five major categories listed in order are:

**Receiving:** Awareness, willingness to hear, selected attention.

- listen to others with respect
- listen for and remember the name of newly introduced people

**Responding:** Active participation.

- attends and reacts to a particular phenomenon
- willingness to respond
- satisfaction in responding (motivation)

**Valuing:** The worth or value a person attaches to a particular object, phenomenon, or behavior.

- simple acceptance
- commitment
- demonstrates belief
- values diversity
- shows the ability to solve problems
- proposes a plan for improvement and follows through with commitment

**Organization:** Organizes values into priorities by contrasting different values, resolving conflicts between them, and creating a unique value system.

- recognizes the need for balance between freedom and responsible behavior
- accepts responsibility for one's behavior
- accepts professional ethical standards
- creates a life plan in harmony with abilities, interests, and beliefs
- prioritizes time effectively to meet the needs of clients, family, and self

**Internalizing values (characterization):** Has a value system that controls their behavior. The behavior is pervasive, consistent, predictable, and most importantly, characteristic of the learner.

- shows self-reliance when working independently
- displays teamwork
- uses an objective approach in problem solving
- displays a professional commitment to ethical practice on a daily basis
- revises judgments and changes behavior in light of new evidence
- values people for what they are, not how they look

#### AFFECTIVE LEARNING DOMAINS EXERCISE

*Give an example of affective learning that you would use in your midwifery studies or in client teaching.*

## Psychomotor

The psychomotor domain includes physical movement, coordination, and use of the motor-skill areas. Development of these skills requires practice and is measured in terms of speed, precision, distance, procedures, or techniques in execution. The seven major categories listed in order are:

**Perception:** The ability to use sensory cues to guide motor activity. This ranges from sensory stimulation, through cue selection, to translation.

- detects non-verbal communication cues, such as listening to how a woman sounds in labor, or distinguishing the differences in fetal heart rate

**Mindset:** Readiness to act. It includes mental, physical, and emotional person's response to different situations.

- knows and acts upon a sequence of steps in a procedure
- recognize one's abilities and limitations

**Guided response:** The early stages in learning a complex skill that includes imitation and trial and error.

- practices a skill such as palpation
- responds to instructor instructions

**Mechanism:** This is the intermediate stage in learning a complex skill. Learned responses have become habitual and the movements can be performed with some confidence and proficiency.

- organizes complex tasks like physical exams

**Complex Overt Response:** The skillful performance of motor acts that involve complex movement patterns; includes performing without hesitation, and automatic performance.

- performing skills such as CPR
- hand skills for delivery

**Adaptation:** Skills are well developed and the individual can modify movement patterns to fit special requirements.

- responds effectively to unexpected experiences
- modifies instruction to meet individual situations

**Origination:** Creating new movement patterns to fit a particular situation or specific problem. Learning outcomes emphasize creativity based upon highly developed skills.

- constructs a new theory
- develops new methods of common tasks

### PSYCHOMOTOR LEARNING DOMAINS EXERCISE

*Give an example of psychomotor learning that you would use in your midwifery studies or in client teaching.*

## WHOLE BRAIN LEARNING

Our brains have two hemispheres, the left and right. The left side is often considered to be the rational side. The right side of the brain is considered the creative, intuitive side. We use both sides of our brain to solve problems, make decisions and learn things, but for most of us one side dominates. If you are left-brain dominant, then you learn by thinking; you may like to work through learning step by step. You'll prefer learning in sizable chunks and breaking down your learning into an ordered series of goals and tasks. If you are right-brain dominant, you learn by giving and sharing. You will prefer learning resources that give you the big picture, such as case studies and examples of good practice. You will prefer to start work on a broad goal or project and fill in the detail you need as you go. By understanding what kind of learner you are, which side is more dominant, you can devise strategies that utilize your whole brain, making learning more effective. Optimum learning occurs when both sides of the brain are activated.



Versalius, 1542

BRAIN HEMISPHERIC STYLE	
LEFT (Analytic)	RIGHT (Global)
1. Verbal	1. Visual
2. Responds to word meaning	2. Responds to tone of voice
3. Sequential	3. Random
4. Processes information linearly	4. Processes information in varied order
5. Logic and Reasoning	5. Responds to emotion
6. Plans ahead	6. Impulsive
7. Recalls people's names	7. Recalls people's faces
8. Speaks with few gestures	8. Gestures when speaking
9. Punctual	9. Less punctual
10. Prefers formal study design	10. Musical
11. Prefers bright lights while studying	11. Prefers frequent mobility while studying
12. Numerical and scientific skills	12. Creativity
13. Analyzing things	13. Intuition
14. Comparing things	14. Imagination

### LEFT BRAIN, RIGHT BRAIN EXERCISE

Are you more of a left brain or a right brain person? Describe how: \_\_\_\_\_ :

### OPPOSITE BRAIN LEARNING EXERCISE

Once you have determined which side of your brain is your dominate side, list some learning activities that will focus on the opposite side. For example, if you are a left brain learner, using pictures, illustrating notes.

- 1.
- 2.
- 3.
- 4.
- 5.

### MEMORY TRICKS

**Loci:** If you have a list of things or events to remember, picture each item or event in a different location in a house or at stops along a path you know by heart. To remember the items, see yourself walking through the house or along the path, retrieving each item or watching each event.

**Association:** Harvard professor William James wrote, "The more other facts a fact is associated with in the mind, the better possession of it our memory retains. Each of its associations becomes a hook to which it hangs, a means to fish it up by when sunk beneath the surface. Together, they form a network of attachments by which it is woven into the entire tissue of our thought. The 'secret of good memory' is thus the secret of forming diverse and multiple associations with every fact we care to retain."

**Mediators:** Memory mediators are physical cues to help you remember something. For example tying a string around your finger to remember to get milk on the way home would be using the string as a mediator.

**Chunking:** Since the memory has a difficult time remembering more than 7 items in a row, grouping longer lists helps. For example, notice the first letter of each word. Memorizing how many of each letters there are in the list will help you remember a longer list.

**Acronyms:** Form a word by rearranging the first letter of a list of words into a word.

**Rhyming:** Creating a rhyme to memorize something is helpful. Putting it to a tune of a song you know can make it easier to remember.

**Directed visualization:** Create nouns that rhyme with each number, then visualize each thing in the list paired in some way with the numbers with which they correspond.

**The chain link method:** Visualize the 1<sup>st</sup> item listed paired with the 2<sup>nd</sup> item, then pair the 2<sup>nd</sup> with the 3<sup>rd</sup>, etc..

## GARDENER'S SEVEN INTELLIGENCES MODEL

Howard Gardner's Theory of Multiple Intelligences hypothesizes that human beings are capable of seven independent means of information processing. People have a combination of multiple intelligences or strengths, and they change over time. See which of these apply to you and the tools you can use to help you learn and teach more effectively.

### 1. Verbal/Linguistic (Learns with Words)

People who love to play with language, tell stories, and read and write. This learner is pretty good at remembering names, places, and dates. They learn best if given an opportunity to hear, see, and say words; use spoken words to explain; read out loud to self or someone else; write notes or make flash cards.

### 2. Logical/Mathematical (Learns with Questions)

Here is a learner who likes to figure things out by asking questions, exploring, and doing some experimenting. This person is usually good at math and logic processes or problem-solving. This person learns best when you've provided opportunities to classify, categorize, and work with abstractions and their relationship to one another. Creating logic trees, time lines, or other graphs of relationships of things are helpful tools to these types of learners. They learn well using percents, numbers, and sequences.

### 3. Visual (Learns with Images)

This person is one who enjoys drawing, designing, and looking at pictures, slides, videos, and films. This person is especially proficient at imagining, sensing changes, doing puzzles, and reading visual charts and maps. Information is best absorbed by visualization, using the 'mind's eye', and working in some way with pictures and colors. They use and create their own pictures of things they are learning. They learn well observing procedures.

### 4. Kinesthetic (Learns with Touch & Movement)

These people learn best through touch, feeling, and physical experience. They need to be interacting with space in some way so as to process and remember the new information through the body. They often are people who use gestures while talking and use their body to express ideas. They learn through doing. Examples of learning tips for these types of learners include: As they learn body parts, palpate; as they learn types of movements, act them out repeatedly such as flexion of the hip; use three dimensional models to emphasize hands-on activities.

### 5. Musical (Learns through Music & Rhythm)

A hummer of tunes, a singer of songs; probably plays an instrument, and often is listening to music. This person excels at remembering melody, noticing the rhythms of life, and keeps perfect time. Useful techniques for these learners include using rhythms or raps, or making little songs about the materials.

**6. Interpersonal** (Learns by Socializing)

This person is often with a group of people and talking with friends. Leading others is an obvious skill along with organizing, mediating, communicating, and generally understanding people and how to work well with them. They learn well in a study group, like opportunities to compare and contrast, like to interview others with and about information, share ideas, and like to cooperate to accomplish any given task.

**7. Intrapersonal** (Learns Well Alone)

This person does better pursuing self-defined interests. They know their own strengths and weaknesses. This type of learner excels at 'knowing' herself, follows instincts with confidence, is self-directed, and can follow limits. New information is absorbed best when the projects are individualized, self-paced, and singularly oriented.

## LEARNING STYLES EXERCISE

*List specific midwifery-related learning activities using each of these styles. It may be self-directed, or for childbirth education clients, or training midwifery apprentices of your own.*

1. Verbal/linguistic

2. Logical/ mathematical

3. Visual

4. Kinesthetic

5. Musical

6. Interpersonal

7. Intrapersonal



### TIPS FOR TEXTBOOK STUDY

1. As you read, ask yourself about the relationship of the different parts or ideas and generate graphs, charts, and diagrams.
2. Use time lines and concept trees to organize the material you are studying.
3. Generate and write down questions as you go, with page numbers for the answers.
4. Make flash cards with definitions of terms, or lists of parts of things, or sequential steps of a procedure.
5. Do not try to speed read technical material.
6. If you find your mind wandering, reread the section during which you have lost focus. If you try three times to read a paragraph and are unable to hold your focus, take a mini break (something physical is especially helpful). If something is distracting you, change it.

### The 5-P Reading System

**Prepare** – Prepare by getting yourself in a good study space, with good lighting, that is conducive to reading and is free of distractions.

**Preview** – Survey reading material: Look at headings, drawings, bold and highlighted areas. Skim over the material first, as that will help you to commit the material to memory after a more detailed reading.

**Predict questions** – Create a question for each heading or topic. Creating questions is also a good way to prepare for tests and quizzes.

**Pick out keywords** – Highlight or bring attention to keywords, phrases, or main ideas or concepts.

**Paraphrase and review** – Repeat information in your own words. Summarize and recite information back.

### The SQ4R Method

**Survey** -- Get an overall picture of what you're going to study BEFORE you study. This is similar to looking at a road map before going on a trip.

**Question** -- Ask yourself questions as you read or study. Questions should lead to emphasis on the what, why, how, when, who, and where.

**Read** -- Read actively; read to answer questions you have asked yourself or questions the instructor or author has asked. Always be alert to bold or italicized print. When you read, be sure to read everything, including tables, graphs and illustrations.

**Recite** – One of the best ways of understanding anything is to tell it to someone else in your own words. Stop reading periodically, recall what you have read and say it out loud.

**Review** – After you have completed the reading, try to remember each section. Reread, go over notes, clarify points you may have missed or don't understand.

**Reflect** – Think about what you have just learned and how it ties in with the ideas from previous readings. Reflecting assists with recall and greater understanding. Try to connect things you have just read to things you already know.

## INTEGRATING DIDACTIC MATERIAL WITH CLINICAL EXPERIENCE

Hands-on experience cements book knowledge. Not all midwifery students have good access to clinical training sites. You may need to be resourceful and create your own. Some ways to gain knowledge and experience of midwifery skills are:

1. Become a Childbirth Educator: Most childbirth educators become certified through correspondence courses and/or regional workshops. In addition to providing additional learning opportunities, teaching childbirth classes is a great way to have one-on-one contact with birthing families. If becoming a childbirth educator is not feasible, perhaps you can attend local childbirth classes as an assistant.
2. Become a doula: Being a doula (professional labor support) or birth assistant is a great way to get birth experience without all the responsibilities. See if there is a volunteer doula program in your area; if there is not one, start one. Being a postpartum doula also gives you valuable experience with newborns and new mothers.
4. La Leche League: Whether you become a leader or just attend meetings, the league will provide you with an important breastfeeding experience.
5. Volunteer: Do office work or other needed help at a local birth center or midwifery practice. If there are none in your area, a women's clinic, naturopathic doctor's office, or other medical office can give you some important skills you will use later in your practice.
6. Join or start a study group. In addition to the study benefits, you can practice on each other, getting some initial hands-on experience in a supportive atmosphere.

## FORMING A STUDY GROUP

Some tips on forming your study group:

- Keep it small at first; 3 - 6 is ideal. Have one person coordinate it, designing schedules and topics. Some groups like to rotate leadership periodically. Have a format and topics planned several months in advance.
- To attract members, put notices up in natural food stores, maternity or birth book stores, or other places that are frequented by mothers. La Leche leaders and childbirth educators can also help spread the word.
- Meet regularly and be consistent (i.e., every 2nd Monday, 7-9 PM) so everyone knows and can also plan their schedule.
- Select at least two texts and be sure everyone gets them: One, an easy workbook style; the other, a quality reference. There are so many good textbooks that you will need, and all are expensive, so that you might consider having each member of your study group purchase a different text (other than your two main ones).
- Have each member research a topic (for example, anemia), and present a class for the group.
- After you are well established, invite speakers such as midwives, nurses, doctors, etc., to talk about specific topics. Make sure everyone will attend (at least 5 people).

## TIME MANAGEMENT

Midwifery students tend to be active, busy women. Often they have family responsibilities, jobs, church or community activities, as well as studying; for those in clinical practice, add prenatal and postnatal visits, births, and recovery time from births, and things can get pretty hectic and busy. Finding quality study time to study effectively can be challenging. Learning good time management skills will not only help the student learn better but will set a foundation that will be important as she graduates and begins her busy midwifery practice.

<b>TIME MANAGEMENT EXERCISE</b> <i>Are you managing time or is time managing you?</i> Honestly answer the following questions, assign points to each, and total in each column 0 = no or rarely; 1 = sometimes; 2 = often; 3 = always	
_____ Often late _____ Miss appointments _____ Have a cluttered desk _____ Misplace paperwork _____ Many projects going on at once _____ Do things at the last minute _____ Can't seem to complete projects _____ Hate to say no _____ Have stacks of paperwork all over _____ Have trouble finding keys or purse  _____ Total Points  If your score is: 0-10 You are doing great, keep it up. 10-20 Have room for improvement. 20-30 Need real help in time management.	_____ Look at "to do" lists _____ File things right away _____ Have time to relax _____ Good at setting limits _____ Finish projects early or on time _____ Can easily find paperwork _____ Accomplish goals _____ Punctual _____ Use a day planner/appointment book _____ Write "to do" lists  _____ Total Points  If your score is: 0-10 You need more time management skills. 10-20 On the right track, but could be better. 20-30 Fantastic, you will be very successful.

### TIME MANAGEMENT TIPS FOR BUSY MIDWIFERY STUDENTS

#### 1. Set SMART Goals:

- Specific (not something vague);
- Measurable;
- Achievable ;
- Recorded (written down);
- Timed (have a time limit)!

#### 2. Establish priorities for your time. Include study, personal health, children and partner, family, work, church or community activities. Budget your time like you budget your money. Prioritize what is most important; and if it is not in the budget, you may need to do without. Prioritize with your goals in mind.

3. Spend time planning and organizing. Find a good organizational planner for your to-do lists and calendar. Whether you use your computer, a PDA, or a print planner, make sure it is readily accessible every day. Plan each week ahead, and have daily tasks based on your goals. Then do a daily review. If you are on call for births, that is always going to take precedence, so plan accordingly.
4. Keep your work area clean and organized. Clutter is a distraction and an energy drain. Don't let paperwork pile up. If you can't see 80% of your desk, you will waste time looking for things. When you sit down to study, make sure all your books and notes are where you can find them easily.
5. Learn to say no. Set limits and boundaries for time commitments. When feasible, delegate. Can your family help without household chores so you can study?
6. Learn your time wasters and distractions. Is it the telephone? The computer? The TV? People dropping by? Little distractions can add up to a major drain on productivity.
7. Break big projects into smaller parts. Don't procrastinate just because it can't all be done at once. Study the difficult subjects first. Break down assignments into smaller sub tasks, and plan time frames to complete them.
8. Study during your best time of the day. Identify and make use of your personal biorhythms. Are you a morning person or a night person? Or is the afternoon or evening when you are most able to focus?
9. Take care of yourself. Schedule in time just for yourself for relaxation and recreation. Take the time to exercise, eat healthy food, and get enough sleep, and take time every day to do self-care.
10. Be flexible. Avoid over-scheduling your time. Allow flex room, especially if you are on call. If over 50 percent of your time is already scheduled, there is no room for interruptions and distractions, as well as the unplanned event, or especially the uncertainty of births.
11. Plan pleasurable rewards to do after each successful study session.
12. Use relaxation techniques to put yourself in a positive frame of mind. Some find that upbeat music, with no words or in a language that you cannot understand, helps screen out extraneous thoughts and other sounds in the environment that might otherwise be distracting.
13. If you are a perfectionist, don't spend so much time on one task that you get behind on every thing else.
14. Learn to set limits for outside projects. Many of us want to be a supermom, a perfect partner and be active in community or church activities, as well as an A+ midwifery student. Give yourself credit for all the good work you do accomplish, and let that be enough.

## SELF-TEST

### TRUE/FALSE

1. \_\_\_\_\_ Midwives need to learn study skills to become better teachers.
  2. \_\_\_\_\_ Andragogy is male-centered learning.
  3. \_\_\_\_\_ It is good to skim a textbook first before reading it.
  4. \_\_\_\_\_ Midwives are all right-brain dominant.
  5. \_\_\_\_\_ In practice, you will rarely use material learned in your early midwifery studies.
  6. \_\_\_\_\_ Pedagogy is teacher-centered learning.
  7. \_\_\_\_\_ To be most efficient, schedule 75% of your time
  8. \_\_\_\_\_ A mathematical learner learns best with questions.
  9. \_\_\_\_\_ The SQ4R Method is a time management tool.
  10. \_\_\_\_\_ Writing test questions is a good study technique.
11. What are the seven intelligences according to Howard Gardner?

Mark the following mental functions with an L or an R to indicate which side of the brain generally performs this function.

12. \_\_\_ Subconscious thoughts
13. \_\_\_ Feelings
14. \_\_\_ Logical analysis
15. \_\_\_ Mathematical calculations
16. \_\_\_ Empathy
17. \_\_\_ Categorizing items or concepts
18. \_\_\_ Imagination: creating internal images of sights, sounds and touch.
19. \_\_\_ Memorizing definitions for terms
20. \_\_\_ Scientific reasoning
21. \_\_\_ Musical and artistic awareness
22. \_\_\_ Perception of patterns and space
23. \_\_\_ Organizing things into a sequence or prioritized list
24. \_\_\_ Control of the left-hand side of the body
25. \_\_\_ Control of the right-hand side of the body

### Answers

1. True 2. False 3. True 4. False 5. False 6. True 7. False 8. True 9. False 10. True  
 11. Verbal – Logical/Mathematical – Visual – Kinesthetic – Musical – Interpersonal – Intrapersonal  
 12. Right 13. Right 14. Left 15. Left 16. Right 17. Left 18. Right 19. Left 20. Left 21. Right 22. Left 23. Left 24. Right 25. Left

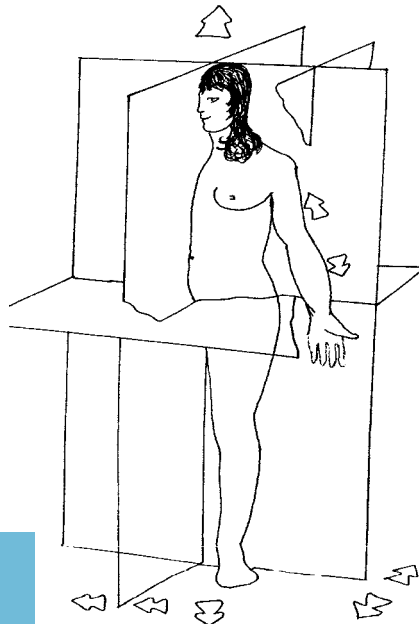
# Chapter 3

## Terminology for Midwives

### OBJECTIVES

*After completing this chapter, the student should be able to:*

1. Discuss why understanding of medical terminology would be useful for midwives.
2. State the meaning of common prefixes, suffixes and roots used in medical terminology.
3. Translate a medical prescription into common speech.
4. Demonstrate an ability to use a medical dictionary to clarify the meaning of a medical term.
5. Translate common medical or midwifery abbreviations into ordinary language.
6. Demonstrate an ability to read and comprehend medical language.
7. Identify the terms in GTPAL and demonstrate their use in medical charting.
8. Demonstrate the 'anatomical position.'
9. Identify the anatomical planes of the body.
10. Correctly use directional terms used in anatomy.



## MEDICAL TERMINOLOGY

One of the first steps in embarking on your midwifery education is to understand medical terminology. Midwives are members of a health care team; medical terminology helps us communicate with other health care practitioners in a way that is understandable and professional. Medical terminology is the language of medicine; and like any language, you need to be able to speak well to communicate effectively.

Midwives need to be able to read and comprehend medical textbooks, journals, prescriptions, and medical charts. Charting is a very important part of good midwifery care. When you use the common language of other health care practitioners, everyone can read and understand your charts. Avoid the temptation to use “midwife only” terms like “yoni” instead of “vagina”. It is popular in some midwifery circles to avoid using “doctorese” and try and create our own woman-friendly language. While the sentiment may be laudable, it can create confusion and is often perceived as unprofessional.

In order to increase retention of medical terminology, try to understand it instead of simply memorizing it. By learning root words, prefixes, and suffixes, you can form a foundation upon which you can base other words. Breaking down larger medical words into their word parts makes them simpler and easier to understand.

Knowledge of the body structures is essential as a basis for understanding medical terms. Review your anatomy and physiology if needed. Understanding the root words can help you identify where and what someone is talking about on the body. Plan on buying a good medical dictionary, and use it every time you run across a word you don't know.

There are two major categories of medical terms:

1. Descriptive- describing shape, color, size, function, etc.
2. Eponyms - the name of those who first discovered or described an anatomical structure or diagnosed a disease or first developed a medical instrument or procedure. The modern trend is moving away from eponyms as they do not tell you where something is located or what it does. An example is the fallopian tubes, named after Gabriello Fallopio; the new term is the uterine tube.

### WORD PARTS

There are three basic parts to medical terms:

1. Prefix - *a word part at the beginning of a word* - comes at the beginning and usually identifies some subdivision or part of the central meaning.
2. Suffix - *a word part at the end of a word* - comes at the end and modifies the central meaning as to what or who is interacting with it or what is happening to it.
3. Root Word - *the foundation of a word, to which a suffix or prefix is added*- usually the middle of the word and its central meaning.

*In addition there are:*

4. Compound Word - *two root words*

5. Combining Form - *a root word plus a vowel.*

Examples

Word using a prefix and root word - *hyper/active*

Word using a suffix and root word - *tonsil/ectomy*

Word using two root words - *chol/e/cyst/ectomy*

Word using combining forms - *cardi/o/vascular*

Word using a prefix and a suffix only - *neo/plasm*

Word using a prefix, root word and suffix - *peri/card/itis*

By changing the prefix and suffix, you alter the meaning of a term without changing its central meaning if you keep the root the same.

For example, *myocarditis*

(**prefix**) myo = muscle

(**root**) card = heart

(**suffix**) itis = inflammation

myocarditis= inflammation of the heart muscle tissue

**Prefix change:**

pericarditis= inflammation of the outer layer of heart

endocarditis= inflammation of the inner layer of heart

**Suffix change:**

cardiologist = a physician specializing in the heart

cardiomyopathy= damage to heart muscle layer

### WORD PART EXERCISE

Answer the following:

1. What is the function of a root word?
2. What is the function of a suffix?
3. What is the function of a prefix?
4. What is a combining form?
5. What is a compound word?



## ROOT WORDS

abdomin/o ----abdomen  
 aden/o-----gland  
 an/o-----anus  
 andr/o-----man  
 append/o-----appendix  
 angio -----tube, or blood vessel  
 arteri/o-----artery  
 arthr/o -----joint

bronch/o-----bronchus

cardi/o -----heart  
 cephal/o -----head  
 cerebr/o-----brain  
 cheil/o-----lip  
 chole/o-----bile, gall  
 chondr/o-----cartilage  
 col/o -----large intestine  
 colp/o -----vagina  
 cost/o-----rib  
 crani/o -----skull  
 cyan/o-----blue  
 cyst/o-----bladder or sac

dactyl/o -----fingers  
 dent/o -----teeth  
 derm/o-----skin  
 derm/a-----related to skin

encephal/o ----brain  
 enter/o -----intestine  
 erythr/o-----red  
 esophag/o ----esophagus

gastr/o -----stomach  
 gingiv/o-----gums  
 gloss/o -----tongue  
 glyc/o or gluc/o---sugar  
 gyn/o -----woman

fibr/o -----connective tissue

hem/a -----blood  
 hepa or hepat/o----liver  
 hydr/o-----water  
 hyster/o-----uterus

ile/o-----ileum (small intestine)  
 ili/o -----hipbone, ilium  
 irid/o -----iris

lapar/o -----abdomen  
 laryng/o -----larynx  
 leuk/o -----white  
 lip/o-----fat  
 lymph/o -----lymphatic system

mast/o-----breast  
 mamm/o-----breast  
 metr/o-----uterus  
 my/o-----muscle  
 myel/o -----bone marrow; spinal cord

nas/o-----nose  
 nephr/o -----kidney  
 neur/o-----nerve

ocul/o -----eye  
 orchi/o or orchid/o----testicle  
 oophor/o -----ovary  
 oste/o-----bone  
 ot/o -----ear

pancreat/o----pancrease  
 pharyng/o----pharynx, throat  
 phleb/o-----vein  
 pneum/o-----lung  
 proct/o -----rectum  
 pub/o-----pubis  
 pulmon-----lung  
 pyel-----pelvis; kidney

rect/o -----rectum  
 ren/o -----kidney  
 rhin/o-----nose

sacr/o-----sacrum  
 salping/o -----uterine tubes  
 splen/o-----spleen  
 stomat/o -----mouth  
 steth/o-----chest

thyr/o -----thyroid gland  
 thorac/o-----chest  
 trache/o-----trachea

ureter/o -----ureter  
 ur/o -----urine

vas/o-----vessel  
 ven/o -----vein

xanth/o -----yellow

## PREFIXES

a, or an	without	negative; not; absent;
ab, or abs		away from
alg/i		pain
amb/i		on both sides
ante		before
anti		against
auto		self
amni/o		amnion
bi		both; two
brachi		short
brady		slow
circum		around
contra		against/opposed
cyn/o		blue
dem		half
de		from
di		double; apart from
dys		difficult; painful
en		in
endo		within
erythr/o		red
epi		upon
exo		out
fore		in front of
hem/o		blood
hemi		half
hom/o		same or similar
hydro		water
hyper		above; excessive
hypo		below; deficient
infra		beneath
inter		between
intra		within
is/o		equal
juxta		near
kera		hard (hornlike)
kinesi		movement
later/o		side
lith/o		a stone
macr/o		large
mal		bad or poor
medi		middle
mega		great or big
men/o		monthly; menstrual
meta		beyond; over; change
micro		small
mono		single
my, or myo		muscle
myel		marrow
olig/o		few
os		mouth or opening
oste/o		bone
para		along side of
per		excessive; through
peri		around
poly		much; many
post		after
pre		before

psued/o	-----	false
pulmon/o	-----	lung
py/o	-----	pus
retr/o	-----	back
semi	-----	half
sub	-----	under
supra	-----	above/greater
syn	-----	with; together
tach/y	-----	fast
top/o	-----	surface
trans	-----	across
troph/o	-----	relating to nutrition
xanth	-----	yellow

## SUFFIXES

— al	-----	pertaining to
— algia	-----	pain
— aemia	-----	blood
— aesthesia	-----	sensation
— algesia	-----	pain
— ase	-----	enzyme
— cele	-----	tumor; cyst
— cyte	-----	cell
— dynia	-----	pain
— ectomy	-----	surgical removal
— emesis	-----	vomiting
— emia	-----	blood
— ethesia	-----	feeling; sensation
— genic	-----	causing
— gogue	-----	to make flow
— graphy	-----	writing; a record
— ia	-----	condition of
— ic	-----	pertaining to
— itis	-----	inflammation
— ize	-----	treat by special method
— ism	-----	condition; theory
— kinesis	-----	movement
— lysis	-----	disintegration
— logy	-----	science of
— metry	-----	measurement
— oid	-----	shape
— oma	-----	tumor
— or	-----	pertaining to
— osis	-----	abnormal condition
— ostomy	-----	opening; forming
— otomy	-----	cutting into
— paresis	-----	weakness
— pathy	-----	disease
— penia	-----	lack
— phobia	-----	fear
— plasm	-----	to mold
— plegia	-----	paralysis
— pnea	-----	breathing
— rhea	-----	flow; discharge
— sclerosis	-----	abnormal hardening
— scopy	-----	see
— trophic	-----	related to measuring

MEDICAL TERMINOLOGY EXERCISE

Use the previous lists and combine roots, prefixes, and suffixes to create medical words, then look up the word in your medical dictionary to check the spelling and pronunciation.

Write Word

Corrections

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## MEDICAL TERMINOLOGY EXERCISE

What are the prefixes for the following?

1. away from = \_\_\_\_\_
2. upon; on = \_\_\_\_\_
3. below = \_\_\_\_\_
4. back; behind = \_\_\_\_\_
5. two = \_\_\_\_\_
6. half = \_\_\_\_\_
7. one = \_\_\_\_\_
8. four = \_\_\_\_\_
9. self = \_\_\_\_\_
10. slow = \_\_\_\_\_
11. bad; abnormal; painful = \_\_\_\_\_
12. fast = \_\_\_\_\_
13. post = \_\_\_\_\_
14. hypo = \_\_\_\_\_
15. above = \_\_\_\_\_
16. half = \_\_\_\_\_
17. within = \_\_\_\_\_
18. bad = \_\_\_\_\_
19. many = \_\_\_\_\_
20. inter = \_\_\_\_\_

Match the following suffixes to the definition

21. – algia = \_\_\_\_\_
22. – cyte = \_\_\_\_\_
23. – cele = \_\_\_\_\_
24. – emia = \_\_\_\_\_
25. – itis = \_\_\_\_\_
26. – gogue = \_\_\_\_\_
27. – lysis = \_\_\_\_\_
28. – oma = \_\_\_\_\_
29. – osis = \_\_\_\_\_
30. – paresis = \_\_\_\_\_
31. – pathy = \_\_\_\_\_
32. – penia = \_\_\_\_\_
33. – pnea = \_\_\_\_\_
34. – rhea = \_\_\_\_\_
35. – scopy = \_\_\_\_\_

## MEDICAL TERMINOLOGY EXERCISE

Fill in the medical names for the following:

1. Kidney disease \_\_\_\_\_
2. Bone cell \_\_\_\_\_
3. Inflammation of the tongue \_\_\_\_\_
4. Small head \_\_\_\_\_
5. Bone tumor \_\_\_\_\_
6. White blood cell \_\_\_\_\_
7. Pain in a nerve \_\_\_\_\_
8. Under the skin \_\_\_\_\_
9. Fear of water \_\_\_\_\_
10. Within a vein \_\_\_\_\_
11. Without fever \_\_\_\_\_
12. Difficult breathing \_\_\_\_\_
13. Decreased output of urine \_\_\_\_\_
14. An incision into the stomach \_\_\_\_\_
15. Fast heart rate \_\_\_\_\_
16. Fast breathing \_\_\_\_\_
17. Painful muscles \_\_\_\_\_
18. Blood in urine \_\_\_\_\_
19. Excessive sugar \_\_\_\_\_
20. Without oxygen \_\_\_\_\_
21. Slow heart rate \_\_\_\_\_
22. Excessive urine \_\_\_\_\_
23. Inflammation of the skin \_\_\_\_\_
25. Light to see in the ear \_\_\_\_\_

Define the following:

1. colostomy \_\_\_\_\_
2. tracheotomy \_\_\_\_\_
3. neuralgia \_\_\_\_\_
4. meningocele \_\_\_\_\_
5. salpingectomy \_\_\_\_\_
6. pyelitis \_\_\_\_\_
7. dysuria \_\_\_\_\_
8. encephalitis \_\_\_\_\_
9. hemiparesis \_\_\_\_\_
10. dentalgia \_\_\_\_\_

## GENERAL MEDICAL ABBREVIATIONS

āā-----	of each
ac-----	before meals ( <i>ante cibos</i> )
ad lib-----	as desired
aq-----	water
bid-----	twice a day ( <i>bis in die</i> )
c-----	with
cc-----	cubic centimeter (= ml)
cm-----	centimeter
C/O-----	complains of
dr-----	dram
Dx-----	diagnosis
ENT-----	ear, nose, throat
ext-----	extract
FUO-----	fever of unknown origin
g (gm)-----	gram
h-----	hour
Hb or Hgb-----	hemoglobin
Hct-----	hematocrit
Hg-----	mercury
hs-----	at bedtime ( <i>hora somni</i> )
IM-----	intramuscular
IV-----	intravenous
inf-----	infusion
mcg-----	microgram
mg-----	milligram
ml-----	milliliter (= cc)
oz-----	ounce
os-----	opening (mouth)
pc-----	after meals ( <i>post cibos</i> )
per-----	by
prn-----	as needed ( <i>pro re nata</i> )
po-----	by mouth ( <i>per os</i> )
pt-----	patient
q-----	every
qd-----	every day
qh-----	every hour
q2h-----	every 2 hours
q4h-----	every 4 hours
qid-----	four times a day ( <i>quater in die</i> )
qod-----	every other day
qs-----	quantity sufficient
R/O-----	rule out
Rx-----	take (prescription)
s-----	without ( <i>sin</i> )
sp gr-----	specific gravity
ss-----	one-half ( <i>semis</i> )
stat-----	immediately ( <i>statim</i> )
supp-----	suppository
susp-----	suspension
subq-----	subcutaneous
tid-----	three times a day ( <i>ter in die</i> )
U-----	unit
ung-----	ointment
v/s-----	vital signs

### PRESCRIPTION EXERCISE

Explain the following prescription orders

1. Amoxicillin 250 mg 1 po qid ac

2. Pitocin 20 U IM prn for a hypotonic uterus.

3. Comfrey ung ss oz apply to affected area hs

4. Vit C 1 gm po q4h x 7 days

5. Meperidine 50 mg qid prn for pain.

6. Chamomile & hops 2 oz aa for inf.  
Use prn sleep

7. Nifedipine 10 mg po q6h for PTL

## ANATOMICAL DIRECTIONS

In order to pinpoint the exact location of a specific part, anatomical directions are necessary. Planes of the body are fixed lines of reference where the body is divided into sections. Those planes are:

**1. MEDIAN PLANE** or the midline plane, which divides the body into equal right and left halves.

Medial and lateral refer to this plane.

**2. SAGITTAL PLANE** which divides the body into unequal left/right sides.

**3. CROSS/TRANSVERSE PLANES** are perpendicular to the long axis of the body, and divide the body into upper & lower parts.

**4. CORONAL OR FRONTAL PLANES** divide the body into equal or unequal front and back parts. The terms anterior and posterior refer to this plane.

**5. CRANIAL OR SUPERIOR** is closer to the head, or above another structure.

**6. INFERIOR** is closer to the feet, or lower than another structure.

**7. ANTERIOR** is towards the front.

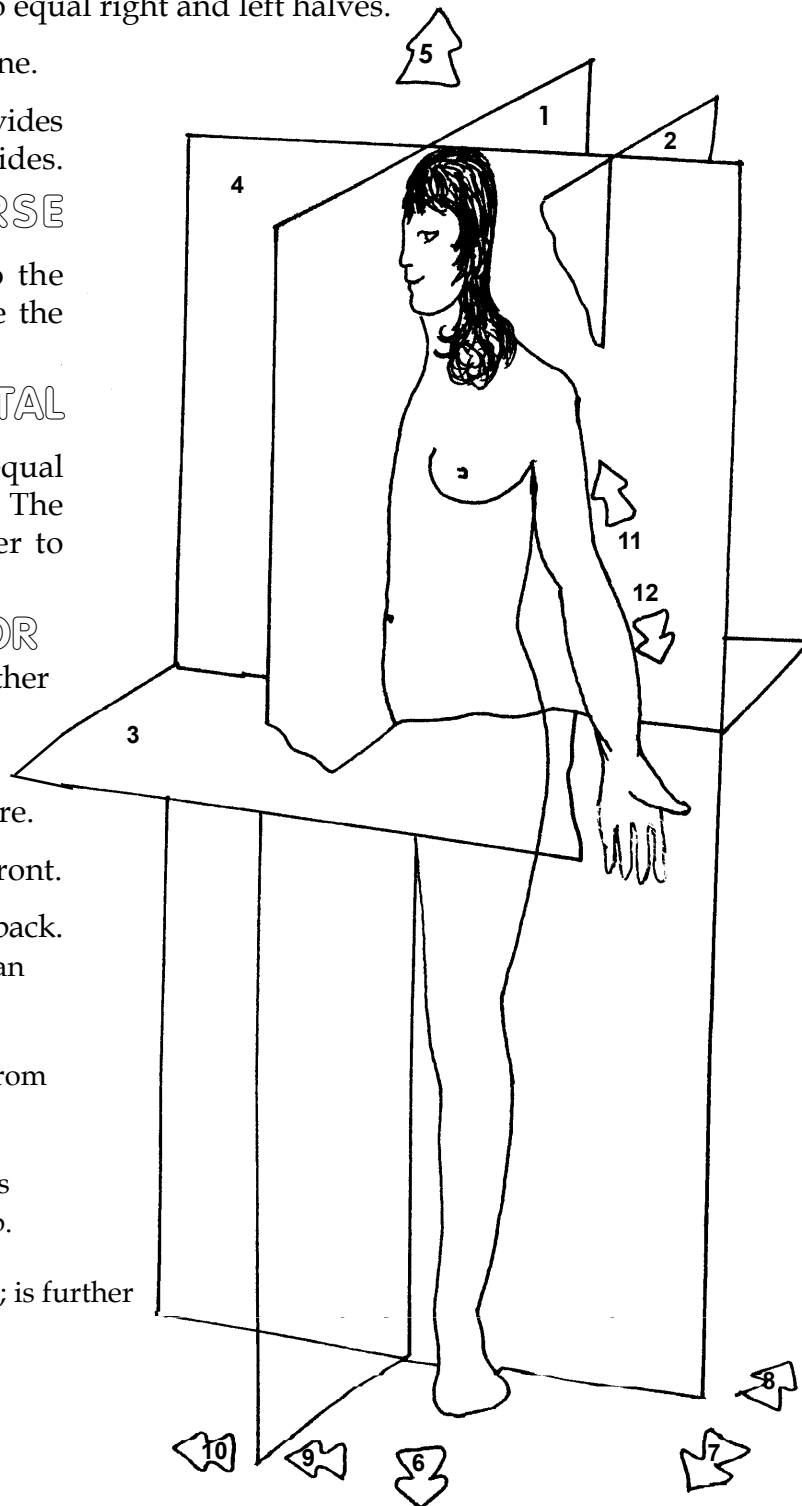
**8. POSTERIOR** is towards the back.

**9. MEDIAL** is closer to the median plane.

**10. LATERAL** is further away from the median plane.

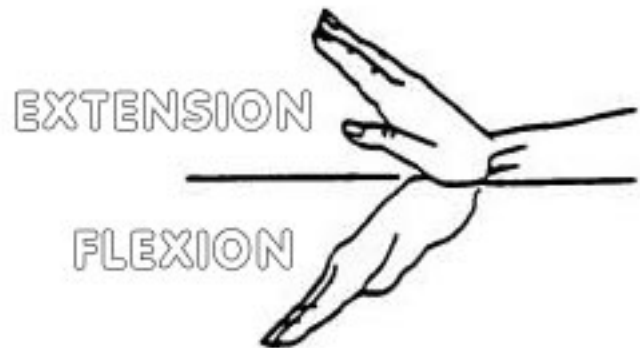
**11. PROXIMAL** refers to limbs only; is closer to the origin of the limb.

**12. DISTAL** refers to limbs only; is further away from the origin of the limb.



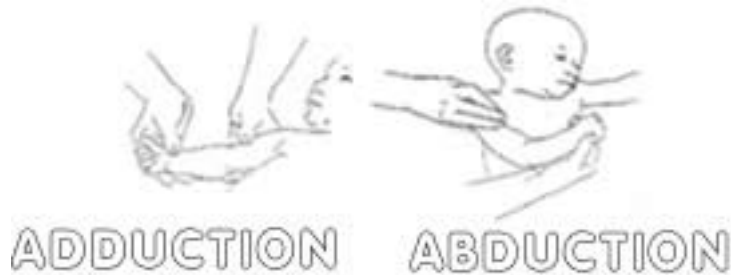
## ANATOMICAL MOVEMENT

**Flexion** - where there is a reduction in the angle between bones or parts of the body. This term applies only to movement along the sagittal or median plane. An example of arms flexing is lifting a dinner plate. When applied to the trunk of the body, this term means bowing forwards.



**Extension** - is the opposite of flexion, and there is an increase in the angle. This term applies only to movement along the sagittal or median plane. With the trunk of the body, this movement is bowing backwards.

**Adduction** - where there is a reduction in the angle between bones or parts of the body. This only applies to movement along the coronal plane. An example of this is where extending arms outwards as if to fly.



**Abduction** - the exact opposite, with an increase in the angle. Also only applies to movement along the coronal plane.

**Rotation** - is rotation of an entire limb clockwise (laterally) or anticlockwise (medially).

**Pronation** - this is the rotation of the hand so that the palm faces posteriorly. This is not medial rotation as this must be performed when the arm is half flexed. Prone means the hand is facing posteriorly.



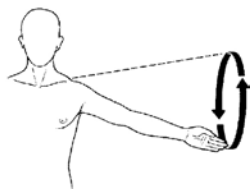
**Supination** - the rotation of the hand so that the palm faces anteriorly. The hand is supine (facing anteriorly) in the anatomical position.



**Protrusion** - the anterior movement of an object. This term is often applied to the jaw.

**Retrusion** - the opposite of protrusion.

**Elevation** - superior movement. This term is often applied to the shoulders (eg shrugging shoulders is elevation).



**Depression** - inferior movement, opposite of elevation.

**Circumduction** - a special case of movement involving adduction, flexion, extension and abduction. The resulting movement creates a circular path of movement. The only joint in the human body capable of circumduction is the shoulder.



## ANATOMICAL DIRECTIONS EXERCISE

- Fill in anatomical terms for the following:  
 towards the front \_\_\_\_\_  
 towards the back \_\_\_\_\_  
 above \_\_\_\_\_  
 below \_\_\_\_\_  
 another word for inferior \_\_\_\_\_
- In the following pairs of body parts, circle the one that is distal.  
 Finger/ Hand  
 Elbow/Wrist  
 Foot/ Knee  
 Elbow/Shoulder
- In the following pairs of body parts, circle the one that is superior.  
 Head/Neck  
 Foot/Knee  
 Elbow/Hand  
 Breast/Umbilicus  
 Kidneys/Bladder
- In the following pairs of body parts, circle the one that is anterior.  
 Umbilicus/Spine  
 Liver/Kidneys  
 Uterus/Bladder  
 Nose/Ears
- In the following pairs of body parts, circle the one that is superficial.  
 Internal Oblique/External Oblique  
 Lungs/Rib Cage  
 Endometrium/Myometrium
- In the following pairs of body parts, circle the one that is lateral.  
 Lungs/Heart  
 Sternum/Breasts  
 Ovaries/Uterus
- Label these two movements



## OB Acronyms, Abbreviations, & Terms

ab-----	abortion or spontaneous abortion	med-----	medication
abnml -----	abnormal	multigravida --	been pregnant more than once
AFP-----	AlphaFetoprotein	multipara -----	given birth more than once
ant -----	anterior	n/a-----	not applicable
APGAR-----	newborn evaluation score	nml -----	normal
AROM-----	artificial rupture of membranes	NST-----	non stress test
ballotable ----	movable	nulligravida ---	has never been pregnant
BC -----	birth control	nullipara -----	has never given birth
BOW -----	bag of waters	OC -----	oral contraceptives
BP -----	blood pressure	OA -----	occiput anterior
CCT -----	controlled cord traction	OP -----	occiput posterior
circ -----	circumference	OT -----	occiput transverse
cl -----	clear	OFC -----	occipital-frontal circumference
contx -----	contractions	O <sub>2</sub> -----	oxygen
CPD -----	cephalo pelvic disproportion	para-----	to give birth
C-sec -----	Cesarean section	pit-----	pitocin
CNS -----	central nervous system	post-----	posterior
CST -----	contraction stress test	PP -----	postpartum
CVS-----	cardiovascular system	PPH -----	postpartum hemorrhage
DTR -----	deep tendon reflex	primigravida --	first pregnancy
EBL -----	estimated blood loss	primipara -----	giving birth for the first time
EDC -----	estimated date of confinement	pro/ glu-----	protein/ glucose
EDD -----	estimated due date	PROM-----	premature rupture of membranes
EFM -----	electronic fetal monitor	PTL -----	preterm labor
EGA -----	estimated gestational age	quickening-----	first fetal movement felt
epis -----	episiotomy	RBC-----	red blood cell (erythrocyte)
ETOH -----	alcohol	RDS-----	Respiratory Distress Syndrome
FBS -----	fasting blood sugar	resp-----	respiration
FHR -----	fetal heart rate	RH -----	Rhesus
FHT -----	fetal heart tone	ROM -----	rupture of membranes
FHS -----	follicle stimulating hormone	RR-----	rate rhythm
GC -----	gonorrhoea	SAB-----	spontaneous abortion
gest -----	gestation	SDLF -----	spontaneous delivery live female
GI -----	gastrointestinal	SDLM-----	spontaneous delivery live male
gravid -----	referring to pregnancy	SROM-----	spontaneous rupture of membranes
gravida -----	a pregnant woman	S/S -----	signs and symptoms
GTT -----	glucose tolerance test	TAB-----	therapeutic abortion
gyn -----	gynecological	TOP-----	termination of pregnancy
hx -----	history	TPR-----	temperature-pulse-respirations
inutero -----	inside the uterus	UA or Ux-----	urine analysis
IAB -----	induced abortion	ut-----	uterine
IUD -----	intrauterine device	UTI -----	urinary tract infection
IUP -----	intrauterine pregnancy	VBAC -----	vaginal birth after cesarean
LB -----	live birth	vits-----	vitamins
LC -----	live child	wks -----	weeks
L & D -----	labor and delivery	WNL -----	within normal limits
LMP -----	last menstrual period	wt -----	weight
LOA -----	left occiput anterior		
LOP-----	left occiput posterior		
LOT-----	left occiput transverse		
lt-----	light		
mec -----	meconium		

## DEFINITIONS OF PREGNANCY

**Gravida:** ("to bear") A pregnant woman. Any pregnancy, including the present one.

**Para:** ("to give birth"). A woman who has given birth. Includes any birth after 20 weeks, whether live or dead.

**Nulligravida:** A woman who has never been pregnant.

**Primigravida:** A woman who is pregnant for the first time.

**Multigravida:** A woman who has been pregnant more than once; she may have not given birth to a child of viable age.

**Nullipara:** A woman who has never given birth to a child over 22\* weeks' gestation.

**Primipara:** A woman who is giving birth for the first time.

**Multipara:** A woman who has given birth more than once at more than 22 weeks' gestation.

**Grand multipara:** A woman who has given birth to five or more children at more than 22 weeks' gestation.

**Term:** A birth that occurs between 38-42 weeks of pregnancy.

**Preterm:** A birth that occurs between 24-37 weeks of pregnancy.

**Postterm:** A birth that occurs after 42 weeks of pregnancy.

\* Note: Sources differ, defining viability as between 20 - 24 weeks

A multiple pregnancy is considered as one pregnancy. The number of births is counted as the babies delivered. Abortions, both spontaneous and induced, are counted as gravida. After 20 weeks, all are counted as para, including stillbirths. The current pregnancy is counted as gravida until delivery.

While the simple gravida\_\_\_ para\_\_\_ is still used, a more detailed system of listing pregnancies is now recommended. This system is called by the abbreviation GTPAL, as it provides information about each gravida or pregnancy.

Gravida\_\_\_ Term\_\_\_ Preterm\_\_\_ Ab\_\_\_ Living child\_\_\_

Maria is pregnant. She had two term births, one abortion, and 2 living children.

Charted as: **G** 4 **T** 2 **P** 0 **Ab** 1 **L** 2

### PREGNANCY DEFINITION EXERCISE

1. A Gravida (G) 3 Para (P) 0 is called a \_\_\_\_\_.
2. Maria had a stillbirth at 28 weeks. It was her only previous pregnancy; she is now pregnant again.  
Chart: G\_\_\_ T\_\_\_ P\_\_\_A\_\_\_ L\_\_\_
3. Jane has four children: one set of twins, one child born at term, one child at 35 weeks. She has had one abortion, and she is pregnant again.  
Chart: G\_\_\_ T\_\_\_ P\_\_\_A\_\_\_ L\_\_\_
4. Debbie had 1 miscarriage at 16 weeks and is pregnant now.  
Chart: G\_\_\_ T\_\_\_ P\_\_\_A\_\_\_ L\_\_\_

## OB TERMS EXERCISE

Fill in the correct words for the following terms:

1. LMP \_\_\_\_\_
2. OC \_\_\_\_\_
3. CPD \_\_\_\_\_
4. EGA \_\_\_\_\_
5. AFP \_\_\_\_\_
6. EDC \_\_\_\_\_
7. FHT \_\_\_\_\_
8. GTT \_\_\_\_\_
9. PROM \_\_\_\_\_
10. SAB \_\_\_\_\_
11. EDD \_\_\_\_\_
12. GC \_\_\_\_\_
13. IAB \_\_\_\_\_
14. BOW \_\_\_\_\_
15. SROM \_\_\_\_\_

Use abbreviations to restate these cases:

1. Shirley Campbell complains of pain with breathing. Has history of smoking, appears to have shortness of breath, is blue on the hands and feet, and is breathing very fast.

2. Sara Cohn is pregnant for the first time. Her contractions are every two to three minutes, is 5 centimeters dilated. Her water broke early this morning.

3. Teresa Garcia is a 26 year old mother of three living children. She had one termination of pregnancy at 12 weeks and is now 22 weeks pregnant; she has had no previous health problems. She is complaining of burning with urination.

4. Jennifer Smith is a pregnant 35 year-old. She has been pregnant 5 times before, and she has six living children, all born at term. She is complaining of kidney pain, she does not have a fever, and she has blood in her urine.

5. Susan Brown's last period was on January 26, 2010. Her due date is November 4, 2010. She has had one miscarriage at 6 weeks and one abortion, a still birth at 27 weeks, and a set of twins at 34 weeks, who are both living.

## SELF-TEST

True/False

1. \_\_\_\_ The midsagittal plane divides the body into right and left halves.
2. \_\_\_\_ The sternum is medial to the areola.
3. \_\_\_\_ The sacrum is posterior to the pubis.
4. \_\_\_\_ The mentum is inferior to the xyphoid.
5. \_\_\_\_ When in anatomical position, the thumb is medial to the pinky.
6. \_\_\_\_ The coronal plane divides the body into top and bottom portions
7. \_\_\_\_ A mid-sagittal cut of a brain is cutting it into right and left halves.
8. \_\_\_\_ A transverse plane divides something into front and back portions.
9. \_\_\_\_ A coronal or frontal plane divides something into top and bottom portions
10. \_\_\_\_ The wrist is distal to the elbow.

*Define the following medical terms:*

11. Hemodilution
12. Microcephaly
13. Bradycardia
14. Hypothermia
15. Nulligravida
16. Amenorrhea
17. Perianal
18. Pylonephritis
19. Polyhydramnios
20. Oophoritis

**Answers:**

1. True 2. True 3. True 4. False 5. False 6. False 7. True 8. False 9. False 10. True  
 11. Dilution of the blood. 12. Small head. 13. Slow heart rate. 14. Below normal temperature. 15.  
 Never been pregnant. 16. No menstrual discharge. 17. Around the anus.  
 18. Inflammation of the kidney. 19. Too much amniotic fluid. 20. Inflammation of the ovary.

# Chapter 4

## Reproductive Anatomy & Physiology

### OBJECTIVES

*After completing this chapter, the student should be able to:*

1. Identify all the parts of the pelvic girdle.
2. Locate all the ligaments of the pelvis.
3. Describe the four classic pelvic types.
4. Locate the structures of, and explain the functions of, the parts of the female and male reproductive systems, including:
  - a) organs;
  - b) musculature;
  - c) ligaments;
  - d) nerves; and
  - e) blood supply.
5. Define and explain the functions of ovarian hormones.
6. Describe how ovulation and menstruation work.
7. List the sources of all the hormones involved in the menstrual cycle.
8. Describe the four phases of the menstrual cycle.
9. Explain the changes that occur in the uterus throughout the four phases of the menstrual cycle.
10. Trace the path of sperm from the testes to the vagina.
11. List each of the glands that add secretion to the semen along the way.
12. Explain how the ovum is moved down the uterine tube toward the uterus.
13. Examine how culture affects feelings and practices around menstruation.

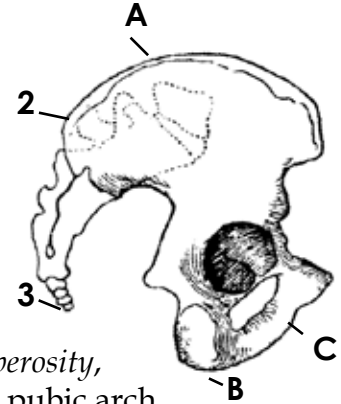


## THE PELVIS

The pelvis consists of four bones: *Two innominate bones* (also called hip bones or coxal bone); the *sacrum*; and the *coccyx*. They are united by four joints. By adulthood, these bones are fused together.

1. The **innominate** or coxal bone consists of three parts:

- A. **ILIUM**: the large, flared out part on the upper side of the pelvis recognizable as the hip bones.
- B. **ISCHIUM**: the lower part below the hip joint (acetabulum). From it comes the ischial tuberosities, the bones used for sitting.
- C. **PUBIS**: the front portion of the pelvis. Extending from the hip joint, it turns down towards the *ischial tuberosity*, fusing with the bone on the opposite side, forming the pubic arch.



2. The **SACRUM** is a triangular bone consisting of five vertebrae fused together. It serves as the back portion of the pelvis. The *sacral promontory* is the anterior superior edge of the first sacral vertebrae.

3. The **COCCYX**, also called the tailbone, consists of four vertebrae (also fused). The coccyx is attached to the sacrum at the *sacrococcygeal joint*. It is usually movable at this point.

### 1. INNOMINATE BONE

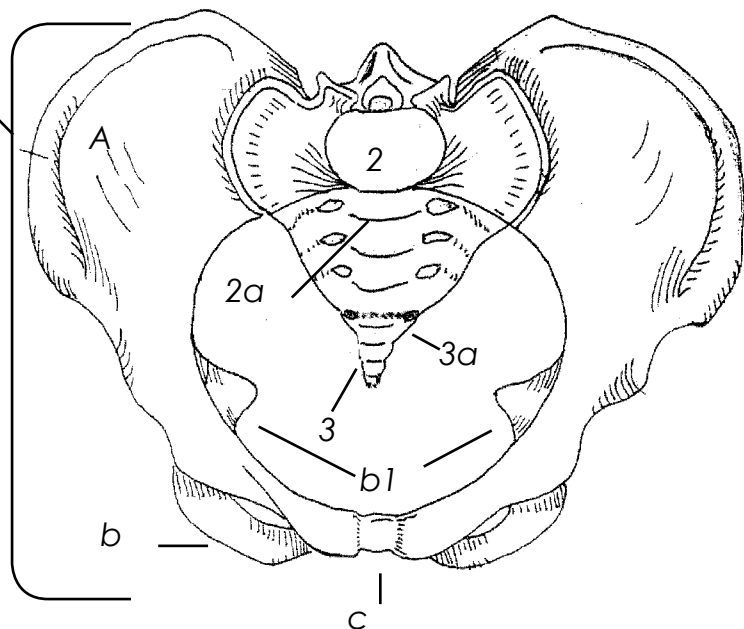
- A. ILIUM
- B. ISCHIUM
- B1. ISCHIAL SPINES
- C. PUBIS

### 2. SACRUM

- 2A. SACRAL PROMONTORY

### 3. COCCYX

- 3A. SACRO-COCCYGEAL JOINT



### PELVIS EXERCISE

1. Draw a line from following bones to their location:

Pubis  
Ilium  
Ischium  
Sacrum  
Coccyx



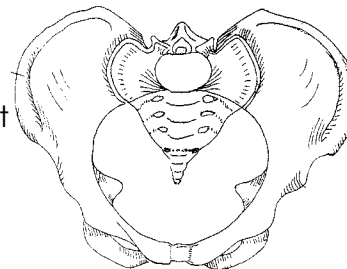
2. Place the letter of the following bone markings on the diagram:

- ischial tuberosities
- ischial spines
- greater sciatic notch
- anterior superior iliac spine
- iliac crest
- obturator foramen
- acetabulum
- inferior rami of the pubis
- sacral promontory



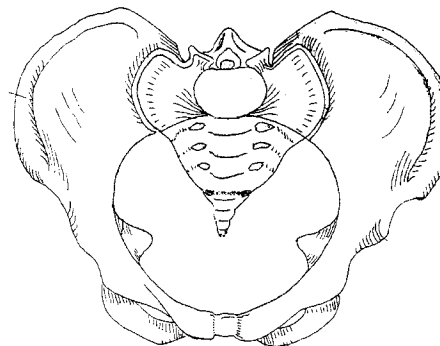
3. Draw a line from following to where the joints are:

- sacro-iliac joint
- symphysis pubis
- sacrococcygeal joint



4. Draw and label the following ligaments on this diagram and mark with the appropriate letters:

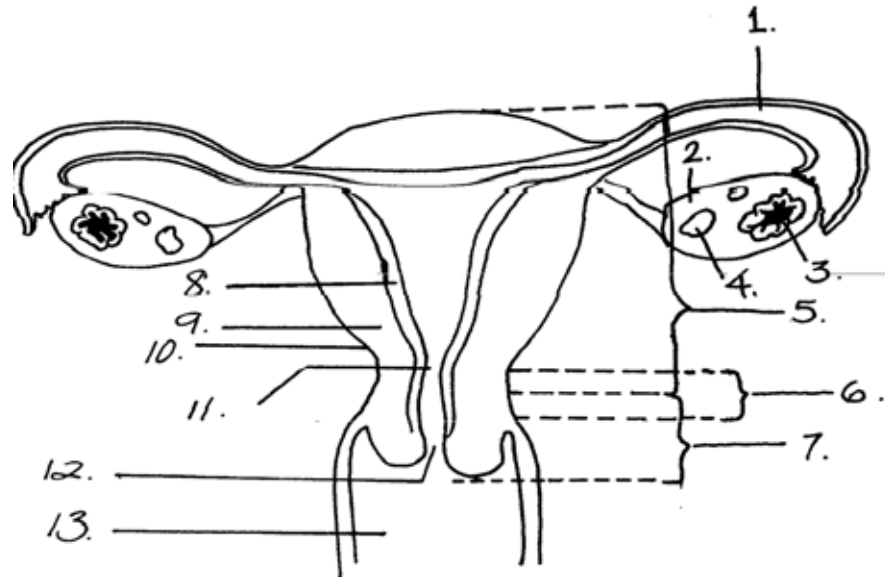
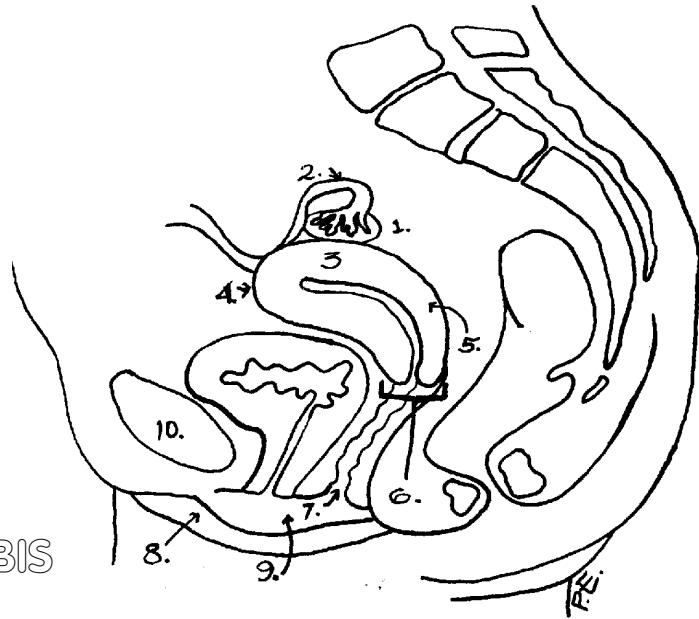
- sacrospinous ligament
- sacrotuberous ligament
- anterior pubic ligament
- sacrococcygeal ligament





## FEMALE REPRODUCTIVE ANATOMY

1. OVARY
2. UTERINE TUBE
3. UTERUS
4. FUNDUS
5. CORPUS
6. CERVIX
7. VAGINA
8. LABIA MAJORA
9. LABIA MINORA
10. SYMPHYSIS PUBIS



- |                             |                 |
|-----------------------------|-----------------|
| 1. UTERINE (FALLOPIAN) TUBE | 9. MYOMETRIUM   |
| 2. OVARY                    | 10. PERIMETRIUM |
| 3. CORPUS LUTEUM            | 11. INTERNAL OS |
| 4. OVARIAN FOLLICLE         | 12. EXTERNAL OS |
| 5. CORPUS                   | 13. VAGINA      |
| 6. ISTHMUS OF THE UTERUS    |                 |
| 7. CERVIX                   |                 |
| 8. ENDOMETRIUM              |                 |

## VULVA

The external part of the female reproductive tract is called the vulva.

It consists of the following parts:

1. The **MONS VENERIS**, also called the mons pubis, is a fatty cushion over the symphysis pubis; it is covered with skin and, after puberty, pubic hair.

2. The **LABIA MAJORA** consists of two folds of skin, beginning at the symphysis pubis, and joining at the perineum. The outer surface is covered with hair, and the inner surface contains sweat and sebaceous glands.

3. The **CLITORIS** is a highly vascular and sensitive organ, generally responsible for the female orgasm. It is located between the

4. hood-like **PREPUCE**, and the

5. **FRENULUM**.

6. The **LABIA MINORA** are two smaller folds of mucosa which extend upwards to the prepuce of the clitoris, and downwards to the fourchette.

7. The **FOURCHETTE** is the anterior edge of the perineum.

8. The **VESTIBULE** is the area inside the labia minora containing the urethra and introitus.

9. The **URETHRA** is a small opening from which the urine is expelled.

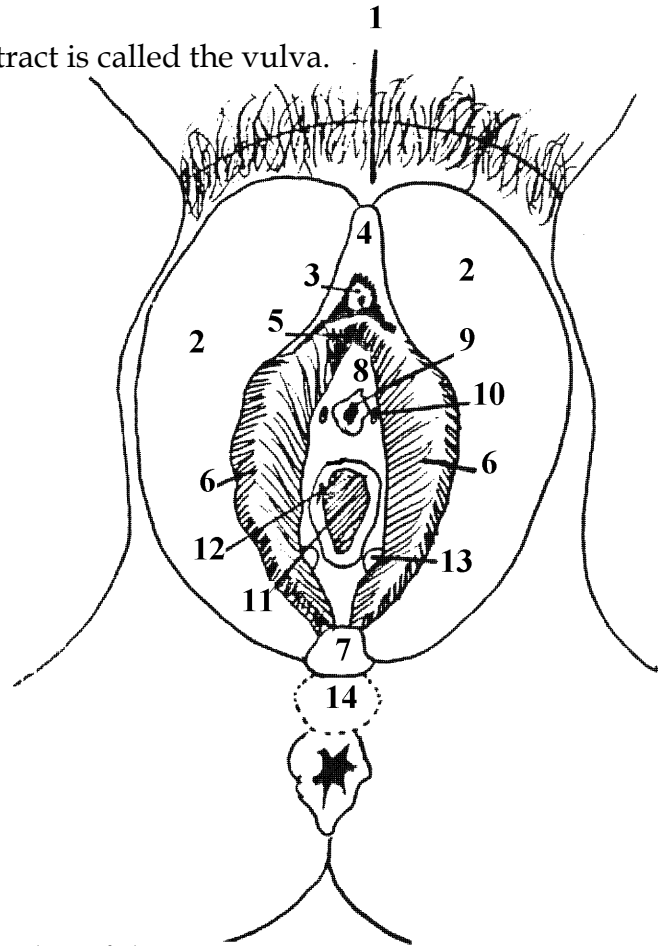
10. The **PARAURETHRAL DUCTS**, also called Skene's ducts, are located on both sides of the urethra.

11. The **INTROITUS** is the vaginal orifice.

12. The **HYMEN** partially closes the introitus before it is torn.

13. The **VESTIBULAR GLANDS**, or Bartholin's glands, are located on each side of the introitus.

14. The **PERINEUM** is the area extending from the fourchette to the anus.



The vulva is supplied with blood from:

- A) the **Femoral Artery**, which is located in the upper thigh; and
- B) the **Internal Pudendal Artery**, which runs along the pubic arch.

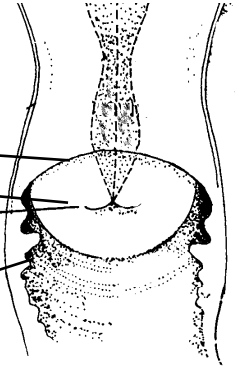
## VAGINA

The vagina is a tube which leads from the vulva to the uterus. Functions: Sexual intercourse; passage of menstrual flow and mucous; lubrication; passage for the fetus during birth. Anteriorly, it is in contact with the bladder; posteriorly, it is in contact with the rectum. The posterior wall of the vagina is longer, due to the attachment of the cervix.

There are four areas surrounding the cervix called **fornices**: one anterior, one posterior, and two lateral.

The cervix has mucous glands, which create vaginal discharge and mucous. These discharges help maintain an important acid/alkaline balance of pH 4.5 (slightly acidic) in the vagina, which can keep it healthy and free from infection. The pH changes to a more alkaline state during ovulation to allow sperm to live. This is one reason why frequent douching is unnecessary and sometimes harmful.

ANTERIOR FORNIX  
LATERAL FORNICES  
POSTERIOR FORNIX



The walls of the vagina are composed of four layers:

- 1) Lining the cavity is a layer of stratified **squamous epithelium**.
- 2) A vascular layer of **elastic tissue**.
- 3) A layer of **involuntary muscle fibers**, arranged in a crisscross manner.
- 4) An encircling layer of **connective tissue**, which contains blood vessels, lymphocytes, and nerves.

### VAGINAL ANATOMY EXERCISE

1. Describe three normal secretions that come out of the vagina.
  
2. How does the vagina expand to allow a baby through?
  
3. Normal vaginal health is maintained by:

## MUSCLES OF THE PERINEUM

1. The **LEVATOR ANI** is a deeper muscular layer of the pelvic floor and acts as a sling-like support for the pelvic structure. It consists of three muscle pairs:

1a. **ILIOCOCCYGEUS**

1b. **PUBOCOCCYGEUS**,  
is perforated by three canals: **urethra, vagina, and rectum.**

1c. **ISCHIOCOCCYGEUS.**

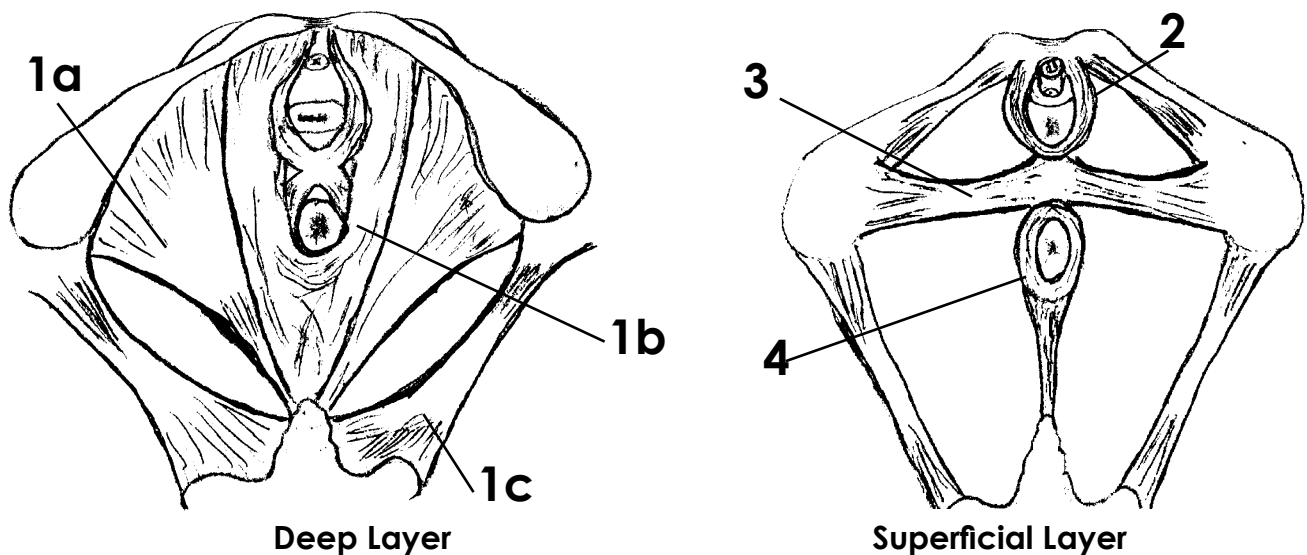
Between the anus and the vagina, the levator ani is reinforced by a central tendon of the perineum in which three pairs of the more superficial of muscles converge:

2. The **BULBOCAVERNOSUS**, surrounds and strengthens the vaginal orifice.

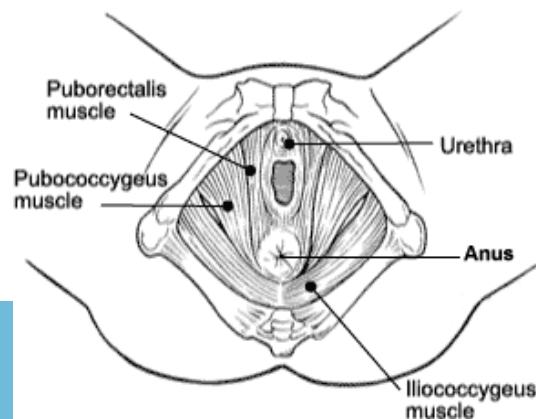
3. The **SUPERFICIAL TRANSVERSE MUSCLE** stretches from the perineum to the ischial tuberosity.

4. **EXTERNAL SPHINCTER ANI** guards the anal canal. These muscles support the perineal floor, and are often lacerated at birth.

5. The **ISCHIOCAVERNOSUS** runs from the ischial tuberosity to the region of the clitoris.



external view



FEMALE ANATOMY EXERCISE

1. Number each part of the vulva in the order it occurs (anterior to posterior):

- |           |       |              |       |
|-----------|-------|--------------|-------|
| introitus | _____ | perineum     | _____ |
| forchette | _____ | mons pubis   | _____ |
| clitoris  | _____ | labia majora | _____ |
| anus      | _____ | urethra      | _____ |

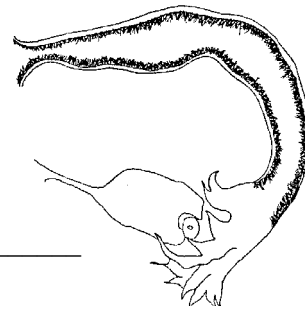
2. State possible consequences of weak pelvic floor musculature.

\_\_\_\_\_

\_\_\_\_\_

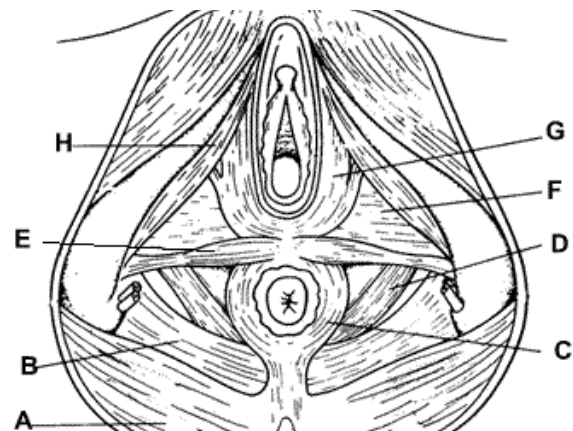
3. Identify the following structures on the diagram:

- a) the interstitial portion
- b) the isthmus
- c) the uterine tubes
- d) the ampulla
- e) the fimbria



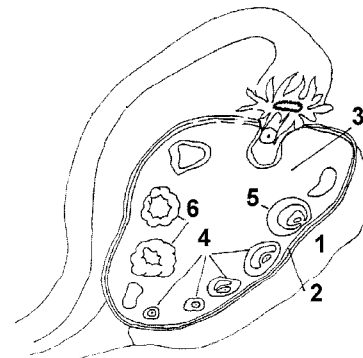
4. What is the mechanism by which an ovum gets from the ovary to the uterus? \_\_\_\_\_

5. Label the following muscles on the diagram:



6. Identify the parts of the ovary:

- 1) \_\_\_\_\_
- 2) \_\_\_\_\_
- 3) \_\_\_\_\_
- 4) \_\_\_\_\_
- 5) \_\_\_\_\_
- 6) \_\_\_\_\_



## WORD SEARCH

Find 11 names of external parts of the female anatomy

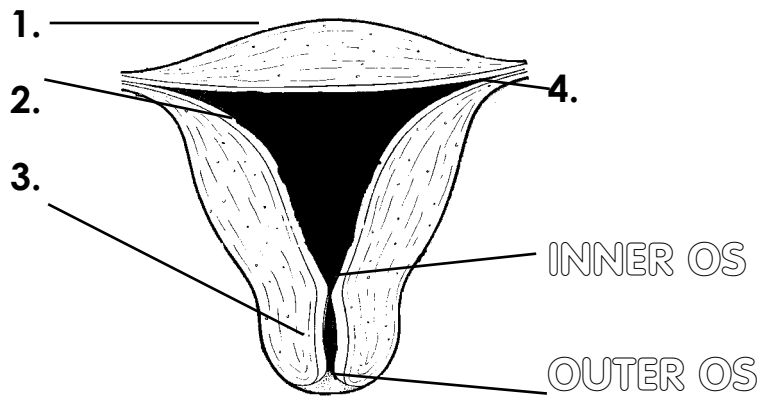
## External Female Reproductive Parts

Y J H P W B O  
 Q D Y N A V A W Z  
 T M O K O D H R X D R  
 Q S F B K A K C T D X X P  
 C A I O L B J F U H P E W T C  
 G E M B U A X B S L O Z X L U J J  
 P A R A U R E T H R A L G L A N D S N  
 X S K O P C N Q L A B I A M A J O R A  
 D U I B S H I L E A I N M N G N Y M X  
 B A G R N E R Y Y F A ' U N K K E U L  
 L X X P O T E R R X M S E F Z V S O Y  
 S C J P M T P A N S I G Q P A S Q T S  
 L F N H H E I E M D N L B G D W T N S  
 I O A R Z O L A Q O A I B O M Q D  
 J Z B J Z N C W R N T P S D C  
 J B Q V D T H A D N X Y J  
 T E A O C A O S D L W  
 S B N K L L U L X  
 H Z S N V J X

## UTERUS

The uterus is the site of menstruation and implantation of the fertilized ovum, as well as of the development and expulsion of the fetus and placenta during pregnancy and labor. The uterus is located between the urinary bladder and the rectum. It is shaped like an inverted pear and is approximately 7.5 cm (3 inches) in length, 5 cm (2 inches) in width, and 1.75 cm (0.75 inches) thick. It consists of four parts:

1. **FUNDUS** - the top of the uterus.
2. **CORPUS** - the body, or the major tapering central portion.
3. **CERVIX** - the neck of the uterus, which enters the vagina. The cervix has an *inner os* (or opening), which enters the uterine cavity, and an *outer os*, which opens into the vagina.
4. **CORNU** - there are two cornu, or horns, located on each side of the fundus.



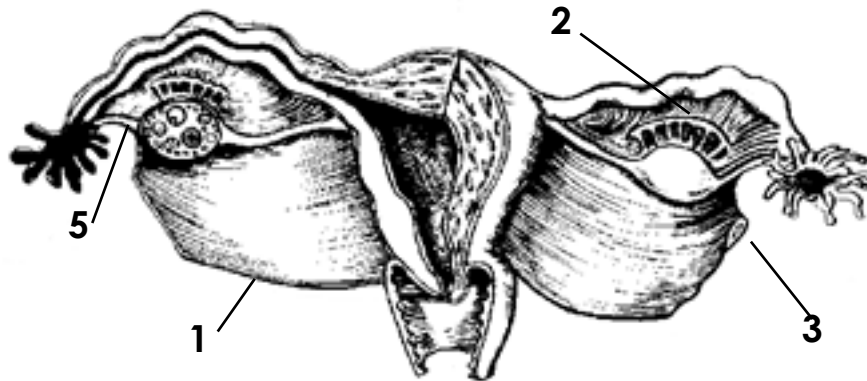
**The uterus consists of three layers:**

1. **PERIMETRIUM** - also known as the serous layer. It is the outer covering of the uterus. It consists of the peritoneum, a loose protective bag which, laterally; will become continuous with the broad ligaments.
2. **MYOMETRIUM** - the middle layer of the uterus, made up of muscle tissue, which forms the bulk of the uterine wall. In the corpus, it is made up of plain muscle cells which run in bundles separated by connective tissue. They pass in all directions and surround blood vessels and lymphatics, passing to and from the endometrium. In the cervix, the muscle bundles are less numerous and lie in collagen fibers.
3. **ENDOMETRIUM** - the inner layer is a mucous membrane that lines the uterine cavity. It is composed of **two principle layers**: the *stratum functionalis*, the interior lining which is shed during menstruation; and the *stratum basalis*, which is permanent and produces a new functionalis following menstruation. The *corporal* endometrium consists of stroma (vascular connective tissue) in which there are numerous mucous glands that open into the uterine cavity. The *cervical* endometrium is much thinner and is raised in folds or ridges. It too, is made up of stroma, and in places forms compound racemose glands, which secrete mucous under the direction of the ovarian hormones. The endometrium varies in thickness and vascularity from day to day, depending on the phases of the menstrual cycle.

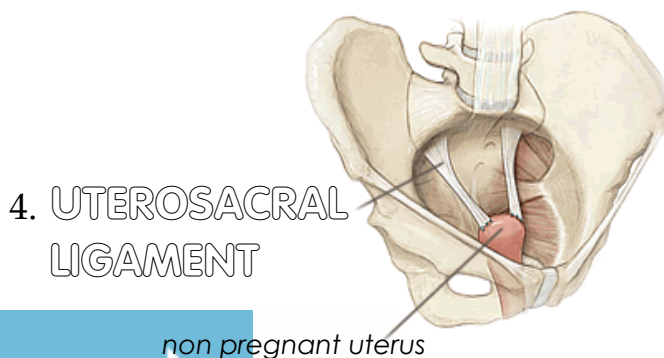
## UTERINE LIGAMENTS

There are three pairs of uterine ligaments, which maintain the position of the uterus:

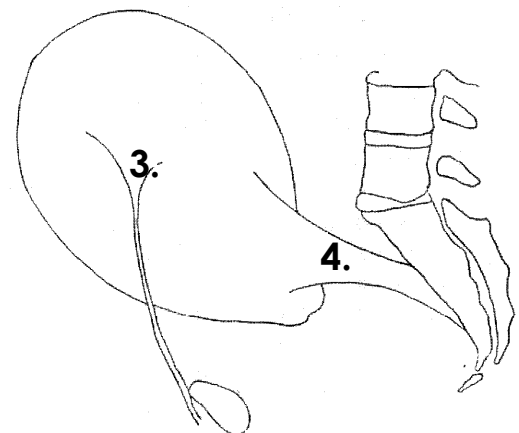
1. The **broad ligaments** are two winglike structures. Each one consists of a double fold of peritoneum enclosing various structures and is continuous with the perimetrium. The base of the broad ligament is continuous with the pelvic floor's connective tissue and attaches to the pelvis sidewalls.
2. An extension of the broad ligament is the **suspensory ligament** of the ovary, also called infundibular-pelvic ligament. At the thickest portion of the broad ligament, it is sometimes called the **cardinal ligament**. It extends from the isthmus of the uterus to the pelvic sidewalls.
3. The **round ligaments** arise at the cornu of the uterus in front of and below the insertion of the tubes, and lie between the folds of the broad ligaments; they pass through the inguinal canal and are inserted into the labia majora.
4. The **uterosacral ligaments** extend from the posterior and upper portion of the cervix, encircle the rectum, and are inserted at the sacrum. They form the lateral border of the *Pouch of Douglas* and, by pulling the cervix backwards, help maintain uterine flexion.
5. The ovarian ligament extends from the insertion of the uterine tubes to the ovaries.



1. BROAD LIGAMENTS
2. SUSPENSORY LIGAMENT OF THE OVARY
3. ROUND LIGAMENT
4. UTEROSACRAL LIGAMENT
5. OVARIAN LIGAMENT



non pregnant uterus



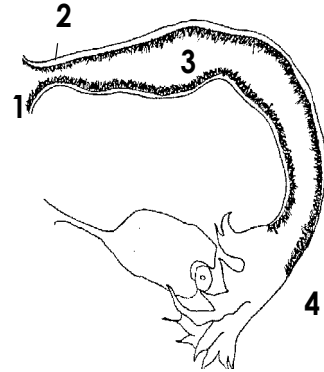
Pregnant uterus



## UTERINE (FALLOPIAN) TUBES

There are two uterine tubes which transport the ova from the ovaries to the uterus. They are positioned between the fold of the broad ligaments. They are approximately 10 cm (4 inches) long, and about the width of a pencil. The uterine tubes consist of four parts:

1. **INTERSTITIAL PORTION** - the thinnest part (1 mm), and the part which passes into the uterine wall.
2. **ISTHMUS** - the narrow portion extending from the uterine wall.
3. **AMPULLA** - the wider middle part, where fertilization usually takes place.
4. **INFUNDIBULUM** - this is the funnel-shaped opening closest to the ovary. It is composed of many fingerlike projections called *fimbriae*.



There are three layers of the uterine tubes:

- a) **Serous membrane** - the outer layer.
- b) **Muscularis** - the middle layer which creates peristalsis, the wavelike contractions which help move the ovum down into the uterus.
- c) **Mucosa** - the lining of the tube containing ciliated cells, hair-like projections which help propel the ovum to the uterus. The mucosa also contains secretory cells, which help to nourish the ovum.

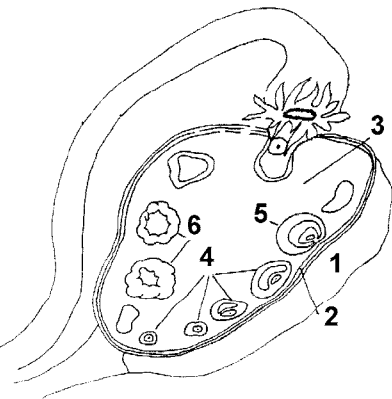
## OVARIES

The ovaries are the almond-shaped organs located in the upper part of the pelvic cavity. They are held in position by ovarian and suspensory ligaments. Each ovary is approximately 2 cm. broad, 1.25 cm thick, and 4 cm long. Functions:

- 1) Development and production of ova.
- 2) Expulsion of ova (ovulation).
- 3) Production and secretion of hormones.

Each ovary consists of the following parts:

1. **GERMINAL EPITHELIUM** - This is the outer covering, composed of simple cuboidal epithelium.
2. **TUNICA ALBUGINEA** - This next layer is surrounded by collagenous connective tissue.
3. **STROMA** - A region of connective tissue, this forms the foundation of the ovary. It is composed of two layers: the outer is called the *cortex*. The inner layer is the *medulla*.
4. **OVARIAN FOLLICLES** - Located in the cortex of the ovary. These are the ova and their surrounding tissues in various states of development.
5. **GRAAFIAN FOLLICLE** - Made up of the mature ovum and its surrounding tissues; it secretes estrogens.
6. **CORPUS LUTEUM** - Meaning "yellow body," it develops at the site of ovulation from the graafian follicle. It produces the hormones, progesterone, and to a lesser degree, estrogens.



## REPRODUCTIVE KEY TERMS

Define the following:

1. Anovulatory
2. Follicular Phase
3. Gonadal
4. Graafian Follicle
5. Human chorionic gonadotropin
6. Luteal phase
7. Hypothalamic-pituitary-gonadal axis
8. Germ cells
9. Menarche
10. Spinnbarkeit

## OVARIAN HORMONES

### ESTROGENS

The main estrogens — estradiol, estrone, and estriol — control the development of breasts and secondary sex characteristics such as fat distribution and hair growth. They assist in the maturation of ovarian follicles and cause the endometrial mucosa to proliferate during the menstrual cycle. Estrogens inhibit FSH production and stimulate LH production.

Estrogens affect the cervical mucus by increasing its quantity and changing the pH, making it into a clear fluid state which aids the penetration of spermatozoa. Estrogens also produce thickening of the vaginal epithelium. Low estrogen can produce thinning of the vaginal wall and a lowering of the quantity of cervical mucus. Estrogens affect the myometrium of the uterus and the muscularis layer of the uterine tube, aiding contractibility.

Estrogens promote the linear growth of bones in the skeletal system. Estrogens may play a role in the prevention of osteoporosis.

### PROGESTERONE

The major functions of progesterone are the preparation of the endometrium for implantation and maintenance of pregnancy. Progesterone is secreted by the corpus luteum and is found in the greatest amounts during the secretory or luteal phase of the menstrual cycle. If pregnancy occurs, the corpus luteum grows, eventually covering two thirds of the ovary, producing progesterone together with the placenta, which will continue to produce progesterone, peaking at about 4 months. Progesterone inhibits the smooth muscles, reducing contractibility in the uterus and intestines. Progesterone affects the development of the breast in conjunction with estrogens, during puberty. It also inhibits prolactin, which in part is why, breast milk is not produced until after birth when the placenta is delivered, as a major source of progesterone is obtained through the placenta.

### ANDROGENS

Types of androgens include: testosterone, dehydroisoandrosterone, and androsterones. They are primarily male hormones, secreted in smaller amounts in females by the adrenal gland. The amounts fluctuate during the menstrual cycle.

During pregnancy, these hormones are responsible for changes in pigmentation in the skin (chloasma), placement of body hair, and sexual drive.

### RELAXIN

This is a hormone which increases during pregnancy, aiding the cervix to soften and relax as well as softening the ligaments to relax the pelvic bones in order to facilitate the birth process.

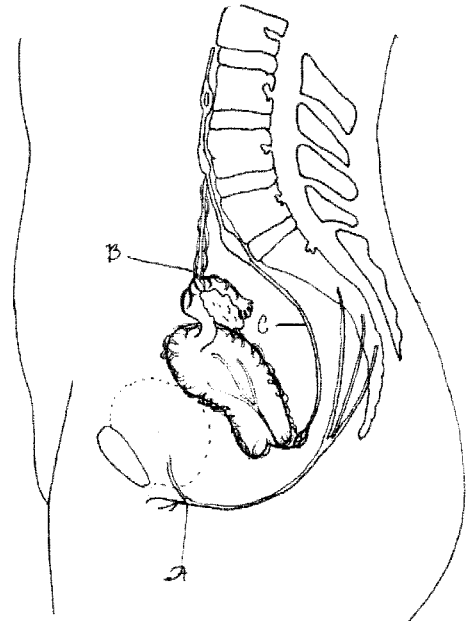
### PITUITARY GONADOTROPHIC HORMONES

Under the direction of the hypothalamus, the anterior pituitary gland produces **Gonadotrophin Releasing Factor (GnRF)**, which stimulates the release of **Follicle Stimulating Hormone (FSH)** and **Luteinizing Hormone (LH)**.

## UTERINE NERVE SUPPLY

The main supply to the uterus is considered to come from the pelvic autonomic system are the sympathetic and parasympathetic nervous systems. Nerve impulses to the uterus are in response to chemical agents within the uterus or hormonal factors in the fetoplacental unit.

Sympathetic nerve fibers from the hypogastric plexus pass to the pelvic plexus in the base of the uterosacral ligaments, from which are supplied the uterus, vagina, bladder, and rectum. Sympathetic nerves from the pelvic plexus pass to the para-cervical ganglia, which are sheaths of sympathetic nerve fibers situated close behind and on either side of the cervix. The contact or pressure on the cervix of a well-fitting presenting part results in the transmission of a stimulus through the para-cervical ganglia from the nerve endings in the cervix. This triggers the release of more oxytocin, creating stronger contractions of the muscle fibers in the upper uterine segment.



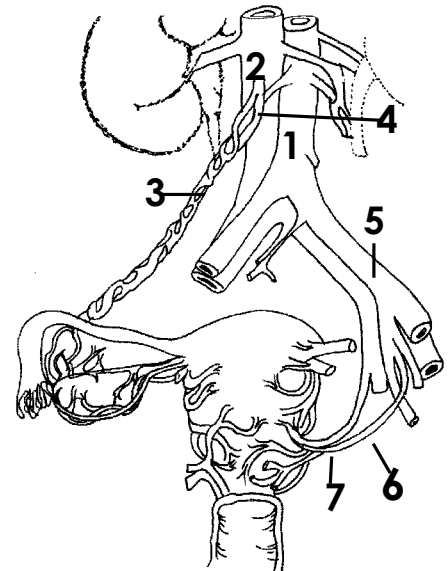
## UTERINE BLOOD SUPPLY

Blood is supplied to the uterus by branches of the internal iliac artery, called the **uterine arteries**. It is drained by the **uterine veins**. Each branch of the uterine artery enters the base of the broad ligament and makes its way to the side of the uterus.

Under the perimetrium, arranged in a circular fashion, are branches called *arcuate arteries* which give off radial arteries that penetrate the myometrium. Just before entering the endometrium, the branches divide into two kinds of arterioles: the *straight arterioles* and the *spiral arterioles*.

There is a network of veins, called the *uterovaginal plexus*, which returns the blood from the uterus and vagina. These veins form a plexus (network) of exceedingly thin-walled vessels which are embedded in the layers of the uterine muscle.

- A. PERINEUM & BLADDER
- B. UTERINE TUBE
- C. CERVIX & UTERUS



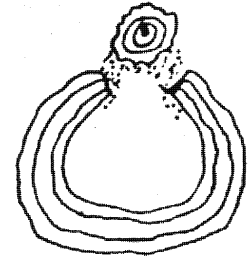
- 1. AORTA
- 2. COMMON ILIAC VEIN
- 3. OVARIAN VEIN
- 4. OVARIAN ARTERY
- 5. COMMON ILIAC ARTERY
- 6. UTERINE ARTERY
- 7. UTERINE VEIN

## OVULATION

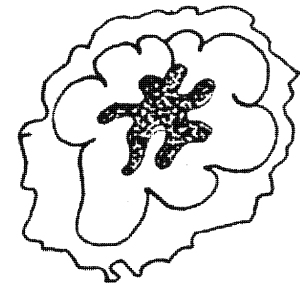
Ovulation is the process of ripening, developing, and expelling the ova. At birth, the female ovary contains about 200,000 ova in each ovary. These are called *primordial follicles*. With puberty and under the influence of estrogens, the primordial follicle matures and becomes the *graafian follicle*. Each month, one of these graafian follicles matures and starts to protrude from the surface of the ovary. As it enlarges, the surrounding capsule thins and stretches. Finally it breaks, and the ovum and its surrounding follicular fluid is released. This is ovulation. Some women can feel the ovum as it is released. A sharp cramp called “*Mittelschmerz*” may be felt. The fimbrial end of the uterine tube lies close to the ovary so it can catch the ovum as it is released. The ciliated hairs and the muscularis layer of the tube propel the ovum towards the uterus.

Ovulation is triggered by a complex hormonal process that takes place during the menstrual cycle. The hypothalamus is releasing **FSHRF** (Follicle Stimulating Hormone Releasing Factor). During the proliferative phase, the follicular fluid surrounding the graafian follicle is secreting high levels of estrogens. This stimulates the anterior pituitary to release **FSH** (Follicle Stimulating Hormone). FSH stimulates the graafian follicle to mature and leads it toward ovulation. Right before ovulation, the hypothalamus secretes **LHRF** (Luteinizing Hormone Releasing Factor). This releases **LH** (Luteinizing Hormone). The presence of LH triggers ovulation, which is followed by the Secretory or Luteal phase.

After ovulation the site of the ovary where the ovum was released becomes the *corpus luteum*, meaning “yellow body”. The corpus luteum produces progesterone. Progesterone is the hormone that helps prepare the uterus for implantation and helps maintain and support the pregnancy. If pregnancy occurs, the corpus luteum grows and continues to produce high quantities of progesterone until the fourth or fifth month. If pregnancy does not occur, the corpus luteum regresses and is replaced by the corpus albicans (white body). This lasts fourteen days.



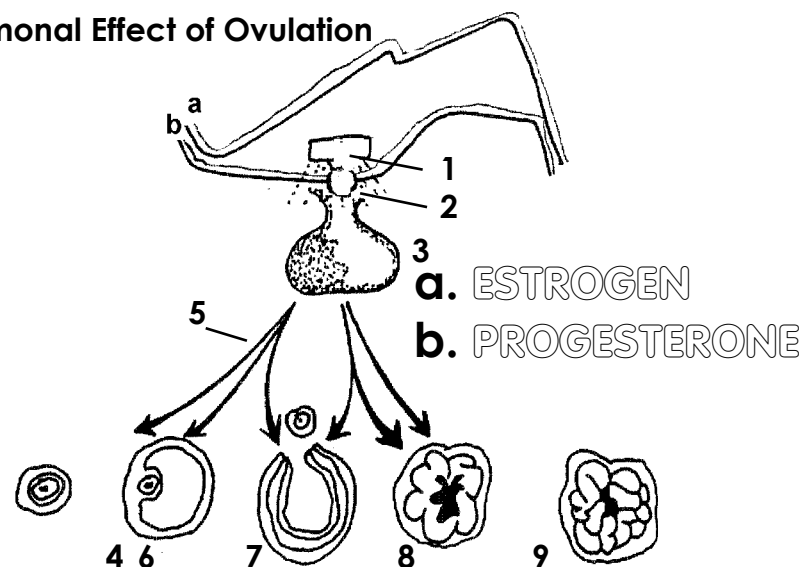
OVULATION



CORPUS LUTEUM

1. HYPOTHALAMUS
2. GONADOTROPHIC HORMONES
3. ANTERIOR PITUITARY
4. OVARY
5. OVARIAN HORMONES
6. GRAAFIAN FOLLICLE
7. OVULATION
8. CORPUS LUTEUM
9. CORPUS ALBICANS

### Hormonal Effect of Ovulation



## MENSTRUATION

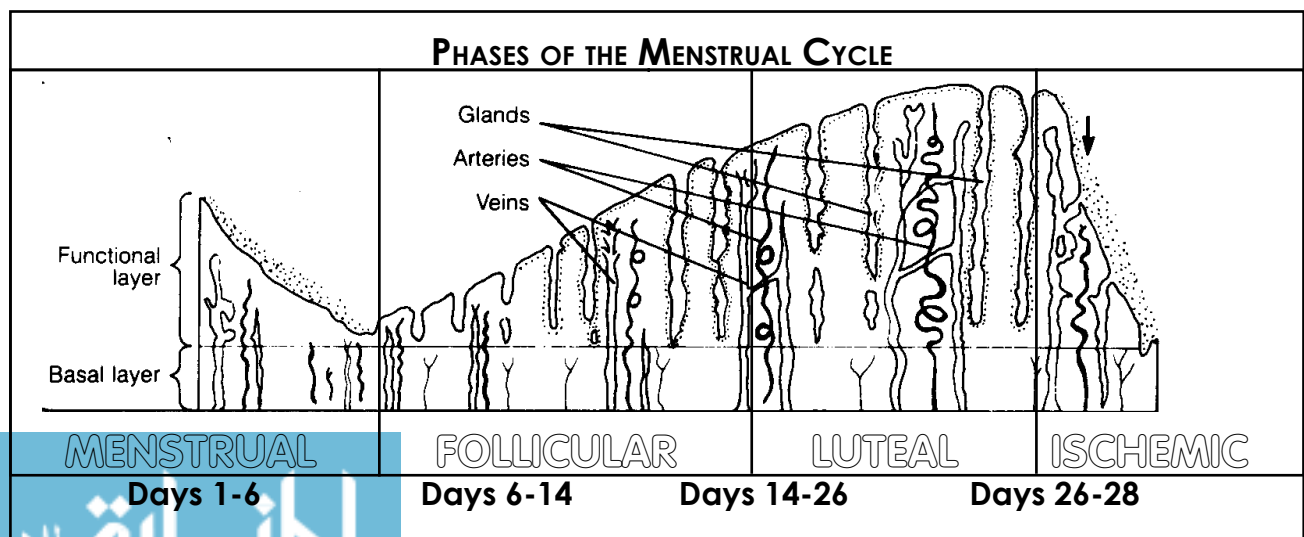
Menstruation is the periodic discharge of blood, mucous, epithelial cells, and one or more unfertilized ovum. This generally occurs on a lunar cycle of approximately twenty-eight days, although the length of the cycle can vary quite a bit for each individual. The menstrual cycle is a series of changes in the endometrium that occurs in a nonpregnant woman. Each hormonal change affects the endometrium, preparing the uterus for the fertilized ovum. If fertilization does not take place, part of the endometrium (*stratum functionalis*) is shed.

There are three phases in the menstrual cycle:

- 1) **Follicular phase** - Also called preovulatory phase, proliferative phase, or estrogenic phase. This phase begins immediately following menstruation. After menses, the endometrium is very thin. During this phase, the endometrium will increase its size six to eight times. It becomes very thick and vascular, and the glands elongate. The Graafian follicle matures and secretes estrogens. These estrogens replace and repair the endometrial lining that was cast off during menses. This phase lasts about ten to thirteen days, and ends with ovulation.
- 2) **Luteal phase** - Also called secretory or post-ovulatory phase. Beginning after ovulation, the glands in the endometrium increase and widen in size. The glands enlarge, secrete, and store glycogen, mucin, and other substances that help to nourish the fertilized ovum. During this phase the Corpus Luteum is formed on the ovary and secretes progesterone. Progesterone is the hormone responsible for building up and preparing the endometrium for implantation. This phase lasts about ten days and ends with menstruation.

Some identify a **Premenstrual or Ischemic Phase** - Estrogen and progesterone levels drop. The spiral arteries undergo vasoconstriction. The endometrium becomes pale. This phase lasts several days.

- 3) **Menstrual phase** - Fourteen days after ovulation, the corpus degenerates, which cuts off progesterone and estrogens. When this occurs, the functional layer of the endometrium sloughs off. This, along with tissue, fluid, mucin, and blood, constitutes menstrual flow. The bleeding that occurs during menstruation comes from patches of the *functionalis* being detached. Because this occurs in patches, excessive bleeding is avoided. Also, *fibrinolysis*, a blood clotting factor, keeps hemorrhage from occurring. Menstruation usually lasts three to six days.



## OVULATION &amp; MENSTRUATION EXERCISES

1. Number each step in ovulation in the order it occurs:

- \_\_\_ Hypothalamus releases LHRF.
- \_\_\_ Hypothalamus releases FSHRF.
- \_\_\_ Anterior pituitary releases LH.
- \_\_\_ Graafian follicles produce estrogens.
- \_\_\_ Anterior pituitary releases FSH.
- \_\_\_ LH triggers ovulation.
- \_\_\_ Corpus luteum releases progesterone and estrogen.
- \_\_\_ FSH stimulates the graafian follicle to develop.

2. Match the phase of the menstrual cycle with its related time period within a 28 day cycle.

- |                |               |
|----------------|---------------|
| ___ Luteal     | 1. Days 1-5   |
| ___ Follicular | 2. Days 6-13  |
| ___ Menstrual  | 3. Days 15-25 |
| ___ Ovulation  | 4. Days 14    |
| ___ Ischemic   | 5. Days 26-28 |

3. Fill in the following:

Hormone	Source	Function
Estrogen		
Progesterone		
Testosterone		
Relaxin		
Follicle Stimulating Hormone		
Luteinizing Hormone		

## MENSTRUATION FEELINGS EXERCISE

*Culture and family have a profound influence on women's feelings and experience of menstruation. How we feel about our bodies can affect how we give birth. Use this exercise to explore some of your own feelings about menarche.*

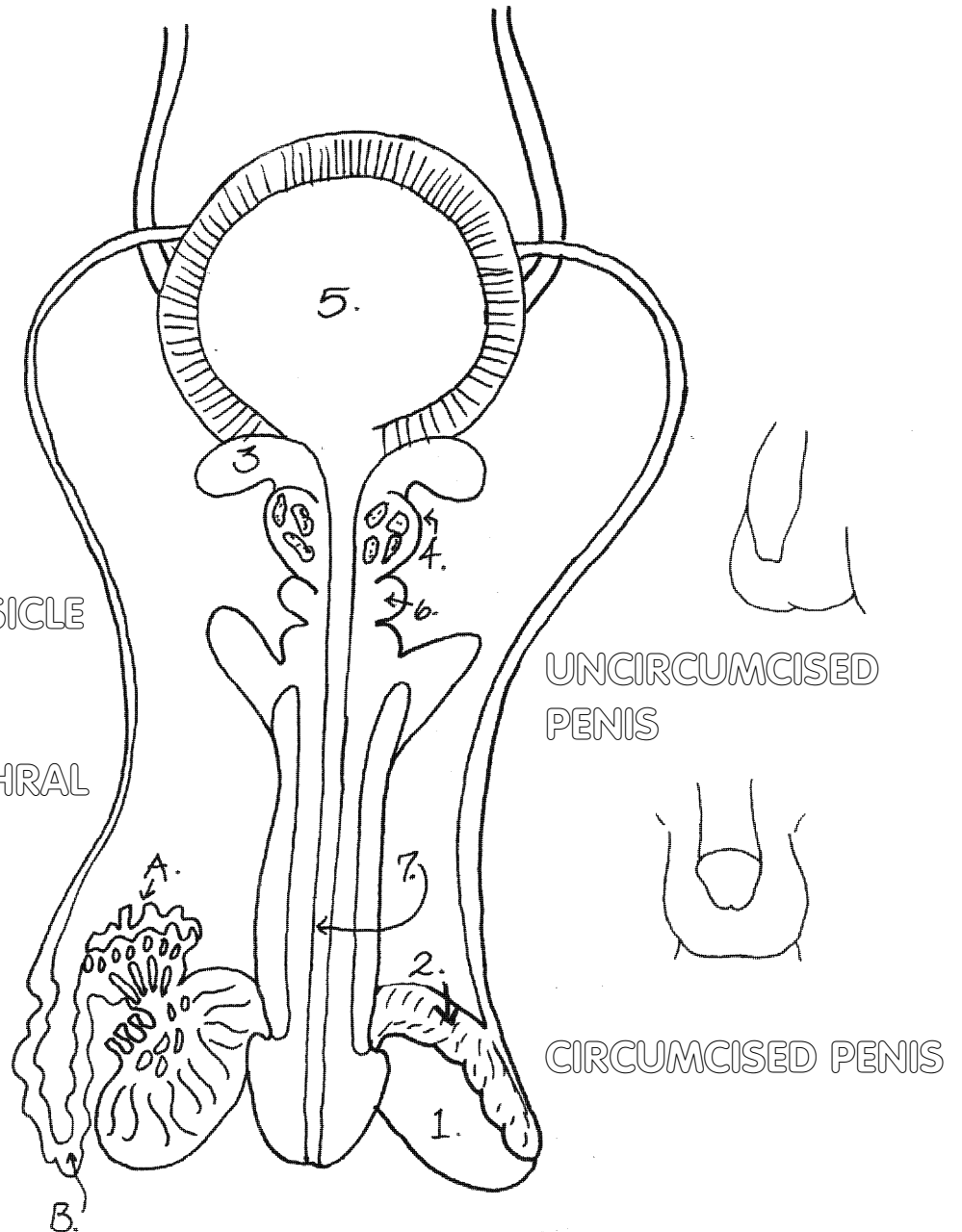
1. What, if anything, did I know about menstruation before my menarche?
2. Where did I learn this?
3. Did I have any misinformation or misconceptions about menstruation?
4. Was there anything I wished I had known about menstruation that I did not know?
5. With what feelings did I anticipate my first period?
6. How did it match or not match my expectations?





## MALE REPRODUCTIVE SYSTEM

1. TESTICLE
2. EPIDIDYMIS
  - A. HEAD
  - B. TAIL
3. SEMINAL VESICLE
4. PROSTATE
5. BLADDER
6. BULBO-URETHRAL GLAND
7. URETHRA



### MALE ANATOMY EXERCISE

Describe how knowledge of male reproductive anatomy is useful to the midwife.

## MALE REPRODUCTIVE SYSTEM

1. The **TESTES** are located inside the scrotum. There are two, each of which is about 5 cm in length and 2.5 cm in width. Each is divided into lobules or compartments. In each lobule, there are two or three tightly coiled tubules, called *seminiferous tubules*, which produce sperm. The male hormone, testosterone, is produced in the testes.

2. The **SCROTUM**, located at the base of the penis, houses and protects the testes. It also helps the testes maintain a temperature of about 3 degrees F below body temperature. If exposed to cold, the scrotum contracts, bringing the testes closer to the body cavity, to absorb heat. When exposed to heat, the reverse process occurs. Excessive heat or cold can inhibit sperm production.

3. The **EPIDIDYMIS** are two organs lying on the posterior border of each testis. It is a tightly coiled tube, about 20 feet long and only 1 mm in diameter, and is the site of sperm maturation and storage. The epididymis propels sperm towards the urethra, during ejaculation, by peristalsis.

4. The **VAS DEFERENS**, also called Ductus Deferens, or seminal duct, is approximately 45cm. (18 inches) long. It goes up and behind the testes through the inguinal canal and enters the pelvic cavity, where it loops over the side and down on the posterior surface of the bladder. The vas deferens propels sperm and adds secretions, creating semen. Vasectomies are done on the vas deferens.

5. The **EJACULATORY DUCTS** are located posterior to the bladder. Each duct is a continuation of the vas deferens. They both eject sperm into the urethra and are about 2 cm (1 inch) long.

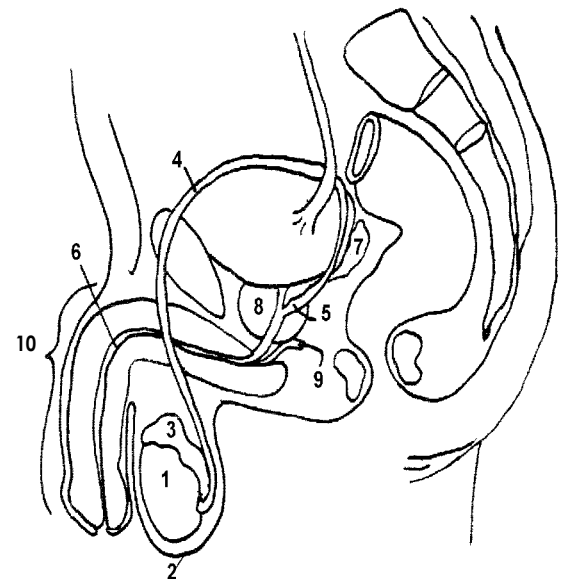
6. The **URETHRA** passes through the prostate gland, the urogenital diaphragm, and the penis. It is about 20 cm (8 inches) long. The urethra is the central duct that sperm and urine pass through to the outside of the body.

7. The **SEMINAL VESICLES** are two accessory glands that secrete the liquid portion of the sperm. Located posterior to and at the base of the urinary bladder, in front of the rectum, they are about 5 cm or 2 inches long. They secrete an alkaline fluid of the semen which is high in fructose, and pass it to the ejaculatory duct.

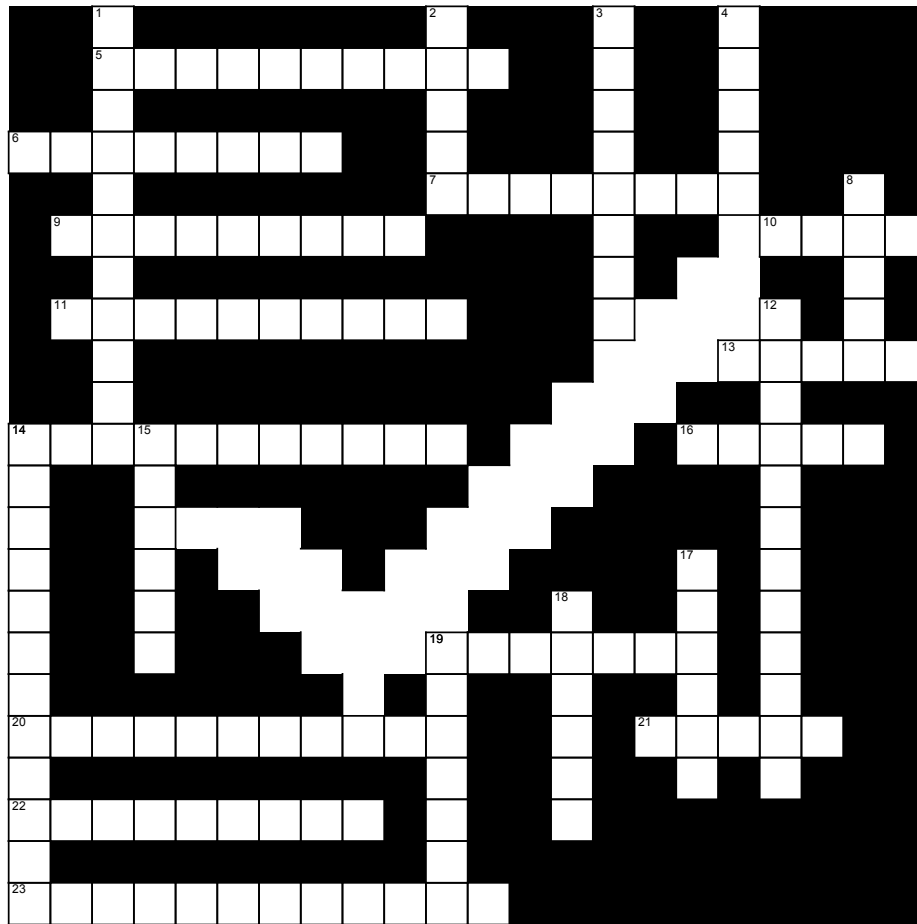
8. The **PROSTATE GLAND** is located inferior to the urinary bladder and surrounds the upper part of the urethra. It is doughnut shaped and is about the size of a chestnut. The prostate secretes an alkaline fluid that comprises about 25% of the semen. This gland can become enlarged and can cause painful ejaculation or urination.

9. The **BULBOURETHRAL GLANDS** or **Cowper's glands** are located beneath the prostate on either side of the urethra. They are about the size of peas. Their function is to provide mucous for lubrication. Pre-ejaculatory emissions come from these glands which lubricate the penis.

10. The **PENIS** is suspended in front of the scrotum. It consists of four parts: **cura**, or root; **corpus cavernosum**, or body; **glans** or head; and **prepuce** or foreskin.



## Reproductive A &amp; P



## Across

5. Pertaining to the residual structure in the broad ligament between the ovary and fallopian tube.
6. The prepuce—the fold of skin covering the glans penis.
7. Any substance which possesses masculinizing activities: such as the testis hormone.
9. Two canals extending from the sides of the fundus uteri.
10. The female reproductive cell.
11. The posterior commissure of the labia majora.

13. A gamete-producing gland; an ovary or testis.
14. A sudden act of expulsion: as of semen.
16. The sexual gland of the female in which the ova are developed
19. A hole: opening: aperture or orifice—especially one through a bone.
20. The mucous membrane which lines the uterus.
21. belonging to the pubis.
22. Opening of the vagina.
23. Pertaining to the interior of the cervix of the uterus.

## Down

1. The male reproductive cells.

2. Lips or lip-like structures on the vulva
3. A small, elongated, erectile body situated at the anterior part of the vulva.
4. A membranous fold which partially or wholly occludes the introitus
8. The external genitals of the female.
12. A substance having an affinity for or a stimulating effect on the gonads.
14. Outside of the uterus.
15. The lower and narrow end of the uterus: between the os and the body of the organ.

17. The upper rounded portion of the uterus between the points of insertion of the fallopian tubes.
18. The canal in the female: extending from the vulva to the cervix of the uterus.
19. The fringe-like end of the fallopian tube.

## SELF-TEST

### True/False

1. \_\_\_ The thick muscular middle layer of the uterus is called the myometrium.
2. \_\_\_ The broad ligament originates at the base of the uterine tube and inserts into the labia majora.
3. \_\_\_ The paraurethral glands are another name for Bartholin's glands
4. \_\_\_ Mittelschmerz is the stretchy, transparent cervical mucous that occurs around ovulation.
5. \_\_\_ The fimbria are at the proximal end of the uterine tube.
6. \_\_\_ Perianal means inside the anus.
7. \_\_\_ The broad ligament extends from the peritoneum.
8. \_\_\_ Semen is slightly acid.
9. \_\_\_ The corpus luteum secretes FSH.
10. \_\_\_ Estrogen is produced by the anterior pituitary gland.

### Multiple Choice

11. The cardinal ligament
  - A. Suspends the ovary to the pelvic side walls
  - B. Attaches to the uterus just below the fallopian tubes and inserts in the labia majora
  - C. Drapes over the uterus and ovaries
  - D. Connects to the uterus at the junction between the cervix and the body of the uterus
12. The round ligament
  - A. Suspends the ovary to the pelvic side walls.
  - B. Attaches to the uterus just below the fallopian tubes and inserts in the labia majora.
  - C. Drapes over the uterus and ovaries.
  - D. Connects to the uterus at the junction between the cervix and the body of the uterus.
13. The broad ligament
  - A. Suspends the ovary to the pelvic side walls.
  - B. Attaches to the uterus just below the fallopian tubes and inserts in the labia majora.
  - C. Drapes over the uterus and ovaries.
  - D. Connects to the uterus at the junction between the cervix and the body of the uterus.
14. The soft mucosal lining of the uterus is the:
  - A. Perimetrium.
  - B. Myometrium.
  - C. Peritonium.
  - D. Endometrium.
15. The levator ani consists of three muscle pairs:
  - A. iliococcygeus, bulbocavernosus, and pubococcygeus.
  - B. pubococcygeus, superficial transverse muscle, bulbocavernosus.
  - C. iliococcygeus, bulbocavernosus, ishiocavernous.
  - D. iliococcygeus, pubococcygeus, ishiococcygeus.

### Answers:

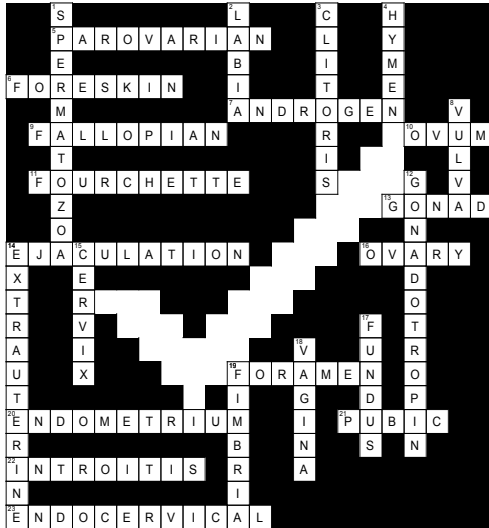
1. True, 2. False, 3. False, 4. False, 5. True, 6. False, 7. True, 8. False, 9. False, 10. False, 11. D, 12. B, 13. C, 14. D, 15. D.

PUZZLE ANSWER KEY

External Female Reproductive Parts



Reproductive A & P



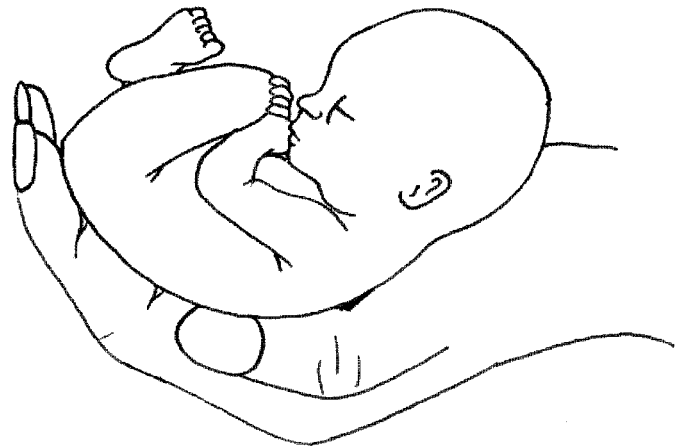
# Chapter 5

## The Beginning of Life

### OBJECTIVES

*After completing this chapter, the student should be able to:*

1. Identify the parts of a cell.
2. State the mechanisms by which substances enter or exit a cell.
3. Describe the structure and function of the plasma membrane.
4. Describe the functions of the cell nucleus, cytoplasm, and organelles.
5. Describe the function of chromosomes.
6. Define terms relevant to genetics.
7. Describe the steps involved in mitosis.
8. State the sequence and functions of meiosis.
9. Explain the entire process of conception, including: where, how, and when fertilization takes place.
10. Explain how twins are formed, both identical and fraternal.
11. Explain how a fertilized ovum develops, from conception to the 14th day.
12. Describe the development of the embryo and fetus from 14 days to 44 weeks.
13. Define the decidua, and locate its areas.
14. Describe how the fetus derives its nutrition.
15. Identify the factors that influence fetal lung maturity.
16. List how fetal circulation differs from an infant's circulation.
17. Describe the importance of the chorionic villi.
18. Describe the tissues to which the endoderm, mesoderm, and ectoderm each give rise in the fetus.



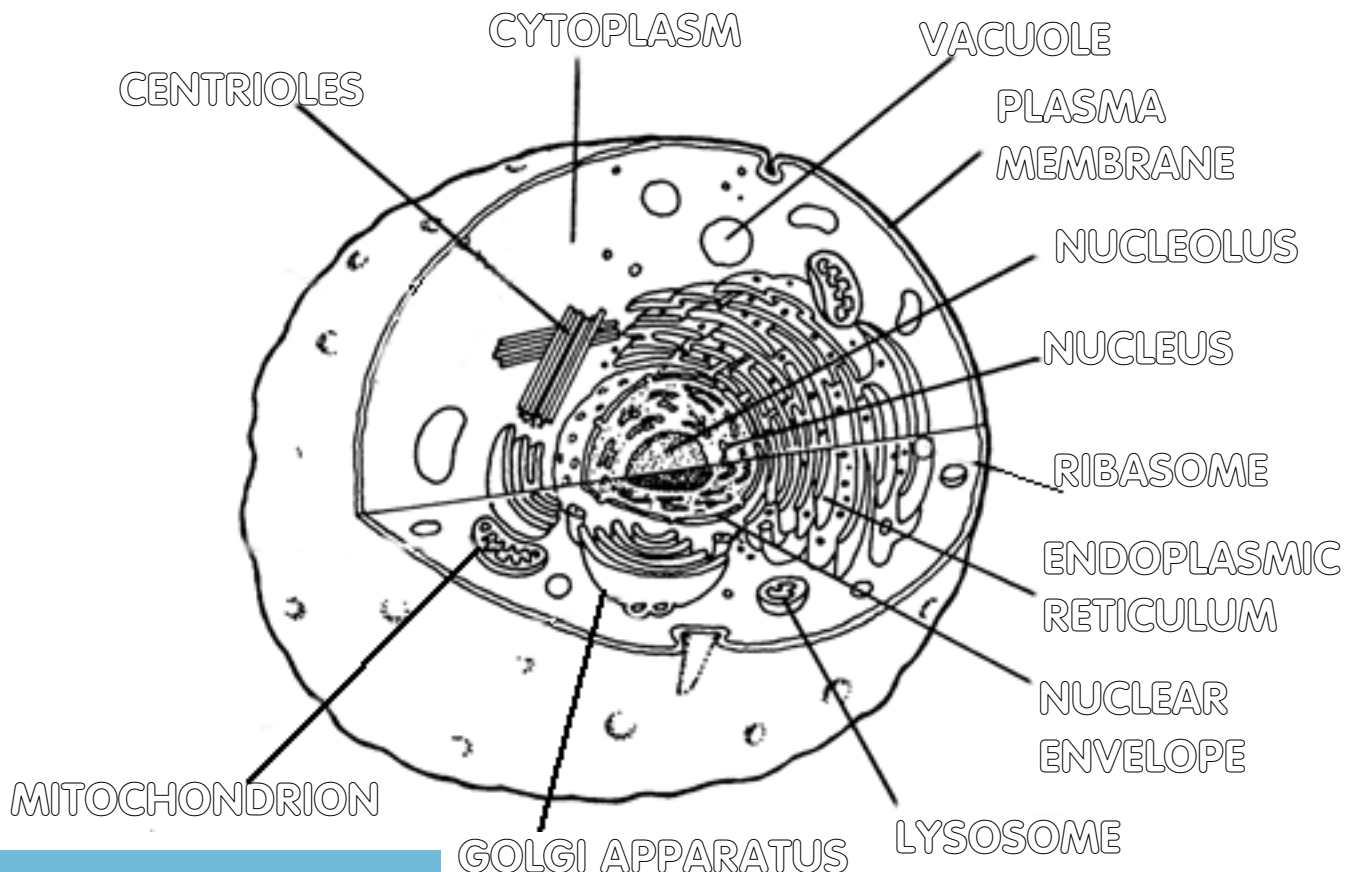
## CELLS

The cell is the smallest unit of a living organism that is able to grow and reproduce independently. It is the fundamental structural unit of all living things. A cell consists of an outer membrane, which encases the fluid of the cell and which separates it from the environment. Within the cell is a nucleus and cytoplasm. The cytoplasm contains organelles that carry out the cell's functions. The nucleus contains the genetic material, deoxyribonucleic acid (DNA), which encodes heritable information for the maintenance of life.

Some organisms are formed only of one cell, such as bacteria. That type of cell, which does not have a nucleus and rarely has membrane-bound organelles, is called a **prokaryote**. A prokaryote contains genetic materials, but those materials are not enclosed within a nuclear membrane.

Cells of higher organisms such as plants and animals are called **eukaryotes**. These are cells with a nucleus. They are subdivided into subcellular compartments called **organelles** such as the **mitochondrion**, the **cell nucleus**, the **endoplasmic reticulum**, the **Golgi apparatus** and many smaller organelles with highly specialized functions. While all these organelles are found in animal cells, plant cells, in addition, contain a central vacuole, which controls pressure to stabilize the cell, and chloroplasts, the site of photosynthesis or light-dependent biosynthesis of sugars (carbohydrates).

### PARTS OF A CELL





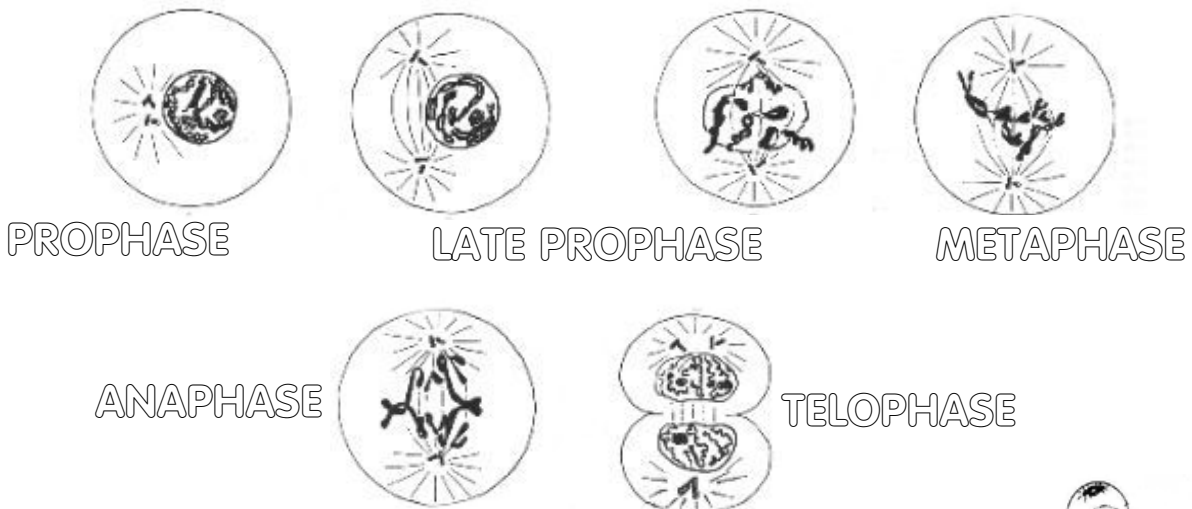
## CELL DIVISION

### MITOSIS

The process of cell division in eukaryotic cells is called **mitosis**. It results in one cell dividing into two new cells, both identical to the original. The two resulting cells each have a nucleus containing the same number and kind of chromosomes as the mother cell. The two new cells are called daughter cells.

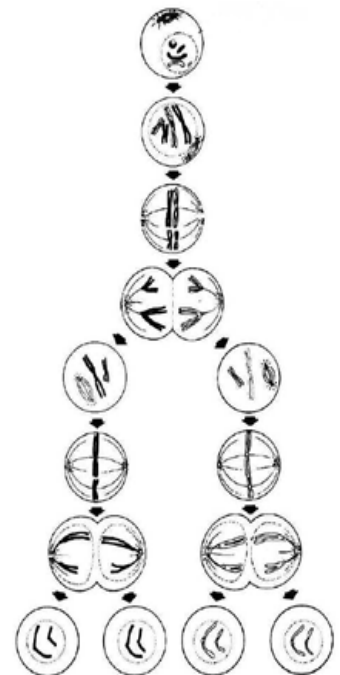
The process in cell division by which the nucleus divides typically consists of five stages:

1. **Interphase - the phase** where a cell is 95% of the time, performing its duties; for example, blood cell carrying oxygen.
2. **Prophase** - the first stage of mitosis where **in** chromatin, consisting of strands of DNA, condenses, nucleolus and nuclear envelope disappear, and spindle fibers form.
3. **Metaphase** - the stage wherein chromosomes are aligned at the cell center prior to separation.
4. **Anaphase** - the phase wherein chromosomes move toward opposite ends of the nuclear spindle.
5. **Telophase** - migration of chromosomes to cells is complete.

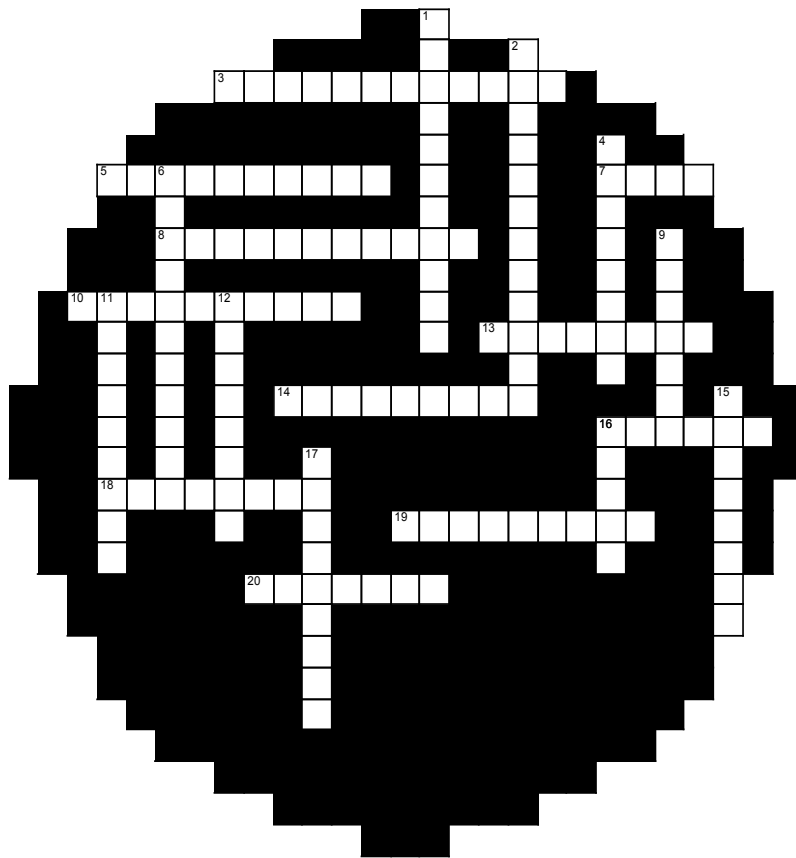


### MEIOSIS

The reproductive process involving two successive divisions of a cell, resulting in four daughter cells, is called meiosis. Unlike what occurs in mitosis, the daughter cells produced in meiosis are not identical to each other. Meiosis is the process by which sperm and egg cells are made. This two-stage type of cell division halves the number of chromosomes in a cell. When two sexual cells fuse, each contributes its half of the chromosomes. The resulting embryo contains the full chromosome complement. Cells with half the chromosomes are called **haploids**; those with the normal chromosomal complement, **diploids**



## Cells



## Down

1. the most condensed and constricted region of a chromosome, to which the spindle fiber is attached during mitosis
2. hollow cylinders made of the protein tubulin that form, among other things, the spindle fibers
4. many membrane bound sacs with little or no inner structure
6. the building blocks of the dna molecule
9. having a pair of each type of chromosome, so that the basic chromosome number is doubled
11. surrounds nucleus and houses rna
12. the first stage of mitosis and meiosis
15. the stage of meiosis or mitosis when chromosomes move toward opposite ends of the nuclear spindle
16. short hair-like structures protruding from the cell membrane, used in locomotion
17. the final stage of mitosis or meiosis during which nuclei form in the daughter cells

## Across

- |   |  |
|---|--|
| 3. cell organelles that help the cell produce energy  | 16. combination of three nitrogenous bases on the mna molecule   |
| 5. cylindrical structures that are composed of groupings of microtubules                      | 18. a membrane-bound organelle in the cytoplasm of most cells containing various hydrolytic enzymes that function in intracellular digestion |
| 7. the letters representing the four different nitrogenous bases are shown in the nucleotides | 19. the nuclear material that makes up chromosomes, consisting of dna and protein  |
| 8. physical structures in the cell's nucleus that house the genes                             | 20. having a single set of chromosomes   |
| 10. the period in the cell cycle when dna is replicated in the nucleus                        |  |
| 13. long cell extensions that function in swimming  |  |
| 14. the cell organelle on which protein is made   |  |

### CELL EXERCISE

Put a check mark in the appropriate column for the characteristics of meiosis and mitosis.

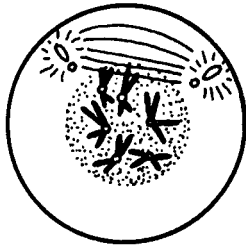
	Meiosis	Mitosis
No pairing of homologs occurs		
Two divisions		
Four daughter cells produced		
Used in growth and maintenance, asexual reproduction		
Associated with sexual reproduction		
One division		
Two daughter cells produced		
Involves duplication of chromosomes		
Chromosome number is maintained		
Chromosome number is halved		
Crossing over between homologous chromosomes may occur		
Daughter cells are identical to parent cells		
Produce gametes		
Synapses occurs in prophase		

Match the descriptions in Column I with the names in Column II.

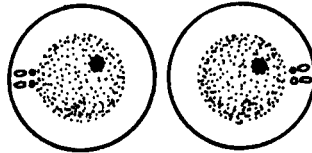
- |   |                           |
|---|---------------------------|
| _____ 1. Holds nucleus together.                          | A. Golgi bodies           |
| _____ 2. Surface for chemical activity.                   | B. nucleus                |
| _____ 3. Units of heredity.                               | C. chromosomes            |
| _____ 4. Digestion center.                                | D. vacuole                |
| _____ 5. Where proteins are made.                         | E. ribosomes              |
| _____ 6. Structures involved in mitosis.                  | F. endoplasmic reticulum  |
| _____ 7. Hollow cylinder that supports and shapes cell.   | G. nuclear membrane       |
| _____ 8. Spherical body within nucleus.                   | H. centrioles             |
| _____ 9. Controls entry into and out of cell.             | I. cytoplasm              |
| _____ 10. Chromosomes are found here.                     | J. cell (plasma) membrane |
| _____ 11. Jellylike substance within cell.                | K. mitochondria           |
| _____ 12. Contains code which guides all cell activities. | L. lysosome               |
| _____ 13. Minute hole in nuclear membrane.                | M. genes                  |
| _____ 14. "Powerhouse" of cell.                           | N. nuclear pore           |
| _____ 15. Contains water and dissolved minerals.          | O. nucleolus              |
| _____ 16. Stores food or contains pigment.                | P. microtubule            |

MITOSIS EXERCISE

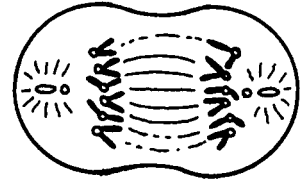
Number the following six diagrams with the stages of mitosis in cells in the proper order. Label each stage with the proper name.



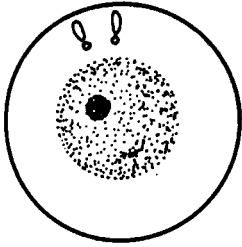
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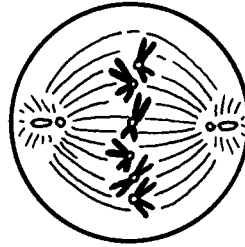
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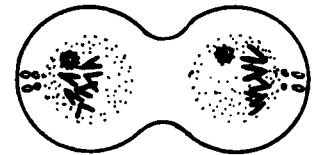
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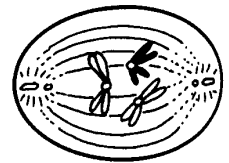
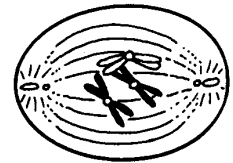
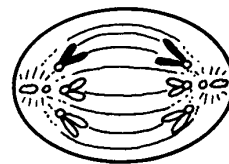
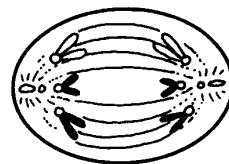
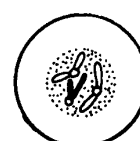
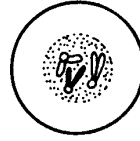
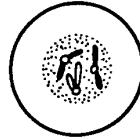
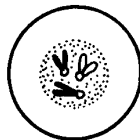
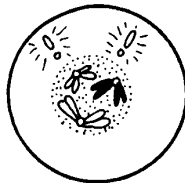
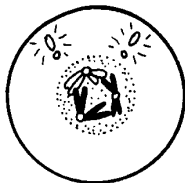


\_\_\_\_\_



\_\_\_\_\_

Label each phase correctly as prophase II, metaphase II, anaphase II, telophase II



\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## CELL ENERGY EXERCISE

Define the following terms:

- A. Diffusion
- B. Osmosis
- C. Filtration
- D. Dialysis
- E. Facilitated diffusion
- F. Active transport
- G. Pinocytosis
- H. Phagocytosis
- I. Exocytosis
- J. Carrier molecule
- K. Sodium potassium pump
- L. Osmotic pressure

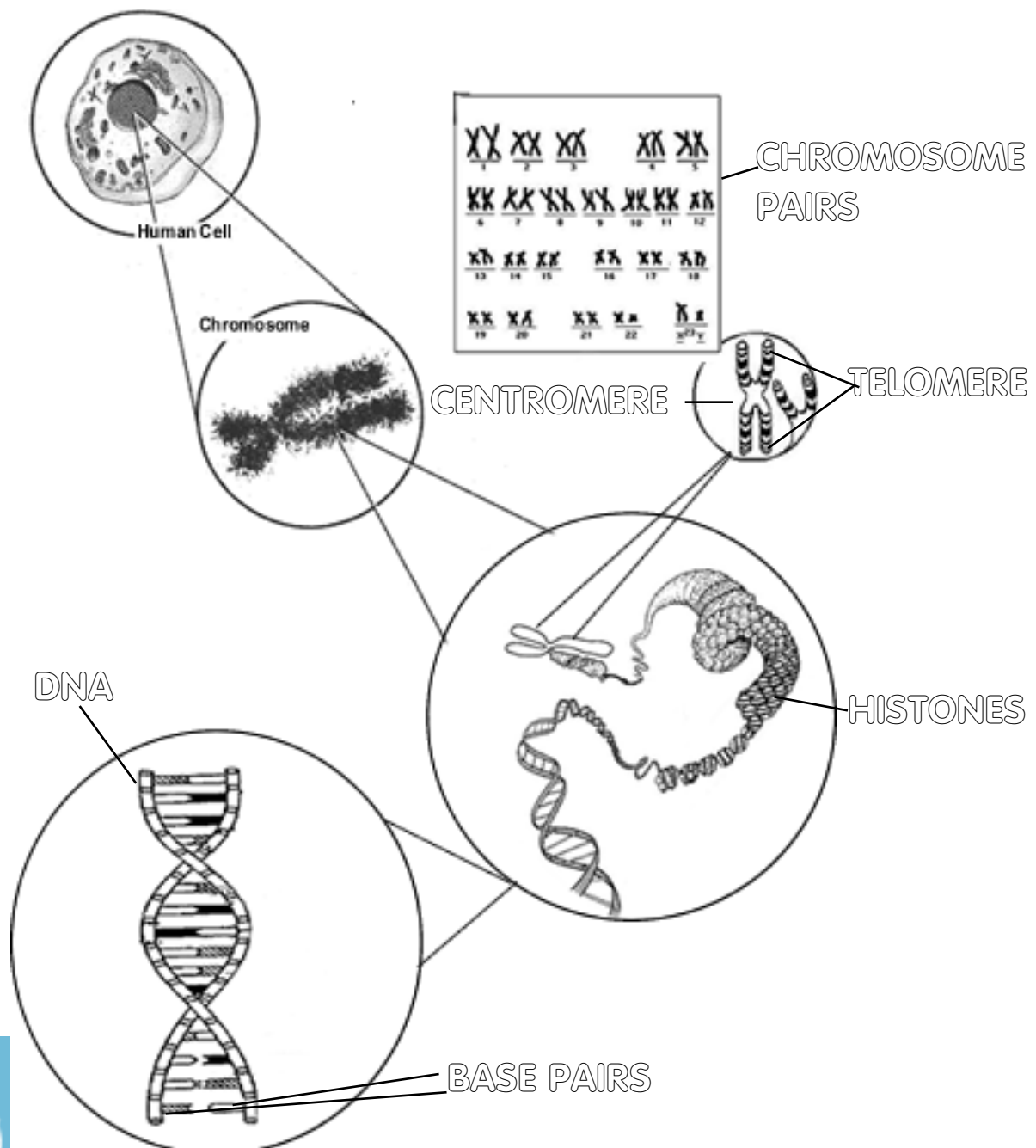
<i>Check which substance enters the cells by what mechanism</i>					
	osmosis	diffusion	facilitated diffusion	active transport	cellular pump
<b>Sodium</b>					
<b>Potassium</b>					
<b>Water</b>					
<b>Proteins</b>					
<b>Amino acids</b>					
<b>Starch</b>					
<b>Glucose</b>					
<b>Fats</b>					
<b>Iron</b>					
<b>Oxygen</b>					
<b>Carbon dioxide</b>					

## CHROMOSOMES

A chromosome is a threadlike structure found within the cell nucleus that contains a long, continuous strand of DNA and associated proteins called histones. Each cell in the body contains 23 pairs (46) of chromosomes. Each parent contributes one chromosome to each pair, so a child gets half of their chromosomes from their mother and half from their father. Egg and sperm cells have only 23 chromosomes each. Chromosomes are numbered 1-22, with the last pair being the sex chromosomes: XX for a female and XY for a male. Each chromosome contains over 1,000 genes.

Telomeres are either end of a chromosome which act as caps to keep the sticky ends of chromosomes from randomly clumping together.

Centromeres are the central portion of the chromosome to which the spindle fibers attach during mitotic and meiotic division.



## GENETICS KEY TERMS

Define the following:

1. Gametes
2. Mitosis
3. Nidation
4. Chromosome
5. Corona radiata
6. DNA
7. RNA
8. Cytosine
9. Adenine
10. Guanine
11. Thymine
12. Cytosine
13. Uracil
14. Meiosis
15. Cytokinesis
16. Haploid number
17. Pronucleus
19. Genotype
20. Diploid
21. Phenotype
22. Oogenesis
23. Dominant
24. Recessive
25. Carrier

## SELECTED HEREDITARY TRAITS IN HUMANS

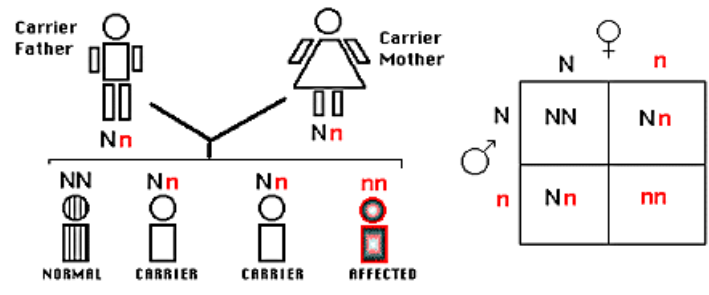
### DOMINANT

Curly hair  
 Dark brown hair  
 Coarse body hair  
 Pattern baldness (dominant in males)  
 Normal skin pigmentation  
 Brown eyes  
 Near or farsightedness  
 Normal hearing  
 Normal color vision  
 Broad lips  
 Large eyes  
 Polydactylism (extra digits)  
 Brachydactylism (short digits)  
 Syndactylism (webbed digits)  
 Hypertension  
 Diabetes insipidus  
 Huntington's chorea  
 Normal mentality  
 Normal resistance to disease  
 Enlarged spleen  
 Enlarged colon  
 A or B blood factor  
 Rh blood factor

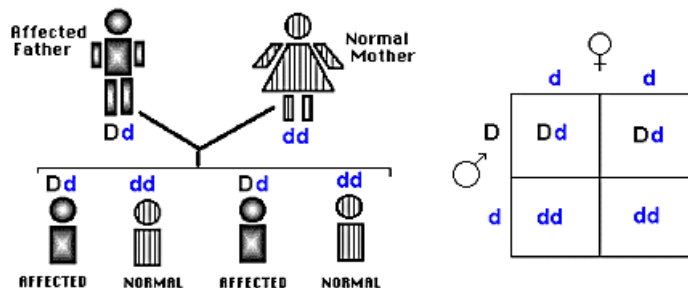
### RECESSIVE

Straight hair  
 All other colors  
 Fine body hair  
 Baldness (recessive in females)  
 Albinism  
 Blue or gray eyes  
 Normal vision  
 Deafness  
 Color blindness  
 Thin lips  
 Small eyes  
 Normal digits  
 Normal digits  
 Normal digits  
 Normal blood pressure  
 Normal excretion  
 Normal nervous system  
 Schizophrenia  
 Susceptibility to disease  
 Normal spleen  
 Normal colon  
 O blood factor  
 No Rh blood factor

### Recessive inheritance



### Dominant inheritance





## Cell Word Search

C C L  
 U I A Y I  
 M Q N L S P T  
 A G O O W U O  
 N D L T N X R R N  
 E E O O P T I G S  
 Z N N C S R C N A D P  
 C I I H I O U E N I S  
 C N N E I K R P E F K  
 H A E M W A A Y L F L  
 A U V I O R C T L U A  
 N G S O K Y I O E S C  
 P L A S M O L Y S I S  
 C E M C T P R T O  
 W M O E E L A U N  
 W S B T M K H  
 E I W O E G Q  
 S S F O S

- One of the four nitrogen-containing bases occurring in nucleotides
- The process by which ATP is produced in the inner membrane of a mitochondrion
- The spontaneous movement of particles from an area of higher concentration to an area of lower concentration
- Haploid reproductive cells
- One of the nitrogenous bases in nucleic acids
- Term applied to two solutions with equal solute concentrations
- Term applied to two solutions with equal solute concentrations.
- The chromosomal characteristics of a cell; also, a representation of the chromosomes aligned in pairs
- Cell components that carry out individual functions
- Diffusion of water molecules across a membrane in response to differences in solute concentration.
- Osmotic condition in which a cell loses water to its outside environment
- Type of cell that lacks a membrane-bound nucleus and has no membrane organelles; a bacterium.
- One of the groups of nitrogenous bases that are part of a nucleotide.
- Relating to the non-gonadal tissues and organs of an organism's body.
- The pyrimidine that replaces thymine in RNA molecules and nucleotide

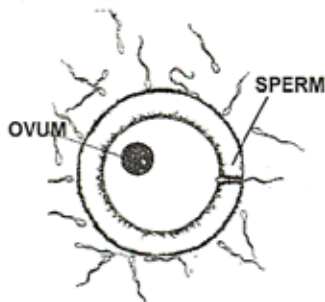
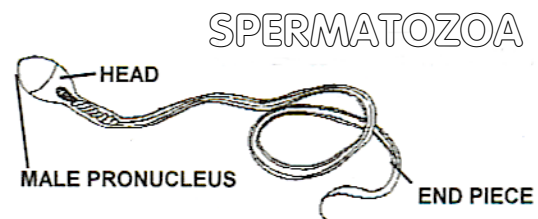
## CONCEPTION

When ovulation occurs, the cervical mucous glands produce mucus that is less acidic (more basic) and of a different viscosity which is more favorable to sperm's motility and survival. This mucous has a very slippery, stretchy quality called *Spinnbarkeit*.

**Fertilization usually takes place in the ampulla of the uterine tube.** Of the hundreds of millions of sperm that are released, only about a few thousand survive to the ovum. The ovum is surrounded by a gelatinous covering called the *zona pellucida*. The zona pellucida consists of several layers of cells, the outmost of which is called *corona radiata*. The hundreds of sperm that attempt to penetrate the ovum all help to break down the zona pellucida so that one sperm will succeed and fertilize the ovum. Only one spermatozoa achieves fertilization, because once the penetration of the corona radiata is made, the ovum immediately develops a fertilization membrane which creates a barrier for the remaining sperm.

**When the spermatozoa enters the ovum,** its tail is shed, leaving the head. The head contains the male genetic material which unites with the nucleus of the ovum (the female genetic material). Each nucleus contains twenty-three chromosomes.

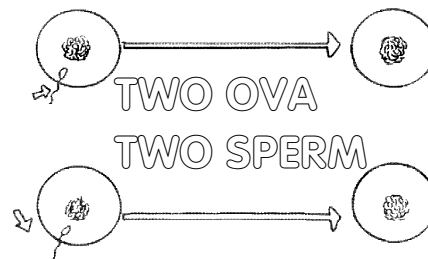
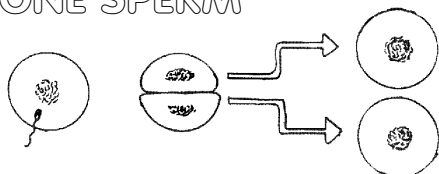
When the pronuclei fuse, fertilization takes place, and there are forty-six chromosomes. Each cell of the new body is developed from this and contains forty-six chromosomes in each nucleus, (except the gamete, or sperm and ova, which contain twenty-three).



These chromosomes contain **DNA**, which is our genetic blueprint responsible for the color of our eyes and hair, our genetic predisposition to diseases, and our heredity in general.

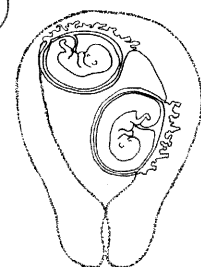
Rarely, the fused pronuclei divide, creating two separate but identical structures, which will become identical or *monozygotic twins*. Fraternal or *dizygotic twins* are caused from two sperm and two ova. They are much more common than identical; the tendency can be hereditary, as it is caused when more than one ovum is released during a menstrual cycle. Identical or monozygotic twins are not hereditary; they are simply a fluke of nature.

ONE OVUM  
ONE SPERM



MONOZYGOTIC

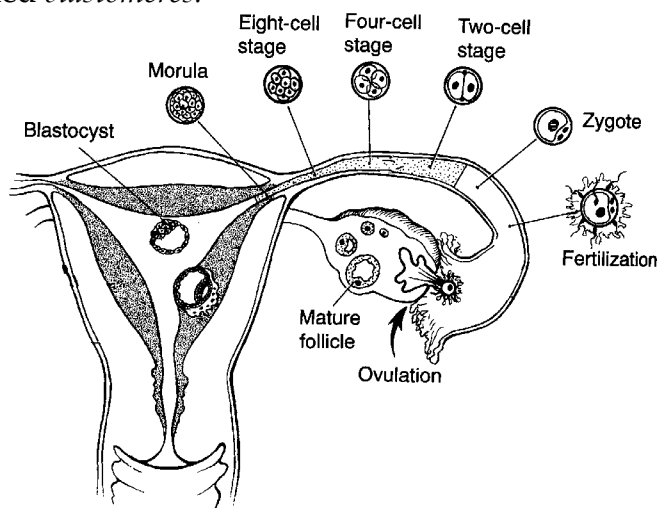
DIZYGOTIC



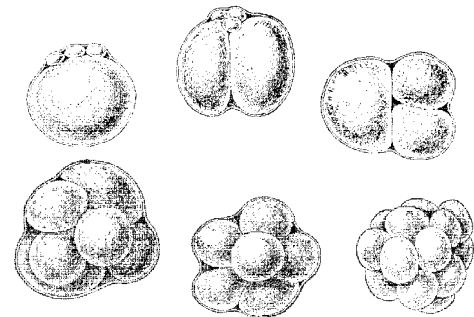
## DEVELOPMENT OF THE FERTILIZED OVUM

Ova and sperm are called *gametes*, and they differ from all other cells in the body because they only have 23 chromosomes in their nuclei. (All cells in the body except gametes have 46 chromosomes.)

**After fertilization** takes place, the new cell is called a *zygote*. Immediately after fertilization, rapid cell division takes place. This is called *cleavage*. The cells divide into two, then four, eight, sixteen and so forth. By the end of the third day there are sixteen cells. These cells are called *blastomeres*.

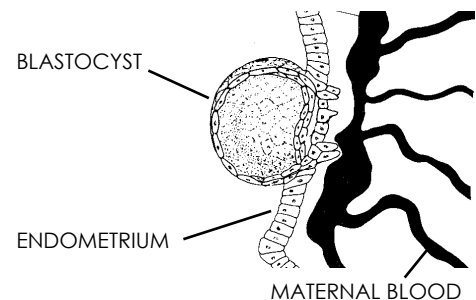


### CLEAVAGE



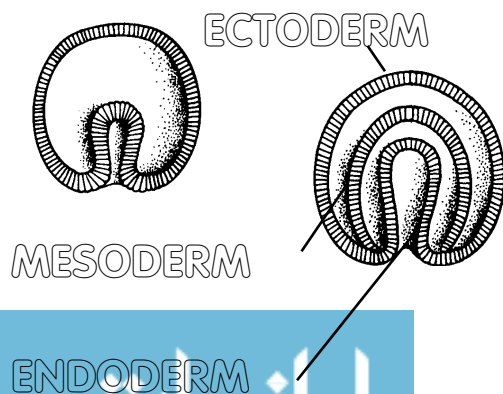
**By day four** a mass of cells called a *morula*, meaning "mulberry", has formed. Five days after fertilization, the morula begins to enter the uterine cavity. This is the blastula phase. It has now formed a hollow ball of cells, called a *blastocyst*, surrounded by a fluid filled cavity called the *blastocoele*.

**On the seventh or eighth day after conception**, the blastocyst implants into the endometrium which will become the decidua during pregnancy. Occasionally, a small amount of bleeding called *implantation bleeding* can occur. The rich vascularity and thick gland secretions in the endometrium during the post-ovulatory or secretory phase help to nourish and support the blastocyst until it can develop its own circulatory system.



Following implantation - **about 14 days after fertilization** - As the cells continue to grow and divide, an inward growth of cells at a particular point results in the formation of a pocket, which pushes into the hollow center of the blastocyst. This is the gastrula stage. Within the double-walled gastrula, the inner cell mass separates into three primary germ layers: *ectoderm*, *mesoderm*, and *endoderm*. The outer cells of the blastocyst, called *trophoblast* or *trophectoderm* will develop into the *chorion* which will surround the developing embryo. Also, from this cell layer comes the *chorionic villi*. These finger like projections will grow out and implant into the decidua, eventually forming the placenta.

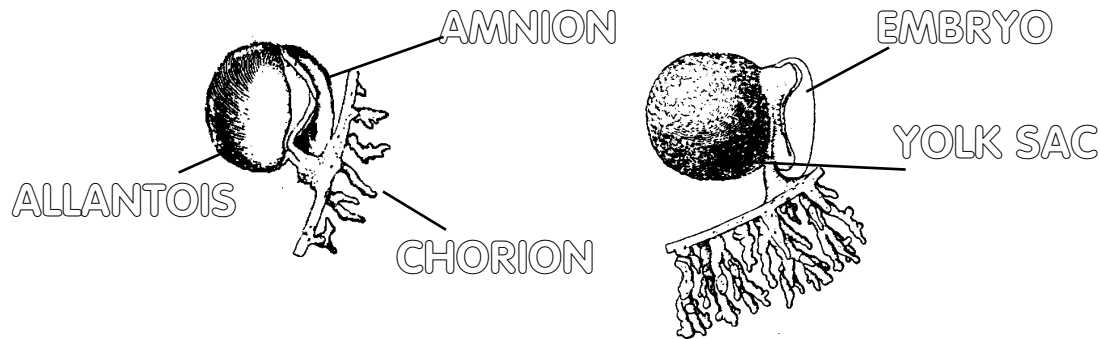
### GASTRULA



results in the formation of a pocket, which pushes into the hollow center of the blastocyst. This is the gastrula stage. Within the double-walled gastrula, the inner cell mass separates into three primary germ layers: *ectoderm*, *mesoderm*, and *endoderm*. The outer cells of the blastocyst, called *trophoblast* or *trophectoderm* will develop into the *chorion* which will surround the developing embryo. Also, from this cell layer comes the *chorionic villi*. These finger like projections will grow out and implant into the decidua, eventually forming the placenta.

ENDODERM

The *extra embryonic mesoderm* is a layer of cells that does not contribute to the formation of the embryo itself. These cells peel off and become the *chorion*, *amnion*, *allantois*, and *yolk sac*. These membranes lie outside the embryonic disc and will protect and nourish the embryo and, later, the fetus.



The allantois is a vascularized membrane whose blood vessels will, in the umbilical cord, aid fetal maternal circulation. The chorion will surround the blastocyst; part will form the placenta and part will fuse with the amnion to become the two layered fetal membranes. This will form the connecting stalk which attaches the chorion to the embryo, eventually fusing and becoming the umbilical cord. The amnion surrounds the fetus, creating the amniotic cavity where the blastocoel was. It will eventually contain and produce the fluid that protects and cushions the fetus and is released before birth. The amnion is more commonly known as the “bag of waters.”

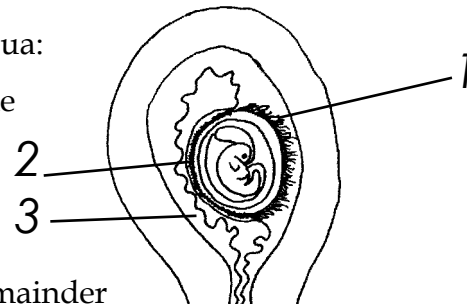
## DECIDUA

After fertilization the endometrium becomes known as the *decidua*. The decidua provides a thick vascular bed for the fertilized ovum. There are three *layers* of the decidua:

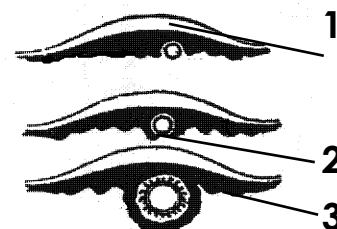
- The **compact layer** is the layer next to the uterine cavity. It is made up of closely packed cells.
- The **spongy layer**, the middle layer is made up of large stroma or decidual cells. This layer prevents the placenta from embedding too deeply in the uterine wall.
- The **basement layer**, the layer closest to the myometrium. Its function is to replace or regenerate the new endometrium during the postpartum period.

After implantation, there are three *areas* of the decidua:

- The **DECIDUA BASALIS** - the area under the embedded ovum.
- The **DECIDUA CAPSULARIS** - the area surrounding the embedded ovum.
- The **DECIDUA VERA** - the area lining the remainder of the uterus.



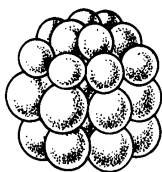
As the ovum grows, the decidua capsularis distends. At the twelfth week the embryo and the uterine cavity grow enough to come into contact with the decidua vera. At this point the decidua capsularis degenerates and disappears.



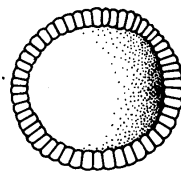
EMBRYOLOGY EXERCISE  
Specify which body structures develop from which layer.

Ectoderm	Mesoderm	Endoderm

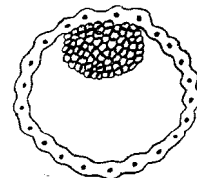
IDENTIFY & LABEL



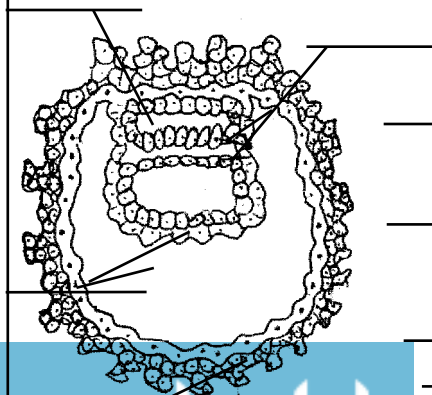
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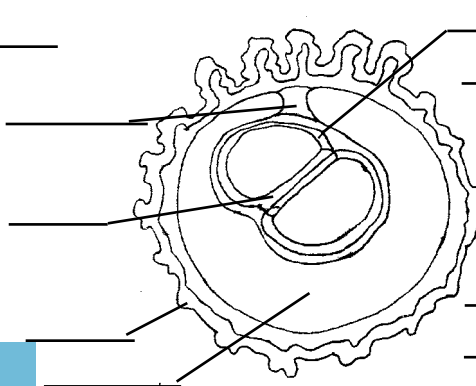
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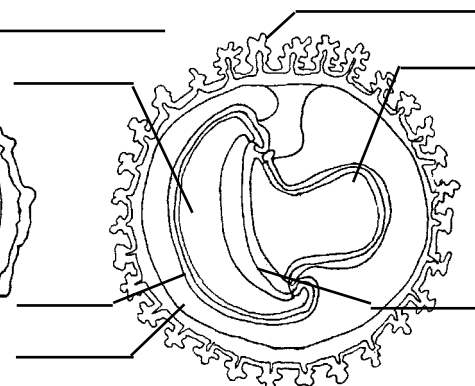
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DAY 11

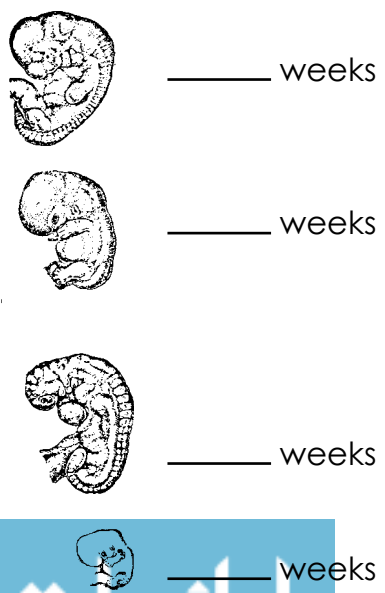
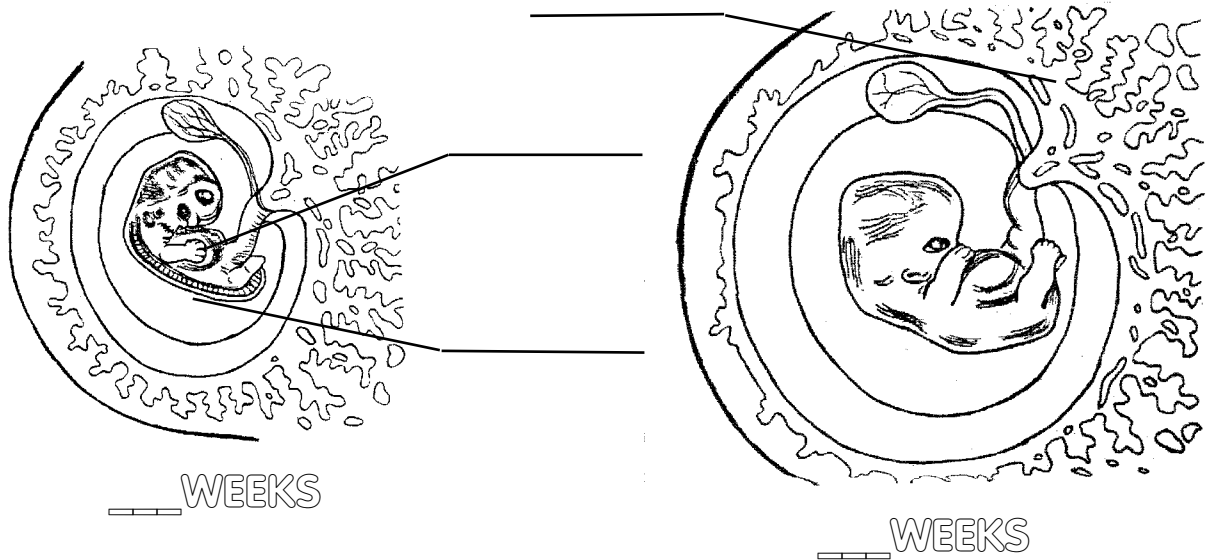
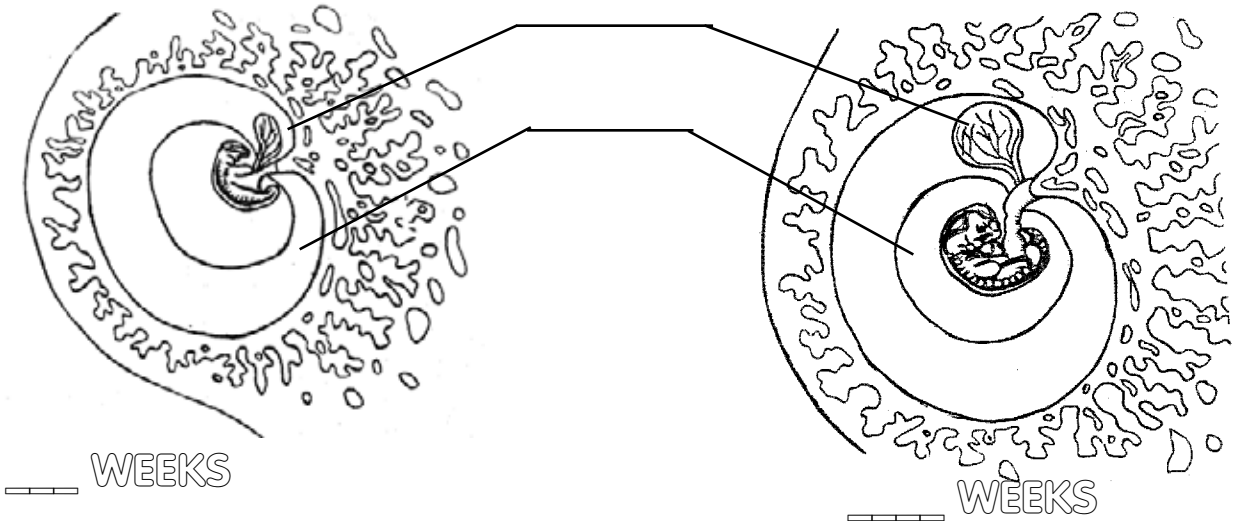


DAY 14



DAY 21

EMBRYOLOGY EXERCISE 2  
Identify & Label



## FETAL DEVELOPMENT

At **eight weeks** the embryo is now called a fetus. Blood vessels and all organs have begun to be formed. At **8 to 12 weeks** fingernails and toenails are forming, hair begins to be developed, *ossification* continues, and the fetus moves actively. The fetus swallows amniotic fluid, and urination occurs.



At **12 to 16 weeks**, slow eye movements begin to occur. Skin is bright pink, and individual facial features are much more discernible. At **16 to 20 weeks** the mother can feel fetal movement. The first movement felt is called *the quickening*. The fetal skin is covered with *lanugo* and *vernix*; there is hair on eyebrows, and eyelashes begin. *Brown Fat* forms. This is a subcutaneous adipose tissue (fat) important in temperature regulation and heat production. It forms in the fetal upper thorax, axillary area, and around the scapulas. It is also located around the adrenal glands and kidneys. It is different from ordinary white adipose tissue in that if the neonate is cold, the autonomic nervous system triggers the Brown Fat deposits to release and metabolize the stored fat, generating heat. Brown Fat is a limited resource which is readily depleted during times of cold stress. After birth it does provide the neonate some additional protection from temperature changes for the first few days of life. In premature babies, where Brown Fat is not developed, as well as in post-mature babies, where fat deposits have wasted away, there are problems regulating body temperature.



The fetus derives its **nutrition** from the maternal blood stream, via the placenta. Therefore, maternal nutrition is the key to how the fetus develops. The fetus converts a variety of fuels into **glucose** for its energy needs.



**22-24 weeks** is considered viability, although mortality and morbidity rates are high.

At **24-34 weeks** the testicles begin to descend, and additional fat is stored.

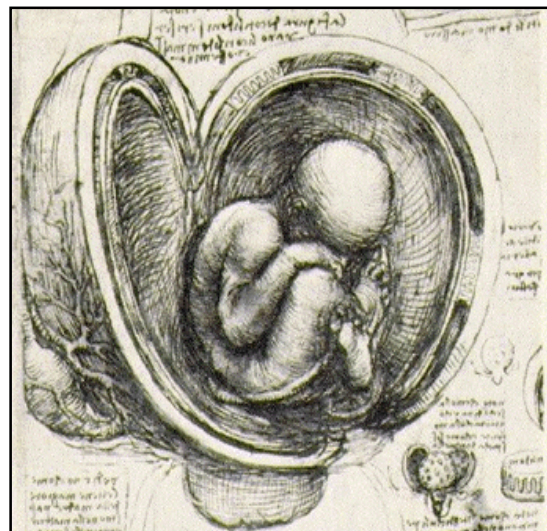


At **34 to 37 weeks** fetal lungs mature. A necessary substance is *pulmonary surfactant*, a group of phospholipids. Two components of mature surfactant are *lecithin* and *sphingomyelin*. The *alveoli* are the air cells of the lungs. When the newborn begins to breathe, and the alveoli expand and fill with air, surfactant is necessary to aid each alveoli to retain enough air or surface tension to keep from collapsing with each expiration. Surfactant is produced by cells in each alveoli.

If there is not enough surfactant, the baby will have difficulty breathing. This condition is known as *Respiratory Distress Syndrome* or *Hyaline Membrane Disease*. If a premature birth is expected, an amniocentesis is usually done. This will show the L/S ratio (or the amount of lecithin to sphingomyelin), which can help determine the maturity of the baby's lungs. If the test shows that the lungs are still immature, the mother can be given drugs to help the baby produce sufficient surfactant to prevent this serious disease of the newborn.

**37-41 weeks** is considered term, during which the majority of babies are born.

At **42 weeks** the fetus is considered post-term. Vernix decreases, skin may be dry and peeling, loss of weight and/or placental insufficiency may occur.



The Womb by De Vinci

## AMNIOTIC FLUID

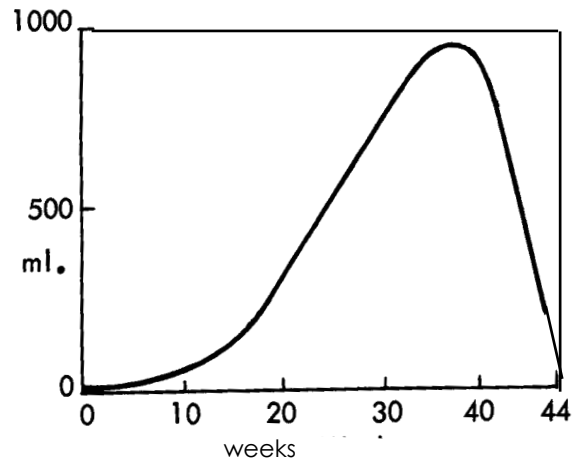
Functions of Amniotic Fluid:

- Protects and cushions the fetus from injury.
- Prevents adhesions between the fetus and amnion.
- Provides a fluid environment, allowing free movement of the fetus.
- Maintains a constant temperature, which minimizes heat loss to the fetus.
- Allows for equal expansion of the fetus in all directions.

Amniotic fluid consists of a slightly alkaline fluid (7.2 pH), consisting of 98% water in a solution of 1-2% equal parts organic and inorganic substances. Fetal cells (dead) are also present. In the first half of pregnancy, its composition resembles that of fetal blood serum. In the second half, it alters; sodium levels drop, and nonprotein nitrogenous substances rise. This occurs due to fetal urine. It also contains albumin, urea, uric acid, creatinine, fat, fructose, inorganic salts, protein and protein derivatives, carbohydrates, lipids, hormones, and over 30 enzymes.

Amniotic fluid volume is increased by fetal urination and decreased by fetal swallowing. It is constantly being produced. The fluid is replaced every three hours.

Fluid volume rises slowly to 15 weeks, then sharply to 30 weeks. It levels off at 37 weeks. Approximate volume: 10 weeks - 34 ml., 37 weeks - 500 to 1000 ml., 40 weeks - 600 to 700 ml.



### AMNIOTIC FLUID EXERCISE

1. Amniocentesis is a procedure in which a small amount of amniotic fluid is withdrawn. List conditions it will test for:

- |          |          |
|----------|----------|
| a. _____ | d. _____ |
| b. _____ | e. _____ |
| c. _____ | f. _____ |

2. List specific hormones present in amniotic fluid

\_\_\_\_\_

\_\_\_\_\_

3. Too much amniotic fluid is called \_\_\_\_\_

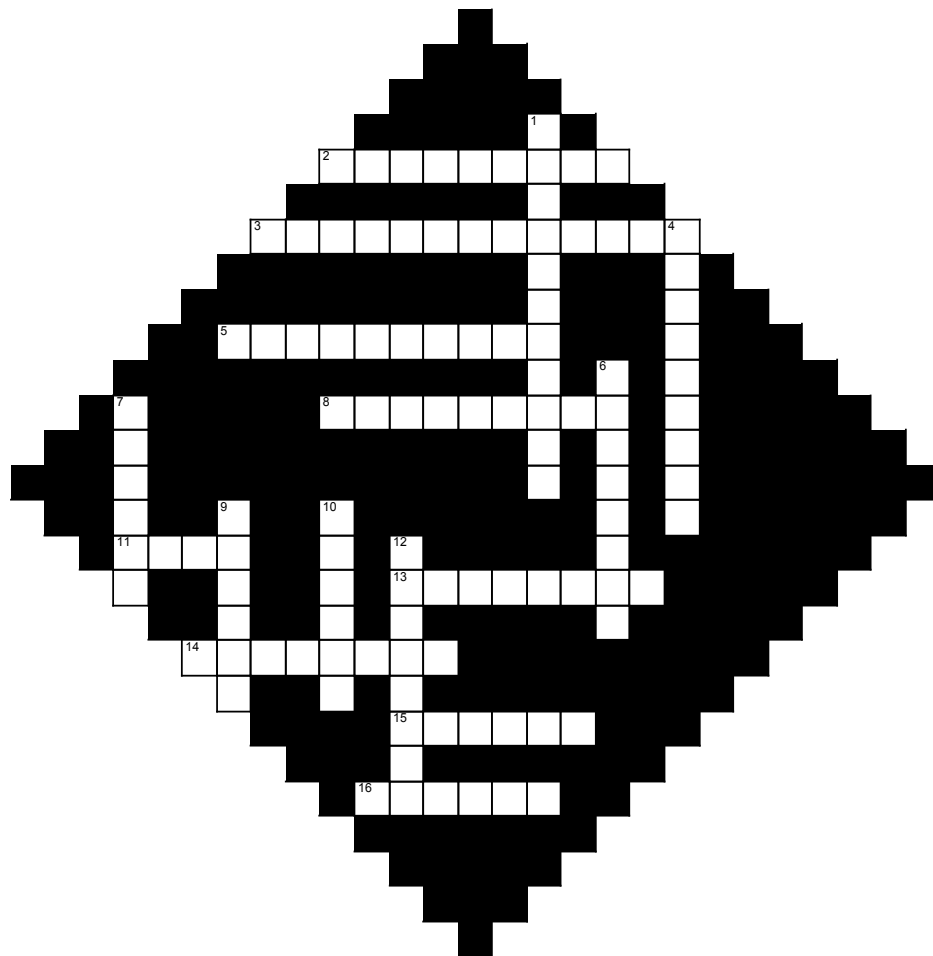
4. Too little amniotic fluid is called \_\_\_\_\_

5. Normal color of amniotic fluid is \_\_\_\_\_



FETAL DEVELOPMENT EXERCISE			
Complete the following chart outlining embryo and fetal development			
Weeks	Length	Weight	Developmental Characteristics
1			
2			
3			
4			
5			
6			
7			
8			
9-12			
12-16			
16-24			
20-24			
24-28			
28-32			
32-36			
37-40			
40-43			

## EMBRYOLOGY &amp; FETAL DEVELOPMENT



## Across

2. A tubular diverticulum of the posterior part of the yolk sack of the embryo
3. The outer layer of cells of the early blastodermic vesicle
5. The mother's first perception of the movements of the fetus.
8. Pertaining to or proceeding from two zygotes (ova).

11. An hereditary germinal factor in the chromosome which carries on an hereditary transmissible character.
13. The innermost layer of cells of the primitive embryo.
14. The implantation of the fertilized ovum in the endometrium of the pregnant uterus.

15. The product of conception in utero from the third through the fifth week of gestation
16. The most internal of the fetal membranes

## Down

1. Pertaining to or derived from one zygote.
4. In obstetrics refers to the passage of the ovum from the ovary to the uterus.

6. The outer layer of cells of the primitive embryo.
7. The fine hair on the body of the fetus.
9. The layer of fatty matter which covers the skin of the fetus.
10. A cell resulting from the fusion of two gametes.
12. The middle layer of cells derived from the primitive embryo.

## FETAL CIRCULATION

The fetus develops its own blood, including its own red and white blood cells. Circulated fetal blood needs to be replenished and oxygenated, so it is carried by the two umbilical arteries to the placenta, where, by osmosis and diffusion, an interchange takes place. Oxygen ( $O_2$ ) and nutrients diffuse into the placenta, and carbon dioxide ( $CO_2$ ) and wastes are expelled into the placenta.

### STRUCTURES OF FETAL CIRCULATION

There are four temporary structures:

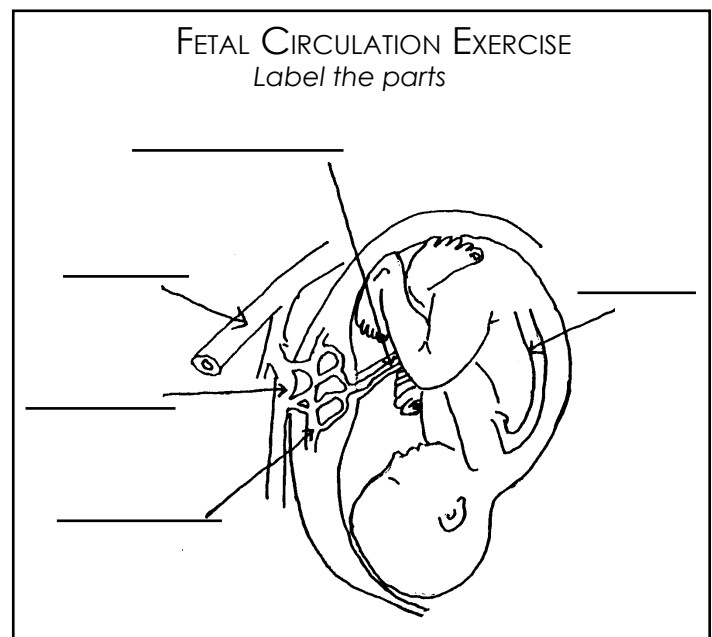
1. **Ductus venosus** - (from a vein to a vein). This vessel runs from the *umbilical vein* to the inferior vena cava and carries blood that has been oxygenated and replenished from the placenta to the heart for circulation throughout the fetus. It bypasses the liver since the placenta does the liver's job in utero.
2. **Foramen ovale** - a temporary opening between the two atria in the fetal heart, in order to bypass pulmonary circulation. Allows the replenished blood to enter the left atrium and be pumped out through the aorta.
3. **Ductus arteriosus** - (from an artery to an artery). This vessel runs from the pulmonary artery to the descending arch of the aorta, in order to bypass pulmonary circulation.
4. **Hypogastric arteries** - These two vessels branch off from the internal iliac arteries and are known as the *umbilical arteries* when they enter the umbilical cord. They return  $CO_2$  and waste to the placenta for expelling and replenishing.

There are four layers separating the fetal blood from the maternal blood: *syncytiotrophoblast* and *cytotrophoblast*, *mesoderm*, and *capillary wall*.

The replenished blood returns to the fetus by a vein in the umbilical cord which goes directly to the liver. But before it reaches the ductus venosus, it empties the  $O_2$ -rich blood into the inferior vena cava, which is returning the  $CO_2$ -rich blood to the heart from all vessels below the diaphragm, including the portal vein. The oxygenated blood is, therefore, mingled with venous blood.

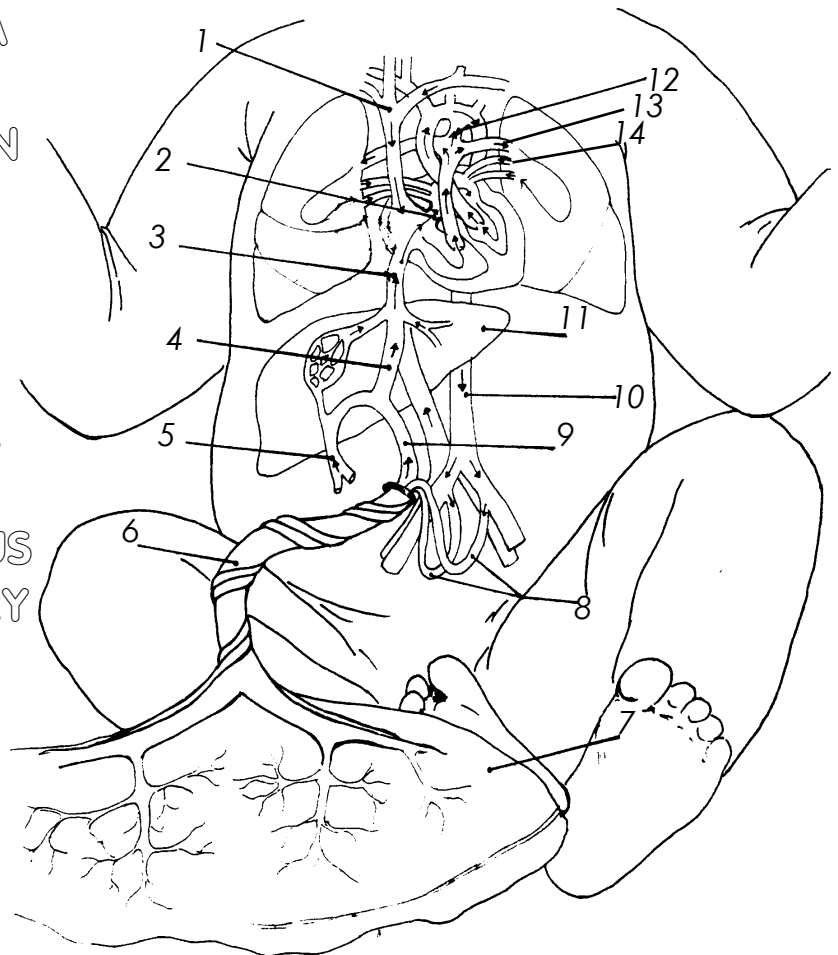
Through the temporary opening known as the *foramen ovale* (between the two atria of the fetal heart), the oxygenated blood returning from the placenta via the inferior vena cava is shunted from the right to left atrium; not into the right ventricle, as it is after birth.

Then the blood passes from the left atrium to the left ventricle, where it is pumped out through the aorta. Some of it goes to supply the brain and upper limbs; some passes down the descending arch of the aorta. The  $CO_2$ -rich blood from the head and upper limbs returns to the heart via the superior vena cava.



## FETAL CIRCULATION

1. SUPERIOR VENA CAVA
2. FORAMEN OVALE
3. INFERIOR VENA CAVA
4. DUCTUS VENOSUS
5. HEPATIC PORTAL VEIN
6. UMBILICAL VEIN
7. PLACENTA
8. UMBILICAL ARTERIES
9. UMBILICAL VEIN
10. ABDOMINAL AORTA
11. LIVER
12. DUCTUS ARTERIOSUS
13. PULMONARY ARTERY
14. PULMONARY VEINS



(Color the veins red and the arteries blue.)

### FETAL CIRCULATION EXERCISE

List the four layers which separate fetal blood from maternal blood:

\_\_\_\_\_

\_\_\_\_\_

List the four temporary structures of fetal circulation:

\_\_\_\_\_

\_\_\_\_\_

## SELF-TEST

### True/False

1. \_\_\_ Monozygotic twins are also called identical twins.
2. \_\_\_ Spinnbarkeit is more acid than non-fertile mucus.
3. \_\_\_ The layer of the uterus where the blastocyst embeds is the endometrial basalis.
4. \_\_\_ During pregnancy, the uterine lining is referred to as the decidua.
5. \_\_\_ The zygote contains 23 chromosomes.
6. \_\_\_ The morula is a solid cluster of cells resulting from cleavage of the ovum.
7. \_\_\_ The foremen oval is the temporary opening in the fetal heart.
8. \_\_\_ The ductus arteriosus carries oxygenated blood back to the vena cava.
9. \_\_\_ The coiled form of DNA contained in the nucleus material is called chromatin.
10. \_\_\_ DNA is replicated during early prophase.

### Multiple Choice

11. Most of the cell's organelles are located in the:
  - A. Nucleus.
  - B. Cytoplasm.
  - C. Extracellular fluid.
  - D. None of the above.
12. The process by which fairly large particles are engulfed and brought into the cell is:
  - A. Pinocytosis.
  - B. Phagocytosis.
  - C. Electrical forces in the membrane.
  - D. Shape and position changes of the carrier molecule in the plasma membrane.
13. The synthesis of RNA from the DNA template is known as:
  - A. Transduction.
  - B. Translation.
  - C. Transcription.
  - D. Transference.
14. The sites of protein synthesis within the cell are the:
  - A. Lysosomes
  - B. Peroxisomes
  - C. Ribosomes
  - D. Mitochondria
15. The chromosomes are contained within the \_\_\_\_\_ of the sperm
  - A. head
  - B. neck
  - C. flagellum
  - D. acrosome

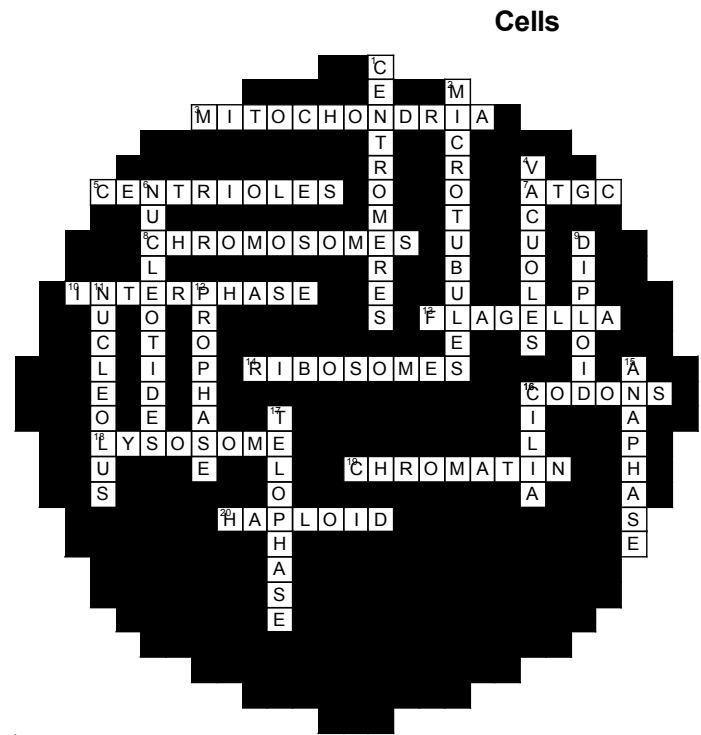
### Answers:

1. True, 2. False, 3. True, 4. True, 5. False, 6. True, 7. True, 8. False, 9. True, 10. True  
11. B, 12. A, 13. C, 14. C, 15. A

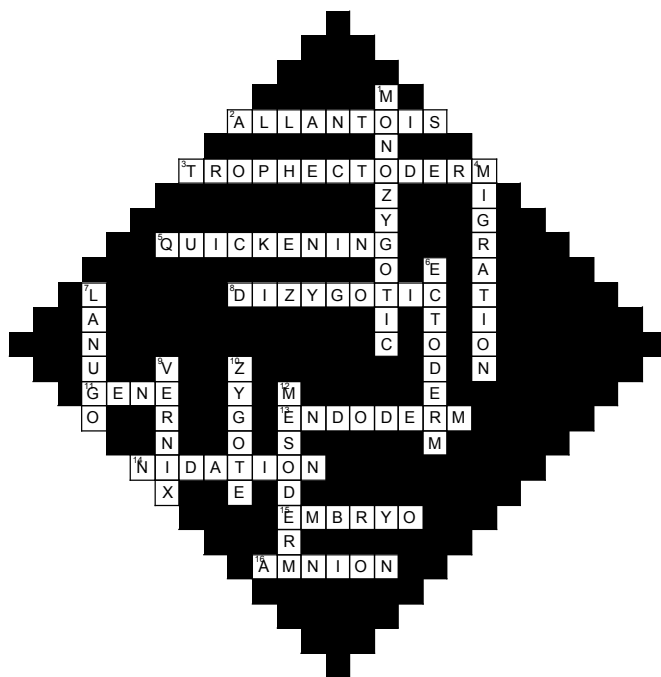
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PUZZLE ANSWER KEY



Embryology & Fetal Development



# Chapter 6

## Normal Pregnancy

*After completing this chapter, the student should be able to:*

1. Describe the definitions of pregnancy.
2. Describe how to determine the length of gestation and how to determine a due date.
3. Identify the signs and symptoms of pregnancy.
4. Identify the difference between presumptive, probable, and positive signs of pregnancy.
5. Describe the physiological changes during pregnancy, including changes to the following systems:
  - A) Neurological.
  - B) Respiratory.
  - C) Circulatory.
  - D) Gastrointestinal.
  - E) Urinary.
  - F) Reproductive.
  - G) Musculoskeletal.
  - H) Integumentary.
6. State the usual timing of the various signs and symptoms of pregnancy.
7. Explain the causes and describe treatments for common discomforts during pregnancy:
  - A) Identify when each one typically occurs.
  - B) The physical changes that predispose pregnant women to the various common discomforts.
  - C) The difference between common discomforts of pregnancy and possible complications.
  - D) Strategies for preventing, alleviating, or minimizing these conditions.
8. Name the four psychological tasks of pregnancy, and list possible feelings, concerns, and needs that characterize each.



## NORMAL PREGNANCY

Midwifery care differs from obstetric care primarily because of the focus on pregnancy as normal and natural state. While part of midwifery care is working with problems or complications if they come up, the underlying philosophy is the normality of pregnancy and birth itself.

Part of a midwife's job is to encourage the woman's belief in her own body, to teach and support her in viewing pregnancy as natural and healthy. In a culture that medicalizes pregnancy and birth, that is not always easy.

By thoroughly understanding the physiology of pregnancy, how the body adapts and changes, and the homeostasis of the entire process, the midwife can educate her clients about what to expect and why it occurs. She can give good information to each client on how to maximize her health and the health of her baby and be able to give sound advice about how to minimize common discomforts.

If a woman understands the reason behind what is going on with her body, it may make it easier to tolerate some of the irritations and discomforts pregnancy brings. She also may not understand the tremendous changes her body is going through, particularly early in the pregnancy, when the outward signs are minimal. She may not understand that fatigue is normal, or that her hormonal levels are taking huge upswings, causing mood shifts or changes in her libido.

Virtually every system in a woman's body is altered during pregnancy. Significant physiologic changes are needed to support the developing fetus and prepare for birth. The body has an amazing capacity for adaptation, and pregnancy is a time that reflects it. It is one of the miracles of creation. Midwives have the opportunity to share that knowledge with women, so they can learn to trust in their bodies, trust in nature, trust in birth and trust in the Creator. With thorough knowledge of the normal physiology of pregnancy, the midwife can more easily identify problems or pathologies that may develop.

Beyond the physical changes that transpire during pregnancy are the emotional and psychological changes that occur, not only with the pregnant woman but with her partner and her family. All of them must adjust to the reality of pregnancy and anticipated new roles as mother, father, grandparent, or sibling. Whether partnered or single, women need care and support to prepare for the challenges and responsibilities of parenting.

Part of providing holistic midwifery care is working with a woman as a whole person, physically, mentally, emotionally, and spiritually.



**The Evolution of Isabella**

*photo by Peter Finlayson*



## LENGTH OF GESTATION

The length of gestation is counted from the first day of the last menstrual period (**LMP**). Normal pregnancy is 40 weeks, or 280 days, or 9 months & 7 days, or 10 lunar cycles. Counted from conception, pregnancy is approximately 38 weeks, or 267 days or 8 months and 3 weeks, or 9 1/2 lunar cycles. The length of gestation varies somewhat for each individual; it can be 38-42 weeks and still be within in the normal range. Less than 5% of women deliver on their due date.

It is important to estimate when delivery is expected as accurately as possible, as the risks of both prematurity and postmaturity are significant. To determine gestational age, establish the Estimated Date of Delivery (**EDD**). Previously called the Estimated Date of Confinement (**EDC**), it is also called the Estimated Date of Birth (**EDB**). For the purposes of determining EDD, always count from the LMP, or Last Normal Menstrual Period (**LNMP**).

**Nagele's Rule:** a method of determining the EDD by taking the **LMP**, subtracting 3 months, and adding 7 days.

If the first day of LMP was *April 10th*, subtract 3 months = *Jan. 10th*  
then add 7 days = *Jan. 17th* is the **EDD**

Determining due date on the basis of LMP alone can be accurate *only if* the following conditions apply:

1. The woman is sure about her dates of LMP.
2. She has a history of regular periods 28-30 days apart.
3. She was not on oral contraceptives up to 3 months prior to conception.
4. She was not breastfeeding at the time.

If any of these conditions apply, alternative methods of determining due date include:

- Getting an early bimanual pelvic exam by an experienced practitioner to determine uterine size.
- Noting when the first fetal movement, or "quickenings," is felt, which usually occurs at about 16 weeks.
- Noting when fetal heart tones are first heard: at around 9-10 weeks with a Doppler, and at around 18-20 weeks with a fetoscope.
- Measuring fundal height in correlation with estimated weeks of gestation. Although the weeks of gestation to the centimeter of fundal height usually corresponds in early and late pregnancy, it may vary. At 20 weeks, the fundus should be at the umbilicus at 20 cm.
- Coital history. Ask the woman if she knows when she got pregnant. For some women, there may have only been one or two times during that month when she had sex.
- Birth control history. Find out when the woman stopped using her method of birth control or if there was a failure in her method.
- Ultrasound, considered a very reliable method in determining due dates, is most accurate between 16 - 18 weeks, but can be used at any time.

### EDD EXERCISE

1. If a woman's LMP is 3/11/10, her EDD is \_\_\_\_\_.
2. If a woman's LMP is 1/26/10, her EDD is \_\_\_\_\_.

## SIGNS AND SYMPTOMS OF PREGNANCY

Today, with accurate and easy home pregnancy tests and ultrasounds, it is rarely the midwives' task to determine pregnancy, however midwives may practice in low resource settings and learning the signs of pregnancy without testing may be helpful. The symptoms of pregnancy were often used to determine pregnancy, not always accurately, as some signs can be from causes other than pregnancy. Therefore, pregnancy signs were delineated into three categories: **presumptive, probable and positive**.

1. **Presumptive signs**, or subjective signs: These are symptoms the woman experiences and reports but which may have other causes than pregnancy. These include: **Amenorrhea**; a cessation of menses. Though it is the most common sign, it also can be caused by breastfeeding, stress, malnourishment, hormonal problems, or chronic disease. **Frequent urination** can be caused by the pregnant uterus pressing on the bladder, or by a bladder infection. **Breast soreness, fullness, tingling, darkening of nipples**, and other breast changes can be signs of pregnancy, or of premenstrual syndrome or ovulation. Many women experience **nausea and vomiting** during pregnancy, but this sign may manifest itself due to the flu or other illness. Most women feel the first fetal movements or **Quickening** about 16 weeks, but it can be overlooked or mistaken.

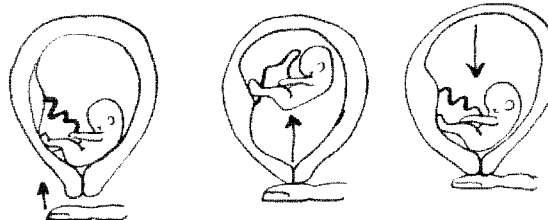
2. **Probable signs**, or objective signs: These are signs observed by the examiner. These symptoms occur when the woman is most likely pregnant but may have other causes than pregnancy. Certain skin changes may occur, such as **striae gravidarum** (stretch marks), **linea nigra** (dark line that runs from umbilicus to pubis), or **chloasma** (mask of pregnancy). These signs only appear during pregnancy but may remain from past pregnancies. An **enlarged abdomen** may be caused by the growing uterus, but it can also be caused by fat, edema, or tumors. **Palpation** of fetal parts is considered a probable sign because the fetal outline can be mistaken for palpation of tumors. **Pregnancy tests** detect the presence of hCG in the urine or blood. While some of these tests approach 99% accuracy when positive, hCG may be present in other conditions.

There are signs and changes in the uterus and cervix observed on pelvic examination such as: **Hegar's sign**, a softening of the isthmus of the uterus. It is felt on bimanual exam as softness and compressibility of the lower segment. It occurs from about the 7<sup>th</sup> to the 12<sup>th</sup> week of pregnancy. **Chadwick's sign** is a blue discoloration of the cervix and vagina. This can occur in early pregnancy. **Goodell's sign** is a softening of the cervix. **McDonald's sign** is an ease in flexing the body of the uterus against the cervix. **Internal Ballottement** occurs when an examiner can feel the fetal body rebound when it is moved. This occurs primarily in the second trimester.



Hegar's sign

Internal  
Ballottement



Tap upwards:  
hold finger  
against cervix

The fetus floats  
upwards in the  
amniotic fluid

As the fetus sinks  
a gentle tap is felt  
on the examining finger

3. **Positive signs**, or diagnostic signs: A fetus visualized during **Ultrasound**. **Fetal heart sounds**, placental or cord (funic) sounds can be heard by a manual fetoscope as early as 18-20 weeks, or by a Doppler at 9 to 12 weeks. **Fetal movement** felt by an examiner is a positive sign.

## PREGNANCY SIGNS EXERCISE

Complete the following chart:

	Weeks Gestation	Presumptive (Subjective)	Probable (Objective)	Positive (Diagnostic)	Other possible causes
Chadwicks Sign					
Enlarging Abdomen					
Braxton Hicks					
Hearing fetal heart sounds					
Positive pregnancy test					
Nausea & Vomiting					
Urinary Frequency					
Breast Changes					
Fetal movements					
Skin Pigmentation					
Hegar's Sign					
Amenorrhea					
Ladin's sign					
Quickening					
McDonald's Sign					

## PHYSIOLOGICAL CHANGES DURING PREGNANCY

**The Cardiovascular and Hematologic System:** The heart increases in size by about 12%. Cardiac output increases by about 1.5 liters/min at term, and the average resting heart rate increases from 70 to 85 beats per minute. Systolic blood pressure is unchanged, but diastolic pressure decreases during mid-pregnancy and then gradually increases after 26 to 28 weeks to non-pregnancy values at term.

The total maternal plasma volume increases by up to 40-60% of normal; the red blood cell volume only increases by 30%. Multiple pregnancy can increase this even further. Because the increase in red blood cell volume is less than that of the increase in plasma volume, the concentrations of red blood cells and hemoglobin drop. That is called the physiologic anemia of pregnancy. The hematocrit tends to fall and, at about 36 weeks, is 5% below the non-pregnant state. The white cell count increases about 8% and is primarily due to an increase in neutrophils.

Eosinophils, lymphocytes and platelets are unchanged. The erythrocyte count decreases.

Creatinine and blood urea nitrogen (BUN) goes down markedly in the first trimester and stabilizes during the second trimester, with a slight rise near term.

White blood cells, platelets, serum cholesterol, and lipids increase. Serum sodium decreases slightly, as does potassium, and both ionized and non-ionized calcium have a small decrease. Magnesium decreases about 10% to 20% during the first trimester.

Coagulation factors are altered during pregnancy. Fibrinogen (Factor I) is markedly increased. Factors VII, VIII and X are also increased. Factors XI and XIII decrease by 30% or more at term. Anti-thrombin II is thought to be decreased.

Increased vascularity causes a distention in the veins of the legs, vulva, and anus, making varicosities and hemorrhoids common. Late in the pregnancy, the obstructing effect of the large uterus on the venous return can exacerbate these problems. The blood flow to the kidneys, skin, and mucous membranes increases.

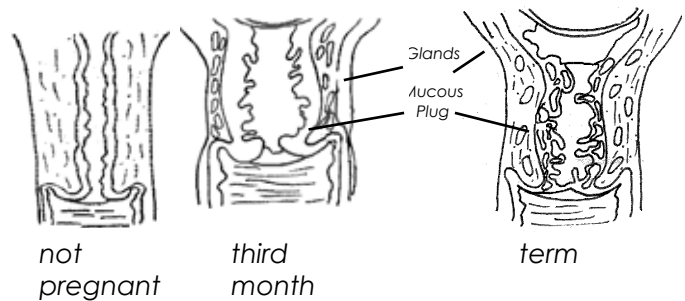
### CARDIOVASCULAR SYSTEM EXERCISE

*Answer the following:*

1. State how blood viscosity is altered by pregnancy.
2. List factors that decrease the workload of the heart in pregnancy.
3. List factors that increase the workload of the heart during pregnancy.
4. Explain what is meant by physiologic anemia.
5. Describe how fluid is drawn back into the vascular space.

**The Reproductive System:** The uterus enlarges to 7 to 8 times its regular size during pregnancy, and blood flow is increased. It gets 2 to 7 times wider, and its capacity increases from about 10 ml to over 5 L. Its weight increases from 50 to 1000 grams. This is mostly due to the growth of existing muscle fibers. During the first trimester, the uterine muscle fibers thicken 1 or 2 cm. Around the bundles of muscles, fibroelastic tissue develops, which strengthens the uterus. During the third trimester, the uterus thins to less than .5 cm to accommodate the growing fetus. Because of the fibroelastic tissue, the uterus has great strength; and during labor, uterine contractions will propel the fetus through the vagina.

**Cervix:** The cervical mucosa undergoes marked changes. The glandular tissue grows and produces an increase in secretions. The **endocervical glands** expand to occupy about half the cervix at term. These glands secrete the thick cervical mucous that becomes the cervical mucous plug, which acts as a barrier and prevents the ascent of bacteria or other substances into the uterus.



**ENDOCERVICAL GLAND CHANGES**

#### REPRODUCTIVE SYSTEM EXERCISE

*Describe changes to the following reproductive structures during pregnancy:*

- A) The ovaries
- B) The cervix
- C) The vagina
- D) The vulva
- E) The uterus

**The Respiratory System:** Maternal oxygen requirements increase 15-20% due to the acceleration of metabolic needs and the needs of the uterine muscle. The intercostal aspects of respiration increase; consequently, deeper breaths are taken, which results in a 20% higher intake of oxygen. The diaphragm is displaced upward as the uterus grows out of the pelvis. The arterial pH remains at about 7.4 to 7.44, with a small increase due to compensation for respiratory alkalosis.

During the third trimester, shortness of breath is common. Pregnant women are more prone to respiratory ailments.

#### RESPIRATORY SYSTEM EXERCISE

*Answer the following:*

1. List the factors that increase the body's need for oxygen during pregnancy.
2. State how the body's demand for oxygen alters over the course of pregnancy.
3. Explain how the woman's respiratory system meets this increased demand.
4. Describe the changes in the woman's tidal volume during pregnancy.
5. Explain how a woman's ribcage is altered by pregnancy.

**The Renal System:** The kidneys enlarge about 1 cm; the ureters dilate due to progesterone effects; renal plasma flow increases by more than 50% from the non-pregnant state; and the bladder is displaced by the uterus. Glomerulus filtration rate increases 50%. Glucose is normally excreted in excess amounts in pregnancy, but with a random pattern. Because of the higher filtration rate, glucose often is not reabsorbed completely by the distal tubules. This results in glycosuria, which in excess or with other factors may be a symptom of gestational diabetes; but periodic positive glucose readings in the urine are normal. Other sugars are also excreted in increased amounts, as are amino acids. Water-soluble vitamins are also excreted in increasing amounts. Potassium and sodium are retained and do not release large salt loads easily, and the tissues can become edematous. Bladder and kidney infections can occur more readily. A trace of protein in the urine is not uncommon and may be due to overly concentrated urine or to vaginal discharge in the specimen.

### RENAL SYSTEM EXERCISE

*Answer the following:*

1. Describe how pregnancy affects the body's retention of sodium and calcium.
2. Explain how renal blood flow is altered during pregnancy.
3. Explain why urinary frequency is usually common in the first and last trimester.
4. Describe how mild glucosuria can occur in healthy pregnant women.
5. Describe the mechanisms for fluid volume regulation.

**The Gastrointestinal System:** The metabolism changes during pregnancy, requiring much more protein and iron for the fetus. The intestines are displaced by the uterus. The need for fluid is increased. Progesterone slows down peristalsis, allowing more time for nutrients to be absorbed, often resulting in constipation, which can also be due to the increasing size of the uterus. Heartburn is common for the same reasons.

### GASTROINTESTINAL SYSTEM EXERCISE

*Answer the following:*

1. Explain why heartburn is frequently a problem for pregnant women.
2. Describe how the general metabolic rate is altered by pregnancy.
3. Explain how pregnancy affects maternal metabolism of carbohydrates.
4. Describe how pregnancy affects the mother's fat metabolism.
5. Explain how protein metabolism is altered by pregnancy.
6. Describe how pregnancy increases the workload on the liver.



**The Musculoskeletal System:** There is widening and increased mobility of the sacroiliac joints and pubic symphysis to facilitate the passage of the fetus through the pelvis. This is primarily due to the hormone relaxin, which also loosens all ligaments and joints in the body. The loosened joints and ligaments, as well as the weight of the growing uterus, can put pressure on the lumbar spine, making backaches common.

### MUSCULOSKELETAL SYSTEM EXERCISE

*Answer the following:*

1. State how the weight of the pregnant uterus affects the spinal curvature and posture.
2. State which hormones relax the woman's ligaments and skeletal muscles.
3. Describe the affect of pregnancy on smooth muscles.
4. Explain how pregnancy affects maternal metabolism of carbohydrates.
5. List possible causes of leg cramps.

**The Endocrine System:** The corpus luteum produces **Progesterone** until the fourth month of pregnancy, when that function is taken over by the placenta. Progesterone, which increases 1000-fold, supports and maintains implantation of the developing embryo in early pregnancy. Progesterone, in the presence of estrogen, inhibits further production of luteinizing hormone (LH) and follicle-stimulating hormone (FSH). **Estrogens** increase about 400-fold. They are initially secreted by the ovaries during early pregnancy, then by the placenta later in the first trimester. Estrogens stimulate uterine growth, increase blood flow to the uterus, help relax pelvic ligaments, support breast development (in preparation for lactation), and support fetal development. Sodium and water retention are increased during pregnancy, in part, because of the influence of estrogen. Progesterone and estrogen are thought to increase **Insulin Resistance**, reducing the available insulin for glucose utilization. Glucose in normal pregnancy physiology shows “lower lows and higher highs,” creating a tendency towards hyperglycemia and hypoglycemia, which can still be part of the normal range of pregnancy.

The **pituitary gland** increases in size during pregnancy. **Cortisol, Aldosterone, Deoxycorticosterone** and **Testosterone** are increased. **Human chorionic gonadotropin (hCG)** rises rapidly until about 8 to 10 weeks (100 days) and then falls off. Serum or urine hCG measurements may be obtained to help diagnose early pregnancy; and hCG is the hormone that is measured in over-the-counter home pregnancy tests. **Human Placental Lactogen (hPL)** is secreted by the syncytiotrophoblast of the developing placenta and rises as the placenta develops and pregnancy progresses. This hPL is needed to help support maternal metabolic needs and decreases the maternal metabolism of glucose, thus making more glucose available to meet fetal nutritional and metabolic needs.

#### ENDOCRINE SYSTEM EXERCISE

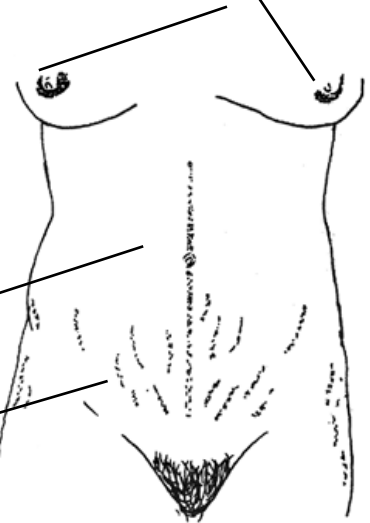
*Explain the functions of the following hormones and how they are altered during pregnancy:*

1. Calcitonin
2. Parathyroid hormone
3. Estrogen
4. Progesterone
5. Relaxin
6. T3 and T4
7. Oxytocin
8. Insulin
9. Prolactin
10. Aldosterone
11. Cortisol
12. Erythropoietin
13. Human Chorionic Gonadotropin
14. Human Placental Lactogen

**The Integumentary System:** Various hormonal and physiological factors create changes in the skin, hair, and nails during pregnancy:

- 1) or darkening of the nipples is more pronounced in brunettes and remains after the birth.
- 2) is caused by a change of pigmentation of the skin which causes a dark line running from the umbilicus to the mons veneris.
- 3) or stretch marks, occur on the abdomen, thighs, breasts, and buttocks. Caused by overdistension of the skin.

### 1. PIGMENTATION OF THE AREOLA



2. LINEA NIGRA
3. STRIAE GRAVIDARUM

- 4) or mask of pregnancy is caused by progesterone. It is a darkening on the face which goes away after the birth.
- 5) are bright red blemishes in the skin with several “legs” coming out from a central body. They usually disappear in postpartum.
- 6) are very common during pregnancy, and women can get them from hormonal or other causes. They should be professionally investigated to rule out allergies, scabies, or other potential disorders.

#### INTEGUMENTARY SYSTEMS EXERCISE

Answer the following:

1. List common changes to hair during pregnancy.
2. List common changes to nails during pregnancy.
3. Explain why acne is common during pregnancy.

## WEIGHT GAIN DURING PREGNANCY

While “normal” weight gain is considered between 25-35 lbs during pregnancy, women can gain as little as 10 lbs or as much as 75 lbs and be within a normal parameter, depending on their pre-pregnant weight.

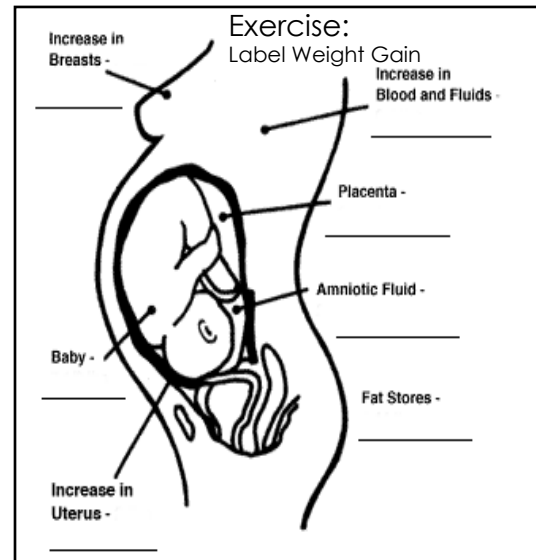
First trimester: 2-6 lbs

Second trimester: 10-18 lbs

Third trimester: 10-20 lbs,  
or a pound a week the last 8 weeks.

*At term the average weight gained breaks down to:*

- Baby = 7-8 pounds
- Placenta = 1-2 pounds
- Amniotic fluid = 2 pounds
- Uterine enlargement = 2 pounds
- Maternal breast tissue = 2 pounds
- Maternal blood flow = 2 pounds
- Fluids in maternal tissue = 4 pounds
- Maternal fat stores = 7 pounds



There are questions and controversy about weight gain in pregnancy, and midwives tend to be more liberal in their recommendations of the amount of weight woman should gain than obstetricians. We live in a culture that worships thinness in women. Women often have body image issues and concerns about gaining too much weight during pregnancy and consequently may not eat healthy food or may even diet during pregnancy, denying their baby much-needed nutrition. Some women who gain a lot of weight during pregnancy can lose it easily within a year of the birth if breastfeeding and exercising. Other women have a hard time losing the extra weight, compromising their long-term health and their feelings about their bodies and themselves.

Weight gain recommendations and counseling should be customized to each woman as an individual. If a woman is underweight at the beginning of her pregnancy, she is at additional risks for preeclampsia and a low birth-weight baby. A woman who starts out overweight, then gains a lot of weight during her pregnancy, has higher incidences of hemorrhoids, varicose veins, stretch marks, backache, fatigue, indigestion and shortness of breath during pregnancy.

Women are often very upset when they weigh themselves every week, even if their weight gain is normal. It is important to reassure women that they look beautiful, that they are healthy, and that the baby needs the extra weight for breastfeeding. However, if a woman is gaining too much for her pre-pregnant size and level of activity, her midwife should encourage her to exercise and to be aware of her weight. The midwife is sometimes the only health care provider a woman may see, so her advice and counsel are important influences on women's health choices. An excess amount of weight gained during pregnancy and not lost after the first year can be a detriment to a woman's health.

If there is a concern about the amount of weight gained during pregnancy, which is usually in women who start out overweight, the best advice and counsel the midwife can give is to exercise. Talking about nutrition and avoiding empty calories is important; however, moderate exercise is the best way to control weight during pregnancy, not diet.

Whenever a woman expresses concern about her weight, talk to her about exercise, yoga, swimming. Encourage her to keep eating healthy food, and assure her that with breastfeeding and exercise, she can easily take off her excess pregnancy weight.

## Physiology of Pregnancy Word Search

T L C  
 H S A I Q  
 I F A C L N I  
 H D L I O T F  
 M D R B V T R I P  
 G E A O R S E B E  
 G A N Y H E A L R R A  
 D R O I P C I A O I M  
 N H R U O O D X E S S  
 H P E T R D Q I L T A  
 N A T E T N L N A A L  
 O I S R O E K Z S L P  
 N D E U I Q L V T S L  
 C G S T A R T I I  
 K O Y Y E J E C S  
 R K C V O C K  
 P K N F O J L  
 Q Y I O D  
 S U Z

1. is displaced upward as the uterus grows out of the pelvis.
2. which part of bp decreases during mid-pregnancy and then gradually increases
3. glands that produce the mucous plug
4. type of tissue which strengthens the uterus
5. progesterone slows this down peristalsis resulting in constipation
6. volume increases up to 50%
7. produced by the corpus luteum until the fourth month
8. hormone that softens joints and ligaments
9. where human placental lactogen (hpl) is secreted
10. enlarges 7 to 8 times its size during pregnancy

## PREGNANCY CONDITIONS KEY TERMS

*Define the following*

1. Syncope
2. Ptyalism
3. Epistaxis
4. Pyrosis
5. Nocturia
6. Carpal Tunnel Syndrome
7. Petechiae
8. Hypoglycemia
9. Leukorrhea
10. Sciatica
11. Spider Nevi
12. Dyspareunia
13. Palmar erythema
14. Antiemetic
15. Pruritis gravidarum
16. Candida
17. Chloasma
18. Molluscum fibrosum gravidarum

## COMMON DISCOMFORTS OF PREGNANCY

### MORNING SICKNESS

The nausea and vomiting that is sometimes present during the first trimester doesn't always occur in the morning but varies with each individual. Fifty percent of pregnant women experience "morning sickness," and one third of those women have vomiting as well as nausea. It is universally prevalent regardless of age, health, culture, or race. Symptoms usually start at about four weeks and can continue up to twelve or fourteen weeks.

A wide range of studies have been done, but no clear, definitive cause of morning sickness has ever been found. The current prevailing theories are: changes in carbohydrate metabolism, increased HCG levels, assimilation of glucose, effects of progesterone, and a buildup of chemical by-products due to the increased hormonal activity of pregnancy.

Hypoglycemia (low blood sugar) is often the cause of nausea in pregnancy. This is why many women experience symptoms first thing in the morning, since there have been many hours since the last meal. Vitamin B6 deficiencies also play a part in causing hypoglycemia. Vitamin B6 is key to utilizing carbohydrates, which are converted through metabolism into glucose. When the diet or supplements provide too little B6, the blood sugar can drop, causing nausea. Many studies have been done showing dramatic improvement in women with morning sickness using vitamin B6. Vitamin B6 supplements (20-50 mg. per day), best taken as a B complex vitamin, can be very effective and are sometimes given as injections for women finding it difficult to keep the oral supplement down.

Hypoglycemia can be prevented by eating smaller, more frequent meals high in complex carbohydrates and protein. For example, snacking on whole grain crackers, nuts, or cheese can prevent blood sugar from dropping, consequently preventing nausea.

Not every case of morning sickness is due to hypoglycemia, poor health, or nutritional deficiencies. One study even showed a correlation between nausea and vomiting during the first trimester and a lower rate of spontaneous abortions and lower infant mortality, possibly due to higher levels of hCG, progesterone and other hormones.

If the nausea and vomiting is severe or persistent enough to keep the woman from keeping food or fluids down, she is at risk for dehydration, ketosis, and malnutrition.

One of the most effective remedies is the use of "Sea Bands," wristbands made for seasickness (available online or in boating stores). They are elastic bands worn on the wrist that apply pressure to a specific acupressure point.

#### MORNING SICKNESS EXERCISE

1. Describe the typical pattern of morning sickness.
2. List strategies for coping with morning sickness.
3. Define *hyperemesis gravidarum*.

## CONSTIPATION

This is a very common and uncomfortable condition in pregnancy of hard, irregular, or infrequent stools.

**Causes and Predisposing Factors:** Increased amount of fluids needed by the body to support the pregnancy and the lack of sufficient water intake to compensate for it. The intestines are displaced by the growing uterus. Decreased peristalsis due to the influence of progesterone is also a contributing factor. Iron supplements, particularly ferrous sulfate, too little fiber in the diet, lack of exercise, and stress can also be factors.

### Prevention and coping strategies:

1. Avoid treatment with enemas, laxatives (including herbal types) or suppositories. These can make one too easily dependent, and some can be dangerous. Enemas and laxatives can sometimes bring on premature labor.
2. Drink six to eight glasses of water a day, and get regular exercise.
3. Eat bulky, high fiber foods and plenty of fruits and vegetables.
4. Eat dried fruits such as prunes, raisins, apricots, apples, etc.
5. Prune juice can be very effective and is very high in iron.
6. Psyllium and flax seed are two herbal laxatives that are safe to use during pregnancy. These are the primary ingredients in over-the-counter products such as Metamucil.

**EXERCISE:** List additional remedies for this condition.

## PTYALISM

Excessive saliva during pregnancy. Also called sialorrhea. This condition is fairly rare and is usually limited to the first trimester.

**Causes and Predisposing Factors:** The specific cause is unknown; it is assumed to be hormonal. It is associated with morning sickness and heartburn and is more common with a severe form of morning sickness called *hyperemesis gravidarum*.

### Prevention and coping strategies:

1. Gargle with salt water.
2. Use astringent mouth washes or regular mouth washes.
3. Chew sugar-free gum, or suck hard candy.

**EXERCISE:** List additional remedies for this condition



## HEMORRHOIDS

Hemorrhoids occur when the veins around the anus become swollen. They may be internal or external, bulging through the anus to the outside of the body. These swollen veins bleed easily. Pain, irritation, and itching are common symptoms.

**Causes and Predisposing Factors:** They are strongly associated with constipation, a diet low in fiber, straining at the stool, and hard stools, all of which put pressure on the veins. The added weight and pressure of pregnancy is a factor, as well as the hormones relaxing the veins.

### Prevention and coping strategies:

1. Relieve straining with bowel movements by avoiding constipation. Encourage a soft, bulky stool with a high-fiber diet and increased fluid intake.
2. Use witch hazel wipes, "Tucks," or other soft, moist astringents pads in place of or in addition to toilet paper.
3. Frequent sitz baths in plain warm water or warm water with some witch hazel added may give a great deal of relief.
4. Use the herbal salve described in Chapter 7.
5. Kegel exercises will improve the circulation of blood in the rectal area, increasing the elasticity of the blood vessels, possibly decreasing hemorrhoids.

**EXERCISE:** List additional remedies for this condition.

## PICA

Pica is a condition not uncommon during pregnancy where the woman has cravings for non-food substances such as ice, clay, laundry, starch or dirt.

**Causes and Predisposing Factors:** Usually a mineral or iron deficiency. Stress may play a role. Eating non-food substances may be harmful.

**Prevention and coping strategies:** Healthy diet, mineral, and vitamin supplements.

**EXERCISE:** List additional remedies for this condition.

## HEARTBURN

Heartburn is pain in the sternal region, belching, acid regurgitation, and epigastric pressure, which causes the stomach content to be regurgitated into the esophagus.

**Causes and Predisposing Factors:** Progesterone causes the valve at the top of the stomach to relax, while the fundus pushes up on the stomach. Certain foods, such as spicy or greasy foods, can cause heartburn in some women.

**Prevention and coping strategies:**

1. Chewable or liquid calcium, taken as often as needed, is very effective.
2. Avoid lying down after eating.
3. Eat smaller meals, and eat more frequently.
4. Avoid spicy or greasy foods, coffee, and tobacco.
5. Folic acid and papaya enzymes are said to be helpful.
6. Elevate the head of your bed.
7. Drink milk or eat yogurt after meals.
8. Avoid over-the-counter remedies that contain aluminum. Ones that contain only calcium and flavoring, such as Tums, are fine.

**EXERCISE:** List additional remedies for this condition.

## BLEEDING GUMS

**Causes and Predisposing Factors:** The hormones of pregnancy increase the vascularity of mucus membranes of the body, including in the mouth.

**Prevention and coping strategies:** Supplementing vitamins C, A, E, and rutin, are recommended. Use an ultrasonic or softer toothbrush.

**EXERCISE:** List additional remedies for this condition.

## VARICOSE VEINS

Also called varices or varicosities, varicose veins are swollen, twisted, or distended veins occurring on the legs and sometimes on the vulva. They can be painful, but this is not common.

**Causes and Predisposing Factors:** Increased vascularity, obstructed venous return due to the enlarged uterus, and enlargement and stretching of the diameter of the veins due to progesterone's muscle-relaxing effect. Varicose veins are associated with age, heredity, multiple pregnancy, increased weight, and activities which require long periods of sitting or standing.

**Prevention and coping strategies:** Do NOT massage directly over the varicosity – it can cause a blood clot to dislodge and create a blockage of blood flow to a vital organ. Recommendations for preventing and treating varicose veins:

1. Pressure stockings or support hose specific for varicose veins can help.
2. Mild regular exercise. Swimming is an excellent exercise for circulation that reduces the stress on the veins. A specific exercise for varicose veins is lying on the side with legs elevated for five minutes, two to three times a day. Varicosities of the vulva can be helped by lying on the side elevating the hips with a pillow for ten minutes, twice a day.
3. Recommended treatments include: Vitamin E, up to 600 IU daily. Vitamin C, rutin, and bioflavonoids. Alternate hot ginger with cold witch hazel compresses. Garlic, nettles and red clover, taken internally. Horse chestnut externally.

**EXERCISE:** List additional remedies for this condition.

## BREAST TENDERNESS

Pain, tingling, and tenderness in one or both breasts or nipples is most common in early pregnancy and in the first pregnancy.

**Causes and Predisposing Factors:** Increased circulation to the area and developing milk-producing tissue.

**Prevention and coping strategies:**

1. Get an appropriately fitted bra.
2. Use cold compresses.
3. Massage or use warm compresses with elder flower oil infusion.

**EXERCISE:** List additional remedies for this condition.

## LEG CRAMPS

“Charlie Horses” or leg cramps are quite common in pregnancy. They are usually in the calves and generally occur at night, because the decrease in circulation at night brings fewer nutrients to the leg muscles.

**Causes and Predisposing Factors:** Usually deficiencies of calcium, magnesium, sodium, vitamin B6, or vitamin E, or high levels of phosphorus in the blood. Also anemia, which reduces the oxygen-carrying part of the blood, allowing muscles to tire easily.

### Prevention and coping strategies:

1. Supplement calcium, magnesium, sodium, vitamin B6, and vitamin E.
2. Reduce foods containing high amounts of phosphorus.
3. Engage gentle aerobic exercise regularly to improve the circulation to the calf muscles.

If a leg cramp occurs:

- a. Straighten your knee and flex your ankle up to release the spasm in the muscle.
- b. Massage the area and apply heat (a hot water bottle, a heating pad, or a wash cloth dipped in hot water or hot ginger root tea).

**EXERCISE:** List additional remedies for this condition.

## BACK PAIN

Back pain or backache is usually low back pain and is more common in late pregnancy, but may occur any time. There also may be pain in the coccyx. All back pain should be differentiated from early contractions.

**Causes and Predisposing Factors:** Common in pregnancy due to loose ligaments from relaxin. This makes all the joints less stable and more easily stressed. Also the added weight gain is a strain on the spine.

### Prevention and coping strategies:

1. Change position frequently.
2. Use pillows for support while sleeping.
3. Exercise, especially engaging swimming and water exercises designed for pregnancy, and prenatal yoga.
4. Use hot packs and hot water bottles.
5. Supplement your calcium.

**EXERCISE:** List additional remedies for this condition

COMMON DISCOMFORTS EXERCISE <i>Complete the chart</i>			
Describe/define	When it usually occurs	Why it occurs more often in pregnancy	Measures to prevent or minimize
Back pain			
Bleeding gums			
Breast tenderness			
Candida			
Carpal tunnel syndrome			

Describe/define	When it usually occurs	Why it occurs more often in pregnancy	Measures to prevent or minimize
Edema			
Fainting			
Fatigue			
Flatulence			
Food cravings			

Describe/ define	When it usually occurs	Why it occurs more often in pregnancy	Measures to prevent or minimize
Foot problems			
Heartburn			
Hemorrhoids			
Increased frequency of urination and nocturia			
Increased salivation			

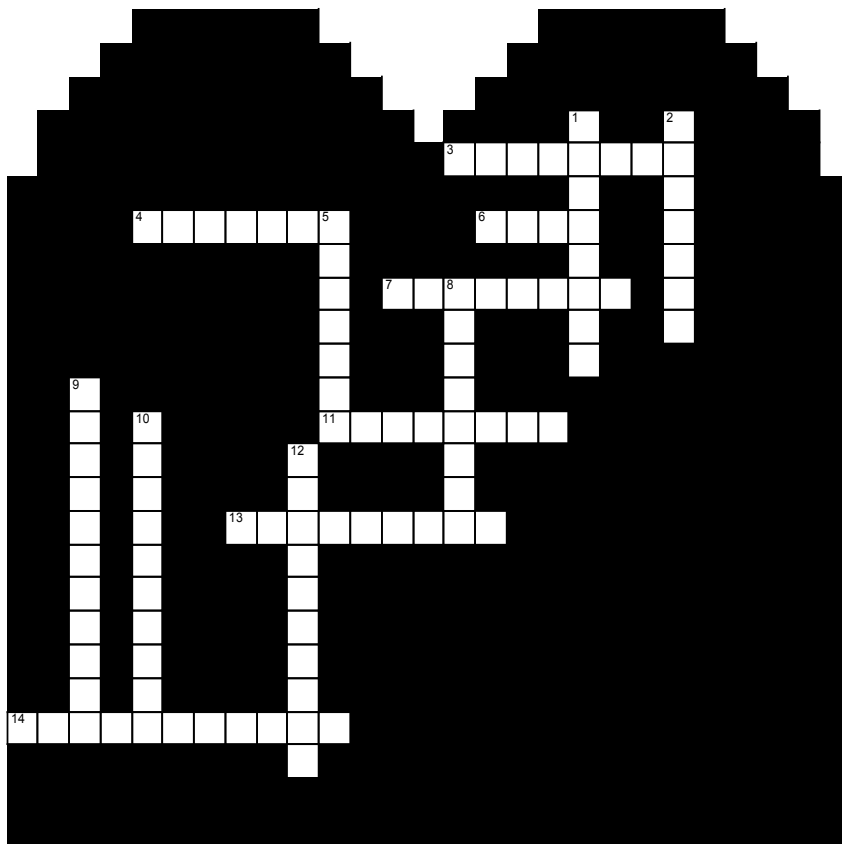
Describe/ define	When it usually occurs	Why it occurs more often in pregnancy	Measures to prevent or minimize
Insomnia			
Leg cramps			
Nasal stuffiness			
Nausea			
Nose bleeds			



Describe/define	When it usually occurs	Why it occurs more often in pregnancy	Measures to prevent or minimize
Pelvic joint pain of the coccyx or symphysis			
Pruritus gravidarum			
Rib soreness			
Round ligament pain			
Sciatica			

Describe/define	When it usually occurs	Why it occurs more often in pregnancy	Measures to prevent or minimize
Shortness of breath			
Supine hypotensive syndrome			
Round ligament pain			
Varicose veins			
Vaginal varicosities			

## Common Discomforts



## Down

1. excessive flow of saliva
2. a yeast infection of skin and mucus membranes
5. light-headedness or fainting caused by insufficient blood supply to the brain
8. a tan discoloration of a woman's face
9. veins around the anus or lower rectum are swollen and inflamed
10. discharge of white mucous material from the vagina
12. helps to reduce and control vomiting and nausea

## Across

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>3. pain in the lower back and hip radiating down the back of the thigh into the leg</li> <li>4. a painful burning sensation in the chest caused by gastroesophageal reflux</li> <li>6. craving or eating earth or clay or other strange substances</li> <li>7. frequent nighttime urination</li> <li>11. nasal bleeding</li> </ol> | <ol style="list-style-type: none"> <li>13. tiny red dots on the skin due to bleeding under the skin caused by low platelet counts</li> <li>14. pain during or after sexual intercourse</li> </ol> |
|---|---|

## EMOTIONAL AND PSYCHOLOGICAL ASPECTS OF PREGNANCY

Pregnancy is a tremendous upheaval in a woman's body, and children are a tremendous upheaval in a woman's life. Part of the process of preparing for birth is preparing to make the transition to motherhood. This is a multidimensional process, encompassing mental and psychological changes, as well as emotional responses. It involves the relationship a woman has with her partner, how she feels about her body, her support system, and her overall life situation. Women who are in non-traditional situations, such as adolescents, single women, lesbian parents or very low-income women, have another set of stressors in addition to the normal pregnancy shifts.

Pregnant women face upsurges of estrogens and other hormones that may increase mood swings, changes in libido, fatigue, bursts of energy, crying spurts, and other unexpected emotional changes. A combination of the physical changes with the mental and psychological changes of preparing for motherhood can be challenging for women.

Among a midwife's responsibilities is to be aware of the psychological changes that a pregnant woman experiences and to be able to actively listen and let a woman know that what is happening to her is normal and to be expected. While mood swings and emotional changes are normal in pregnancy, a midwife needs to be able to know if a pregnant woman becomes clinically depressed or may have a family or life situation that may require help or intervention.

Communication and counseling skills are important to good midwifery care.

### EFFECTIVE COMMUNICATION:

- ◆ Prevents misunderstandings.
- ◆ Solves problems.
- ◆ Strengthens interpersonal relationships.
- ◆ Builds trust.
- ◆ Increases efficiency.
- ◆ Diffuses emotional reactions.
- ◆ Reduces stress.

Communication involves both the sending of a message as well as receiving; "I" messages ("I think," "I feel") are more effective than "you" messages ("You should," "You're wrong"). It involves talking *with* and *to* listeners, rather than *at* them.

### ACTIVE LISTENING TECHNIQUES:

1. Show interest and acceptance.
2. Be open-minded and avoid prejudging the speaker or the message.
3. Tune in to words, meanings, and feelings conveyed.
4. Focus on the central messages sent.
5. Validate their feelings: "It is normal for you to feel this way."
6. Avoid interrupting the other person.
7. Listen first, then respond.
8. Ask questions to verify your understanding of the message.
9. Respond to what is communicated, rather than to how the message is sent.
10. Use Nonverbal Communication: eye contact, facial expressions, body language, touching.
11. Paraphrase what you hear back: "What I hear you saying is...".
12. Mirror or reflect back what is said exactly: "You feel ....".
13. Give verbal: "I'm listening" cues: "uh, uh", "I see" or "aha".

## MATERNAL ROLE ATTAINMENT

Women become mothers over the course of their pregnancies with a set of tasks, first identified by Reva Rubin in 1964 and expanded by Ramona Mercer in 1986, called Maternal Role Attainment. Through this process, a mother becomes competent in her role and integrates mothering behaviors so she is comfortable with her position as a mother.

The first task is **Validation of the Pregnancy**. The mother may question the reality of the pregnancy and need to confirm the pregnancy with physical signs, such as looking at her body for signs of pregnancy or trying to feel fetal movement. Or she may reassess the pregnancy signs, have another pregnancy test, or see a doctor or midwife for confirmation. The baby still seems unreal. She may be ambivalent about the pregnancy, even if it was planned. She may have concerns about how having a baby will affect her life, her partner, her work and her family. Part of this process is accepting the fact that she really is pregnant. As she accepts the pregnancy, she considers the safety of herself and the baby. She changes her behavior, e.g. she quits smoking or improves her diet, starts taking vitamins, and starts prenatal care. It is also an anticipatory stage. She fantasizes about her role as a mother and thinks about what life will be like as a parent. She may have dreams about the unknown, something alien growing inside her.

### EXERCISE TASK 1: VALIDATION

*Fill out the following for your pregnancy, or interview a friend or client if you have never been pregnant.*

1. How did I feel when I found out I was pregnant?
2. Whom did I tell first?
3. When did I tell everyone (co-workers, acquaintances)?
4. What were some of the things that I worried might affect my pregnancy?
5. How long did it take for me to feel like I accepted the pregnancy?

The second task is **Fetal Embodiment**. Now she incorporates the fetus into her body image. She seeks acceptance of the baby by others. How her partner and family react is important to the woman at this stage. She and the baby become one in her mind. The mother finds herself gradually turning inward, being more introspective, becoming more interested in the baby. She may find herself feeling more dependent on her partner and family. She may start reading and learning about pregnancy. She takes a more active role in protecting the health of the baby, possibly worrying about normalcy or miscarriage. As her body begins to have visible changes it may bring up feelings about body image. She seeks out other women who are or recently have been pregnant. She thinks about being a mother; what that means; and she considers her relationship with her own mother. She may have fantasies and daydreams about what it would be like to have a baby. Dreams are often about self but begin to shift to others.

### EXERCISE TASK 2: FETAL EMBODIMENT

*Fill out the following for your pregnancy, or interview a friend or client if you have never been pregnant.*

1. How did I feel about my body in early pregnancy?
2. Did I feel my partner had the same level of interest in the pregnancy as I did?
3. What were my worries or concerns during this phase?
4. Did I talk to my own mother about babies and parenting? How did that feel?
5. Did I think about how I was parented and what I would do differently or the same?

The third task is **Fetal Distinction**, where she views the fetus as an individual being, a baby, a child of her own. She begins the process of creating a mothering identity separate from her own mother. She begins thinking about the baby after birth, what its personality may be; she may start thinking about names. She touches her belly often and feels the baby kicking. She takes an interest in other babies and children. She buys baby supplies, reads, takes classes and wants to learn about pregnancy. She seeks reassurance from her partner and wants him to participate in the pregnancy, which he may or may not be ready for. She may have concerns about her attractiveness with her changing body and seek reassurance. She starts dreaming about babies and children.

### EXERCISE TASK 3: FETAL DISTINCTION

*Fill out the following for your pregnancy or interview a friend or client if you have never been pregnant.*

1. How did I feel the first time I felt the baby move?
2. What kind of mother did I think I would make at this stage?
3. What things did I do to prepare for the baby at this stage?
4. What did I think about the unborn baby at this stage?
5. How did I feel about my body in mid-pregnancy?
6. How did I feel about my partner's participation at this stage?

The fourth task is when the mother is preparing to give up the baby, to experience labor and birth, and to become a mother to the baby. She may have some anxiety as labor and birth approaches. She may feel dependent or vulnerable and rely on partner and family for support. She may be uncomfortable with the discomforts of late pregnancy, fueling anxiety about labor and birth. She begins actively preparing for birth, likes to take action and to do things to get ready. She nests, readying her home for the baby. She thinks about caring for an infant and makes decisions about what she needs to do. She makes sacrifices for the baby. She may worry about meeting the baby's needs, but she begins to see herself as a mother: someone strong, capable, and nurturing. She dreams about babies and birth. She may have anxiety or fears about the birth, the health of the baby, and loss of control, freedom and self identity.

#### EXERCISE TASK 4: ROLE TRANSITION

*Fill out the following for your pregnancy, or interview a friend or client if you have never been pregnant.*

1. How did I feel about my body in late pregnancy?
2. What decisions did I make at this time regarding caring for the baby?
3. What were the concerns or fears I had about birth?
4. What did I do to prepare for birth?
5. What was it like to hold the baby for the first time?



## SEXUALITY DURING PREGNANCY

Pregnancy affects women's sex drives differently. Some women find a new intimacy with their partner. They find themselves more easily aroused, and their libido increases. Sometimes, not having to worry about birth control can enhance sexuality. Other women lose much of their sex drive, perhaps wanting cuddling and holding instead of intercourse. The reproductive drive is very connected to sexual drive, and some women find that, once they are pregnant, that drive is diminished. Sometimes, intercourse can be uncomfortable while pregnant, especially in the later months. Some women have a harder time reaching orgasm while pregnant; others find it easier. And then, there are those who find that being pregnant does not affect their sexuality at all.



Making love is a powerful connecting force with your partner. Pregnancy and the new life to come is an extension of that creative force. We need to respect the connection between procreation and sex, as the two forces are intertwined, yet distinct. We make love to share in a deep, intimate way with someone we love. A new life – a child – can be a result of that union. During pregnancy, that baby is connected with the exchange of energy that occurs during lovemaking. Very possibly, the baby likes the loving energy and all the rocking and moving about.

Orgasm stimulates the production of oxytocin, the hormone which causes contractions. It is very normal to experience “Braxton-Hicks” contractions during or after sexual activity. Intercourse, particularly in the rear-entry position, is a wonderful way to stretch and prepare the perineum for birth to prevent tears.

Years ago, women were advised not to have sex during the last six weeks of pregnancy. This was due to fear of infection and premature labor. As long as the waters are intact and the mucous plug is present, the baby is protected from infection. Unless the woman has a history of premature births or other problems, it is generally safe to continue to have intercourse all the way through the pregnancy.

The father's feelings may change during pregnancy. He may feel afraid of hurting the woman or the baby while making love. If there are problems, the most important thing at this point is clear communication between partners, each expressing their feelings and desires.

Often a midwife is the only person a woman can talk to about her sexual issues. Ideally, all midwifery training should include courses on human sexuality. By learning about the range of human sexual behavior and the physiological and psychological issues around sex, a midwife can be better prepared to be a resource and a help for her clients. It is important to get over your own personal issues and embarrassment about talking about sex and create a trusting environment so your client feels safe talking to you about her sexuality as it relates to pregnancy and her relationship. Our sexuality is interconnected with our feelings, well-being and happiness; if there are problems in this area, it can come out in other ways.

Many women, some say as high as 1/3 of all women, have experienced some sort of sexual hurt or abuse during childhood. In some women, this can affect how they feel about their bodies and consequently how they labor and birth. By creating a safe and comfortable place to discuss sexuality, you may be able to help a woman work through some of these issues prior to delivery.

## SEXUALITY OF PREGNANCY EXERCISE

Answer the following:

1. What physiological factors would affect a woman's sexuality?
2. What are some emotional or psychological factors that may affect a woman's sexuality?
3. List conditions in which any sexual activity would be not recommended during pregnancy.
4. What are some positions or activities you would recommend during pregnancy?
5. How would you bring up the topic of sexuality during a routine prenatal visit?
6. Your client has a very different sexual lifestyle than what is in your comfort zone. How will you approach this and why?
7. Your client has shared that she is a survivor of childhood sexual abuse. What will you say and why?

## SELF-TEST

1. \_\_\_ The cervix is unchanged by pregnancy.
2. \_\_\_ The average length of a normal pregnancy is 10 lunar months.
3. \_\_\_ The pulse rate decreases over the course of pregnancy.
4. \_\_\_ During pregnancy, the metabolic rate generally declines.
5. \_\_\_ Constipation can be caused by vitamin supplements.
6. \_\_\_ Pica can be caused by anemia.
7. \_\_\_ Blood volume generally increases about 20% in a healthy singleton pregnancy.
8. \_\_\_ Estrogen relaxes smooth muscle, decreasing peristalsis and causing constipation.
9. \_\_\_ Varicose veins should be massaged regularly.
10. \_\_\_ Chloasma can become serious, requiring referral to a physician.

Match the following hormones in column I with the appropriate descriptions in Column II.

- | Column I                             | Column II                               |
|--------------------------------------|---|
| 11. ___ Estrogen                     | A. Softens pubic joints.                |
| 12. ___ Human Chorionic Gonadotropin | B. Increases metabolic rate.            |
| 13. ___ Human placental              | C. Induces milk let-down reflex.        |
| 14. ___ Oxytocin                     | D. Promotes growth of uterine tissue.   |
| 15. ___ Parathyroid                  | E. Alters calcium metabolism.           |
| 16. ___ Relaxin                      | F. Increases metabolism of fatty acids. |
| 17. ___ Thyroxine                    | G. Preserves the corpus luteum.         |

Indicate with an up or down arrow if the following things normally increase or decrease during pregnancy.

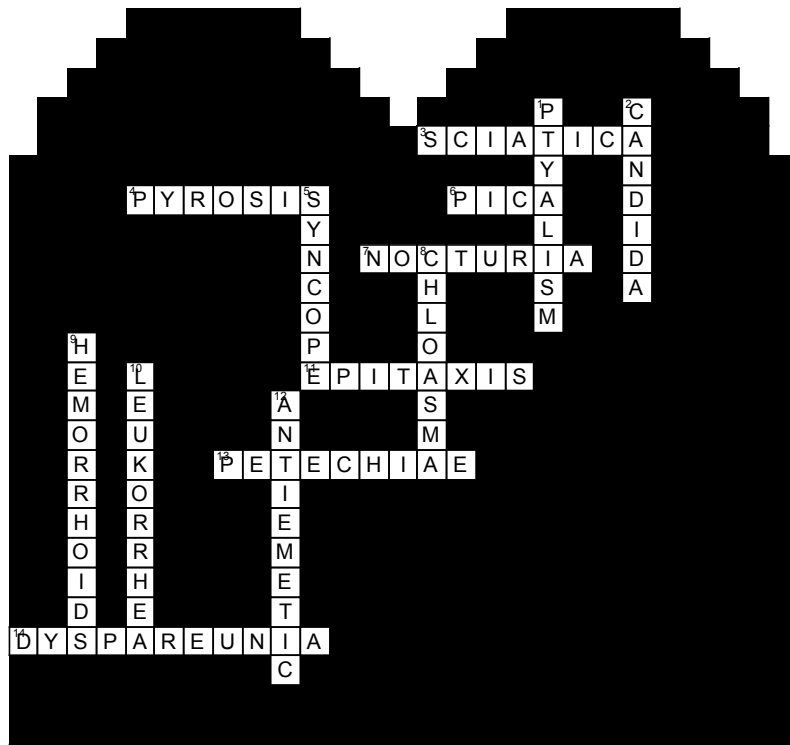
18. \_\_\_ Heart size
19. \_\_\_ Heart rate
20. \_\_\_ Hematocrit
21. \_\_\_ Work load of the heart
22. \_\_\_ Stroke volume
23. \_\_\_ Cardiac output
24. \_\_\_ Blood volume
25. \_\_\_ Diameter of blood vessels
26. \_\_\_ Blood pressure during the second trimester
27. \_\_\_ Blood viscosity
28. \_\_\_ Kidney size
29. \_\_\_ Peristalsis of the intestines
30. \_\_\_ Capacity of the lungs

### ANSWERS:

1. False, 2. True, 3. False, 4. False, 5. True, 6. True, 7. False, 8. False, 9. False, 10. False, 11. D, 12. G, 13. F, 14. C, 15. E, 16. A, 17. B, 18. increases, 19. increases, 20. decreases, 21. increases, 22. increases, 23. increases, 24. increases, 25. increases, 26. decreases, 27. decreases, 28. increases, 29. decreases, 30. decreases.

PUZZLE ANSWER KEY

Common Discomforts



Physiology of Pregnancy Word Search



# Chapter 7

## Supporting a Healthy Pregnancy

### OBJECTIVES

*After completing this chapter, the student should be able to:*

1. Comprehend the midwife's role in prenatal nutrition, education and counseling.
2. Understand the role nutrition plays in the outcome of pregnancy.
3. Comprehend how to review a history for nutritional risk factors.
4. Identify nutritional risk factors in pregnancy.
5. Review nutritional requirements during pregnancy.
6. Explain the role of iron in pregnancy and how it is absorbed and utilized.
7. List foods high in necessary nutrients required during pregnancy.
8. Describe the functions of necessary nutrients during pregnancy.
9. Describe several benefits of using herbs during pregnancy.
10. Explain why certain types of herbs are not recommended in pregnancy.
11. List specific herbs contraindicated in pregnancy.
12. Explain the physical and psychological benefits of prenatal exercise.
13. Discuss guidelines for exercising safely during pregnancy.
14. Identify conditions:
  - A) with contraindications for exercise during pregnancy;
  - B) that would gain additional benefit from prenatal exercise;
  - C) that would necessitate modifying or limiting prenatal exercise.



Raspberry Leaf

## SUPPORTING A HEALTHY PREGNANCY

One of the most important roles a midwife has is health educator. Pregnancy, more than any other time in their lives, is a time when women are open to change. They may quit smoking, learn healthier eating habits, or start an exercise program, all for the sake of their baby; they may not have done those things otherwise. Midwives have the opportunity to educate women to make healthier lifestyle choices that will not only help them have a healthier baby, but will have lifelong positive effects.

Educating women on the dangers of smoking and the use of alcohol and drugs is part of health education. Another aspect is the focus on prevention of problems through nutrition, herbs, and exercise. It is a simple concept: Healthy mothers make healthy babies. Labor and delivery is an intense physical challenge for most women. Going into labor fit and well-nourished gives women more energy, more reserve, and a better ability to deal with pain. Healthy mothers have babies with higher birth weights, higher APGAR scores, and fewer complications.

Educating women to change health behaviors is a process that takes place over their entire prenatal period. Each visit should include discussion around health topics. The same principles of adult education used by a midwifery student apply to working with pregnant women. Treat them with respect as capable individuals. Validate and affirm their knowledge, and help them integrate the new material with what they already know. Avoid jargon and a lot of medical terminology, but don't talk down to women nor make assumptions about what they know or don't know.

Pregnant women look to their midwives for information. However, midwives need to be careful of not overwhelming women with advice or philosophies that are so radically different from their own lifestyle or beliefs. Otherwise, the risk is that all advice will be disregarded.

Listen to women. Work with them from the place they are, not where you think they should be.

### HEALTH PROMOTION EXERCISE

List ways a midwife can promote health in these areas:

1. Stress Management
2. Self Esteem
3. Self Care
4. Relationships

## NUTRITION IN PREGNANCY

Midwives educate women on what a critical part nutrition plays on the outcome of pregnancy. They work to improve a woman's existing diet and review and recommend nutritional supplements. For many women, pregnancy is the first time a woman has focused on her nutrition. She may have come from a "junk food" type of diet and not have any concept of healthy nutrition, or she may follow a particular diet, such as vegan or macrobiotic. She may have special nutritional needs.

The critical role nutrition plays in pregnancy is clearly evident. Adequate and appropriate nutrition is essential in preventing nutritional anemias, low birth-weight babies, some birth defects, prematurity, some cases of nausea and vomiting, and a host of other pregnancy and fetal complications. Some outcomes of poor nutrition, such as developmental delays, are not always evident at birth and sometimes not even for years. Obviously, the healthiest possible pregnancy produces the healthiest child. The woman's nutritional status plays an important part in how her body responds to the stresses of labor, the blood loss that occurs following birth, and how she recuperates afterwards.

There are substances in many women's daily diet that are potentially harmful to the fetus. For example, coffee, colas and other caffeinated beverages can, if taken daily in large doses, cause damage to the fetal nervous system that may not become evident for years. Any type of artificial or chemical food additives have unknown effects and are best to avoid whenever possible.

The midwife should know the specific nutritional requirements during pregnancy for proteins, carbohydrates, fats, vitamins, and minerals. Understanding the roles iron and folic acid play in the prevention of anemia is one example. The midwife needs to evaluate the woman's current nutritional status and then make specific recommendations as needed.

Start by working with the woman's existing diet. Begin in her intake process with a nutrition review, a comprehensive health history, and a three-day diet recall. Then review the amount of protein, calcium, iron, etc., she is receiving. There are computer programs and services that will give detailed nutritional analysis, or it can be done using reference books.

Make recommendations based on her existing diet. If she is a vegetarian, for example, and not getting enough protein or B vitamins, give her charts and recommend specific vegetarian foods. If a woman is eating a lot of foods high in sugar and fat, work with her by giving her ideas of healthy foods to substitute. A radical change in diet such as switching to a total vegetarian diet or a weight loss diet, is not recommended in pregnancy.

Talk about nutrition at each prenatal visit. Use resources in your community, such as the WIC program, which can provide supplemental high nutrition foods to low-income mothers. WIC programs frequently have nutrition in pregnancy and breastfeeding classes that are open to anyone regardless of income. Other community resources, such as county extension services, frequently offer classes, recipes, and cooking lessons.

At the initial visit, a nutritional history will give you valuable information. A separate nutrition form is great, or you can glean some of the needed information from the existing forms and an interview.

It is important to recognize that different cultures have different beliefs about certain foods during pregnancy. Part of midwifery care is learning about the cultural practices of the population of women you serve, and respecting that whenever possible. In some cases, if the practices are potentially harmful, teach women about the risks to allow them choices.

DIET TYPE EXERCISE	
<i>Define components of these diets</i>	<i>List potential deficiencies during pregnancy</i>
Vegetarian	
Vegan	
Kosher/Hallal	
Lacto-ovo-vegetarian	
Macrobiotic	
Raw Foods	
Omnivorous	
Weight Loss	
Gluten Free	
Atkins	



### FOODS TO AVOID DURING PREGNANCY EXERCISE

Certain foods may have health risks during pregnancy, for example certain cheeses or types of fish. List foods, (excluding junk foods and medicinal herbs) why to avoid them, when, and what quantities they are considered safe.

Name of Food to Avoid	Rational	At what point during pregnancy	Amount considered safe

### PAST HEALTH HISTORY QUESTIONS RELEVANT TO NUTRITIONAL NEED

History of:

1. Anemia, heavy or frequent menstrual periods, IUD use, recent surgery, or accidents involving blood loss. Blood loss can cause anemia and depletion of iron, copper, and B12.
2. Frequent or recent infections. This may lead to premature destruction of red blood cells resulting in anemia, or it may indicate that the immune system is weak and might benefit from more Vitamin A and C in the diet.
3. Recent or extended use of oral contraceptives. This increases the body's need for B-6 and folic acid.
4. PMS. May indicate the woman's diet tends not to meet her body's demand of B-6.
5. Slow clotting time. This may be due to decreased production of Vitamin K or low levels of calcium (which is involved in clotting) in the blood.
6. Hepatitis or other liver problems. The liver is intimately involved with the metabolism of foods; if it is damaged, the body may not get the full benefit of the nutrients the woman eats.
7. Alcohol or serious drug abuse can lead to liver damage and the problems in #6.
8. Being underweight, or having anorexia or bulimia. This often leads to a generally poor nutritional status and depletes stored nutrients.
9. Rickets or other nutritional deficiencies.
10. Colitis, intestinal viruses, dysentery, or tapeworms.
11. Closely-spaced pregnancies.
12. Pregnancy while breastfeeding, or breastfeeding three months prior to pregnancy.
13. Hypoglycemia or diabetes.
14. Family history of anemia or diabetes.
15. Craving nonfood items such as ice, clay, dirt, laundry starch, or plaster.

### CURRENT PREGNANCY QUESTIONS RELEVANT TO NUTRITIONAL NEED

If any of the following conditions apply, the woman may need more than the standard prenatal nutritional support, until any deficiency is resolved.

1. Anemia
2. Smoking cigarettes
3. Currently breastfeeding another child
4. Under age 19 or over age 35
5. Strict vegetarian or vegan diet
6. Overly concerned about weight gain
7. Persistent nausea and vomiting
8. Bleeding gums or bruising easily
9. Leg cramps
10. Eyes light sensitive, itchy or burning, or poor night vision
11. Easily fatigued
12. Poor appetite
13. Rashes or skin conditions
14. Frequent constipation
15. Upper right quadrant pain
16. Very athletic or has physically demanding job
17. Multiple pregnancy
18. Grand multiparity
19. Hypertension

## NUTRITION KEY TERMS

*Define the following terms:*

1. Complex Carbohydrate
2. Simple Carbohydrate
3. Monosaccharide
4. Polysaccharide
5. Disaccharide
6. Refined
7. Fortified
8. Enriched
9. Protein
10. Amino Acid
11. Essential Amino Acid
12. Complementary Proteins
13. Essential Fatty Acids
14. Saturated Fat
15. Monounsaturated Fat
16. Polyunsaturated Fat
17. Fiber
18. Soluble Fibers
19. Cellulose
20. Antioxidant
21. Mineral
22. Trace Mineral
23. Cholesterol
24. LDL
25. HDL
26. Triglycerides

## BASIC NUTRITIONAL REQUIREMENTS IN PREGNANCY

### CALORIES

Sufficient calories must be ingested to meet the added needs of pregnancy, to protect protein from being burned for energy, and to get the vitamins and minerals that are required. Poor maternal weight gain is clearly linked to poor fetal weight gain and development. Diets sufficient in calories are more likely to be sufficient in protein and other nutrients as well. The daily caloric recommendations during pregnancy are based on the height, weight, and age of the mother, as well as her level of activity. The average calorie intake recommended per day is 2,500, with more in the second and third trimesters correlating with fetal growth.

### PROTEIN

Protein supplies the amino acids needed for growth and maintenance of tissues. Much of the growth that occurs during pregnancy is dependent on protein; uterine muscle tissues, fetal muscles, brain cells, and connective tissues all depend on protein to maintain adequate growth. If the protein intake is adequate, most of the other nutritional needs are easier to meet, with the exception of iron and folic acid. The protein requirement for a pregnant woman can vary depending on her age, stage of pregnancy (protein needs increase after 20 weeks), height and weight, and special needs. 75gm. per day is usually sufficient.

Milk and milk products are a simple and inexpensive source of protein. Women who have milk allergies, and or who are vegans (vegetarians who use no animal products), are at risk for protein deficiencies; however, it is possible to get enough protein on these diets with effort. Emphasis should be on bean products and nuts, as well as mixing legumes and grains to form complete proteins.

### FAT

If calorie, protein, and micronutrient intake is adequate, an intake of 30% of calories from fat appears to be acceptable. The recommended adequate intake (AI) for pregnant women, established in 2002, was set at 13 grams per day of omega-6 fatty acid and 1.3 grams of omega-3 fatty acid per day. Women should be encouraged to eat fish and seafood several times per week and use omega-3 fatty acid rich canola oil or flaxseed oil to insure adequate fatty acid intake. Some fish should be avoided because of high levels of mercury, such as shark, swordfish, king mackerel, or more than six ounces of "white" or "albacore" tuna or tuna steak each week.

### FIBER

The recommendation for fiber intake remains the same as that for nonpregnant women, 28 grams total fiber per day. Fluid needs may increase during pregnancy, especially when fiber intake is increased.

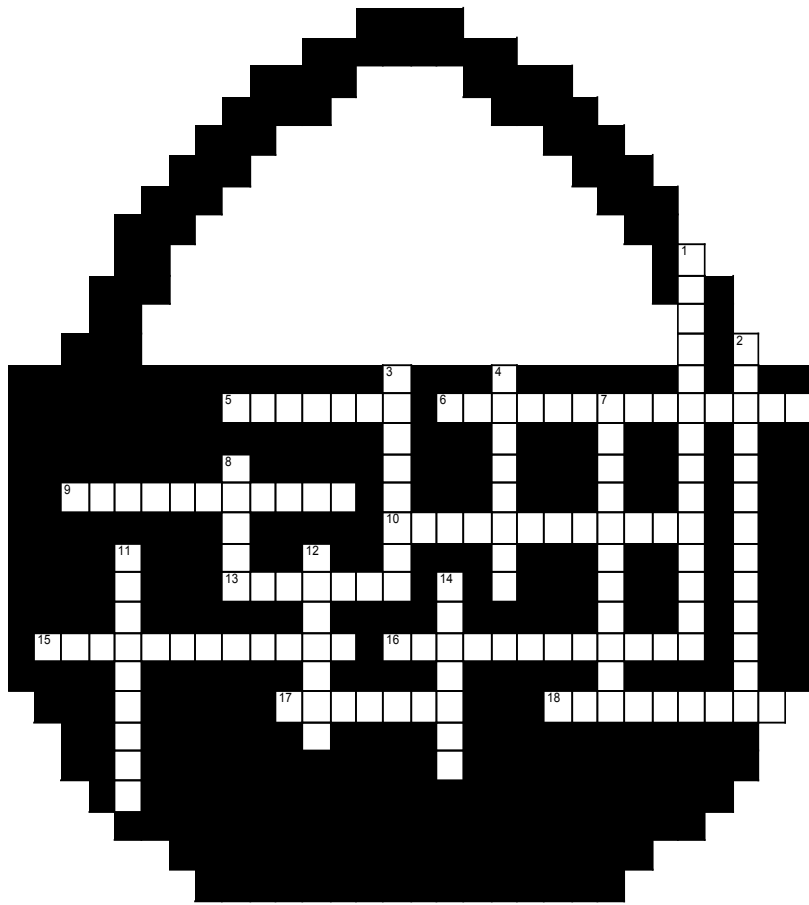
### CARBOHYDRATES

The RDA for carbohydrate during pregnancy is 175 grams per day, which accounts for both maternal and fetal glucose needs. Intake of complex carbohydrates, such as whole grains, fruit, and vegetables is preferred.

## NUTRITION EXERCISE

1. List foods high in protein that an omnivore would eat.
2. List foods high in protein that a lacto-ovo vegetarian would eat.
3. List foods high in protein that a vegetarian would eat.
4. List foods high in protein that a vegan would eat.
5. List risks and problems with protein deficiency during pregnancy.
6. List some sources of healthy fats for pregnant women.
7. What is the difference between simple and complex carbohydrates?
8. List foods high in fiber.

## Nutrition Terms Crossword



## Across

- |   |   |
|---|---|
| 5. a large complex molecule made up of one or more chains of amino acids                | 13. processing to remove impurities   |
| 6. sugars or carbohydrates made up of more than one sugar unit                          | 15. following a meal  |
| 9. a molecule that can neutralize free radicals before they interact with living tissue | 16. sugars formed by the combination of two simple sugar units  |
| 10. an abnormally low level of glucose in the blood                                     | 17. a naturally occurring inorganic element or compound having an orderly internal structure and characteristic chemical composition. |
|   | 18. the main component of plant cell walls  |

## Down

1. simple sugars, such as glucose, having only one sugar unit
2. fatty substance in the body that acts as a major form of stored energy
3. re-supplied with vitamins and minerals lost or diminished during processing of food
4. the principle form of carbohydrate energy stored within the bodies muscles and liver
7. a fat-like substance found in blood, muscle, liver, brain, and other tissues in people and animals.
8. an ingredient in edible plants that aids in digestion
11. to add ingredients to food for quality and enrichment purposes
12. organic molecules essential in small amounts for normal metabolism, growth and development of the body
14. hormone produced by the pancreas essential for bodily use of sugars

## Vitamins

**Fat-Soluble Vitamins** – Vitamins A, D, E, & K are stored in the liver and used if the dietary intake becomes inadequate.

**Vitamin A:** Is responsible for the development of healthy eyes in the fetus, as well as constantly affecting our vision in dim light. Deficiencies can cause night blindness. Vitamin A is also involved in the growth of epithelial cells, which compose the skin and line the gastrointestinal tract. RDA for Vitamin A is 5000 IU during pregnancy. Toxicity has been noted for those taking over 7000. *Vitamin A overdoses have been linked to fetal malformations.*

**Vitamin D:** Is a necessary part of the process of absorption and utilization of calcium and phosphorus in skeletal development. It is formed in the skin after exposure to sunlight. Pasteurized milk contains added Vitamin D. One quart of milk per day provides the 400 IU that are needed during pregnancy. Vitamin D deficiencies can cause rickets. *Overdoses can cause hypercalcemia, which can cause seizures in neonates.*

**Vitamin E:** Its primary function is as an antioxidant – it takes on oxygen, preventing other substances from undergoing chemical changes. This can protect cell membranes, keeping them healthy. It is essential in the process of the formation of red blood cells in bone marrow, tissue healing, and treating hemolytic anemia in newborns. RDA for Vitamin E is 10 IU for pregnant women. *Toxicity has been reported with doses over 600 IU.* Externally, Vitamin E is used to prevent stretch marks and to heal scar tissue. It can be used on the perineum to heal previous episiotomy scars.

### VITAMIN EXERCISE

List sources high in:

Vitamin A

Vitamin D

Vitamin E

Vitamin K

Vitamin C

**Vitamin K:** An essential factor for the synthesis of prothrombin and necessary for the normal blood clotting process. Vitamin K is synthesized in the large intestine with the help of *E. coli* bacteria. Newborns are born lacking Vitamin K, and many practitioners routinely administer injections of Vitamin K to prevent blood clotting disorders. It is state law in many areas that all babies are given Vitamin K at birth. Parents may sign a waiver.

**Water-Soluble Vitamins:** Are not stored in the body; the unused portion is excreted in the urine. They include Vitamin C and the B Vitamins: thiamine (B1), riboflavin (B2), niacin (B3), folic acid, pantothenic acid (B5), pyridoxamine (B6), and cobalamin (B12).

**Vitamin C** is essential to the formation and development of the connective tissue and the vascular system. It is widely believed to boost the immune system, and to protect the body from infection, including viruses. The RDA for Vitamin C in pregnancy is 70 mg daily, which should be easily obtainable in a diet containing raw or slightly cooked fruits and vegetables. Many women supplement large doses of Vitamin C, up to 2 grams (2,000 mg) daily during pregnancy for various therapeutic benefits. *Although the toxicity dose is relatively high, 4-6 grams, the body may become dependent on high doses and create a scuroy-like condition in the baby following the birth.*

**B Vitamins**, or "B complex," are necessary to aid in the process of cell respiration, glucose oxidation, and energy metabolism. Folic acid promotes fetal growth and plays a direct role in the prevention of neural tube defects if taken prior to and very early in pregnancy. Folic acid deficiency is linked to placenta abruptio, bleeding disorders in pregnancy, hemorrhagic disease of the newborn, and megaloblastic anemia. A B12 deficiency can cause pernicious anemia. B12 is only found in animal sources; thus vegans are at higher risk for developing B12 deficiency. B6 supplements, both oral and IM injections, are used in treatment of nausea and morning sickness.

### VITAMIN EXERCISE

List sources high in:

Vitamin B1

Vitamin B2

Vitamin B3

Vitamin B5

Vitamin B6

Vitamin B12

Folic acid



## IRON

Iron is essential in the production of hemoglobin, the coloring matter in red blood cells, and it transports oxygen in the blood from the lungs to the tissues. Insufficient iron intake is the most common cause of anemia during pregnancy. Deficiencies in B6, B12, or Vit. C, folic acid, copper, and zinc can also lead to anemia.

With anemia the capacity of the blood to carry oxygen is reduced. The fetus receives less oxygen, making fetal distress more likely. Oxygen deprivation can lead to a shorter attention span, diminished coordination, memory, and lowered scholastic achievement in the child. In the mother, anemia can reduce the capacity to withstand bloodloss, making her more susceptible to shock. Anemia can also affect the uterine muscle causing, *uterine inertia* (tired uterus) resulting in longer labors. It can also affect the pain of contractions, because muscles that lack oxygen build up lactic acid, causing increased pain.

Pregnancy presents extra demands of iron, especially in the second trimester. The fetal demands for iron increase during the third trimester. The placenta pulls large amounts of iron from the maternal bloodstream by active transport. The fetal liver stores iron to meet its needs for the first six months, as very little iron is present in breastmilk.

During the postpartum period, iron deficiency contributes to greater fatigue, greater tendency to postpartum depression, and higher risk of infection.

The average daily requirement for iron in pregnancy is 18 to 48 mg. However, only about 10% of the iron we eat is absorbed, so it is important to stress high-iron foods and use iron supplements. When Vitamin C is eaten with iron, it doubles iron's absorption rate. Iron is absorbed better if eaten with food. Chelated iron is the best-absorbed source among iron supplements; they are chemically bound with substances that are easily absorbed. Avoid ferrous sulfate and timed-release iron.

### IRON EXERCISE

1. List food sources high in iron.
2. What are other ways to get iron besides food?
3. List inhibitors to the absorption of iron.
4. List advantages and disadvantages of iron supplements.
5. Explain ways to maximize absorption of iron.
6. List signs and symptoms of iron deficiency.

## CALCIUM

Calcium not only gives strength to bones and teeth; calcium also is needed for the transmission of nerves to the muscles, and for the contraction and relaxation of the muscles. Calcium is a factor in the clotting of blood, balancing the pH of blood, and in maintaining normal blood pressure. During pregnancy, calcium is more easily absorbed and utilized.

The RDA of calcium during pregnancy is 1200 mg, 1600 for pregnant adolescents. When too little calcium (hypocalcemia) is present in the body, muscles tire easily; leg cramps and other muscle pain may be present, as well as bleeding gums, headaches, poor bone formation in the fetus, and depletion of calcium in the maternal bones. An Appalachian "old wife's tale" was that for every child born, the mother lost a tooth. Hypertension (high blood pressure) and preeclampsia have been linked in numerous studies to lower calcium intake.

*Hypercalcemia*, or too much calcium, can cause seizures and other problems in the neonate. This usually is not due to the mother eating too much calcium, but to the effects of anoxia on the blood pH or to excessive vitamin D intake.

### CALCIUM EXERCISE

1. List food sources high in calcium.
2. List vegetarian food sources of calcium.
3. List vegan food sources of calcium.
4. List advantages and disadvantages or risks of calcium supplements.
5. What are signs or symptoms of calcium deficiency?

## CHOLINE

Choline is an essential nutrient found to play a role in memory function, fetal brain development, and prevention of heart disease, fatty liver, and neural tube defects. An intake of 450 mg is recommended for pregnant women. Beef liver and eggs are considered excellent sources of choline.

## FOLATE

To prevent neural tube defects, women of childbearing years and pregnant women should consume 400 mcg per day of synthetic folic acid from fortified foods (cereals and other grains), supplements, or both, in addition to consuming folate from foods in a varied diet. To ensure that blood vitamin levels are adequate at the time of neural tube closure, supplementation should begin at least one month before conception. Research indicates that abnormal folate metabolism may also play a role in Down syndrome and other birth defects. Women who have previously delivered an infant with a neural tube defect may need to consume more than the recommended amount of dietary folate equivalents (up to 4 to 5 mg/day).

## LUTEIN AND ZEAXANTHIN

Lutein and zeaxanthin are antioxidants that appear to reduce harmful free radicals in various parts of the body. Free radicals can play a role in a variety of chronic diseases, including macular degeneration, cancer, and heart disease. Lutein levels increase significantly during pregnancy and are found to be elevated in umbilical cord blood, indicating the importance of these antioxidants in fetal development.

## OTHER IMPORTANT MINERALS

**Zinc** is an important nutrient factor affecting fetal growth; RDA in pregnancy is 20 mg. **Magnesium** is essential for cellular metabolism and structural growth; RDA is 280-355mg. **Potassium** affects the electrolyte balance and the heart beat. **Phosphorus** plays a critical role in all cell functions; many enzymes and B Vitamins become active only when a phosphorus group is attached. **Sodium**, the positive ion in sodium chloride (common table salt), is essential. Pregnant women are no longer told to restrict sodium intake.

MINERAL EXERCISE		
	Function of Mineral	Food sources of Mineral
Boron		
Chlorine		
Chromium		
Copper		
Cobalt		
Fluorine		
Germanium		
Iodine		
Magnesium		
Manganese		
Nickel		
Phosphorus		
Potassium		
Selenium		
Sodium		
Sulphur		
Vanadium		
Zinc		

### MEAL PLAN EXERCISE

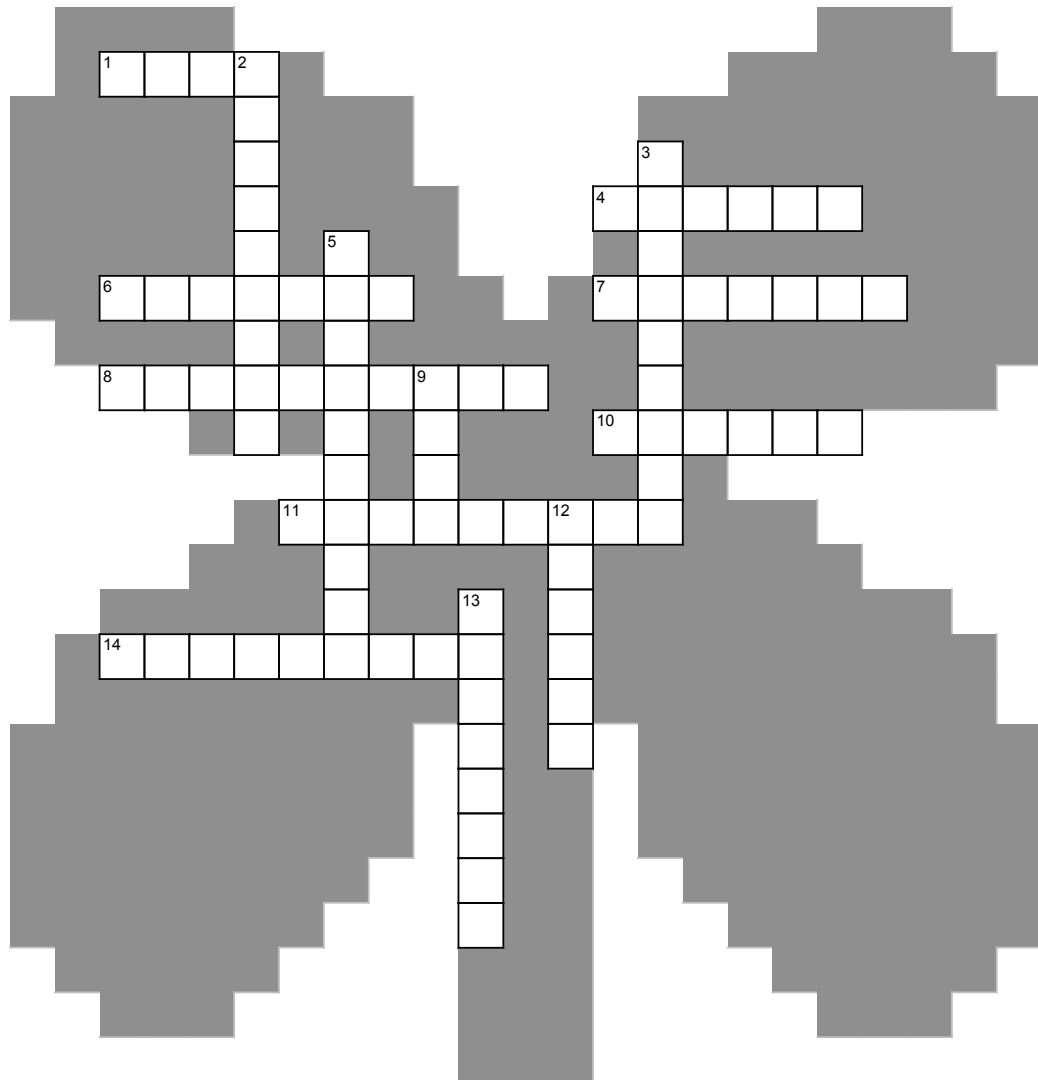
*Write a three day menu for a vegetarian pregnant mother that provides 75 gms of protein in three meals and two snacks per day. Be sure to include enough folic acid and iron.*

DAY ONE

DAY TWO

DAY THREE

## Vitamins & Minerals



### Across

1. Deficiency may result in white spots on finger nails, fatigue, decreased alertness, susceptibility to infections.
4. Necessary for the absorption & utilization of Iron
6. Plays a key role in the body's metabolic cycle for generating energy; aids in the digestion of carbohydrates.
7. helps maintain proper nerve and muscle function
8. Vitamin used as a treatment for morning sickness
10. Deficiency may result in pellagra.
11. Regulates the neuromuscular activity of the heart
14. An antioxidant important in the blood breakdown of amino acids and the production of energy.

### Down

2. Deficiency may lead to pernicious anemia
3. Works with sodium to regulate the body's waste balance and normalize heart rhythms
5. Deficiency may result in itching and burning eyes; cracks and sores in the mouth & lips; bloodshot eyes; dermatitis;
9. Deficiency may result in weakness, paleness of skin, anemia.
12. Aids in the development and functioning of the thyroid gland;
13. Protects cell membranes and prevents free radical generation thereby decreasing the risk of cancer and disease of the he

## CASE STUDIES

Julia is 16 years old, G1 T0 P0 Ab0 L0, she is still in high school, and her diet consists of a lot of soda, potato chips, and pizza. She started in her pregnancy at 190 lbs; she is 5'2".

1. What was her BMI in the beginning of pregnancy?
2. What are some concerns you have for her?
3. Describe how you will encourage her to eat healthier?
4. What will you recommend for exercise?
5. List ways you will encourage her to make healthy changes without her feeling lectured to:

Maya is 28 years old, G3 T1 P0 Ab1 L1 and works as a seamstress. Her child is now two years and weighed 5lbs 6oz at term. She recently weaned her two-year-old. She is 5'7", and her pre-pregnant weight was 115 lbs. She is a very strict vegan.

1. What is the percentage she is underweight?
2. What are some concerns you have for her?
3. What changes will you recommend in her diet and why?
4. What will you recommend for exercise?
5. List ways you can encourage her to have a healthy pregnancy while respecting her veganism.

## HERBS DURING PREGNANCY

The use of herbs during pregnancy and birth is a time-honored tradition dating back as long as midwives have been attending women. Some herbs are very nutritious and can be used to enhance the diet. Herbs have long been a way to strengthen and tone the uterus to prepare for an easier birth. Herbs have also been used to increase the strength of contractions during labor, to prevent hemorrhage, and to help expel the placenta. Herbs can be gentle medicine to diminish the discomforts of pregnancy and to enhance homeostasis or the self healing of the body. Herbs can be invaluable allies in bringing optimal health.

On the other hand, herbs can be powerful medicine. Some herbs may be effectively used during one stage of pregnancy and yet dangerous in another. Any herb strong enough to affect the powerful forces of birth is an herb that should be treated with respect and caution.

An herb that is recommended during one stage of pregnancy but not another is generally an herb to approach with caution. Herbs such as blue and black cohosh, birth root, and motherwort are recommended by many herbalists during the end of the last trimester of pregnancy. These herbs affect the uterus, inducing contractions or dilating the cervix. In a normal, healthy pregnancy, there is no need to intervene; nature's system works quite well. There are a few situations, however, where intervention is appropriate, and herbs can be a gentler, safer option than allopathic drugs or other invasive procedures. Herbs can be an important tool in the homebirth midwife's kit.

Alterative herbs should be treated like drugs during pregnancy. Examine the possible risks versus known benefits in every situation. Nutritive herbs can be used as nourishment and as supplements to strengthen, tone, and optimize health during pregnancy.

What is the difference between an alterative herb and a nutritive one? A simple answer is that herbs which taste bitter or acrid are alterative herbs, while those that taste mild or pleasant are herbs that are usually safe to use on a frequent basis. For example, goldenseal, tansy, and the cohoshes are very bitter-tasting herbs that exert a powerful influence on the uterus. Red raspberry leaves, alfalfa, and rosehips are all herbs that taste mild and are nourishing as well as safe. There are some exceptions, but overall, this is a good guideline.

Before using a specific herb, learn as much as possible about its effects. If an herb is recommended, find out who has used it and in what situation. Until recently, there have been few formal studies done on herbs, so we have had to rely on anecdotal or passed-down information. Document which herb you use, its dosage, and quantity, not only for yourself, but also to share with other midwives. In addition, keep up with whatever new research is being done on herbs. Be prepared to change recommendations as you learn more about them.

The internet has become a remarkable tool for learning about herbs. Much of the current research on herbs can be found on the 'net, as well as historical uses. Just be sure to look at the sources critically; where, how, and by what methods the information was obtained. Just because the information is in a book or on the a web page does not make it accurate.

By using nature's remedies, the midwife can support the natural process of birth. The responsible midwife is the careful midwife, avoiding even *potential* risks. Remember "*First do no harm.*" By continuing our education about herbs in pregnancy, birth, and postpartum, we can learn how to use herbs both effectively *and* safely.



Nettles



## HERBS FOR PREGNANCY THROUGH POSTPARTUM

### TO PREPARE FOR A HEALTHY BIRTHING

Herbs which are helpful and safe in pregnancy are strawberry leaves, borage, watercress, spearmint, peppermint, hibiscus, lemon grass, peach leaves, ginger root, red clover, rosehips, yerba buena, and slippery elm. (Slippery elm is listed in some herbals to avoid because years ago it was used to induce abortions by inserting it into the cervix; drinking the tea is considered safe.)

#### PREGNANCY TEA BLEND

Raspberry leaves  
Alfalfa leaves  
Peppermint leaves  
Nettle leaves



Mix equal parts. Steep 1/4 cup of herbs for each quart of tea. Drink several cups a day.

**Raspberry** – (red raspberry is best) helps to strengthen and tone the uterus. It is the most widely known and respected herb for preparing for an easy birth and for preventing complications.

**Alfalfa** – contains Vitamin K, which is a factor in the clotting of blood and helps prevent hemorrhage in both mother and baby. It also contains Vitamins A, B6, B12, D, E, and Niacin. It aids milk production.

**Peppermint** – flavors the tea, helps with nausea and digestion.

**Nettles** – strengthens and tones the kidneys; high in iron and calcium.

### HERBS FOR NAUSEA OR MORNING SICKNESS

Raspberry leaves, peach leaves, peppermint, ginger root, nettles, and strawberry leaves.

*To make a delicious drink for morning sickness and nausea, mix:*

1 part strained cool raspberry leaf tea

1 part apple juice

1 part ginger tea

Keep in refrigerator or serve over ice

### HEARTBURN

Peppermint, ginger, fennel, and fenugreek. Also, papaya enzymes, ice chips, carbonated water, and the morning sickness drink described above. Calcium carbonate tablets are also very effective.

### CONSTIPATION

This is a common complaint during pregnancy due to increased fluid needs, the size and weight of the uterus displacing the intestines, the effect of progesterone, and the use of iron supplements. Use herbal laxatives that are based on fiber.

Herbal laxatives can be bought over the counter; there are a variety of commercial preparations that are herb-based. Remedies based on psyllium, flax, or chia seed are gentle and safe during pregnancy. You can use over-the-counter preparations or make your own:

#### Gentle Herb Laxative

2 parts psyllium seeds

2 parts chia seeds

Grind finely. Take two tablespoons in a glass of juice before bed.

## STRETCH MARKS

Calendula, Vitamin E, wheat germ oil, and coconut oil externally are helpful in preventing stretch marks.

### Recipe for Belly Balm

3 parts coconut oil  
1 part cocoa butter  
1 part liquid Vitamin E  
1/2 part beeswax

Warm at very low heat until melted. Pour into a container and let cool to harden. Apply liberally.

## LEG CRAMPS OR MUSCLE CRAMPS

Calcium and magnesium supplements, alfalfa and nettle tea or capsule

## HEMORRHOIDS

### Herbal Anti-Hemorrhoid Salve

2 cups dried plantain leaves  
2 cups coconut oil  
1/2 cup dried yarrow flowers and leaves



Mix and put into a nonmetal, covered container. Put in oven at 120 degrees for 6 hours. You may need to leave the oven door open a crack. Strain while warm through a cheese cloth. Put in a clean, wide-mouthed jar and store in a cool place. Use this salve whenever hemorrhoids are irritating.

**Witch Hazel Wipes for Hemorrhoids:** Place 2 dozen 2x2 soft gauze squares in a small wide-mouthed jar. Pour witch hazel extract (available in drug stores) over gauze, enough to cover them. Keep close to toilet to use as soothing wipes.

## VAGINAL IRRITATION / ITCHING

Increased discharge is normal during pregnancy. Unless there is burning, excessive itching, a foul smell, or irritation present, increased discharge alone is not a sign of infection. Occasionally some women experience mild to moderate vaginal itching during pregnancy that is not caused by infection. In those cases *fresh* aloe vera gel (not bottled), applied liberally on the irritated areas, may help.

**Herpes:** External use of Calendula ointment, spirits of camphor, and aloe vera are useful for making herpes sores heal faster. Internally, drinking lots of water helps to flush the virus. Lysine, Zinc, Vitamins B, A, and C may minimize outbreak duration and severity.

## HERBS FOR COLDS / COUGHS

Red clover, garlic, raspberry, nettles, rose hips, fenugreek, peppermint, chamomile, ginger root, plantain, and mullein. **For dry coughs:** slippery elm, mullein, marshmallow, yerba buena, fennel, fenugreek, coltsfoot, and hops. **For mucous coughs:** ginger, plantain, St. John's wort, raspberry leaves, strawberry leaves. Local honey and bee pollen eaten before the allergy season is a good preventive measure in fighting hayfever.

## HERBS FOR LABOR AND BIRTH

Use caution and respect when using herbs during labor; use only when indicated. They should be used only by an experienced practitioner in combination with other actions or procedures. Tinctures tend to work best for labor and birth. They are concentrated, readily available in emergencies, and there is less of a chance of vomiting than there is with teas. Most tinctures are available through herb stores.

**To prevent miscarriage or spontaneous abortion:** Anytime bleeding, spotting, or heavy cramps occur in the first trimester, these herbs are recommended: red raspberry, black haw, alfalfa, false unicorn root, and wild yam.

**To induce labor:** Use the following tincture only with certainty of dates two weeks or more overdue and when bag of waters has been broken for over 24 hours with no or ineffective contractions. Some contraindications for inducing labor are pelvic disproportion, prematurity, high head, and malpresentations. If the woman is just overdue, sexual activity is the safest method of inducing labor, but never with ruptured membranes. Orgasm stimulates cervical and vaginal nerves, which then send messages to the brain to stimulate oxytocin. Semen contains prostaglandins which soften and help dilate the cervix. Nipple stimulation is another effective method. Castor oil, senna, or other strong laxatives sometimes have been used to induce labor; however, there is a risk of causing intestinal cramps, vomiting and diarrhea, and then labor not starting.

### Uterine Stimulant Tincture

- 2 ounces Birthroot (*trillium pendulum*)
- 1/2 ounce Blue Cohosh
- 1/2 ounce Black Cohosh
- 1/2 ounce Osha root



Birth Root (Trillium)

Put in a quart jar and cover with vodka or 100% grain alcohol, keep in cool dark place for 6-8 weeks, shaking daily, strain well, and put in brown glass eye dropper bottles. Usual dose is 15-30 drops.

**Other herbs used to stimulate labor:** birthroot, blue cohosh, black cohosh, osha root, squaw vine.

## POSTPARTUM HERBS

**Postpartum Hemorrhage:** Using herbs as a preventative measure is much more effective than herbally treating an active hemorrhage. As early in labor as possible, give the mother 10-15 alfalfa tablets and 2 acidophilus tablets to promote the production of Vitamin K. This helps prevent hemorrhage in both mother and baby. Pregnancy Tea Blend also helps prevent excessive bleeding. Before the birth, make up one quart of equal parts of shepherd's purse and alfalfa tea and start giving it to the mother as soon as the baby is born. This not only forestalls the bleeding but also aids quicker recovery. If bleeding is excessive, use recommended herbs and tinctures early, and go to other methods as necessary.

### Postpartum Anti-Hemorrhage Tincture

- 2 parts birthroot
- 2 parts shepherd's purse
- 1 part alfalfa.



Sheperd's Purse

15-30 drops every 20 minutes for the first two hours after birth. Remember, herbs are only one tool in treating hemorrhage. They should not be used when bleeding is due to perineal or cervical lacerations, if placenta is still in, if hemorrhage is severe, if a woman is in shock, or if bleeding is caused by clots or a full bladder.

**Herbs to use for retained placenta:** Angelica and birthroot tincture.

**Some helpful herbs for after-cramps:** St. John's wort, Dong Quai, cramp bark, raspberry leaves, valerian tincture, and calcium tablets.

**For tears and stitches use:** Peri rinses with comfrey and sage tea. Bed rest is important. Powdered or oil based herbs or preparations should not be applied to tears or stitches, as they impede air circulation and prevent tissues from healing. Sitz baths with sage, comfrey, uva ursi and sea salt work well.

**Herbs to increase milk supply are:** Blessed thistle, marshmallow, alfalfa, borage, fennel, and hops.

#### Nursing Mother's Tea Blend

1 part peppermint  
2 parts alfalfa  
1 part blessed thistle  
1 part borage



Blessed Thistle

**Herbs to decrease milk supply for weaning or in case of infant death or adoption:** Sage, parsley, yarrow, and cornsilk.

**Sore Nipples:** Poke root salve and pure lanolin (anhydrous). *See Chapter 12 for prevention.*

### HERBS FOR BABIES

Babies under four months ideally should not be given herb teas by mouth. However, if herbs are indicated, herb baths can be given. Medicinal effects are quite easily absorbed through the skin. To make herb baths: Pour 1 gallon of boiling water over 1 ounce herbs, steep 1/2 hour or until cool, strain well, and add to bath water.

**For Colic:** Herb baths – chamomile for tired fussy babies; peppermint, fennel, or fenu-greek for babies with gas.

**For Colds:** Herb baths – sage and eucalyptus.

#### HERB EXERCISE

*List additional herbal remedies for conditions related to pregnancy & birth.*

## HERBS TO AVOID DURING PREGNANCY

These herbs fall into five main groups:

**1. Herbs that affect the uterus: stimulants, abortifacients, emmenagogues:** Many of the herbs listed have specific use in pregnancy, labor, or postpartum when recommended by an experienced practitioner; however, potential problems can result if these herbs are taken inappropriately. Some of these herbs contract the uterus, and/or act as vasodilators, and/or irritate the uterine lining.

angelica	mugwort
basil (large doses in tea)	Oregon grape root
bayberry	osha
beth root or birth root	pennyroyal
black cohosh	sage
blue cohosh	skullcap
blue flag or wild iris	spikenard
broom flowers	squaw vine
catnip	St. John's wort
chamomile (large doses)	tansy
cottonwood root	valerian
cramp bark	vervain
elder	wormwood
false unicorn root	yarrow
hyssop	
mistletoe	
motherwort	



Yarrow

**2. Herbs that contain toxic or potentially toxic alkaloids:** Many of these herbs are powerful medicines which help heal a variety of illnesses; but a dose that might not harm us, might harm a developing fetus.

comfrey	mistletoe
chaparral	sassafras
echinacea	white oak
goldenseal	white willow bark
iris	wild lettuce
lobelia	wintergreen
mandrake	



Golden Seal

**3. Herbs that stimulate or mimic hormones:** These herbs stimulate or mimic various hormones or hormonal actions and, when indicated, are beneficial. However, they may cause imbalance if used incorrectly:

angelica	ginseng
burdock	licorice
damiana	sarsaparilla
dong quai	wild yam
	vitex (chasteberry)



Angelica

**4. Laxatives:** Any laxatives, including herbal laxatives – particularly cathartics and purgatives – should be avoided during pregnancy, because they also can easily create laxative dependence. Also, laxatives can irritate fetal intestines, causing meconium staining, and may induce premature labor. There are some laxative herbs that, based on their fiber and mucilaginous qualities, are recommended if a laxative is needed. (See "Herbs for Constipation").

**Laxatives to avoid during pregnancy:**

aloe vera gel (internally)	Oregon grape root
buckthorn	pokeweed
casarea sagrada	rhubarb
goldenseal	senna



Oregon Grape

**5. Diuretics** are herbs that promote the flow of urine and prevent the retention of water. In pregnancy, the natural mechanism of the body is to retain additional water (edema, puffy face, swollen ankles). This retention helps the body protect itself by providing a reserve to meet the increased blood volume and to have a reserve fluid to draw upon when blood loss occurs after the birth. Diuretics affect the kidneys, which are already under the stress of pregnancy, and should be avoided during pregnancy.

**Diuretics**

buchu	cubeb berries
cleavers	corn silk
dandelion	hops
parsley	urva ursi



Cleavers

All herbs listed "to be avoided" are for internal use; external use of any of these herbs may be safe, with the exception of powdered herbs or salves put on the newborn's umbilical cord, or on open vaginal/perineal tears. Herbs used in very small quantities as seasonings for foods are also considered safe.

Women in the first trimester, or those who have a history of miscarriage, bleeding, cramping during pregnancy, should be especially cautious using herbs during pregnancy.

**HERB EXERCISE**

List additional herbs to avoid in pregnancy & birth.

**GLOSSARY OF TERMINOLOGY RELATING TO THE MEDICINAL ACTIONS OF HERBS**

Abortifacient.....	Causes miscarriage.
Adaptogenic.....	Helps the body adapt to stress and supports normal function.
Alterative.....	Promotes a gradual and beneficial change in the body.
Anabolic.....	Promotes tissue growth.
Analgesic.....	Reduces pain.
Anaphrodisiac.....	Inhibits libido and sexual activity.
Anesthetic.....	Numbs perception of external sensations.
Anodyne.....	Relieves pain.
Anthelmintic.....	Expels or destroys parasitic worms.
Anthraquinones.....	Irritate the intestinal wall causing a bowel movement.
Antiasthmatic.....	Relieves the symptoms of asthma.
Antibilious.....	Relieves biliousness.
Antibiotic.....	Destroys or inhibits microorganisms.
Anticoagulant.....	Prevents blood clotting.
Antidiarrheal.....	Combats and arrests diarrhea.
Antiemetic.....	Stops vomiting.
Antifungal.....	Combats fungal infections.
Antigalactagogue.....	Diminishes milk production.
Anti-inflammatory.....	Reduces inflammation.
Antilytic.....	Prevents formation of urinary calculi.
Antimicrobial.....	Destroys or inhibits microorganisms.
Antioxidant.....	Prevents oxidation and breakdown of tissues.
Antipyretic.....	Reduces fever.
Antirheumatic.....	Relieves rheumatism.
Antiscorbutic.....	Cures or prevents scurvy.
Antiseptic.....	Destroys or inhibits micro-organisms that cause infection.
Antispasmodic.....	Relieves muscle spasm, or reduces muscle tone.
Antitussive.....	Soothes and relieves coughing.
Aperient.....	Mild laxative.
Aperitive.....	Stimulates the appetite.
Aromatic.....	Spicy stimulant.
Astringent.....	Tightens mucous membranes and skin, reducing secretions & bleeding.
Bitter.....	Stimulates secretions of saliva and digestive juices, increasing appetite.
Bowel Irritant.....	Increases peristalsis of the gastrointestinal tract, causing diarrhea.
Cardiotonic.....	Improves heart function.
Carminative.....	Relieves digestive gas and indigestion.
Cathartic.....	Powerful purgative (strong laxative).
Cholagogue.....	Stimulates the release of bile from the gallbladder.
Circulatory Stimulant.....	Increases blood flow, usually to a given area, e.g., hands and feet.
Demulcent.....	Coats, soothes, and protects gastric mucous membranes.
Depurative.....	Detoxifying agent.
Detoxification.....	Aids in the removal of toxins and waste products from the body.
Diaphoretic.....	Induces sweating.
Diuretic.....	Stimulates urine flow.
Emetic.....	Causes vomiting.
Emmenagogue.....	Promotes menstruation.
Emollient.....	Softens or soothes the skin.
Esculent.....	Edible as food.
Estrogenic.....	With a similar action to estrogen.
Expectorant.....	Stimulates coughing and helps clear phlegm from the throat and chest.

Febrifuge.....	Abates or reduces fever.
Fetotoxic .....	Potentially harmful to the growing fetus.
Galactagogue .....	Increases milk production.
Genotoxic.....	Prevents normal growth.
Hallucinogenic.....	Causes visions or hallucinations.
Hemolytic.....	Destroys red blood cells.
Hemostatic .....	Stops or reduces bleeding.
Hepatic.....	Affects the liver.
Hepatotoxic.....	Damaging to the liver.
Herpetic .....	Remedies for eruptions of the skin.
Hormonal .....	Contains precursors to or alters the body's production of hormones.
Hypnotic.....	Induces sleep.
Hypoglycemic.....	Reduces the blood sugar level.
Immune Stimulant .....	Stimulates the immune system to defend the body from infection.
Laxative .....	Promotes evacuation of the bowels.
Lithotriptic .....	Helps dissolve kidney stones.
Maturing .....	Ripens or brings boils and ulcers to a head.
Mucilaginous .....	Gelatinous, viscous substance that is soothing to inflamed parts.
Mutagen.....	Interferes with normal cell growth.
Mydriatic .....	Dilates the pupil of the eye.
Narcotic .....	Causes drowsiness or stupor and relieves pain.
Nauseant.....	Produces nausea and/or vomiting.
Nervine .....	Restores the nerves; relaxes the nervous system.
Nutritive .....	Providing nutritional value.
Oxytocic .....	Induces contractions of the uterus, speeds labor.
Parasiticide.....	Kills parasites.
Pectoral .....	Acts on the lungs.
Purgative .....	Promotes rapid and extreme bowel movements.
Refrigerant.....	Having a cooling quality.
Rubefacient.....	Stimulates blood flow, produces reddening of the skin.
Sedative .....	Reduces the rate of activity and nervous excitement.
Sialagogue .....	Stimulates the flow of saliva to aid digestion.
Stimulant .....	Increases the rate of activity and nervous excitement.
Stypic.....	Stops bleeding when applied topically.
Sudorific .....	Produces prosue perspiration.
Teratogenic .....	Interferes with the normal development of the fetus.
Tonic.....	Invigorating or strengthening
Uterine Relaxant .....	Relaxes the uterine muscle.
Uterine Stimulant.....	Causes the uterus to contract.
Vasoconstrictor.....	Contracts and narrows blood vessels.
Vasodilator .....	Relaxes and widens blood vessels.
Vermifuge.....	Expels intestinal worms.



## GLOSSARY OF HERBAL PREPARATION TERMINOLOGY

- Capsule:** Dried powdered herb, contained in a gelatin capsule (pill covering). Capsules come in various sizes, denoted by the number of zeroes, for example 000 capsules.
- Cold Compress:** An absorbent folded cloth, dipped in a cold fluid (cold water or a cold herbal infusion) and applied topically to a body area.
- Cream:** A mixture of water and fat or oil that is applied to the skin.
- Decant:** To strain an infusion or tincture, saving the fluid portion and discarding the plant matter.
- Decoction:** Water-based preparation of bark, roots, leaves, flowers, berries, or seeds simmered in boiling water.
- Elixir:** A liquid herbal preparation with a pleasant taste, due to the addition of honey or sugar.
- Essential Oil:** Distillation of volatile oils derived from aromatic plants. These are *extremely potent and must be diluted* in a carrier oil or fluid in the proper dilution before use.
- Fixed Oil:** A nonvolatile oil (plant constituent) produced by hot or cold infusion (preparation).
- Fomentation:** The localized application of alternating hot and cold compresses to increase circulation and relieve pain and swelling.
- Galenical:** A medicine in a standard formula prepared from plants.
- Hot Compress:** An absorbent folded cloth, dipped in hot fluid (for example, hot water or an herbal infusion) applied topically to an area.
- Infused oils:** An oil-based preparation in which the plant matter is packed in a jar with a vegetable oil (often olive oil) to draw out its properties. The infusion is then decanted.
- Infusion:** Water-based preparation in which flowers, leaves, or stems are brewed in a similar way to tea.
- Inhalation:** Breathing of medicinally infused steam or liquid through the nasal passages.
- Liniment:** External medication applied by rubbing.
- Ointment:** A blend of fats or oils that form a protective layer over the skin.
- Poultice:** A moist, soft mass or paste made of herbs or other substances usually applied hot to affected area to alleviate pain and reduce swelling.
- Simple:** A herb used on its own.
- Steam Inhalation:** 5-10 drops of essential oil added to one liter of very hot water or a hot infusion of an herb placed in a container. The container is then covered with a towel, into which the person sticks their head to breathe the herbal steam. Usually used for respiratory ailments.
- Suppositories:** An herbal combination (cocoa butter or powdered herb mixed with an essential oil or infused oil) shaped into long, thin cylinders and frozen to harden them. They are then used by inserting them into the rectum or vagina.
- Syrup:** An infusion or decoction combined with honey or sugar as a preservative. Helpful for sore throats, coughs, children's remedies, and to enhance the palatability of unpleasantly flavored herbs.
- Tincture:** Plant medicine prepared by soaking and straining herbs in alcohol, vinegar, or glycerin.
- Topical:** An herbal remedy to be applied to the body surface.
- Volatile Oil:** Plant constituent distilled to produce essential oil.
- Wildcrafted:** Using herbs that have grown naturally in the wild (not cultivated).

## Medicinal Actions Word Search

P G H  
 A A E N V S Z  
 O S E C J U X C M  
 S E U S T O G B D E X  
 E U G O G O T C A L A G C  
 N X Q L N R R N N E R V I N E  
 X P B R I T A E W U W A B C S  
 T D E W L G N L I M G E M E T I C  
 Y T I C C Y A E A L F O V R H E E P W  
 Y N U T I K L I S L O G I Z B B A P Y  
 G D R O T E I C T O C A T H A R T I C  
 X K E R E U C A R M I N A T I V E I F  
 U T A P T U F I E T E G W W D T O  
 I N R T M E N G E M R R L A M  
 C T E I A B G U R M U T P V U  
 S H C X U E F O E P E N H  
 L R N I H U H  
 U T R P Q  
 X M B A W  
 N E I  
 R F D

- |   |  |  |   |
|---|--|--|---|
| 1. Tightens mucous membranes and skin, reducing secretions & bleeding | 6. Stimulates urine flow   | 13. Affects the liver  | 18. Promotes rapid and extreme bowel movements            |
| 2. Relieves digestive gas and indigestion                             | 7. Causes vomiting   | 14. Remedies for eruptions of the skin                               | 19. Stimulates blood flow, produces reddening of the skin |
| 3. Powerful purgative (strong laxative)                               | 8. Promotes menstruation   | 15. Gelatinous, viscous substance that is soothing to inflamed parts |   |
| 4. Coats, soothes, and protects gastric mucous membranes              | 9. Softens or soothes the skin   | 16. Restores the nerves; relaxes the nervous system                  |   |
| 5. Induces sweating   | 10. Stimulates coughing and helps clear phlegm from the throat and chest | 17. Acts on the lungs  |   |
|   | 11. Abates or reduces fever  |  |   |
|   | 12. Increases milk production  |  |   |

## PRENATAL FITNESS & EXERCISE

Giving birth, particularly outside of the hospital, demands a great deal of physical stamina. A primigravida may be in labor for 24 hours or more, and a great deal of that time is walking, squatting and moving about. A woman's level of fitness during her pregnancy can affect the outcome of her delivery. Women who engage in regular exercise have shorter labors and fewer interventions, including Cesarean sections. They experience less discomfort and recover more quickly than those who do not exercise. In addition, exercise trains the brain to produce more beta-endorphins, the natural pain-killers the body produces during labor.

Exercise yields many benefits, not only for pregnancy and postpartum, but for overall health. Exercise increases a person's strength, flexibility, and endurance. It helps the heart, the blood vessel strength and elasticity, and the oxygen-carrying capacity of the blood. It increases the vital capacity of the lungs and HDLP (the good cholesterol). Exercise decreases high blood pressure, risk of osteoporosis and adult onset diabetes, excessive weight, constipation, and varicose veins.

People who exercise regularly report a greater sense of well-being and self esteem; they have more energy and live longer. They have lower incidences of depression and insomnia.

A woman who had an existing exercise routine may need to modify it somewhat, but for the most part she can maintain her regular routine. Some exceptions are: long distance running, or specific sports such as skiing, snow boarding, sky diving, scuba diving, martial arts, surfing, or horseback riding. Low impact aerobic exercises such as walking, swimming, or prenatal yoga are excellent choices. Often community pools offer special pregnancy and postpartum water aerobic classes that are a great way both to exercise and to connect with other pregnant women.

There are some conditions in the presence of which a woman should not exercise, or in which her exercise should be very limited after medical consultation.

1. Any bleeding or history of bleeding this pregnancy.
2. History of asthma or heart disease.
3. If more than 20% underweight.
4. History of three or more spontaneous abortions.
5. History of incompetent cervix.
6. History of or current IUGR.
7. Placenta previa and low-lying placentas.
8. History of preterm labor.
9. Preeclampsia or high blood pressure.
10. Diabetes prior to pregnancy.



Warning signs or symptoms: ALL pregnant women should stop exercising if any of these are present:

1. Severe headache.
2. Edema of the hands and face.
3. Chest pain.
4. Nausea or fever.
5. Bleeding or fluid discharge.
6. Regular, strong contractions.
7. Dizziness and disorientation.
8. Difficulty walking.
9. Cramps.
10. Joint or hip pain.



### *General Guidelines for Prenatal Exercise*

<b>DO'S</b>	<b>DON'TS</b>
<ul style="list-style-type: none"> <li>◆ Warm up before and cool down after.</li> <li>◆ Eat small frequent meals and snacks to keep energy levels up.</li> <li>◆ Alternate periods of food, fluids, exercise, fluids, food, rest, etc...</li> <li>◆ Get plenty of fluids to avoid dehydration.</li> <li>◆ Exercise in the aerobic zone for 15-30 minutes at a time, 3-5 times a week.</li> <li>◆ Vary your routine enough to make it interesting, and to work on different muscle groups and effects.</li> <li>◆ Create realistic exercise goals. If not already in good condition, start out at a low level of intensity of workout and make very gradual improvements.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Get overheated. (Avoid hot tubs &amp; saunas.)</li> <li>◆ Exercise excessively vigorously. It can decrease the oxygen supply and can cause uterine irritability.</li> <li>◆ Exercise on slippery or uneven surfaces.</li> <li>◆ Do vigorous upright exercise for more than a 30-minute interval.</li> <li>◆ Do exercises that involve being on the back for long periods of time or standing in one position.</li> <li>◆ Do activities requiring balance that could lead to falls or blows to the abdomen.</li> <li>◆ Continue to exercise if there are cramps, bleeding, contractions, or pain.</li> </ul>

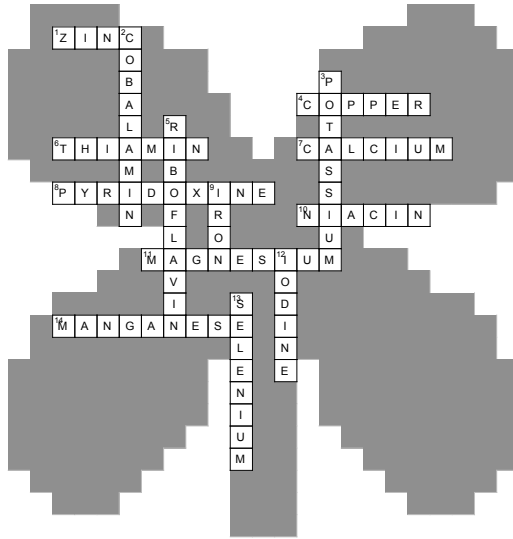
### PREGNANCY EXERCISE

- A) Contraindications for prenatal exercise.  
 B) Conditions needing further assessment before recommending prenatal exercise.  
 C) Conditions that may benefit from prenatal exercise.

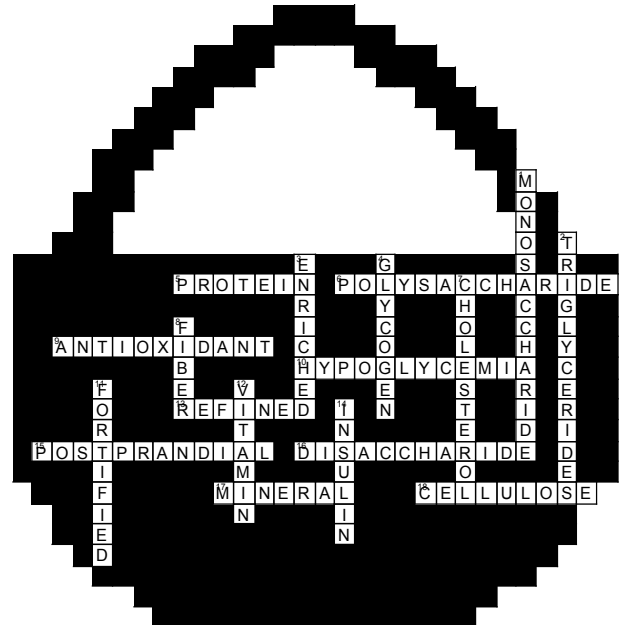
1. \_\_\_ Placenta previa.
2. \_\_\_ Depression.
3. \_\_\_ Hypertension
4. \_\_\_ Low-lying placenta.
5. \_\_\_ History of preterm labor.
7. \_\_\_ Chronic heart disease.
8. \_\_\_ Constipation.
9. \_\_\_ Incompetent cervix.
10. \_\_\_ Morbidly obese.
11. \_\_\_ Somewhat overweight.
13. \_\_\_ Gestational diabetes.
14. \_\_\_ Multiple gestation.

PUZZLE ANSWER KEY

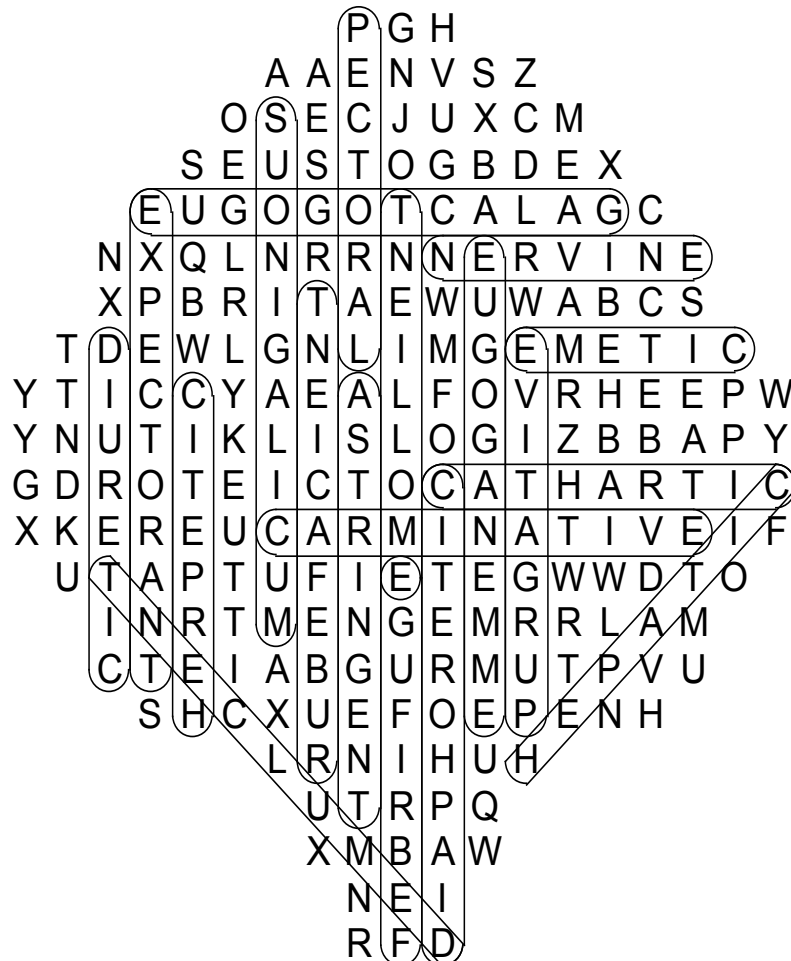
Vitamins & Minerals



Nutrition Terms Crossword



Medicinal Actions Word Search



## SELF-TEST

### True/False

1. \_\_\_ Simple carbohydrates are processed grains, such as white flour.
2. \_\_\_ Diuretic herbs are contraindicated in pregnancy.
3. \_\_\_ Lactose intolerance is an example of a food allergy.
4. \_\_\_ Pica is a craving for non-food items.
5. \_\_\_ Vitamin C deficiency causes bleeding gums and easy bruising.
6. \_\_\_ Normal weight gain in pregnancy is 10-20 lbs.
7. \_\_\_ Exercise improves the body's carbohydrate and lipid metabolism.
8. \_\_\_ Some abortifacient herbs are safe to use in late pregnancy.
9. \_\_\_ Vitamin C increases iron absorption.
10. \_\_\_ Pregnant women cannot get enough protein on a vegetarian diet.

### Multiple Choice

11. Which two minerals are major constituents of bones?
  - A) Calcium and zinc.
  - B) Phosphorus and calcium.
  - C) Sodium and magnesium.
  - D) Selenium and calcium.
12. Which of the following vitamins are fat-soluble?
  - A) B, C, D, and E.
  - B) A, D, E, and K.
  - C) A, C, and E.
  - D) B, C, and E.
13. Which of the following describes water-soluble vitamins?
  - A) Vitamins D and E.
  - B) Frequently toxic.
  - C) Stored extensively by the tissue.
  - D) Easily absorbed and excreted.
14. Which of the following are examples of herbs that strengthen contractions?
  - A) Blue cohosh, Birthroot
  - B) Yarrow, Catnip
  - C) Shepherds purse, Bayberry
  - D) Valerian, Skullcap
15. Which herb increases milk supply?
  - A) Chamomile, Raspberry Leaf
  - B) Blessed Thistle, Fenugreek
  - C) Cleavers, Corn Silk
  - D) Cascara sagrada, Senna
16. What foods are high in Iron?
  - A) Whole wheat pasta, whole wheat bread
  - B) Oysters, red meats, dark leafy greens,
  - C) Apples and oranges
  - D) Bagel with organic cream cheese

### Answers

1. True, 2. True, 3. False, 4. True, 5. False, 6. False, 7. True, 8. True, 9. True, 10. False, 11. B, 12. B, 13. D, 14. A, 15. B, 16. B.

# Chapter 8

## Preventing Infection

### OBJECTIVES

*After completing this chapter, the student should be able to:*

1. Explain the the midwife's role in infection control.
2. List techniques to prevent the spread of infections from:
  - A) client to midwife.
  - B) midwife to client.
  - C) client to client.
  - D) inanimate object to client.
3. Demonstrate proper handwashing techniques.
4. Discuss Standard and Transmission-Based Precautions.
5. Demonstrate how to correctly put on and remove sterile gloves.
6. Identify ways to prevent infections spread by body fluids.
7. Identify ways to prevent infections spread through other methods.
8. Discuss specific uses of protective barriers in midwifery practice.
9. Identify local regulations and agencies that affect midwives regarding infection control.



BioHazard Symbol

## MIDWIFERY AND INFECTION CONTROL

Midwives are healthcare workers who work in many different settings, not only in families' homes, but also in birth centers, hospitals, and prenatal clinics, both in this country and abroad. Part of a midwife's responsibility is to prevent the transmission of infection and blood-borne pathogens that cause disease.

Hepatitis B and HIV are two blood-borne pathogens that are very prevalent in certain parts of the world. Both represent a serious risk to clients and midwives if exposed. It is highly recommended that midwives get immunized for Hepatitis B.

Infections that are acquired from the practitioner or facility are called nosocomial infections (NI); they are diseases that we, as healthcare professionals, give to our clients. These are one of the fastest-growing problems in hospitals today, with *one patient in ten* acquiring an infection as a direct result of being hospitalized. These infections are serious and life-threatening.

Maternal infection after delivery (puerperal fever) was the leading cause of maternal death in the days before antibiotics and knowledge of how bacteria spread disease. Today, as antibiotic-resistant infections are becoming more common, the risk looms once again.

While the risk of NI is greater in hospital settings, homebirth midwives are not immune to being a carrier or cause. Midwives who deliver babies at home, and especially those who use waterbirth tubs, are at additional risk of being exposed to both blood-borne pathogens and infectious bacteria. Many people choose to deliver at home to avoid the sterile feel of the hospital. Some midwives may be resistant to employing infection control procedures due to a desire to keep everything as low-key and natural as possible. Preventing infection does not have to be invasive, nor overly medical; it is simple and effective to implement.

Handwashing with soap and water is one of the most effective methods of preventing infection. In addition, proper sterilization and disinfecting of equipment and the use of appropriate precautions can prevent the spread of disease and protect both the client and the midwife.

Formally called Universal Precautions or Body Substance Isolation Guidelines, Standard Procedures are a set of recommendations for anyone exposed to blood or possibly infectious materials. Transmission-Based Precautions are used if there is known or suspected presence of blood-borne pathogens or infectious conditions.

*Midwives use a variety of techniques to prevent infection in their day-to-day practice:*

1. **Screening** for HBV and HIV to determine whether to use Standard or Transmission-Based Precautions.
2. **Prevention** including emphasizing health to reduce susceptibility to infections.
3. **Clean techniques** including proper handwashing, use of disposable supplies such as non-sterile exam gloves, and keeping the prenatal and birth supplies clean.
4. **Disinfection** of equipment between clients to eliminate most pathogenic microorganisms. This may include using chemicals or boiling. While this works for most midwifery care, it should not be used for invasive procedures such as using catheters or suturing.
5. **Sterilization** to destroy all microbial life, including highly resistant bacteria. This is done via an autoclave, pressure cooker, or gas. This is used for anything coming in contact with the bloodstream, such as needles for venipuncture, or instruments used for suturing or cutting the cord.



## TYPES OF INFECTIONS SEEN IN MIDWIFERY PRACTICE

Depending on where a midwife practices, she may see a wide variety of infectious agents. No population is exempt. By using Standard Precautions, she reduces the risk of transmission regardless of the risk factors or infection status. For midwives who work in developing nations where disposable supplies are not as available as in industrialized countries, there are additional challenges, but the same principles apply.

TYPES OF INFECTION EXERCISE			
<i>Complete this chart.</i>			
Name of Agent	How Transmitted	Who is at Risk	How is it Prevented
Staphylococcus aureus			
Streptococcus pneumoniae			
Human Immunodeficiency virus (HIV)			
Tuberculosis			
Hepatitis B or C virus (HBV or HCV)			
Enterococcus			
Respiratory Infections (colds and flu)			
Head Lice			
Urinary Tract Infections			
Postpartum Infections (Endometritis, salpingitis)			
Mastitis (breast infections)			

## INFECTION CONTROL KEY TERMS

Define the following terms:

1. Asepsis
2. Colonization
3. Communicable disease
4. Disinfectant
5. Etiology
6. Immunity
7. Incubation period
8. Pathogen
9. Reservoir
10. Resident flora
11. Susceptible
12. Tuberculocide
13. Sterilization
14. Common Vehicle Transmission
15. MRSA
16. Vector-Borne Transmission

## CONTROLLING MICROORGANISMS EXERCISE

Complete this chart.

Method	How Accomplished	Pathogens Killed	Midwifery Application
<p><b>Sterilization</b></p> <p>Totally destroys all of viable microorganisms' spores and other infectious agents.</p>			
<p><b>Disinfection</b></p> <p>Reduces the total microbial population.</p>			
<p><b>Sanitization</b></p> <p>Reduces the number of microorganisms to safety levels that meet public health standards.</p>			
<p><b>Antiseptic</b></p> <p>Applies chemical agents to tissue to prevent infection by killing or inhibiting pathogen growth.</p>			

## INTERVENTIONS THAT BREAK THE CHAIN OF INFECTION

### 1. Microorganism or Etiologic agent:

- Ensure that articles are properly cleaned, disinfected, or sterilized before use.
- Educate clients and family members about appropriate methods to clean, disinfect, and sterilize articles.

### 2. Source:

- Assist clients in the use of appropriate hygiene.
- Dispose of damp or soiled linens appropriately.
- Dispose of all body fluids appropriately.

### 3. Portal of Exit:

- Avoid talking, coughing, or sneezing over open wounds or sterile fields, and cover the mouth and nose when coughing and sneezing.

### 4. Mode of Transmission

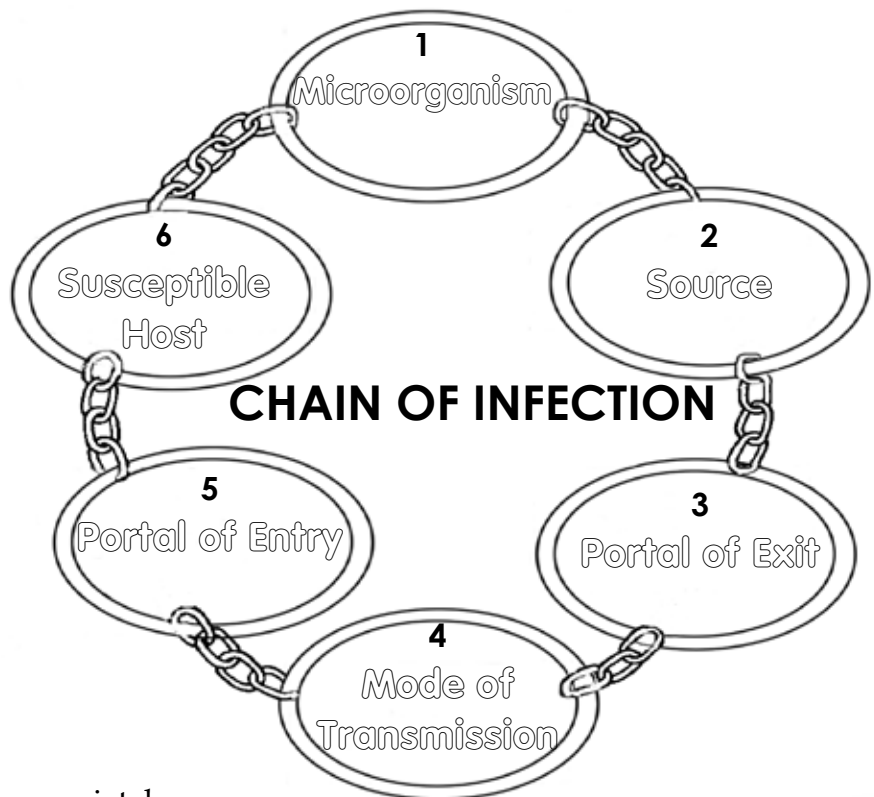
- Wash hands between client contacts, after touching infectious material, and before performing invasive procedures or touching open wounds. Instruct clients and family members to wash hands before handling food or eating, before and after eliminating, and after touching infectious materials.
- Place discarded soiled materials in moisture-proof refuse bags.
- Handle bedpans and emesis basins with caution.
- Initiate and implement aseptic precautions for infected clients.
- Wear masks when in close contact with clients who have infections transmitted by droplets from the respiratory tract.
- Wear gloves when handling infectious secretions and excretions. Wear gowns or aprons if there is danger of soiling clothing with infectious material.

### 5. Portal of Entry

- Use sterile technique for invasive procedures such as injections and catheterizations.
- Use sterile technique when exposing open wounds or handling dressings.
- Handle needles and syringes with caution.

### 6. Susceptible host

- Maintain the integrity of the client's skin and mucous membranes.
- Educate client on health maintenance, diet, vitamins, and herbs.



AGENCY EXERCISE	
Define agency & its role in infection control:	How it applies to midwifery practice:
CDC	
FDA	
OSHA	
County Health Department	
State Health Department	
EPA	
JCAHO	

### HIV/HBV EXERCISE

1. Have you had an HBV vaccine, and if not, why not?
2. Do you plan to routinely screen your clients for HBV and HIV?
3. Would you do a birth for a client you know was HIV and/or HBV positive? If not, why not?
4. What, if any, special precautions would you take knowing someone's HBV and/or HIV status was known to be positive.

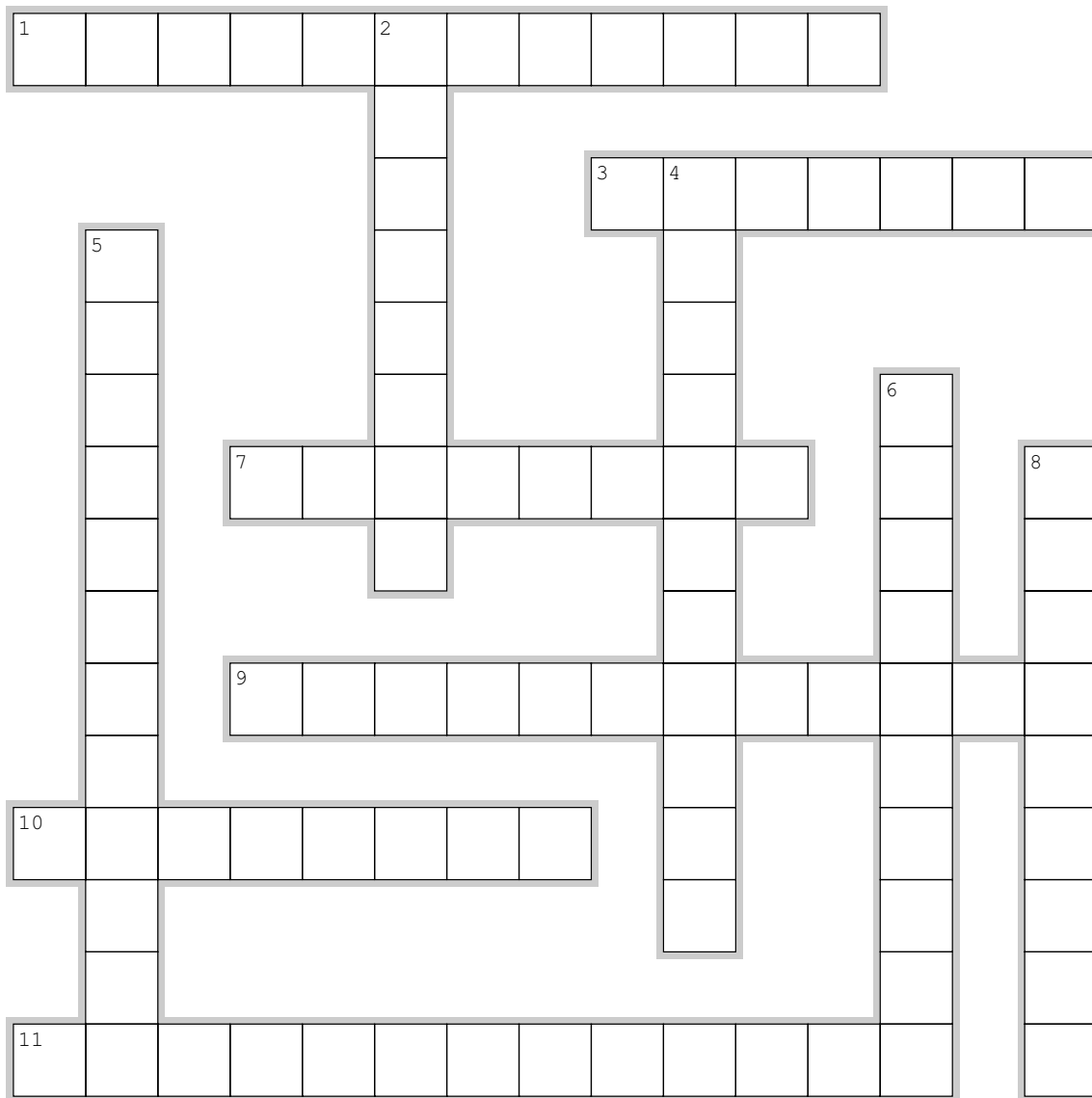
## STANDARD PRECAUTIONS FOR MIDWIVES

Standard Precautions assumes that all blood and body fluids are potential sources for infections regardless of the status of the source individual. As midwives, we do not like the idea of treating all women as potentially diseased objects; however, as healthcare providers, we are aware of the prevalence of Hepatitis B (HBV), HIV and other blood-borne pathogens. One reason some families choose to deliver outside of the hospital is to avoid the sterile atmosphere that can interfere with the sense that birth is a normal, natural event. A midwife can use Standard Precautions without compromising the family's comfort and choices for their birth.

While many practices routinely screen for HBV and HIV, do not let a negative test reading lull you into a false sense of security. It takes time from exposure to show positive on tests. That is why it is important to avoid direct contact with all body fluids. At homebirths it is difficult to avoid contact with blood or body products. Midwives sit on women's beds to deliver the babies; women bleed on us; their water breaks in our faces; we hold the bowl while they vomit. However, there are some simple things you can do at home to minimize your risks:

1. **Always Wear Gloves.** In addition to the birth and direct client contact, use gloves when cleaning up postpartum, doing laundry, washing instruments, examining the placenta, and whenever changing chux or peri pads. Wash hands before and after gloves are removed.
2. **Wear Protective Eyewear.** Antisplash goggles are best, or regular glasses. If you don't need glasses, buy ones with clear lenses. They can protect your eyes from splashing blood, as well as from unexpected water bag breaks.
3. **Wear Protective Clothing.** Disposable plastic aprons can be ordered in your birth kits, or wear a heavy birthing apron over your clothes for births, doing laundry, or whenever you may be exposed to spraying or droplets of body fluids.
4. **Be Careful with Sharps.** Prevent injuries caused by needles or other sharp instruments or devices during procedures. Take precautions when cleaning used instruments, during disposal of used needles, and when handling sharp instruments after procedures. To prevent needlestick injuries, needles should not be recapped, purposely bent or broken by hand, removed from disposable syringes, or otherwise manipulated by hand. Disposable syringes and needles, scalpel blades, and other sharp items should be placed in puncture-resistant containers for disposal after use. The puncture-resistant containers should be located as close as practical to the use area.
5. **Practice Proper Handling of Laboratory Specimens.** Assume all blood and body fluids are infectious.
6. **Properly Identify and Dispose of Biohazards.** Any item that drips body fluids is considered a biohazard. Placentas are considered biohazards. Disposable pads like chuxs used during birth, which may drip, should be placed in red plastic bags, labeled and disposed of according to local regulation. Placentas, if not taken by the parents for personal use, such as planting a tree, are the midwife's responsibility. They should also be red bagged and disposed of as a biohazard.

## INFECTION CROSSWORD PUZZLE



## Across

1. When microorganisms can be cultured from a body site but are not causing infection or disease.
3. Freedom from infection or infectious material.
7. A disease-causing organism.
9. Capable of being transmitted by infection.
10. The cause of a disease; the study of causes of disease.
11. The complete destruction of all microorganisms.

## Down

2. The condition in which an organism can resist disease.
4. Vulnerable to disease or the effects of a drug.
5. A chemical or physical process that kills microorganisms such as bacteria, viruses, and protozoa.
6. Period between infection and clinical manifestation of disease.
8. Anything in which an infectious agent normally lives and multiplies.

## PREVENTING INFECTION EXERCISE







Answer the following questions:

1. To what does the "portal of entry" refer?
2. What is meant by aseptic?
3. How can you protect yourself from infection?
4. How can you protect your clients from infection?
5. List methods of reducing the transmission of infection in a prenatal clinic setting.
5. List methods of reducing transmission of infection in a homebirth setting.
6. List methods of reducing transmission of infection in a birth center.
7. How will you protect the birth team from contamination during a water birth?



## 10 EASY STEPS TO PROPER HAND-WASHING TECHNIQUE

**Equipment Needed:** A sink with hot running water. Soap or disinfectant. Paper towels. If clean running water is not available, boil water and have an assistant pour warm water over hands.

Steps		Rationale
1. Push watches and long sleeves to above the level of your elbows. Remove any jewelry.		1. This provides complete access to hands and forearms. Jewelry may harbor germs or may puncture gloves.
2. Stand in front of the sink while keeping your hands from touching the sink.		2. The inside of the sink is contaminated with the germs people have washed off.
3. Use warm water, not hot.		3. Warm water loosens dirt. Very hot water and removes more of your skin's natural oils, causing more skin irritation.
4. Wet your hands and lower arms thoroughly. Keep your hands lower than your elbows during washing.		4. The hands are the most contaminated parts to be washed. Water flows from the least to most contaminated area.
5. Apply soap to the hands. If bar soap is to be used, hold it throughout the washing process.		5. If you put the bar down and pick it up again, you are reintroducing more germs from whatever surface you put the soap down on.
6. Wash the hands, using plenty of friction, 15-30 seconds. Clean between your fingers by interlacing your fingers and rubbing them up and down the length of your fingers in first one hand, then the other hand. Rub the palms and the back of your hands in a circular motion.		6. Soap cleans by emulsifying oils in your skin and lowering surface tension. Friction and rubbing mechanically loosen and remove dirt and transient bacteria. Interlacing your fingers ensures that all surfaces are cleaned.
7. Clean under your fingernails with the bristles of a scrub brush or a nail cleaner device. Keep your nails trimmed short.		7. Dirt and secretions that lodge under the fingernails contain microorganisms. Long fingernails can scratch a client's skin.
8. Rinse your hands and wrists thoroughly, keeping your hands above your elbows.		8. This keeps germs from unwashed area of your forearm from running down into the area that is now cleanest (your hands).
9. Dry your hands thoroughly, with a clean paper towel down to the wrist and forearm.		9. This avoids moving germs from your forearm to your clean hands.
10. Use a new paper towel to cover the faucet handle(s) to turn off the water. Properly dispose of the paper towels.		10. Covering the faucet prevents recontamination of germs. Wet paper towels and wet hands allow the transfer of pathogens by capillary action.

## TYPES OF GLOVES

In an effort to reduce midwives' exposure to blood-borne pathogens, as well as to protect clients from cross-contamination, gloves should be worn whenever there is the potential to have direct skin contact with blood, other potentially infectious material, mucous membranes, or non-intact skin, and when handling items or surfaces soiled with blood or other potentially infectious materials.

There are a variety of gloves available for medical use, including latex (sterile, or non-sterile), neoprene (chloroprene), nitrile, vinyl, polyurethane, and a variety of copolymers. These come in powder and non-powder styles.

Latex is a natural protein, and it used to be the most common type of glove used in medical settings. However, a growing number of people have developed latex allergies, which can be mild to severe. Latex allergies are cumulative; the more you are exposed, the worse the reaction. Some allergic reactions have even included anaphylactic shock, which can be life-threatening. It is because of this that some hospitals have declared themselves to be "Latex-Free Zones," even banning latex balloons. Midwives who do not work in settings requiring gloves on a daily basis are at less risk for allergic reactions than those who do. If irritation, redness or itching of the hands occurs, a non-latex glove should be used.

**SELECTION GUIDE FOR GLOVES**

	<b>Barrier Protection</b>	<b>Strength &amp; Durability</b>	<b>Puncture Resistance</b>	<b>Fit &amp; Comfort</b>	<b>Elasticity</b>	<b>Allergenicity</b>
<i>Latex</i>	Long-standing barrier qualities.	Strong, natural rubber is durable.	Has Re-seal qualities.	Provides comfortable fit.	Natural ability due to elastic quality rubber.	Contains protein & chemical allergens. Low powder is preferred.
<i>Neoprene (Chloroprene)</i>	Good, but tear resistance is marginal.	Strong.	Has some puncture-resistant qualities.	Provides a good fit, has some elastic ability that enhances fit.	Close to latex & allows for flexibility.	Contains no latex proteins but has some accelerator chemicals.
<i>Nitrile</i>	Resistant to punctures & tears, flexes & does not develop holes.	Strong; has puncture-resistant qualities.	Has puncture-resistant qualities.	Slightly tighter fit	Less than latex over time; tends to shape to wearer's hand.	Contains no proteins but contains some accelerator chemicals.
<i>Vinyl</i>	Easily breaks during use, baggy.	Weak, breaks easily & punctures easily in use.	Punctures with sharps.	Fit limited; baggy.	Dexterity compromised.	Contains no proteins but chemical accelerators.
<i>Polyurethane</i>	Durable & high puncture resistance.	Excellent tear, puncture & abrasion resistance.	Superior to latex for puncture resistance; mimics nitrile in performance.	Good comfort & fit; has latex-like qualities.	Elasticity is apparent.	Contains no latex proteins & no chemical accelerators.
<i>Copolymer (block polymers)</i>	Good resistance to tears.	Stronger than vinyl; puncture resistance is fair.	Easy to puncture.	Latex-like fit and comfortable.	Elasticity superior to vinyl but below latex.	Contains no latex proteins but some chemical accelerators.

Table adapted from *Types of Gloves* by Denise M. Korniewicz

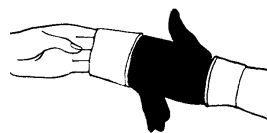
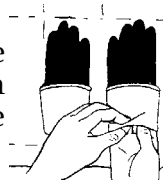
## HOW TO PUT ON STERILE GLOVES

**Preparation for a sterile procedure:** Collect all relevant equipment. Open all the things that are going to need opening, unless an assistant can do it for you. Do a sterile scrub of your hands and forearms.

### Steps:

### Rationale:

1. Peel open the outer envelope wrap. Place it on a clean, dry, firm surface, so the cuffed end of the gloves faces you.
  2. Open the inner wrapper by pulling the folded up paper cuff edge open. Open the wrapper paper by touching the underside of the wrapper only.
  3. Pick up a glove with the hand glove will not go on. Touch only the folded back cuff that will be inside the glove when you wear it.
  4. Slip the appropriate hand into the glove while keeping the fingers of the glove pointed down.
  5. Wiggle your fingers inside the glove until your fingers slide into the finger holes. Your other hand stabilizes the glove by holding only the cuffed portion of the glove that will be interior to the glove when it is on completely. Now firmly pull the glove on the rest of the way.
  6. With your gloved hand, pick up the second glove. Do this by sliding your fingertips up under the portion of the cuff of the second glove that will be the outside after it is unfolded.
  7. Hold your hands above waist level, and away from anything they might touch. Slide your ungloved hand into the glove. Wiggle your fingers into all the correct finger holes.
  8. Pull the glove firmly on by pushing it up your forearm with the fingertips of the first gloved hand inside the cuff.
  9. After the glove is pulled all the way on, carefully unfold the cuff by wiggling the cuff unfolded with your fingertips inside the cuff.
  10. Now use the second glove to unfold the cuff of the first glove in the same manner.
1. This keeps the inside of the paper wrapper a clean surface, so it does not contaminate the inner wrapper.
  2. The direction of the glove gives you easy access, and does not have you reach over the glove, possibly dropping germs off your hands.
  3. This keeps the inside of the inner wrapper a sterile surface, so it does not contaminate the gloves.
  4. This keeps the outside of the glove (the portion of the glove that will be in contact with sterile instruments or the client's tissue) sterile.
  5. This keeps the outside of the glove from getting contaminated on anything.
  6. This gets the glove on without contaminating it. If you held it up and wiggled, the long droopy fingers might bounce around and touch part of your hands or wrists.
  7. The outside of the glove is sterile. Keep sterile items only in contact with other sterile items.
  8. This gets the glove on correctly without contaminating the outside of either glove.
  9. This gets the glove on snug, without contaminating it.
  10. This covers your wrist and distal forearm without contaminating the glove by having your thumb come in contact with your arm. If you opened the cuff by holding the edge of the glove and pulling it up your arm, your thumb might touch your arm, contaminating your glove.

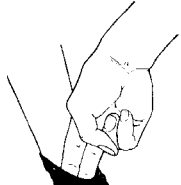




## HOW TO SAFELY REMOVE AND DISPOSE OF GLOVES

The intent of this technique is to remove the glove without exposing yourself to anything on the outside surface of the glove. It also ends up containing the outsides of the glove inside the inverted portion of the glove, containing any contaminant.

1. With your non-dominant hand, pinch the outside of the glove on the other hand at the base of the dominant hand's palm.
2. Gently pull off the glove on your dominant hand by pulling towards your fingertips.
3. Once it is fully removed, pull your index finger and thumb to your palm and use your other fingers to gather up the removed glove into the palm of your non-dominant hand. This will create a fist with the removed glove scrunched up in it.
4. Now take your dominant hand and slide your middle and index fingers carefully under the cuff of the glove still on your non-dominant hand.



5.  Once your fingers are about into your palm, invert the glove by pinching the inside of the wrist portion between your dominant hands index finger and thumb.
6.  Continue inverting the glove, so that the other glove ends up contained inside the dominant hand's glove and the glove turns inside out. This leaves only the portion of the glove that was in contact with you on the outside.
7.  Properly dispose of the gloves
8. Wash your hands.

### GLOVES EXERCISE

Answer the following questions.

1. List when you should glove up in a midwifery practice.
2. What procedures require sterile gloves?

**EQUIPMENT EXERCISE**

1. How do you prepare equipment for sterilization or disinfection?
2. What is instrument milk? What is its purpose?
3. How would you sterilize a thermometer?
4. Does a speculum for routine uses need to be kept sterile?
5. Does a speculum for routine uses need to be sterilized or disinfected between uses?
6. How would you assure your birthing tub did not transmit pathogens?
7. You have just finished washing birth instruments in a sink. How do you sanitize the sink afterwards?
8. What do you have to do differently for instruments sterilized in a pressure cooker rather than an autoclave?

## SELF-TEST

### True/False

1. \_\_\_ Boiling instruments will kill all bacteria, viruses, and fungi.
2. \_\_\_ Use the hottest water possible during hand washing for the best results.
3. \_\_\_ OSHA regulations only apply to midwives with employees.
4. \_\_\_ HIV is easily disinfected on surfaces.
5. \_\_\_ HBV is easily disinfected on surfaces.
6. \_\_\_ An autoclave will kill 100% of bacteria.
7. \_\_\_ The water in birthing tubs dilutes blood-borne pathogens to safe levels.
8. \_\_\_ Family members do not need wash their hands before holding the baby.
9. \_\_\_ Transmission-based procedures are done for known infectious status.
10. \_\_\_ Nosocomial infections happen only in hospitals.

### Multiple Choice

11. Disinfection using chemical agents successfully removes:
  - A) all pathogenic bacteria.
  - B) all pathogenic viruses.
  - C) most pathogenic bacteria.
  - D) all the important bacteria.
12. Sterile exam gloves should be used:
  - A) whenever a client is touched.
  - B) if you suspect a client is contagious.
  - C) whenever you do a pelvic exam.
  - D) whenever there is potential contact with the bloodstream.
13. Boiling instruments for at least 30 minutes results in:
  - A) sterilization.
  - B) disinfection.
  - C) sanitization.
  - D) asepsis.
14. Hand washing:
  - A) is inadequate to prevent disease.
  - B) can prevent the spread of most disease.
  - C) should always be done with antibacterial soap.
  - D) should be done with the rings on.

### Answers

1. False, 2. False, 3. True, 4. True, 5. False, 6. True, 7. False, 8. False, 9. True, 10. False, 11. C, 12. D, 13. B, 14. B.

## PUZZLE ANSWER KEY

<sup>1</sup> C O L O N										<sup>2</sup> I Z A T I O N														
					M																			
					M						<sup>3</sup> A S E P S I S													
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<sup>11</sup> S T E R I L I Z A T I O N																								
R																								

# Chapter 9

## Prenatal Care

### OBJECTIVES

*After completing this chapter, the student should be able to:*

1. Explain the difference between good prenatal care and great prenatal care.
2. Explain the benefits of prenatal care.
3. Describe what HIPAA is and how it applies to midwifery practice.
4. Explain the importance of charting and give examples of charting rules.
5. Define a SOAP and SBAR and give examples.
6. Describe what is involved in writing practice guidelines/protocols.
6. Describe how to take a complete medical history, including:
  - a. Communication techniques.
  - b. Family history.
  - c. Past medical and obstetric history.
  - d. Sexual history taking.
  - e. Current pregnancy.
7. Describe what the first prenatal visit involves.
8. Describe how to give a complete head-to-toe physical exam.
9. Explain why physical exam skills are important for midwives to learn.
10. List information taken and charted on subsequent prenatal exams.
11. Demonstrate prenatal exam skills, including:
  - a. Measuring fundal height.
  - b. Taking vital signs and knowing the normal ranges.
  - c. Listening to Fetal Heart Tones.
  - d. Palpation using the steps of Leopold's maneuver.
12. Describe the rationale for pelvimetry, and how to perform it.
13. List the prenatal tests and when they are recommended.
14. Describe how Rh and other blood incompatibilities can affect pregnancy outcomes.
15. List purposes for the following antenatal tests and procedures:
  - a. Amniocentesis.
  - b. AFP testing.
  - c. Chorionic Villi Sampling.
  - d. Biophysical profile.
  - e. Fetal movement counting.
  - f. Ultrasound.
  - g. Non-stress test and contraction stress test.





## THE MIDWIFE'S ROLE IN PRENATAL CARE

One of the most important roles a midwife has is as a prenatal care provider. Good prenatal care can identify, screen for, and prevent complications in mother and baby. Great prenatal care includes education about pregnancy, birth, and parenting, and develops a warm and trusting relationship between the midwife and the family she serves.

One of the primary differences between the midwifery model and the medical model is the time midwives spend with their clients on perinatal education and relationship-building. Midwives typically spend five times more time with clients than physicians do. Midwives get to know the family, the partner, the other children, and the support network. They are members of a community health team, not outsiders with little contact. Midwives educate families on pregnancy, birth, nutrition, harmful substances, parenting, infant care, herbs, and general health.

Great prenatal care is the cornerstone of healthy mothers and babies, reducing complications, raising birth weights, and lowering mortality. During prenatal care a midwife practices her art; she trains her hands and her ears, hones her instincts, and uses her experience as well as her training. By feeling babies and bellies, she does not rely on ultrasound to know the position and size of the baby. Modern obstetrics has lost many of the hands-on skills as a result of relying on technology. By listening to fetal heart tones, particularly with a manual fetoscope, a midwife trains her ear to hear what is normal. The more women a midwife examines, palpates, and listens to babies in bellies, the better she gets at identifying what is outside of the normal range.

A midwife is a member of the health care team; and part of good prenatal care is knowing when to order specific tests and make appropriate referrals. The professional midwife keeps current with changing obstetric knowledge. Midwives educate women on the pros and cons of a variety of tests and procedures to allow parents to make an informed choice. Some parents want every possible test and do not want to take even a remote chance with their baby's health. Other parents want little or no intervention or technology or wish to weigh risks versus benefits for every possible action.

Women trust their midwives and will most often follow the advice and recommendations given. How a midwife presents information largely determines how a client receives it. For example, in my practice very few, if any, of my clients ever circumcised their boys, while another midwife working in my birth center had much higher circumcision rates. We both gave clients the same exact handouts and information, but the way we emphasized it was different, and consequently, we had different outcomes. A midwife who does not believe in a specific test or procedure can influence her client's decision. Ideally, all midwives should present information to clients in a non-biased or non-judgmental way, so that the clients can then make their own decisions.

Educating parents about birth empowers them. By becoming more aware and knowledgeable about birth, women have less fear, and can and *will* make better and informed decisions about the options they have. Having a baby outside of the hospital requires much more responsibility on the part of parents. They need to take classes, read, and take an active role in their pregnancy and birth planning. Making choices about their birth is one of the first steps in the parenting process.

A professional midwife should be aware of and sensitive to differences in the various cultures and life-styles of her clients. She should take the time to learn about the cultural practices of the population she serves. This may include beliefs or taboos, religious ceremonies or rituals, or feelings and attitudes. Active listening, good communication, and counseling skills are midwifery tools as important as a fetoscope and a measuring tape. Taking the time to develop good rapport creates a better relationship and, consequently, a better birth experience for everyone.

## Giving Prenatal Care

### RECOMMENDED SCHEDULE OF PRENATAL VISITS

First visit at 6-12 weeks.

Then visits every 4 weeks; until 28 weeks, when visits increase to every 2 weeks; until 36 weeks, with visits every week.

After 40 weeks, two visits a week are recommended for fetal surveillance.

Additional visits are scheduled as needed.

### PRENATAL FORMS

There are a wide variety of forms available for prenatal care. Some are designed specifically for midwives in out-of-hospital practices; some are more standard medical forms. Some midwives design their own. Electronic forms may be used in the future, but currently there is not one system in standard use.

I designed my own forms for years, but found that when I had to transfer clients to the hospital or another practitioner, it was often hard for them to find information. The Oregon State Health Division designed a Uniform Prenatal Care Record for use by all practitioners. Although it was geared for physicians in hospitals, it is easily transferable to any practice. The state provides NCR copies of the form at no cost to practitioners, and it has become widely adopted. I found that by using the state form, transferring clients became more professional, and I was able to use the same risk factors as the rest of the medical community. Your state or province may provide a similar form, or you can use the one in this book. Electronic Medical Charting will be replacing paper charts in the near future, so it is a good idea to become familiar with what is used in your area.

### HIPAA AND MIDWIVES

The Health Insurance Portability and Accountability Act (HIPAA) of 1996 is a complicated and multifaceted law with regulations to protect client privacy that affect all health care providers, including midwives.

These regulations requires activities, such as:

- Notifying clients about their privacy rights and how their information can be used.
- Adopting and implementing privacy procedures for its practice, hospital, or plan.
- Training employees so that they understand the privacy procedures.
- Designating an individual to be responsible for seeing that the privacy procedures are adopted and followed.
- Securing client records containing individually identifiable health information so that they are not readily available to those who do not need them.

Compliance with HIPAA regulations should not be difficult for midwives with small practices. Explaining to clients what their privacy rights are and having them sign a form are the important tasks, as well as setting a process for everyone who may have access to those records.

## CHARTING

Good charting is integral to professional midwifery care. Excellent charting improves the quality of the care. Keeping accurate records:

- Helps the practitioner remember specific details.
- Is a method of effective communication with other health care practitioners in cases when a hospital transfer is necessary, if the family transfers to another practitioner, or as a means of sharing information between the midwives in the same practice.
- Helps in the diagnosis or recognition of problems by looking for trends or patterns, for example in fetal growth.
- Provides documentation that can be used for research.
- Provides documentation for insurance reimbursement.
- Aids in documenting for peer review committees, state licensing or regulatory agencies, and other entities who assess the quality of care by providers. For birth centers, reviewing charts is essential in accreditation processes such as that of the NACC.
- Provides legal protection. Your chart is the legal document which accurately and completely reflects the care you provided. It will protect you against claims that you have practiced inappropriately. It also serves as a legal document for use in other legal proceedings. Charts which are poorly maintained, incomplete, inaccurate, illegible or altered create questions of fact regarding the treatment given.

## CHARTING RULES

1. Write legibly.
2. Use good quality forms and file folders. Two-or-three hole punch all forms, and clip them to your charts. This will reduce the possibility of losing an important form or lab slip.
3. Always keep your charts in the same place, preferably in a waterproof and lockable file cabinet. Always put them away right after using them.
4. Use proper spelling and grammar.
5. Use standard abbreviations. Obscure terms used only by lay midwives should be avoided. Learning medical terminology and abbreviations is essential.
6. Use black ink (or dark blue).
7. Use military time.
8. Chart right away – but not in advance.
9. If you refer to another practitioner, specify him or her by name.
10. For errors, draw a single line through the error, write the error correction above it, and sign your initials. Do not erase or use white-out. All corrections, late entries, entries made out of time sequence, and addenda should be clearly marked as such in the record.
11. Chart consecutively, line by line, not leaving any blank spaces.
12. Leave no blank spaces on charts. If for example, a woman is seen at 12 weeks and it is too early to note the position of the baby, draw a line through the box to show it wasn't done, or write N/A for "not applicable".

13. Each and every page of a patient record should be clearly labeled with the patient's complete name and medical record number.
14. Only document factual and objective information from your own treatment and/or observation. When documenting information derived from other sources (for example, other health care providers, other medical records or entries in the same medical record), be sure to reference the source of that information.
15. Use quotation marks for specific comments given by client.
16. Use complete, concise descriptions; do not generalize ("is doing fine").
17. Chart telephone calls about problems or questions.
18. All entries in the medical record should be dated with an indication of the time the note was written and be signed by the person making the entries.
19. Document all instances of refusal of recommended treatment and that the client was informed of the potential consequences and verbalized understanding of those consequences.

Two common forms of charting are **Narrative** and **SOAP Notes**. Narrative form includes brief notes for simple problems -- sentences and phrases to describe the situation in a simple storytelling style. A SOAP note is a method of charting that is standard in medicine as a way of organizing available data and presenting it in a clear and concise way. SOAP notes are done in a prenatal chart if there is a problem or question with the client.

**S: SUBJECTIVE** - What the client tells you is wrong. A chief complaint (CC).

**O: OBJECTIVE** - The examiner's observations and exam. Previous diagnosis, tests, or procedures.

**A: ASSESSMENT** - A diagnosis or summarization of available data, which may lead to a conclusion. If an assessment is not possible, note reasons why.

**P: PLAN** - Include lab tests given or recommended. Recommendations given or referral noted.

*Some practices also use:*

**I: IMPLEMENTATION** - How to proceed with the plan.

**E: EVALUATION** - How realistic the plan is and whether the recommendations worked

**R: REASSESSMENT** - After reviewing the plan, what can be done next.

*Example of a SOAP note:*

**S:** Ruth Sanchez is a 26 year-old, G 2 T 0 P1 A 0 L1 at 26 weeks' gestation. Came in on 1-15-00 because "felt faint and dizzy". Did not lose consciousness, but felt she would faint on first getting up this morning. Has felt tired for the last five days. Has not been taking the prenatal vitamins or iron recommended on 11-28-06

**O:** BP 90/58, pulse 86, slight pallor, hct 32, FHT 130. Physical exam findings are WNL.

**A:** Anemia and low blood pressure, creating orthostatic hypotension.

**P:** Repeat hemogram. Risks of anemia explained. Stressed importance of taking iron. Recommended prenatal vitamins with iron. Prescribed ferrous fumarate, 40 mg., TID; increase fluid intake. Referred to WIC program to supplement with high-iron foods. Handouts given. Recheck again in two weeks, with instructions to call if further episodes occur.

*Daphne Singingtree, CPM charted 1-15-06 2250*

Another charting method is **SBAR: Situation, Background, Assessment, Recommendation**. It is useful for providing consistent handovers of clinical information, for example when transferring a client to the hospital.

## CHARTING EXERCISE

1. Make a SOAP note for a woman complaining of nausea and vomiting.

S

O

A

P

2. Now make it SOAPIER

I

E

R

3. You have decided to refer her to another provider, make a SBAR note.

S

B

A

R

## DOCUMENTATION - PRACTICE GUIDELINES AND PROTOCOLS

In addition to charting, an important part of your practice will be writing practice guidelines and/or protocols. The two terms are used interchangeably, practice guidelines are considered more flexible. Protocols may have specific legal ramifications if part of a physician/ midwife agreement, or licensing regulations.

*Considerations when writing guidelines:*

1. They are written for your future practice, consider your practice area, what medications or medical access you will likely have. For example, a very rural practice or a Canadian midwife may have very different protocols than an urban US midwife.
2. They are not academic papers, references, citations are not generally used. However, citing sources can be useful for updating and checking references.
3. They are not detailed, everything you need to know about any given condition, they are an outline of the steps you will take. It is not a repeat of a chapter in a text book.
4. They are short and succinct. Numbers or bullets are used frequently.
5. They are realistic. Don't write anything you can't or won't do.
6. Use algorithms, if this happens--then this--if that happens--then this.
7. Be specific, e.g., how much blood loss, which medication or herb, what dosage, which method of delivery, what lab test.
8. They are for your own use, as well as for your assistant. A blueprint of your practice, what you will do when.
9. It is not enough to say refer to a physician, be specific, are you consulting? Transferring care? Risking out for OOH? Is it an considered a emergency? EMS activated?
10. They can and should change, they are living documents.

There is not a right and wrong way to write guidelines/ protocols, there are many formats, including SOAP, different headings, bullets, numbers, letters.

Protocols are your clinical practice guidelines to good care. A map, or recipe of what you are going to do when. This does not mean that they are going to apply to every birthing client, or that you are going to write guidelines for every possible situation that comes up. Many student midwives begin writing their protocols during training as they are learning each phase. It is way to bring together what they have learned from many sources, then at the end of their training they have a complete set of guidelines for their practice.

## PROTOCOL EXAMPLE

**Name of condition** (may include a definition if needed).

*Example:* Anemia - Hematocrit less than 34% prior to 12 weeks or after 24 weeks, or less than 30% at anytime.

**Policy** (optional) May be a statement of purpose or it may be reflect the laws or conditions of your license.

*Example of Policy:* According to MN law, transfer of care is only necessitated when gestational hypertension develops into the associated prenatal condition preeclampsia. However, the policy of Groovy Midwifery Services is to transfer care should the diagnosis become severe hypertension.

### Screening or Risk Factors.

*Example:* Assess and verbally review pregnant mother's records for risk factors such as:

- Family history
- History of related problem
- Sign/symptoms
- Diet history
- Stress or Living Situations

**Diagnosis** (order these labs, perform this procedure, monitor in this way).

- Physical Exam results (if BP is over ??)
- Lab results (if HCT is under ??)
- If XXX symptoms exist

Differential diagnosis or rule out conditions can be put here (Rule out twins via ultrasound.) If the condition changes: (Define, if heart rate drops, or lab change, be specific)

Or if this occurs, check:

- This lab value
- Or this condition
- Or physical sign/symptom

**Treatment Plan** (may include preventive measures).

Should be very specific, include dosages, even with herbs, lab results, and what happens if the lab or physical finding change. It may include referral or transfer of care. Be specific.

*Example.* For probable diagnosis of Fe-deficient anemia

- Floridex liquid iron, 2 tbls po bid between meals with vitamin C containing foods, or other supplement supplying 60 to 120 mg/day of elemental iron sources other than sulfate.
- Education re: well balanced diet, Fe-rich foods, importance of Fe compliance, risk of overdosing, foods that interfere with absorption. Recommend use of cast iron for cooking.
- Referral to nutritionist and WIC when appropriate.

**Follow up** – should be specific with times, or change of plans if the condition changes, and what change creates which action.

## FIRST PRENATAL VISIT

The timing of the first prenatal visit varies. Ideally women come in for preconception counseling. Some start as early as possible in the first trimester (6-8 weeks) to educate women on nutrition, particularly folic acid supplements, and on avoiding harmful substances. Other practitioners wait until later in the pregnancy (10-12 weeks), as there is little vital information provided early on, and if there is an early pregnancy loss, there has been less time and energy (and money for tests) invested. Some midwives do an early counseling visit and schedule the tests, history and physical for the following appointment.

Schedule enough time for the first session. Two hours for an initial visit is typical, given the time needed for questions, education, counseling and getting to know your client, her family and her individual wishes for her birth.

The first step usually begins with history-taking. Information regarding her current pregnancy should also be charted. During the initial visit, start with a complete physical exam in order to rule out chronic or other serious illness. Then, the woman's pelvis is measured and a speculum exam done to visualize the cervix, and to conduct a pap smear and STD cultures as indicated. Her initial blood work is done at this time. Some midwives refer clients to a physician or a public health department for this part of the visit. However, in order to provide comprehensive care, the midwife may do it herself. At the first visit the mother is weighed, and her urine and blood pressure are checked. Depending on her stage of pregnancy, she may be measured, the fetus palpated and the fetal heart tone checked.

### HISTORY TAKING

A comprehensive history is an important part of good prenatal care. It should cover: medical history, including allergies and hospitalizations, family history including genetic disorders, past contraceptive use, sexual history, menstrual history, and past pregnancies and births, noting any complications or problems. It should also cover the woman's current living situation, work, and social factors. Current medications, herbs and supplements, health habits, smoking, and alcohol or illegal drug use are also reviewed.

Holistic midwifery care begins with knowing a woman's *herstory*. By knowing about her family, her past pregnancies, her present living and work situation, and other details about her life, you learn who she is as an individual. Since a midwife may be the only health care provider a woman may see, medical history taking is an important skill. This may be needed if a medical condition unrelated to pregnancy develops.

Do not rely on client's written responses on forms as their means of history taking. While we do review these forms, we value even more highly the interview process. Items on the forms receive oral clarification and elaboration, such as when something occurred or how it was treated.

History taking is about listening. Good communication skills establish rapport with your client. You need both verbal and non-verbal skills. Verbal communication are evident in the way in which we talk to the client and ask questions. Ask open-ended questions, and take the time to really hear what the client has to say. Encourage her with verbal and nonverbal cues, as well as with silence. Avoid moral judgments. Ask one question at a time; avoid multipart questions. Avoid leading questions. Focus by paraphrasing and summarizing. Ask her permission to talk about sensitive topics. Nonverbal communication is more than body language; it is how we behave with clients, how they are greeted and treated. When women are treated with respect, their privacy is respected, and they feel listened to, then they can more easily open up and trust the midwife.

Listening to women is a fundamental aspect of the midwifery model of care.



### SEXUAL HISTORY TAKING FOR MIDWIVES

A complete sexual history is an important tool for midwives to give thorough and holistic care. A healthy sexual life is associated with a greater sense of well-being, which can affect general health. Birth begins with sexual contact. Women's feelings or issues about their bodies or sex can affect how they give birth. Medical issues may arise, such as STDs or certain sexual practices which may be contraindicated in pregnancy. Estimates suggest that the lifetime incidence of sexual difficulties is about 50% in the general population, but the majority of sexual dysfunction is not identified. Many times a midwife may be the only person that the woman trusts enough to discuss sexual matters or difficulties. While it is outside the scope of midwifery care to give extensive counseling for sexual dysfunction, an assessment of sexual health is an important part of holistic midwifery care.

Because sexuality is so difficult for most people to talk about, privacy, sensitivity and a non-judgmental attitude are necessary to encourage clients to discuss their problems openly.

#### Guidelines for Midwives on Sexual History-Taking

**Introduction** - Always use a transition statement explaining the routine nature of the questions and why they are relevant to avoid surprising the person; e.g., "I would like to take your sexual history now. I ask these questions routinely, because sexual issues can have a significant impact on overall health and well-being."

**Timing** - Best done when a degree of trust has been established. If it doesn't arise naturally, it may be discussed in reference to menarche or past STDs. It is worthwhile to begin discussion by covering the less sensitive areas first, and then moving into the more sensitive topics. It is usually appropriate to reassure the client with a statement that most people initially feel awkward or uncomfortable discussing their sexuality. The initial interview may be too soon for clients to really open up about sexual matters. It can be brought up later when appropriate.

**Confidentiality** - Clients will be more willing to discuss difficult issues if the interview takes place behind closed doors, if there are no interruptions, and if they are reassured that confidentiality is guaranteed. Some people may not want you to record the information they disclose to you.

**Practitioner Discomfort** - Any discomfort or anxiety you bring into the interview will be communicated to the client and may prevent honest disclosure of concerns. The best way to overcome this anxiety is to take sexual histories so often that it really does become routine.

**Judgmental Attitudes** - As in other parts of the interview, the midwife should avoid imposing her own values on the client. This is particularly critical in taking a sexual history. The problem may be greater when there is an ethnic, racial, or social class difference between a midwife and the client. No assumptions are safe to make in taking a sexual history. A particularly difficult issue for some heterosexual or Christian midwives is interviewing lesbian clients. Also sexual practices that are unfamiliar to the midwife or couples who are non-monogamous are other examples of areas where a midwife's personal biases may interfere with communication.

**Competence Anxiety** - Midwifery training often does not include the physiology and psychology of sex. The midwife may feel inadequate in her knowledge of these areas. Errors made will not destroy the interview if the midwife is sensitive to the client's response. Clients are usually willing to provide sexual information when your approach is relaxed but professional, concerned, self-confident, and non-judgmental. Some issues may come up that are outside the scope of midwifery training or care. A client may require ongoing counseling, medical evaluation, or other referrals.

**Terminology** - Terms that are overly technical or overly colloquial often get in the way of clarity in taking a sexual history. Many people, especially teenagers, may not understand the meaning of certain words, i.e., "monogamous." Nonmedical people may think "sexually active" means vigorous sex or having multiple partners. Some consider overly medical terms to be intimidating or less friendly. Ann Frye promotes midwives using the word "yoni" as a more feminist and less medical model term for vagina. Ina May Gaskin used to encourage midwives to use the words "puss" or "pussy". However, certain words bring up different reactions for each individual, and I believe it is best to stay with specific clinical terms; I do not think there is anything wrong with the terms vagina or penis. Slang words like "pussy" can interfere with the client-midwife professional relationship if they are trigger words for clients. Sometimes general terms such as "bottom" can be useful; however, they are best avoided if you need to give specific information. For example, making love can mean something very different than intercourse. Words such as "adultery" and "kinky" have negative moral connotations and should also be avoided.

**Sexual Abuse** - It is estimated that a third of all women have had some sort of unwanted sexual contact, and many of these women have experienced significant childhood sexual abuse. This may have a profound effect on their pregnancy and birth or current sexual relationship. If a woman tells you she is a survivor of sexual abuse, that may open the door to asking her if she is interested in further counseling about it. Assure her that you will be respectful of her feelings, and encourage her to be safe by assuring her that, if something is making her uncomfortable, she may let you know right away.

#### **Topics Covered in a Sexual History for Pregnant Women:**

- A client's satisfaction with her sex life.
- Whether safer sex methods are used, whether there are multiple partners, and whether any partners have a history of STDs.
- History of sexual abuse.
- Current unwanted sexual contact.
- Interest in further counseling and/or referral for sexual issues.
- Pain or Discomfort.
- Concerns about increasing or decreasing libido.
- Concerns about the safety of sex during and after pregnancy.

## HISTORY-TAKING EXERCISE

1. List and explain the relevance in midwifery practice of 10 conditions in each of these areas of woman's history.

Family history:

Past medical history:

Obstetric history:

Menstrual history:

Sexual History:

2. List five reasons why a history might contain inaccurate or unavailable information.

3. Describe cultural and/or social barriers to obtaining accurate information in a history taking interview

Oregon Uniform Prenatal Record (1997) Form B

NAME:

Practice Name & Logo

DATE:

PSYCHOSOCIAL RISK FACTORS				Neg.	Pos.	PHYSICAL EXAMINATION			
<i>How does the patient rate the following at this time?</i> Answer 1 for NO STRESS                      3 for MODERATE STRESS 2 for SOME STRESS                          4 for SEVERE STRESS						HEENT	WT.	HT.	B.P.
<b>Score</b>						Neck			
Financial worries (e.g. food, shelter, health care, transportation) . . . . .						Skin			
Other money worries (e.g. bills, etc.) . . . . .						Lungs			
Problems related to family (partner, children, etc.) . . . . .						Breasts			
Having to move, either recently or in the future . . . . .						Heart			
Recent loss of a loved one . . . . .						Abdomen			
Current pregnancy . . . . .						Neuro			
Current abuse: sexual, emotional or physical . . . . .						Extremities			
Problems with alcohol or other drugs . . . . .						Vulva/Vagina			
Work problems (e.g. being laid off, etc.) . . . . .						Cervix			
Problems related to friends . . . . .						Uterus			
Feeling generally "overloaded" . . . . .						Adnexae			
<b>TOTAL:</b>						Rectal			
Within the past year, has the patient been hit, slapped, kicked or otherwise physically hurt by someone?				Yes	No	Pelvimetry	Adeq.	Borderline	Contr.
Since pregnancy began, has she been hit, slapped, kicked or otherwise physically hurt by someone?				Yes	No	SIGNATURE			DATE
Within the past year, has anyone forced her to have sexual activities?				Yes	No				
ANTEPARTUM RISK SCORING (Indicates pregnancy/outcome risk)						PRENATAL COURSE (at 37 wks)			
<b>INITIAL RISK SCORE</b>		<b>Gynecologic History</b>		<b>OTHER:</b>		<b>37 WEEK SCORE</b>			
<b>Risk General</b>		2 DES Exposure		<b>TOTAL INITIAL RISK SCORE</b> <input type="text"/>  <b>37 WEEK RISK SCORE</b> <input type="text"/>		<b>Infections</b>			
1 Age <17 or >35		2 Herpes				3 Herpes – first episode			
1 1st visit >20 weeks or unsure dates		2 Uterine surgery (other than C/S)				___ Acute hepatitis			
1 Weight <100 or >200 pounds		1 Uterine or cervical malformation				(1st & 2nd trimester = 1; 3rd = 3)			
1 Nulliparous (if yes, skip to Gyn Hx)		<b>Medical History</b>				3 Pyelonephritis			
<input type="checkbox"/> SUBTOTAL (maximum score 2)		2 Chronic anemia (Hct <30)				1 UTI			
<b>Obstetric History</b>		2 Asymptomatic heart disease				3 Syphilis			
2 Parity ≥5		5 Symptomatic heart disease				1 Gonorrhea/Chlamydia			
2 Repeated spontaneous abortion (≥3)		5 Chronic hypertension				___ Rubella (1st trimester = 5; 2nd = 1)			
5 Premature <35 weeks		5 Thromboembolic disease				<b>Uterine factors</b>			
3 Growth retarded infant (IUGR)		2 Pulmonary disease		5 Placenta previa					
2 Infant ≥10 pounds		5 Renal disease		3 Other significant bleeding					
1 Midforceps or difficult delivery		5 Diabetes		5 Premature labor					
Cesarean delivery:		1 Epilepsy		5 Premature rupture of membranes					
low transverse plans C/S = 1;		1 Psychiatric problem		5 Oligo- or polyhydramnios					
low transv plans labor = 3;		<b>Family History</b>		3 Cerclage					
low vert = 2; classical = 3		1 Inheritable defect		1 Abnormal PAP					
5 Neonatal death or stillborn		1 Parent or sibling with diabetes		<b>OTHER:</b>					
1 Infant with congenital anomaly		<b>Substance/Drug Use</b>		2 Weight gain > 50 pounds					
2 Ante- or Postpartum hemorrhage		3 Alcohol abuse		2 Weight gain < 20 pounds					
3 Eclampsia or severe PIH		1 Tobacco >1 pack per day		(exclude obesity)					
1 Mild pre-eclampsia		3 Narcotics or IV drug abuse		2 Severe anemia (Hct < 30)					
5 Isoimmunization (e.g. Rh)		1 Drug with known fetal effect		5 Insulin-requiring diabetes					
				2 Non-insulin-requiring diabetes					
				3 Mild pre-eclampsia					
<b>BIRTH PLANS</b>									
Pre-Reg		Tour		Episiotomy		Circ		Bottle	
Hosp		Birth Room		VBAC		Contraception		Breast	
Prenatal Class		Anesthesia		C/Section		Peds:			
LABORATORY DATA – DATE AND RESULT									
TEST	DATE	RESULT	Disc.	Acc/Dec	TEST	DATE	RESULT	Disc.	Acc/Dec
Type and Rh					PPD				
Antibody Screen					1 Hr. GTT				
Hct/Hgb					3 Hr GTT				
" / "					Sickle Cell				
Platelets					Chlamydia				
Rubella					Gonorrhea				
RPR					Urine culture				
HBsAg					PAP Smear				
Maternal serum screening (Gen)					Other:				
Amniocentesis									

Oregon Uniform Prenatal Record (1997) Form A

Practice Name & Logo

NAME:

DATE:

S O C I A L	PHONE: H: _____ W: _____		ADDRESS _____								
	AGE	DOB	MARITAL STATUS	ETHNIC	RELIGION	OCCUPATION	PLANNED PREG.				
	SOCIAL NOTE:						FATHER OF BABY – HIS OCCUPATION / WORK NO.				
	<b>PREVIOUS PREGNANCIES</b>										
								<b>G: T: P: A: L:</b>			
No.	Date	Gestation Length	Labor Hours	Type Delivery	Anesth.	Sex	Wt.	PLACE OF DELIVERY	Complications		
Neg.	Pos.	FAMILY HISTORY					Neg.	Pos.	MEDICAL HISTORY		
		Diabetes							HEENT		
		Hypertension							Cardiovascular		
		Renal Disease							Respiratory		
		Cancer							Gastrointest.		
		Twins							Urinary		
		Heart Disease							Neuropsych.		
		Lung Disease							Infections		
		Seizure Disorder							Varicella		
		Other							Herpes		
Details:									STD		
									Transfusion		
									Surgeries		
									DES Exposure		
									Endocrine (Diabetes, Thyroid)		
									Anemia		
									Phlebitis/Varicosities		
									GYN		
									Abnormal PAP		
									Other		
							<b>Now</b>				
Details:							<b>HABITS / EXPOSURES</b>				
							<input type="checkbox"/> SMOKING		<b>Quit for Preg</b>		
							<input type="checkbox"/> Cessation Offered	<input type="checkbox"/> Cessation Accepted	<input type="checkbox"/> Never Smoked	<input type="checkbox"/>	
							<input type="checkbox"/> ALCOHOL		<input type="checkbox"/>		
							<input type="checkbox"/> OTHER DRUGS		<input type="checkbox"/>		
							<input type="checkbox"/> MEDS				
							<input type="checkbox"/> X-RAYS THIS PREG.				
							<input type="checkbox"/> HIV DISCUSSED		<input type="checkbox"/> YES <input type="checkbox"/> NO		
							<input type="checkbox"/> OTHER				
Details:							<b>ALLERGIES</b>				

Signature \_\_\_\_\_ Date \_\_\_\_\_

Oregon Uniform Prenatal Record (1997) Form C

Practice Name & Logo

NAME:

DATE:

DATING																		
MENARCHE: _____			MENSES: REGULAR IRREGULAR			PREGNANCY TEST: TYPE _____ DATE _____												
DATE OF CONCEPTION (IF KNOWN): _____			EDC: _____			FIRST EXAM: SIZE _____ DATE _____												
LMP _____			MENSES q _____ DAYS _____			CONFIRMS LMP <input type="checkbox"/> YES <input type="checkbox"/> NO												
BASIS: <input type="checkbox"/> LMP <input type="checkbox"/> SONO <input type="checkbox"/> EXAM <input type="checkbox"/> CONC DATE <input type="checkbox"/> ARBITRARY						FIRST FHT'S: DT _____ DATE _____			CONFIRMS LMP <input type="checkbox"/> YES <input type="checkbox"/> NO									
DATE	PROBLEM LIST						ULTRASOUND DATA											
							Initial Risk Score		37 Week Score									
							Psychosocial Score		Consult:									
							β Strep Date __/__/__											
ANTEPARTUM RECORD FLOW SHEET											G:	T:	P:	A:	L:			
DATE	WEEKS GESTATION	FUNDAL HEIGHT	SGA LGA AGA	FETAL SIZE	PRESENTATION	FHT	WEIGHT	PRE-PREG	FETAL ACTIVITY	B.P.	PROTEIN	SUGAR	LEUK EST/ NITRITE	URINE RETURN	16 wks: __/__/__      28 wks: __/__/__		SEE NOTES	SIGNATURE

Check-off forms are important as a reminder to cover important topics. Most midwives develop their own. Here is one adapted from my practice.

Prenatal Education Checklist				
	Topics	Discussed	Handout	Signed Form
1 <sup>st</sup> Visit or 6-12 weeks	Nutrition			
	Supplements			
	Practice Philosophy			
	Hazards: Smoking, ETOH, Drugs, Work Exposures, Violence In Home			
	Birth Place: Home / Center / Hosp			
	Lab Tests: HIV/HBV, STD			
	Emergency Contact			
	Informed Consent			
	Insurance And Financial			
	Herbs			
12-16 weeks	Prenatal Testing: Triple Marker			
	Exercise/Fitness			
	Fetal Development			
	Common Discomforts			
	Ultrasound			
	Diet Review - WIC			
16-20 weeks	Weight Gain			
	Anemia			
	Antenatal Rhogam			
20-24 weeks	Preterm Labor Signs			
	GST Screening			
24-28 weeks	Classes: Childbirth, Refresher, And Sibling			
	Emotional Changes			
	Hospital Pre-Registration			
28-30 weeks	Sexuality			
	Diapers, Baby Supplies			
	Birth Plan Review			
30-32 weeks	Fetal Movement Kick Counts			
	Siblings			
32-34 weeks	GBS			
	Birth Supplies List			
	Breastfeeding			
	Home Visit Scheduled			
9 <sup>th</sup> Visit or 34-36 weeks	Newborn Screening			
	Eye Prophylaxis			
	Vitamin K			
	Circumcision			
	Car Seat			
36-37 weeks	Signs Of Labor: When To Call			
	Pediatrician			
	Immunization Plans: HBV			
	Transport And Back Up Plans Review			
37-38 weeks	Support Systems Review			
	Back Pain			
39-40 weeks	Labor Support			
	Bonding			
	Breastfeeding Review			
40-42 weeks	Post Dates Risk NST			
	Biophysical Profile			
	Review Induction Methods			

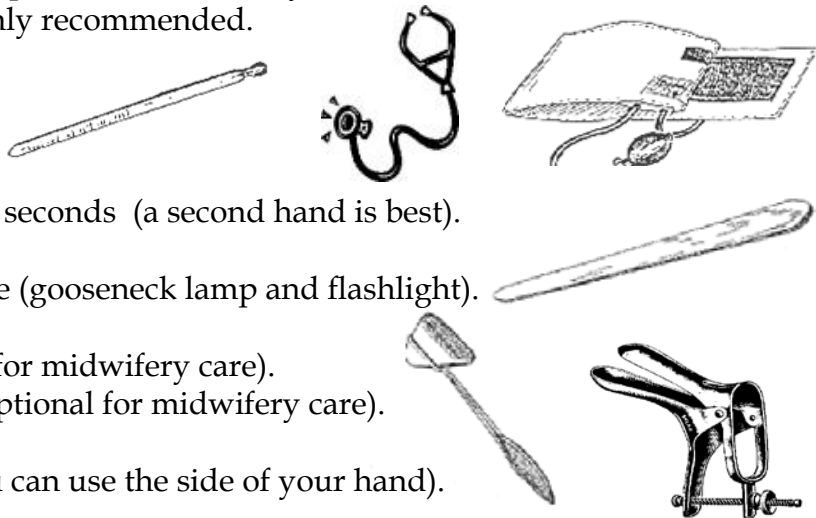
## PHYSICAL EXAM FOR INITIAL PRENATAL VISIT

The initial physical is important, not only to screen out disease or abnormalities, but to get a general picture of a woman's overall health. Some midwives do not feel it is in the scope of their care to give complete physicals, so they refer women to other practitioners for complete physicals. Other midwives feel these skills add to the level of comprehensive care given. There are situations in which we may be the only health care provider the woman sees, or other situations such as domestic violence, when doing a complete physical is the only time to recognize and acknowledge bruises or signs of pain.

Giving physical exams involves a set of skills that are very much based on the midwifery model. They are low tech, high touch. It requires experience and hands-on practice to develop expertise. It is best learned hands-on from an experienced practitioner. Practice giving physicals on as many people as possible: your friends and family, other midwifery students. Practice often enough that you are comfortable and confident. Here is a condensed version of a head-to-toe physical with emphasis for midwifery clients. Additional books such as *Bates' Guide to Physical Exam* are highly recommended.

### Equipment Needed:

1. Stethoscope.
2. Blood pressure cuff.
3. Watch that displays seconds (a second hand is best).
4. Thermometer.
5. Directed light source (gooseneck lamp and flashlight).
6. Exam gloves.
7. Otoscope (optional for midwifery care).
8. Ophthalmoscope (optional for midwifery care).
9. Tongue blades.
10. Reflex hammer (you can use the side of your hand).



### PHYSICAL EXAM VOCABULARY

Define these terms as they apply to physical exams:

1. Visual inspection:
2. Palpation:
3. Percussion:
4. Auscultation:
5. Bruit:
6. Asymmetry:
7. Ascites:



## SKIN

Use gloves if there are open sores or evidence of infection or other communicable features. Observe for: **Lesions** (sores), rashes or other abnormalities. **Color** of skin should not have pallor or be yellow or jaundiced, bluish or mottled. Note any bruising. **Pigmentation** changes such as chloasma, *linea nigra*, or *striae gravidarum* should be noted. **Brittleness** or excessive dryness of the skin, hair nor nails may indicate nutritional deficiencies or hypothyroidism. **Turgor** is the term used to describe the degree of skin resiliency. When the skin is pinched, it should be elastic and return to its normal shape. Retaining a tent-like shape may indicate dehydration. **Hair** can be checked for hair loss or signs of head lice; this can be done without announcing what you are looking for. **Nails** are checked for color, consistency, shape and contour.

SKIN EXERCISE		
	Signs and Symptoms	Usual Treatment
Pruritus		
Scabies		
<i>Herpes Gravidarum</i>		
Skin tags		

## HEAD & NECK

**Movement** of the head and neck should be smooth. Look for facial asymmetry, involuntary movements or edema. It should be possible to palpate the temporal artery located at the temples. **Lymph nodes** may be palpated but should not be tender or hard.

The **thyroid gland** is palpated by feeling on either side of the trachea from behind the client.

You can have the woman swallow. You should not feel it or if so, it should be very small. There should be no excessive enlargement or tenderness.

**Carotid pulse** should be easily palpated.

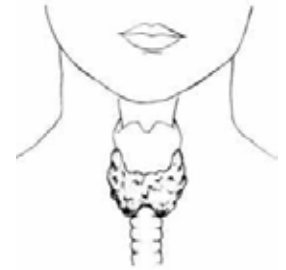
**Eyes:** **Pupils** should respond equally to light. No redness, discharge, lesions or jaundice should be present. The client should not complain of poor or blurred vision. **Eyelids** should have no inflammation, loss of lashes, edema or loss of elasticity. If you have an ophthalmoscope, you can check for corneal reflections, which should be centered over the pupils.

**Ears:** There should be no pain, loss of hearing, ringing in ears, inflammation or bulging of tympanic membrane (if checked with an otoscope).

**Nose:** No inflammation, bleeding, deformity or discharge should be present. Pregnancy can increase edema in nasal mucosa, which can result in nasal stuffiness or nosebleeds.

**Mouth:** Lips should be free of sores or lesions; color of lips, tongue and gums should be pink. Obvious dental problems or bleeding gums should be noted.

**Throat:** Using a wooden tongue blade and a good light source, inspect the inside of the mouth, including the buccal folds and under the tongue. Note any ulcers, white patches or other lesions.

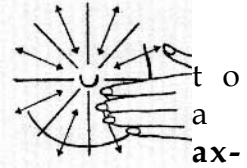


THYROID GLAND

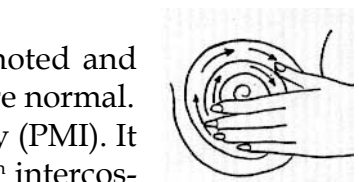
## CHEST AND LUNGS

**Chest** should be symmetrical with no retraction or bulging of intercostal spaces (ICS). On auscultation, lung sounds should be bilateral without rales, wheezes, rhonchi or other abnormal signs. Listen to all four quadrants of each lung. There should be no tenderness or deformity when palpating the ribs and sternum. The chest and diaphragm are percussed, and the location of the dullness sound is noted. During pregnancy the level of dullness goes up.

**Breasts** should be symmetrical in shape and size with no evidence of puckering or dimpling, nor should masses, lumps or hardness be felt. No redness or heat should be present. This is a good chance to demonstrate to a woman how to do a breast self-exam. Breasts should be examined in either circle or spoke pattern, making sure to examine the entire breast. Check **axillary area** for nodes or lumps. Discharge of milk or colostrum is normal.



SPOKE METHOD



CIRCLE METHOD

**Nipples** should appear normal without cracks, fissures or bleeding. Inverted nipples need to be noted and treated. Pigmentation changes, such as darkening are normal.

**Heart:** Auscultate for point of maximal intensity (PMI). It should be located left of midsternum in the 4<sup>th</sup> or 5<sup>th</sup> intercostal space. A diffused or enlarged PMI may indicate cardiac disease. Irregularities or skipped beats, murmurs, and palpitations should not be heard. The rate and rhythm should be normal.

Check underarm for lumps

RESPIRATORY EXERCISE		
Name	Define and Describe	Conditions in which it is seen
Rales		
Wheezing		
Rhonchi		
Fremitus		
Stridor		

## ABDOMEN

Note general appearance of abdomen. No dilated veins or increased pulsation should be present. Excessive pubic hair distribution over the abdomen may indicate Cushing's Syndrome or other abnormalities. On palpation, abdomen should be relaxed and not tender. Liver and spleen should not be able to be palpated past the costal margin nor be enlarged or tender. Bowel sounds should be heard on auscultation.

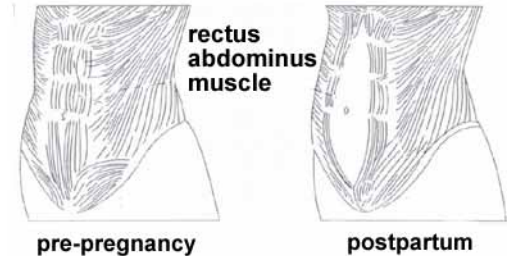
**Diastasis recti**, or the separation of the rectus abdominus muscles, needs to be noted. This can occur in late pregnancy or during birth. Have the client raise her head from a lying position, while you are feeling the muscles. If separated, note the degree.

Check for costovertebral angle (CVA) tenderness by firm percussion over the costovertebral angles.

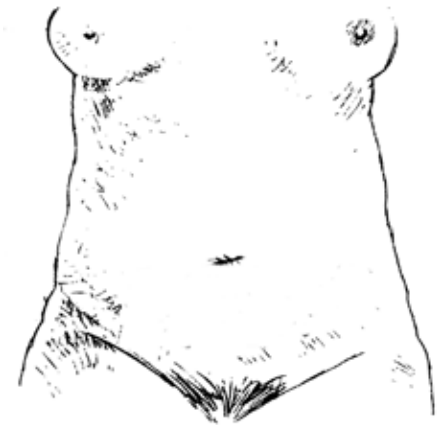
**Uterus:** Fundal size should be measured and noted.

After 20 weeks, the fundal height in centimeters and the gestation in weeks are approximately the same. **Fetal heart tone** should be counted and position noted.

**Fetal position** is palpated and charted.



### ABDOMEN EXERCISE



Condition	What it could signify in pregnancy
Enlarged liver	
CVA Tenderness	
Diminished bowel sounds	
Abdomen is tight, hard and tender	

**EXTREMITIES**

**Arms and hands** should be warm, with good pulses on both sides, without pain or deformities; edema of hands may be noted in late pregnancy. **Nail beds** should be pink; when pressed and blanched, it should take less than 2 to 3 seconds for capillary refill and for the nail beds to pink back up.

**Spine** should have normal spinal curves. **Backaches** are common during late pregnancy; however, no numbness, tingling or sciatic pain should be present.

**Legs and feet** should be warm with strong pulses on both sides. No discoloration or pallor should be evident. **Varicosities**, if present, should be noted. If **Edema** of ankles and feet is present, any pitting should be noted, as well as the degree 1+, 2+, 3+, which represents the depth of edema and how fast it returns, with 3+ being the most severe. **Reflexes** in both legs should be symmetrical and normal. Clonus should not be present.

Reflexes are graded on a 0 to 4 “plus” scale:

- a. 0: Absent
- b. 1+ or +: Hypoactive
- c. 2+ or ++: Normal
- d. 3+ or +++: Hyperactive without clonus
- e. 4+ or ++++: Hyperactive with clonus

**REFLEXES EXERCISE**

*Answer the following.*

1. Define clonus and describe how to check for it.
  
  
  
  
  
  
  
  
  
  
2. What can hyperreflexia signify in pregnancy?
  
  
  
  
  
  
  
  
  
  
3. In addition to the patella reflex, where are the other reflexes?
  
  
  
  
  
  
  
  
  
  
4. Describe in detail how to check reflexes.

## PELVIC EXAM

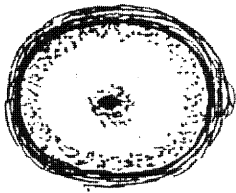
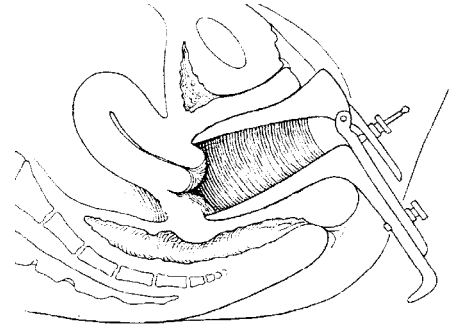
**Vulva** should appear pink and moist without lesions, swelling, warts, varicosities, inflammation, irritation or infection. Vestibular glands should not be inflamed.

**Vagina** should be pink, dark pink or purplish bluish in color. **Vaginal discharge** should be thin or mucoid, colorless or cloudy, nonirritating, with no itch or burning reported. There should be no bulging into the anterior wall of the vagina (*cystocele*) or the posterior wall (*rectocele*). The **perineal tone** and elasticity should be noted. Old episiotomy scars may be present. Note **muscle tone** while the woman tightens her vaginal muscles (*Kegel*).

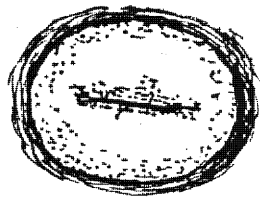
**Cervix** should be pink or bluish in color (*Chadwick's Sign*), soft and enlarged. The os may be slightly dilated. Note lesions, polyps or red spots on or around cervix, or white patches on cervix, or mucosa. **STD screening** could be done at this time if needed. **PAP smears** are often done at the six week visit, but some practices do them in early pregnancy. You should both **observe** the client's face and **ask her** if the examination is painful in any way. Your ability to palpate the uterus and ovaries will depend on her anatomy, the size of your hands and your level of skill.

**Ovaries** should not be tender. No masses should be felt.

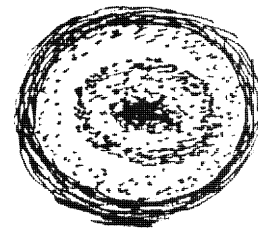
**Anus and rectum:** No lumps, rashes, tenderness. Hemorrhoids are noted.



NULLIPAROUS  
CERVIX



PAROUS  
CERVIX



CERVICAL EROSION



ANTEFLEXED



RETROFLEXED



MIDPOSITION

## Uterine Positions

## PELVIC EXERCISE

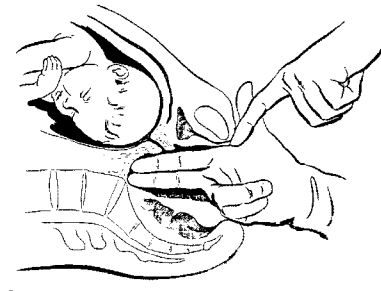
Answer the following:

1. When communicating with a woman during a pelvic exam, how are you going to make her feel more comfortable?
2. Describe the step-by-step procedure in doing a pelvic exam.
3. Describe how to examine the following body parts during a pelvic exam:
  - a. External genitalia.
  - b. Vestibular glands.
  - c. Urethra.
  - d. Paraurethral glands.
4. Describe cystocele and rectocele. What are the signs and symptoms? When may they occur? What are the midwifery implications?
5. List the conditions a Pap smear can diagnose.
6. When are pap smears recommended during pregnancy, and when are they not recommended?
7. Explain the meaning of an abnormal pap smear with the following terms:
  - a. CIN:
  - b. CIS:
  - c. SIL:
  - d. HPV:
8. Describe the steps in doing a Pap smear.
9. Describe follow-up, referral, and counseling for the abnormal Pap smear.

## PELVIMETRY

Pelvimetry, or the measuring of the pelvis by hand through the vagina, is becoming a lost art. Ultrasound and trial of labor has largely substituted the need for knowing exact pelvic measurements. However, midwives have long recognized the value of pelvimetry. By understanding how each woman's pelvis is shaped, a midwife can assess the progress of labor and make recommendations specifically for her.

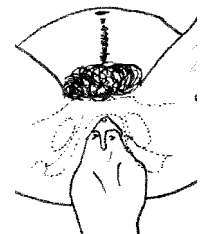
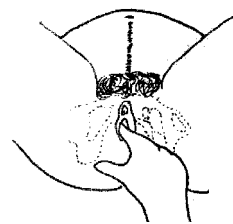
To measure the pelvis by hand, one must know the pelvis and its normal dimensions, be taught by an experienced practitioner, and do it often enough to keep in practice. Years ago, one used obstetric calipers or a pelvimeter to measure distance. It is now simpler and easier to just measure your own hand in centimeters. Start by measuring the width of your fist, then the distance between the bottom of your thumb and the tip of your forefinger, and then stretch the forefinger and the middle finger and measure that distance.



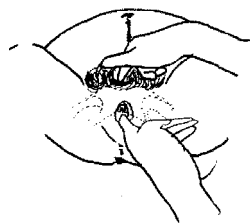
1. Start by gently inserting your gloved 1st and 2nd fingers into the vagina. With your fingers, find the sacrum and follow it up until you find the sacral promontory. Measure the distance between the underside of the symphysis pubis to the sacral promontory. Your finger should just barely reach it. It is called the **DIAGONAL CONJUGATE** and it should measure **11.5 cm**. This measures the pelvic inlet. The distance from the upper side of the symphysis pubis to the sacral promontory is the true conjugate and is 12.5 cm. Since we cannot reach it vaginally, use the diagonal conjugate to estimate.

2. Slightly withdraw your finger, moving it against the side walls of the vagina until you locate the ischial spines. On each side, the distance should be greater than **10.5 cm**. This is called the **INTERSPINOUS** or bispinous diameter.

This measures the midpelvis. Note if the spines are sharp

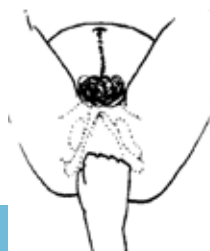
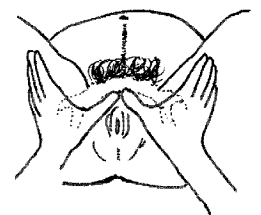


or blunt.



3. Palpate up the coccyx to where it joins the sacrum – the sacrococcygeal joint. The distance between that and the lower edge of the symphysis pubis is the **OB. FRONT TO BACK DIAMETER** and should be **11.5 cm**. This measures the outlet. Also, check for movability of the coccyx, length and curve of the sacrum, tightness, rigidity, or pain.

4. As you withdraw your finger, feel upwards and measure the **PUBIC ARCH**. It should be at a 90-degree angle. This is part of the outlet as well.



5. After your fingers are out, make a fist with your hand and place it on the outside of the vagina between the two ischial tuberosities. This measures the **BITUBEROUS DIAMETER**, which should be greater than **10.5 cm**. Your fist should fit easily between the two bones. This is the final part of the outlet.

## PELVIMETRY EXERCISE

1. Why is measuring the pelvis by hand important for midwives to do?
2. What will you change as the results of what you discover in pelvimetry?
3. What is the normal diameter of the diagonal conjugate? \_\_\_\_\_ And what does it measure?
4. What is the normal diameter of the interspinus diameter? \_\_\_\_\_ And what does it measure?
5. What additional qualities do you look for in the ischial spines?
6. What is the normal diameter of the OB. front to back diameter? \_\_\_\_\_ And what does it measure?
7. What is the normal angle of the pubic arch? \_\_\_\_\_ And what does it measure?
8. What is the normal diameter of the Bituberous diameter? \_\_\_\_\_ And what does it measure?



## PRENATAL EXAM SKILLS

### TAKING VITAL SIGNS

**Temperature** - Body temperature can be measured in several ways:

1. Oral, with a glass, paper or electronic thermometer: Normal 98.6 F or 37 C.
  2. Axillary, with a glass or electronic thermometer: Normal 97.6 F or 36.3 C.
  3. Rectal or "core," with a glass or electronic thermometer: Normal 99.6 F or 37.7 C.
  4. Ear or forehead electronic thermometer: Normal 99.6 F or 37.7 C.
- Of these, axillary is the least accurate, and rectal is the most accurate.

**Pulse** - Count the pulse for 15 seconds, multiply by 4, and record. Count for a full minute if the pulse is irregular, and record the number of irregularities, if possible, per minute. Record both the rate and rhythm.

1. Sit or stand facing your client.
2. Grasp her wrists with your free (non-watch-bearing) hand, client's right with your right or client's left with your left.
3. Compress the radial artery with your index and middle fingers, or all three middle fingers, with the middle finger just inward from the bony bump just before the wrist joint.
4. Note whether the pulse is regular or irregular:
  - a. Regular: Evenly spaced beats; may vary slightly with respiration.
  - b. Regularly Irregular: Regular pattern overall with "skipped" beats.
  - c. Irregularly Irregular: Chaotic, no pattern, very difficult to measure rate accurately.



The normal adult heart rate is between 60 and 100 beats per minute (bpm). A pulse greater than 100 beats per minute is tachycardia. A pulse less than 60 beats per minute is bradycardia. Tachycardia and bradycardia are not necessarily abnormal. Athletes tend to be bradycardic at rest. Tachycardia is a normal response to stress or exercise.

**Respiration** - This is best done immediately after taking the pulse. Do not announce that you are measuring respirations, but do so silently while the wrist is held as if continuing to take the pulse. Thus, the client tends to be distracted and does not unconsciously or consciously interfere with her natural breathing.

Count breaths for 15 seconds and multiply this number by 4 to yield the breaths per minute. In adults, normal resting respiratory rate is between 14-20 breaths per minute. Rapid respiration is tachypnea.

#### TPR EXERCISE

Take the Temperature, Pulse, and Respirations of three people and record here.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

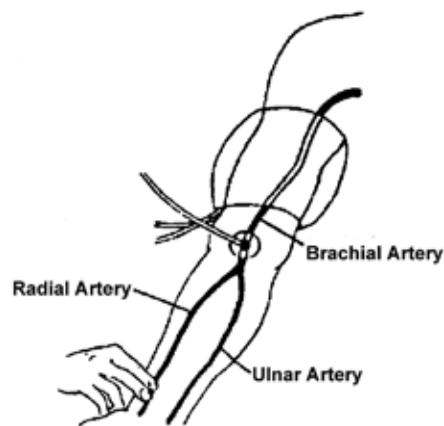
## BLOOD PRESSURE

**Blood pressure (BP)** - Measures the pressure exerted by the blood upon the blood vessels. It tests the effort the heart makes to circulate blood. There are two readings. The upper number, the systolic, pertains to the systole or contraction of the heart. The lower number is the diastolic, or the period of relaxation between the systole of the heart.

In order to take a blood pressure, you need a good quality BP cuff and stethoscope. Make sure you use the right size BP cuff; women over 200 lbs. need a larger size cuff, and children or very small women need a smaller size. A cuff that is too small may result in an inaccurately high reading; a cuff that is too large may result in an inaccurately low reading.

Arterial blood pressure is easily affected by maternal position; therefore, it is important to always test the woman's BP in the same position and from the same arm at each visit. It is best to test a pregnant woman's BP from the sitting position, or when she is lying on her left side. If the BP is taken with a woman supine, particularly the last trimester, inaccurate readings may take place due to the weight of the uterus on the maternal vena cava.

1. Position client's arm so that the antecubital fold is level with the heart and slightly flexed at the elbow.
2. Support her arm with your arm or a bedside table.
3. Center the bladder of the cuff over the brachial artery approximately 2 cm above the antecubital fold, with the gauge facing the inside of the arm; place the stethoscope at the crook of the arm over the brachial artery.
2. Gently pump up the cuff until the gauge reads about 160 or so, or about 30 beats higher than you estimate.
3. Slowly release the air valve, listening with the stethoscope for the first time you hear the beat; look at the gauge reading noting the number, then listen and note the last time you hear the beat.
4. The first beat you hear is the systolic reading. The last is the diastolic; i.e., 110/70.



### Blood Pressure Classification

Normal Range 90/60 - 140/90

Mild Hypertension: 140-159/90-99 (taken on more than one occasion)

Moderate Hypertension: 160-179/100-109

Severe Hypertension: 180-209/110-119

Crisis Hypertension: 210+/120+

### BP EXERCISE

Take the blood pressure of four different people and record here.

1. \_\_\_\_\_/\_\_\_\_\_

2. \_\_\_\_\_/\_\_\_\_\_

3. \_\_\_\_\_/\_\_\_\_\_

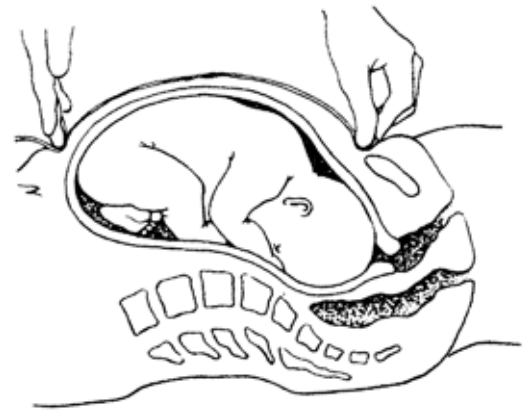
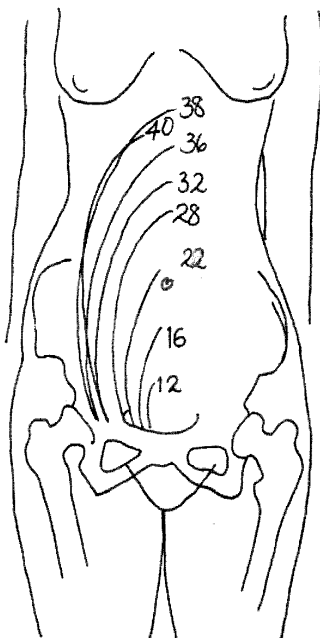
4. \_\_\_\_\_/\_\_\_\_\_



## MEASURING FUNDAL HEIGHT

The fundus is usually measured with a standard cloth or vinyl measuring tape using centimeters. Some midwives use a disposable paper measuring tape and write on the tape itself, to give to the clients after delivery. Fundal height has also been measured using finger breadths above and below the umbilicus.

When using a measuring tape: place the beginning end at the midline of the superior border of the symphysis pubis. Stretch the tape across the abdomen to the top of the fundus, with the edge of the other hand firmly pressing down on the fundus. It is important that the woman lie relatively flat and at the same position each time. It is best to use the same examiner each time to assure consistency. A 1-2 cm difference between examiners is usual.



It is important that the woman lie relatively flat and at the same position each time. It is best to use the same examiner each time to assure consistency. A 1-2 cm difference between examiners is usual.

Between 18 and 36 weeks, fundal height in centimeters roughly corresponds to weeks of gestation (i.e., at 24 weeks, 24 cm is an average fundal height). Keep in mind that these are averages; they may vary.

Factors such as maternal weight, the pressure each examiner uses on the fundus, and differences in amount of amniotic fluid, fetal growth, and position all affect variances in fundal height. The important thing is to see a consistent growth pattern without a large sudden increase in fundal height.

The fundal height should increase *at least* one centimeter in two weeks or three centimeters in four weeks. It should *not* be more than two centimeters in two weeks or three centimeters in two weeks.

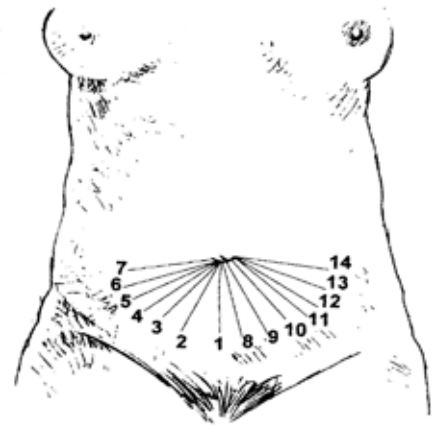
### FUNDAL HEIGHT EXERCISE

Fill in the blanks

1. The fundus is at the level of the symphysis pubis at \_\_\_\_\_ weeks.
2. The fundus is between the level of the symphysis pubis and the umbilicus at \_\_\_\_\_ weeks.
3. The fundus is at the level of the umbilicus at \_\_\_\_\_ weeks.
4. The fundus is between the level of the umbilicus and the xiphoid process at \_\_\_\_\_ weeks.
5. The fundus is at the level of the xiphoid process at \_\_\_\_\_ weeks.
6. List possible causes for an abnormally high fundal height:
7. List possible causes of abnormally low fundal height:

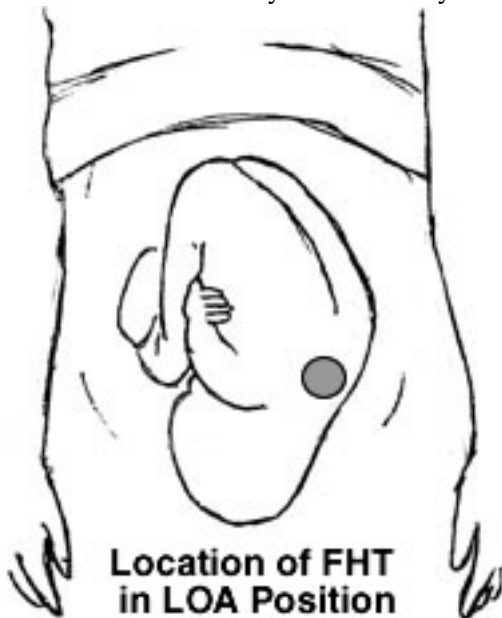
## HOW TO COUNT FETAL HEART TONES (FHT)

**10th through 16th week of pregnancy** – This early in pregnancy only a Doppler (ultrasound type fetoscope) can hear the fetal heart tone (FHT). If parents prefer not to use a Doppler, then unless there is bleeding, there is no need to hear the heart tone at this time. Start by applying a small amount of ultrasound jelly (KY Jelly will work in a pinch) on the Doppler. Place Doppler on the middle of the abdomen, at the upper border of the pubic hair. If no fetal heart tones are heard, slowly rotate the angle of Doppler up toward the umbilicus. Think of the ultrasound as a flashlight beam in the dark, searching for the FHT. Create a firm contact, but do not press hard, as that will interfere with the conductive property of the jelly. At this stage of pregnancy, fetal heart tones are rarely found far away from the midline.



**The 16th through the 24th weeks of pregnancy** – Either a Doppler or a manual type fetoscope will work, although it is difficult to hear the FHT prior to 18 weeks with most manual fetoscopes. Start searching a little above the pubic hairline, and again at midline. If you cannot hear it, move the fetoscope systematically over the abdomen like spokes of a wheel starting at the lower abdomen; move the fetoscope every 2 or 3 centimeters, listening until heard. If FHT is not heard in lower abdomen, repeat the process for upper abdomen.

**After the 24th week of pregnancy** – Start by palpating the maternal abdomen to determine the position of the fetus; locate the fetal back, as that is where the FHT is heard most easily and clearly. If you cannot easily identify the fetal back, place the fetoscope on the midline, halfway between the umbilicus and the upper border of the pubic hair. If nothing is heard, move systematically to the middle of each quadrant of the abdomen.



Once the fetal heart tones are located, count the beats for at least 15 seconds, multiply this number by four to get the number of beats per minute, and record your findings on the chart. Timing for 15 seconds is adequate in prenatal care, unless an irregularity is noted, or during labor, when the FHT should be taken for a full minute.

Changes may occur in the fetal heart rate while you are listening. A positive sign is an increase in heart rate with fetal movement. The gradual slowing of the fetal heart after fetal activity stops is a normal response to decreased activity. However, if you cannot associate the change in heart rate with changes in fetal movement, listen carefully for one minute each on two separate occasions. If still present, the woman should have a nonstress test with an electronic fetal monitor.

Occasionally, you may hear a “swooshing” sound while listening for fetal heart tones. This is known as the “uterine soufflé”; it is synchronous with the maternal pulse, and is produced by maternal blood coursing through enlarged uterine arteries. The maternal pulse may be mistaken for fetal heart tones, particularly when you are auscultating the lower abdomen. You should count the mother’s radial pulse when listening through the fetoscope, in order to differentiate between the two pulses.

## PALPATION OF THE FETUS

Palpation is a method of determining the fetal position. It can be highly accurate in the hands of a skilled and experienced practitioner. It is an art learned with experience and patience. There is a specific technique or method of palpating called *Leopold's Maneuvers*, used by many practitioners. This technique uses an organized approach to determining fetal position. Start by facing the woman's head on either side for the first three maneuvers, and turn towards her feet for the last maneuver. Be sure to have her lying on a relatively firm surface with her knees bent.

### 1. First maneuver:

- A. Place your hands on the sides of the fundus, and curve your fingers around the top of the fundus.
- B. Palpate for shape, size, consistency, and mobility.

### 2. Second maneuver:

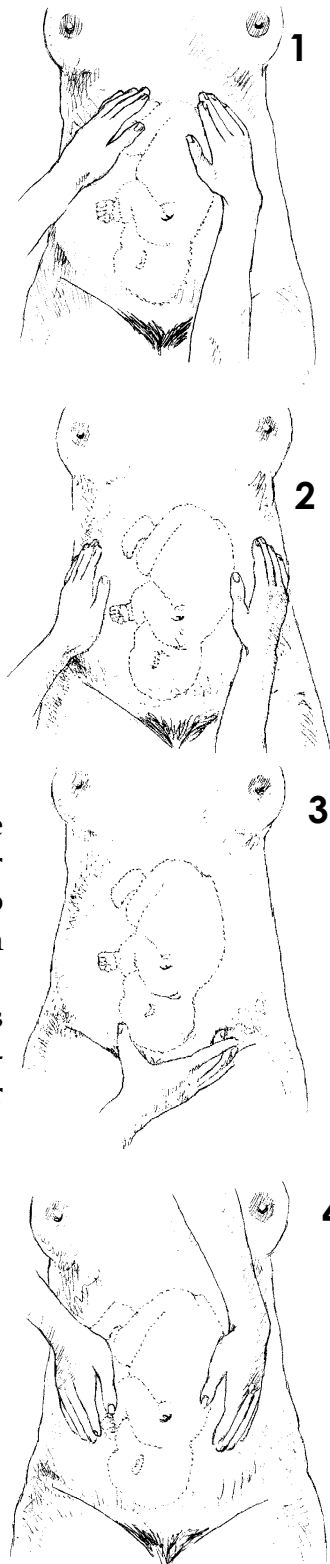
- A. Place your hands on both sides of the uterus, about midway between the symphysis pubis and the fundus.
- B. Apply pressure with one hand against the side of the uterus, thereby pushing the fetus to the other side of the abdomen and your examining hand, and stabilizing it there. Maintain this pressure while your examining hand palpates the other side of the uterus.
- C. Your examining hand palpates the entire area from the abdominal midline to the lateral side and from the symphysis pubis to the fundus. Use firm, smooth pressure and rotary movement.
- D. Reverse the procedure for examination of the other side of the uterus.

### 3. Third maneuver:

- A. Grasp the portion of the lower abdomen immediately above the symphysis pubis between the thumb and middle finger of one of your outstretched hands. It will be necessary to press gently but firmly into the abdomen in order to feel the presenting part below and between your thumb and finger.
- B. A movable mass will be felt if the presenting part is not engaged. As in the first maneuver, palpate for shape, size, consistency, and mobility in order to differentiate if it is the breech or head in the lower pole of the abdomen.

### 4. Fourth maneuver — Turn and face the woman's feet.

- A. Place your hands on the sides of the uterus with the palms of your hands just below the level of the umbilicus and your fingers directed towards the symphysis pubis.
- B. Press deeply with your fingertips into the lower abdomen and move them toward the pelvic inlet.
- C. In a breech presentation, or in a head presentation after you have palpated the cephalic prominence, your hands continue their movement toward the pelvic inlet. At the brim of the true pelvis, your hands will be unable to continue in this direction because the symphysis pubis prevents further movement.



## SUBSEQUENT PRENATAL EXAMS

EVERY VISIT SHOULD INCLUDE THE FOLLOWING:

1. **Present date and number of weeks gestation is charted.**
2. **Weight gain** – Normal weight gain throughout pregnancy varies for each individual. A total gain of 20-40 lbs. is normal range. 1st & 2nd trimester, 10-15 lbs.; 3rd trimester, 10-15 lbs. Sudden weight gain may indicate edema and consequently, preeclampsia, or poor nutrition (high in empty calories).
3. **Fundal height** – is measured by centimeter and should correspond with the weeks of gestation after 20 weeks. At 16 weeks, fundus should be halfway to umbilicus. A rapid rise of fundal height may indicate multiple pregnancy, polyhydramnios, hydatidiform mole, or a miscalculation of EDC. A rate that is too small or absence of growth may indicate intrauterine growth retardation (*IUGR*) or a miscalculation of EDC.
4. **Fetal heart rate (FHR)** – normal range 110-160 BPM; location of FHR is noted.
5. **Blood pressure (BP)** – normal range 90/60 to 140/90, or no greater than a 30<sub>s</sub>/20<sub>D</sub> mm hg rise above her normal. Proteinuria and edema need to be carefully monitored in all hypertensive women to screen for preeclampsia.
6. **Fetal position** – is checked by palpation, location of fetal kicks, position of PMI of FHT, and an internal exam when necessary.
7. **Position** – note "ceph" (cephalic) or vertex for head down or breech, etc. If early in pregnancy, draw line through box or write N/A for not applicable.
8. **Urine** – is checked. Protein, glucose, nitrites, blood, and leukocytes should all be negative or occasionally, a trace. (*See lab tests for more information.*)
9. **T.P.R.** – temperature, pulse, and respiration are checked routinely in some clinics (although usually, just pulse is checked regularly). Many only do TPR on initial visit or if indicated.
10. **Notes** – Ask if the following symptoms occur: bleeding, cramping, vaginal irritation, dizziness, fainting, visual disturbances, contractions, sciatic pain. Check for hyperreflexia if indicated.



Discussions about tests and procedures need to be charted. If a woman is non-compliant – not taking her vitamins, not quitting smoking, etc. – that needs to be charted. If a woman refuses a test or procedure, she should initial the documentation of refusal on the chart. SOAP notes are taken if any problems occur. As a helpful reminder, place in each client's chart a checkoff sheet of handouts or educational material she has been given or you have discussed.

### NORMAL RANGES EXERCISE

List the normal ranges in pregnancy for the following:

BP	____ to ____	Temp.	____ to ____
Pulse	____ to ____	Resp.	____ to ____
Hgb	____ to ____	Weight gain	____ to ____
Hct	____ to ____	FHR	____ to ____

## Prenatal Lab Tests

### Blood Work

When:	Test:	Normal Range:	Tests for:	
<b>H E M O G R A M</b>	Initial visit	Hg or Hgb - Hemoglobin	12-16	Oxygen carrying capacity of red blood cells; anemia.
		HCT - Hematocrit	37-47	RBC volume in a specific amount of blood; anemia.
		MCH - Mean Corpuscular Hemoglobin		26-34 Hemoglobin level of each red blood cell.
		MCHC - Mean Corpuscular Concentration		32-36 Concentration of hemoglobin in individual cell.
		Mean platelet volume	7.4-10.4	Response to hemorrhage, infection.
		Lymph percentage	24-44	Viral infections.
		Platelet count	150-440	Acute infection, hematologic pathology, clotting factor.
		Red cell distribution width	11.5-14.5	Change in RBC size and width.
		WBC - White blood cell count or Leukocytes	3.8-11.1	Infection (either bacterial or viral) aplastic anemia, other serious blood diseases.
		VDRL or RPL	nonreactive	Syphilis.
		Rubella Antibody Titer	immune/positive	Past Rubella (German Measles) exposure or vaccine
		ABO factor group	A, B, AB, O	Blood type.
		Rh factor		+ (positive) or - (negative) or Rh- Du+, Kell +
		Rh antibody titer	Negative or <8	see Rh.
		HBsAg	Negative	Hepatitis B.
		* HIV human immunodeficiency virus	Negative	Negative exposure to the virus that causes AIDS.
		* Toxoplasmosis	Negative	a protozoan infection from cat feces, raw meat.
	16-21 wks	AFP alphafetoprotein (Triple Marker)	Negative	neural tube defects, Down's Syndrome.
26-28 wks	*GST (glucose screening test)	<140-160		
		1 hr post dose	gestational diabetes.	
34-36 wks	repeat hct/hg or hemogram	<i>see hemogram</i>		
34-36 wks	repeat Rh antibody titers	Negative or <8	only in Rh - women.	

### Cervical/Vaginal Tests

When	Test	Normal	Tests for
initial visit	GC culture	negative	Gonorrhea.
	Chlamydia culture	negative	Chlamydia.
	Pap Smear (often done postpartum)	negative	Cervical cancer, also condyloma.
	* HSV (Herpes culture) if Hx	negative	Herpes infection.
	* Strep B (repeated at 36 wks)	negative	Presence of strep bacteria.
	* Wet mount/ KOH/ gram stain (some practices genital cultures instead)	negative	Yeast infections, trichomonas, bacterial vaginosis.

\* not done routinely in all practices

### Urinalysis:

When	Test	Normal	Tests for
Each visit	Protein	negative to trace	Preeclampsia, kidney dysfunction.
	Glucose	negative to trace	Diabetes.
	Nitrites	negative to trace	Urinary tract infections.
	Ketones	negative	Hypoglycemia, dehydration, ketosis.
	Bilirubin	negative	Liver dysfunction.
	Leukocytes	negative	Kidney or urinary tract infection.
	Blood	negative	Kidney or urinary tract infection.

LAB TESTS EXERCISE		
<i>Complete chart</i>		
<b>Condition</b>	<b>List Test(s) Used</b>	<b>Normal Range</b>
Anemia		
Gestational Diabetes		
Urinary Tract Infection		
Liver problems		
Preeclampsia (HELLP)		
Past Rubella exposure		
Fetal Neural Tube Defects		
Herpes		
Syphilis		
Gonorrhea		
Hepatitis exposure		
Bacterial Vaginosis		
RH Incompatibility		



PRENATAL BLOOD WORK EXERCISE

*Complete chart.*

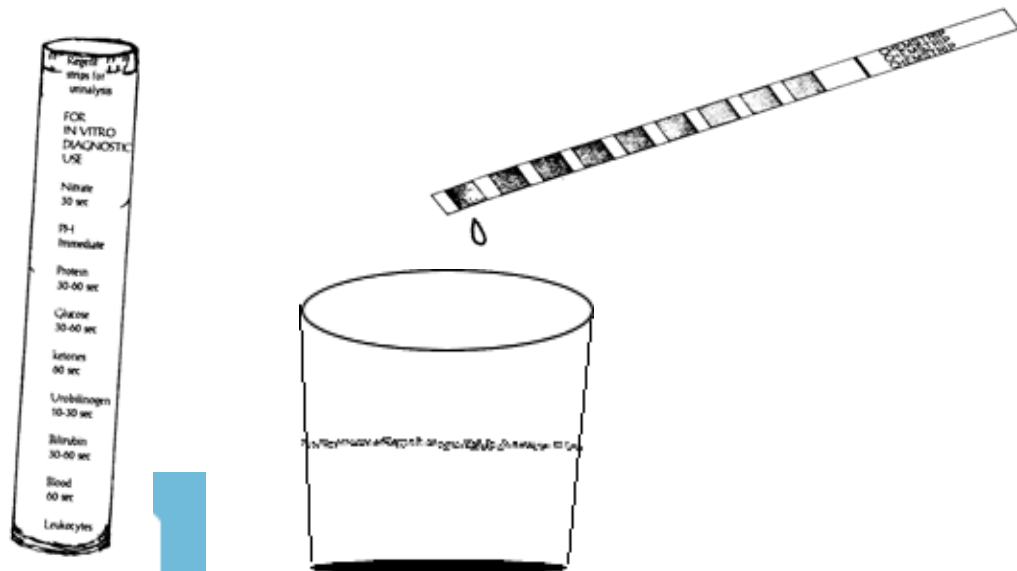
Name of Test	Description of what it measures	Rationale for prenatal testing	Normal Range in Pregnancy
Hemoglobin			
Hematocrit			
MCV (Mean Corpuscular Volume)			
MCH (Mean Corpuscular Hemoglobin)			
MCHC (Mean Corpuscular Concentration)			
Mean platelet volume			
Platelet count			
Red Cell distribution width			
White Blood Cell count			
Neutrophil count and percentage			
Lymphocyte count and percentage			
Monocyte count and percentage			
Eosinophil count and percentage			

PRENATAL BLOOD WORK EXERCISE PART 2			
<i>Complete chart.</i>			
Name of Test	Description of what it measures	Rationale for prenatal testing	Normal Range in Pregnancy
Basophil count and percentage			
VDRL or RPL			
Rubella Antibody Titer			
ABO factor group			
Rh factor			
Rh Antibody Titer			
HBsAg			
HIV Antibody screening			
Toxoplasmosis			
Glucose Tolerance test or screen			

## URINE TESTING BY CHEMSTRIP

Testing the urine using urinary dip sticks or Chemstrips is pretty simple and should be done at each prenatal visit. While a one-time increase in any one value is often in the normal range, it may be an indication for further exploration or a careful recheck at the next visit. Inaccurate readings can result from improper timing of each test, out-of-date-strips, strips left with the lid off, or samples contaminated by vaginal secretions or an unsanitary urine cup. The color and smell of urine can indicate specific problems as well, such as concentrated urine as a sign of dehydration, or red or brown urine as a sign of bleeding or infection.

URINALYSIS BY CHEMSTRIP EXERCISE			
<i>Complete chart</i>			
Name of Test	Rationale for Prenatal Testing	Prenatal Range of Normal	Possible Causes of Abnormal Results
Protein			
Glucose			
pH			
Ketones			
Bilirubin			
Leukocytes			
Nitrates			
Blood			



## Lab Work Word Search

O M T R  
 W N T E H I  
 I Y X A O V Z K I O W F R E  
 X H P M Y L S C B T X H H C S  
 A L P H A F E T O P R O T E I N  
 W S M I E W C E N R I P W M D V  
 R L X L S M L L D X T L E O N  
 Z U P I O A A E Y G E A E G L  
 B S C E X T L O S S T L  
 Q E U N Z A O T L M T O N  
 S S N L V H L M C A O E B S R  
 M F O G L D P A U R S G I Z W  
 M A T Y C A T E C I P N P R  
 E E B Y K Q S T M N  
 K E Z X D W

- test for neural tube defects, down's syndrome
- virus found after a pap smear
- high amounts, persistently may indicate gestational diabetes
- red blood cell volume in a specific amount of blood
- oxygen carrying capacity of red blood cells; anemia
- found in the urine may indicate dehydration
- if high can indicate a viral infection
- found in urine can indicate infection
- can affect clotting factors
- high amounts in urine can be indicative of preeclampsia or pih
- the german measles antibody titer test
- vdrl or rpl is another name for this test
- a protozoan infection from cat feces, or eating raw meat.

## BLOOD TYPES AND RH FACTOR

There are four basic **types of blood** in humans:

- O** which occurs 46% of the time in white populations (universal donor).
- A** which occurs 41% of the time.
- B** which occurs 9% of the time.
- AB** which occurs 4% of the time (universal recipient).

Each letter refers to a specific antigen. Antigens are proteins which cause the formation of antibodies which serve to protect the body from invasions by foreign substances. Each major factor has specific antigens called agglutinogens or isoantigens. Blood type A has A isoantigens but lacks B isoantigens, therefore A recognizes B as a foreign substance. (Type O lacks both isoantigens so then recognizes both A & B blood as foreign. Type AB recognizes A, B, and O as compatible and is called the "universal recipient").

The **Rh Factor**, or Rhesus factor, is a specific antigen which coats the red blood cells. It is present in 85% of the white population (slightly lower for black populations). They are considered Rh+ (positive). The 15% of the population who do not have the antigen are Rh- (negative). If blood from an Rh+ person enters the blood stream of an Rh- person, then *isoimmunization* can occur. If an Rh- woman carries an Rh+ baby, minute amounts of blood can be exchanged during the birth, or sometimes, during pregnancy. If the father is Rh+ and if the baby is positive, the possibility exists for the Rh- mother's blood to attack an Rh+ baby's blood cells, causing jaundice or other serious *hemolytic* diseases. If the father's Rh type is also negative, the baby will be negative and no problems occur. Problems rarely occur during the first pregnancy. However, during each subsequent pregnancy (including miscarriages and abortions), the woman's body remembers the invaders, so the next time they come, the blood is prepared to meet the "enemy."

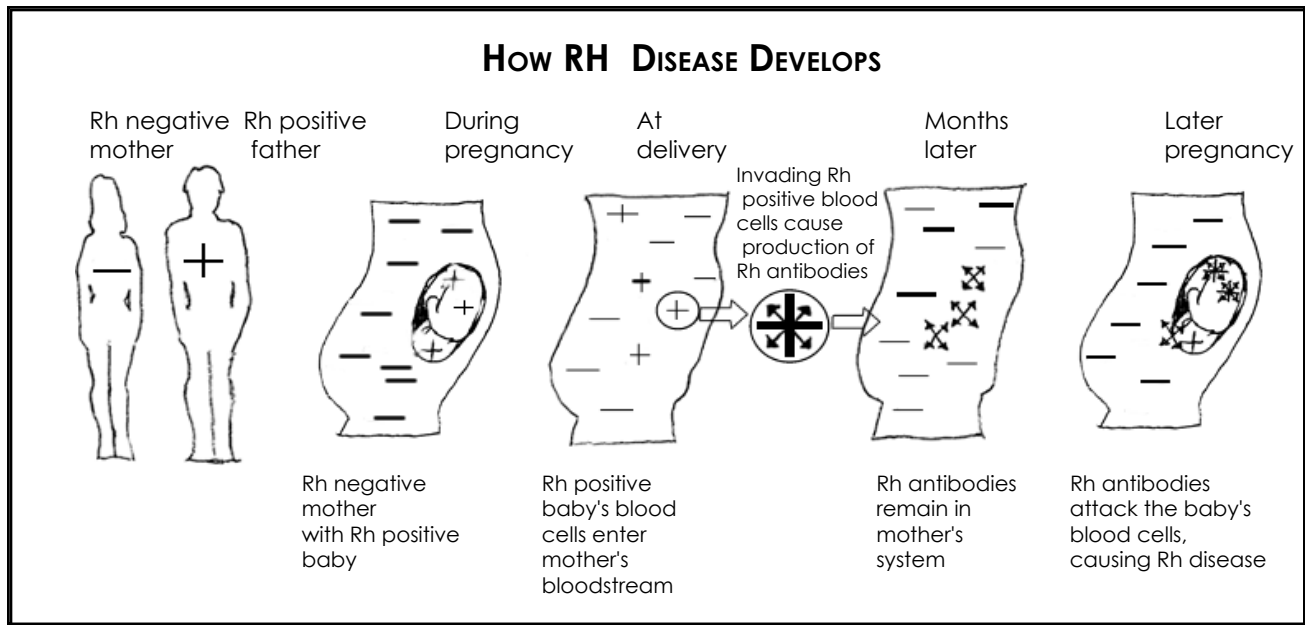


There are several forms of the Rh antigen and blood factors, including: **Du factor, Kell factor, C, & E**, as well as other rare subtypes. The DU factor is the most significant, as it provides stimulus to antibody formation in Rh negative people. If a woman is Rh negative but Du positive, she is rarely at risk for Rh isoimmunization problems, is not given Rhogam, and is considered the same as Rh+.

The **Kell group** consists of seven factors that are rarely present. 91% of the population is Kell factor negative; 9% is Kell factor positive. When Kell factor is positive, the babies can sensitize a Kell- mother in the same way as Rh sensitization occurs.

**Rhogam**, or Rh immune globulin, is a vaccine that is given to Rh- women within 72 hours of birth, miscarriage, or abortion. It contains anti-Rh antibodies, which will protect subsequent babies from problems. Many practitioners now give Rhogam antenatally at 28 weeks to protect those few babies in whom isoimmunization occurs during pregnancy.

**Indirect Coombs Test:** As a part of prenatal testing, this test is sometimes done on all mothers, although it is generally only done on Rh negative or Kell negative mothers. This test screens for minor blood factors and the presence of antibodies. Specifically this tests for the presence of the antibodies in the blood serum as opposed to the red blood cells. If positive, an Antibody ID test is done to determine the exact type and level of antibody in the blood. A **Direct Coombs** test checks for the presence of antibodies directly on the red blood cells. This could tell if the fetal red blood cells are being attacked.



**Rh antibody titer:** All Rh- women have Rh titer levels tested during their pregnancy to make sure that the Anti-Rh antibody levels are not rising which would cause problems for the baby. Other factors such as *anti-Kell* can also cause hemolytic problems to the baby, and rising antibody titers can spot this. If antenatal Rhogam is given, titer levels do not have to be continually monitored. Titer levels are done at 28, 32, 36, and 38 weeks. Low titers under 1:16 are not a problem. Over 1:16, they may cause problems and require intervention.

#### ABO INCOMPATIBILITY:

This condition is relatively common but only rarely causes problems. Infants with ABO incompatibility generally experience jaundice, which can range from mild, requiring no treatment, to severe, requiring phototherapy or blood transfusions. Rhogam or other treatments are not usually given if ABO incompatibility exists, although in some areas, all babies' cord blood samples are tested.

#### ABO incompatibility can occur if:

Mother is O, and baby is A or B

Mother is A, and baby is B or AB

Mother is B, and baby is A or AB.

O mothers with B babies have the highest risk of problems.

#### RH EXERCISE

*Rh and blood incompatibilities exist when:*

Mother is Rh\_\_\_ and father is Rh\_\_\_

Mother is type\_\_\_ and baby is\_\_\_\_\_

Mother is Rh\_\_Du\_\_and father is Rh\_\_\_

Mother is Kell factor\_\_\_and baby is Kell factor\_\_\_

## ANTENATAL DIAGNOSIS OR PRENATAL TESTING

The challenge for today's midwife is to be able to learn and keep up with the rapidly changing technological advances while still understanding and trusting in the natural birth process. As home birth midwives, we tend to be very conservative when it comes to embracing new tests and procedures, especially when they are recommended routinely for all women. Since so much of standard protocol is determined more by insurance companies than by medical research, it is difficult to decide what to recommend. But knowledge is power, and when we know as much as possible about current obstetric tests and protocols, we can present informed options to parents, allowing them to make educated choices.

### AFP (ALPHAFETOPROTEIN) TRIPLE SCREEN

Also known as Multiple Marker Screen, and Triple Marker. It is a maternal blood test that aids in the detection of birth defects in the baby, such as Down's Syndrome, open neural tube defects (which cause *spina bifida*), and other serious birth defects.

**Benefits:** It is relatively inexpensive and non-invasive. It picks up about 80% of neural tube defects and about 30% of Down's Syndrome. If it is positive, further tests may be done. If the fetus has problems, parents will have more time to plan and make choices. Parents may choose to terminate the pregnancy if the fetus will have serious birth defects.

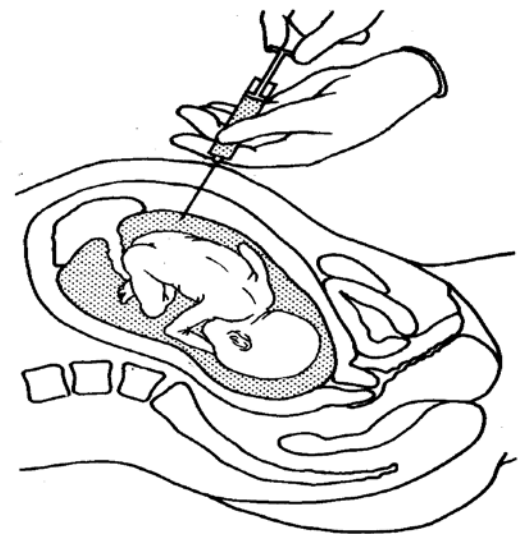
**Risks:** The test itself poses no risks to the mother or baby. There are quite a number of false positive results (5%-15%), which can cause undue stress on parents while they await the results of the second test. If the second test is positive, the next step for testing, amniocentesis, carries risk, expense, and frequently, still turns out negative. It is not done until the 16th or 21st week of pregnancy, so if it is positive, the parents are faced with the traumatic decision of whether to terminate the pregnancy at this stage.

### AMNIOCENTESIS

A sample of the amniotic fluid is withdrawn from the uterus with a long, thin needle through the mother's abdomen. It is done under ultrasound in the hospital. During the 1st trimester, it tests for genetic disorders, Down's Syndrome, and other birth defects. During the 2nd and 3rd trimesters, it is commonly done whenever premature delivery is expected in order to measure the maturity of the baby's lungs, or in high risk deliveries, where early delivery is desired.

**Benefits:** Highly accurate in diagnosing genetic abnormalities of the fetus, such as Down's Syndrome and other birth defects. Helps determine fetal lung maturity by using the L/S (Lecithin-sphingomyelin) ratio, the shake test (rapid surfactant test), and creatinine levels.

**Risks:** Small (< 2%) chance of perforation of the placenta or placental vessels, which may result in hemorrhage, fetal trauma, premature labor, premature rupture of membranes, maternal and fetal infection, or fetal death.



## BIOPHYSICAL PROFILE

Used primarily for very high risk pregnancies, the biophysical profile is a score given to a series of five separate tests. Each test is scored 0,1, or 2, with 2 being the highest, 1 being the midrange, and 0 being absent or deficient, bringing the total score up to 10 for a positive result. Scores of 0 to 5 can indicate a fetus at risk, which should be delivered as soon as possible.

BIOPHYSICAL PROFILE			
Test	2	1	0
NST	reactive	suspicious or inconclusive	nonreactive
Fetal Breathing Movements (FBM) on ultrasound	1 or more FBM lasting >30 sec. during 30 min. test	1 FBM lasting < 30 sec. during 30 min. test	no FBM
Gross fetal movements on ultrasound	> 3 body/limb movements during 30 min. test	2 or 3 body/limb movements during 30 min. test	< 2 body/limb movements during 30 min. test
Fetal tone & fetal flexion	> 1 episode of fetus actively extending & flexing	slow extension return to partial flexion	absence of withflexion
Quantity of amniotic fluid on ultrasound	> 1 pocket of fluid measuring at least 1 cm	little or < 1 pocket of fluid	no pockets or < 1 cm fluid

## CONTRACTION STRESS TEST (CST)

Indicated if the nonstress test is nonreactive, indicating fetal distress. It is also sometimes done in postmaturity past 42 weeks, in some high risk pregnancies at term, or if slow or decreased fetal movements are present. Uterine contractions are stimulated by nipple stimulation with a breast pump (BSST-Breast Stimulation Stress Test), or by an intravenous medication Pitocin (OCT-Oxytocin Challenge Test). The fetal heart rate is monitored electronically to determine how the fetus responds to the stress of contractions.

## NON-STRESS TEST

Tests fetal well-being by monitoring fetal heart rate and by evaluating the heart rate response to fetal movement. The FHR should rise with movement. Most accurate with an electronic fetal monitor, although it can be done at home or office with a Doppler fetoscope. Non-stress tests are commonly done for postmaturity past 41 or 42 weeks, for high risk pregnancies, or for slow or decreased fetal movements. A *reactive*, or positive test is one where fetal heart accelerates with fetal movement or abdominal palpation. A baby under stress would have a *nonreactive* or negative test because the fetal heart rate did not react or slowed as the result of stimuli. When this occurs, the baby is at significant risk, and delivery should take place as soon as possible. Sometimes a suspicious or inconclusive result occurs, which warrants a repeat test in 24 to 48 hours.

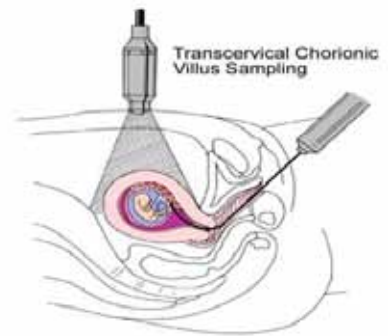


## CVS (CHORIONIC VILLI SAMPLING)

A biopsy (a sample of cells) is taken from the chorionic villi via the abdomen, and the cells are examined microscopically for genetic and other birth defects.

**Benefits:** Can be done as early as the 8th week, so if abnormalities exist and termination of pregnancy is chosen, the procedure is done earlier with fewer physical and emotional risks.

**Risks:** Slightly higher (<3%) risk of pregnancy loss than amniocentesis.



## FETAL MOVEMENT CHARTING

One method of determining fetal well-being is by counting fetal movements felt by the mother. In any three hour period there should be 10 or more movements. Fewer than 10 fetal movements in three or four hours indicates further testing. Useful for postdate pregnancies.

FETAL MOVEMENT CHARTING

	Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
<b>Date</b>							
<b>Start Time</b>							
<b>Time of 10th movement</b>							
<b>Date</b>							
<b>Start Time</b>							
<b>Time of 10th movement</b>							
<b>Date</b>							
<b>Start Time</b>							
<b>Time of 10th movement</b>							
<b>Date</b>							
<b>Start Time</b>							
<b>Time of 10th Movement</b>							

## GLUCOSE SCREENING TEST (GST)

Most medical practices in the US routinely give a Glucose Screening or Challenge Test between 24-28 weeks of pregnancy. This is a non-fasting test where 50 grams of a glucose drink are given, and after an hour, the blood is drawn. If the reading is higher than 160, then there is an indication for a Glucose Tolerance Test (GTT) to rule out Gestational Diabetes Mellitus (GDM).

GDM is a potentially serious condition that affects between 2 - 7% of pregnant women tested. GDM usually has no symptoms and is easily treated with diet alone in most cases. Women who develop diabetes during pregnancy often develop Type 2 Diabetes later on in life, so there is an additional long-term health benefit in screening.

Some practitioners only recommend screening women with risk factors; other practitioners do not recommend the screening test at all.

Risk factors for GDM include: women more than 50 lbs overweight; those with a history of large babies or unexplained still birth; women with a history of diabetes in their family; and women over age 35.

The main drawback to the test is there are often false positive results, which then require the GTT to further evaluate. In the past, women reported feeling nauseous from the glucose load, but since the glucose load was lowered to 50 grams, that problem has been eliminated.

## ULTRASOUND SCAN

A screening and diagnostic test using high frequency sound waves to “see” inside the uterus. Although ACOG has stated there is not evidence justify testing every woman during pregnancy with ultrasound, it is the defacto standard of care, with women often getting ultrasound at every prenatal visit. Midwifery clients usually use ultrasound only when indicated.

### Indications for ultrasound:

1. Unclear dates: If mother was nursing, had irregular periods, on oral contraceptives at the time of conception, or just forgot her LMP. The highest infant mortality rates are with premature and postmature babies; accurate dating is important in order to respond appropriately and prevent these problems. Ultrasound is most accurate at for determining due date when done by 12-16 weeks.
2. Bleeding: Accurate diagnosis of ectopic pregnancy, placenta previa, or abruptio, hydatidiform mole, threatened or missed abortions, and other disorders.
3. Malpresentation: Determines position of baby; i.e. breech, cephalic, transverse.
4. Suspected multiple pregnancy: Can tell how many fetuses and their positions.
5. Uterus large for gestational age: Tests for polyhydramnios (too much amniotic fluid), measures fetal size and gestational age.
6. Uterus small for gestational age: Tests for intrauterine growth retardation, oligohydramnios (too little fluid), and other fetal disorders.
7. Suspected congenital abnormalities: Many major congenital abnormalities are detectable with ultrasound and, in some cases, can be treated in utero.
8. Uterine abnormalities, tumors, fibroids: To diagnose and monitor growth of tumors.



**Disadvantages to ultrasound:** Primarily cost. Some parents choose a low technology birth, and although unproven some have concerns about possible long-term affects of ultrasound.

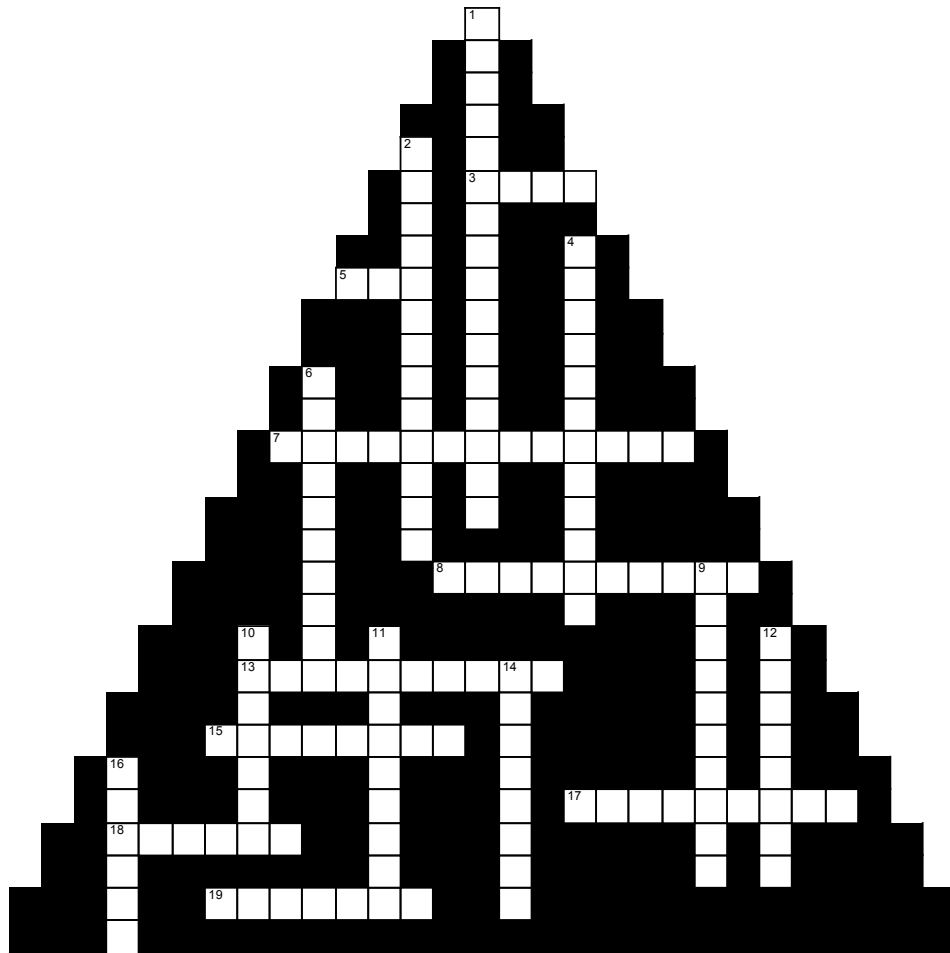
### ULTRASOUND EXERCISE

Answer the following:

1. List reasons why you would not recommend routine ultrasound to all woman in your practice.
2. List reasons why at least one ultrasound may be a good idea for low risk women.

ANTENATAL DIAGNOSIS EXERCISE		
<i>Complete chart.</i>		
Test	Indications/Benefits	Risks
CST/NST (contraction stress and non-stress tests)		
Gestational diabetes screening		
Ultrasound		
Fetal movement counting		
Maternal alpha-fetoprotein triple marker		
Amniocentesis		
Chorionic villi sampling		
Biophysical profile		
List other tests		

## Prenatal



## Across

3. Number of Leopold's maneuvers.
5. Test for cervical cancer.
7. A sample of the amniotic fluid is withdrawn from the uterus with a long, thin needle, through the mother's abdomen.
8. Amniotic fluid visualized through the cervix.
13. Used to diagnosis twins

15. Includes Hgb, Hct, WBC, & MCH.
17. The lower number of a blood pressure.
18. Vaccine given in cases of Rh compatibilities.
19. A detailed way of organizing chart notes.

## Down

1. A maternal blood test for neural tube defects.
2. A protozoan infection from cat feces, raw meat.

4. Sign of preeclampsia.
6. RBC volume in a specific amount of blood.
9. Measuring the pelvis.
10. Another name for German Measles.
11. Simple story telling form of charting.
12. The higher number of a blood pressure.
14. Found on urine dipsticks in cases of urinary tract infection.

16. Term used to describe the degree of skin resiliency.

## Self-Test

### True/False

1. \_\_\_ The liver is palpated in the upper left quadrant.
2. \_\_\_ When taking a blood pressure, you put the stethoscope over the radial artery.
3. \_\_\_ The first pulsation you hear while taking blood pressure is called the diastolic.
4. \_\_\_ A resting respiratory rate of 14 would be normal for an adult.
5. \_\_\_ The upper range of normal for adult blood pressures is 140/90.
6. \_\_\_ The space between the ischial tuberosities measures the pelvic outlet.
7. \_\_\_ An increase in the number of WBCs indicates anemia.
8. \_\_\_ Proteinuria is a sign of gestational diabetes.
9. \_\_\_ The true conjugate of the pelvis normally measures 11.5 cm. or more.
10. \_\_\_ The normal range of fetal heart tones is now considered to be 110-160.

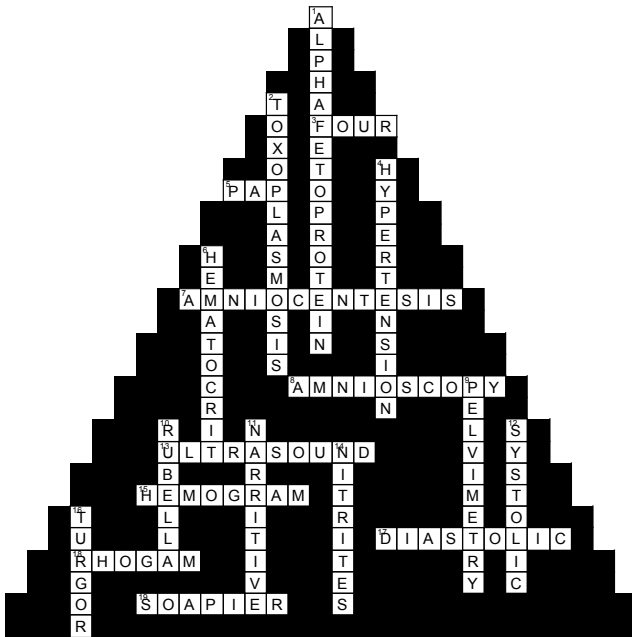
### Multiple Choice

11. When taking blood pressure, the client's arm should be:
  - A) Straightened and extended at a forty five degree angle.
  - B) Held up by the client, raised to heart level.
  - C) Dangling freely at the client's side.
  - D) Slightly bent at the elbow, while being supported in a slightly raised position.
  
12. The diastolic measurement assesses:
  - A) The amount of force with which the heart must beat during its contraction.
  - B) The pressure exerted on the blood vessel when the heart is contracted.
  - C) The pressure exerted on the blood vessel when the heart is relaxed.
  - D) The pressure exerted on the heart when the blood vessel is relaxed.
  
13. Which of the following are potentially at risk for Rh sensitization during this pregnancy?
  - A) Rh- mom having a baby with a Rh+ man.
  - B) Rh+ mom having a baby with a Rh- man.
  - C) Rh- mom having a baby with a Rh- man.
  - D) Rh+ mom having a baby with a Rh+ man.
  
14. A woman's fundal height will generally be at about the level of the umbilicus at:
  - A) 12 weeks.
  - B) 16 weeks.
  - C) 20 weeks.
  - D) 30 weeks.
  
15. Chlamydia is generally screened for by:
  - A) A blood test.
  - B) A visual inspection of the pertinent area.
  - C) A culture.
  - D) Taking a history to determine if the woman is at risk for it.
  
16. Which of the following lab tests are routinely repeated at every prenatal visit?
  - A) Culture for STDs.
  - B) Chemstrip urine analysis for glucose.
  - C) The hemoglobin level.
  - D) Fasting blood sugar.

### ANSWERS

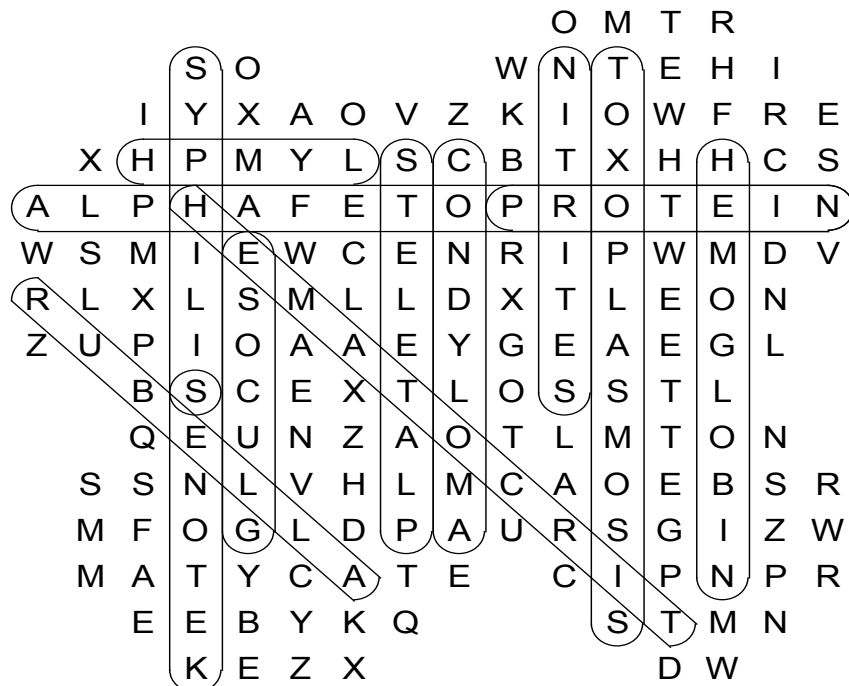
1. FALSE, 2. FALSE, 3. FALSE, 4. TRUE, 5. TRUE, 6. FALSE, 7. FALSE, 8. FALSE, 9. TRUE, 10. TRUE, 11. D, 12. C, 13. A, 14. C, 15. C, 16. B.

Prenatal



PUZZLE ANSWER KEY

Lab Work Word Search



# Chapter 10

## Normal Labor & Birth

### OBJECTIVES

*After completing this chapter, the student should be able to:*

1. List the "4 'P's" of labor, and explain how they influence the outcome of labor.
2. Identify and describe the four main pelvic types and their relevance.
3. Define the fetopelvic relationship, including the:
  - a. Bones of the fetal skull;
  - b. Station;
  - c. Engagement; and
  - d. Synclitism, posterior and anterior.
4. Describe the stages of labor and the mechanism of labor.
5. Describe the maternal and fetal physiological changes that occur during labor including:
  - a. Onset of labor and ways to distinguish true from false labor.
  - b. Length of labor and use of the partograph and other methods to determine normal.
6. Identify the types of fetal heart rate patterns and their significance.
7. Describe the care of the mother during normal labor and delivery at home.
8. Describe how to manage a normal delivery.
9. Describe how to prevent perineal tears.



## NORMAL LABOR

There are four factors that influence the outcome of labor ("The Four P's"):

1. The **PASSAGE** refers to the bony structure of the pelvis and the muscular structure of the pelvic region. Their size, shape, and condition will affect the length of labor, the stress placed on fetus and mother during labor, and the ease or pain of labor.

2. The **PASSENGER** refers to the fetus's position, presentation, size, and gestational age. For example, a larger or postdate baby usually takes longer to deliver than smaller or preterm babies.

3. The **POWERS** refers to the ability of the uterus to contract and the cervix to dilate, effectively expelling the fetus. This also reflects the mother's overall health condition and her position at delivery.

4. The **PSYCHE** refers to the mother's mental - emotional state, psychosocial, or cultural considerations. For example, fear and tension are well-known causes of prolonged labor.

The position is sometimes used as a fifth "P", but it is also part of powers.

### LABOR EXERCISE

Passage:

Passenger:

Powers:

Psyche:

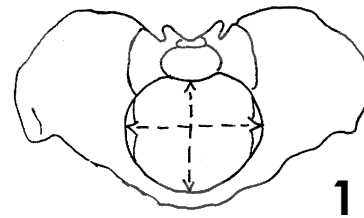


## THE PASSAGE

### PELVIC TYPES

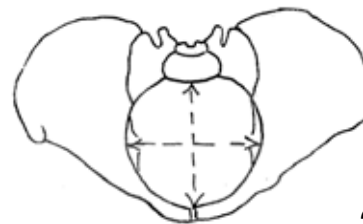
There are four main pelvic types, or variations, of the pelvis.

**1. GYNECOID** The normal female pelvis, with a round brim. It is ideally suited for giving birth. The most common type of pelvis.



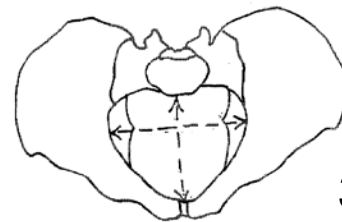
1

**2. ANTHROPOID** The brim is oval and narrow in the transverse. Labor prognosis is good if no other factors interfere. This type of pelvis can predispose women to persistent posterior position of the baby.



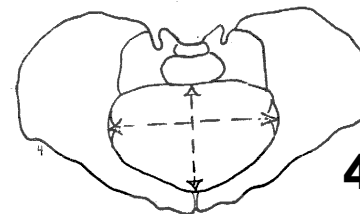
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**3. ANDROID** A male shaped pelvis with a heart-shaped brim. This type can present problems during birth.



3

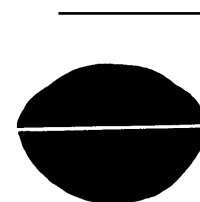
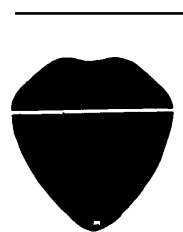
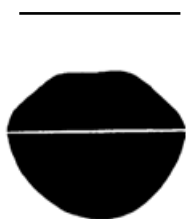
**4. FLAT PELVIS** Also called *platypelloid*, it is kidney-shaped with a flat brim. Some sources call this the most difficult type of pelvis for the fetus to pass through. Occurs rarely.



4

### PELVIC TYPE EXERCISE

Identify each pelvic type



### PELVIC TYPE EXERCISE

Answer the following:

1. If you ascertained that a woman had an android-type pelvis via pelvimetry at the initial prenatal visit during her first trimester, what would be your follow up?
  
2. What steps would you recommend to this woman during her pregnancy that may help her in labor?
  
3. During her labor, how would knowledge of her pelvis shape help you?
  
4. What fetal positions may she be more likely to experience?
  
5. What techniques would you use during labor to help her birth more easily?

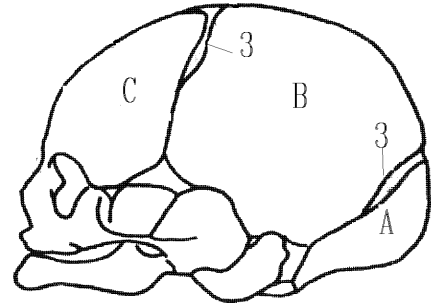
Complete the following diameters:

Diameters	Gynecoid	Anthropoid	Android	Flat
Diagonal Conjugate				
Bispinous				
OB Front to Back				
Pubic Arch				
Bituberous				

## THE PASSENGER

### FETAL SKULL

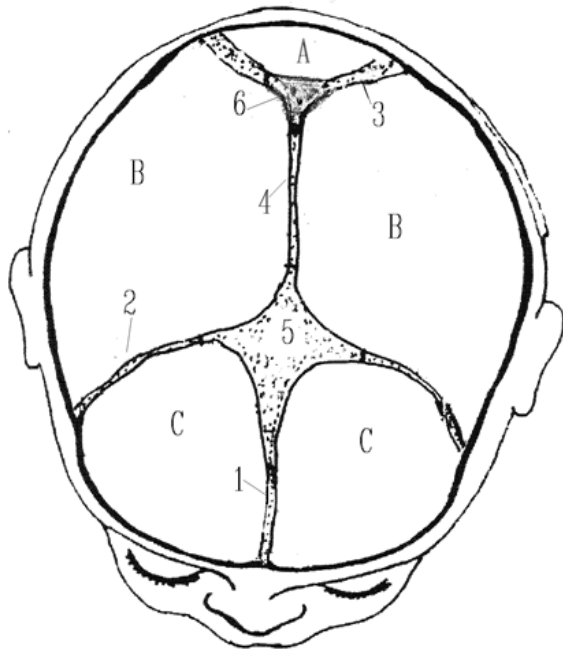
While there are many bones in the fetal skull, those relevant to the study of obstetrics are located in the vault of the skull. The bones are soft and joined by membranes so that they can overlap easily. The head molds as it descends through the pelvis, facilitating delivery. The pre-term infant's head molds more, while the post-term infant's skull is harder and can present more problems during birth.



There are five bones:

- A. One **OCCIPITAL** bone, which is located in the back of the skull;
- B. Two **PARIETAL** bones, which form the sides of the skull;
- C. Two **FRONTAL** bones, located anteriorly.

**Sutures** are membrane covered spaces between the bones. The sutures and the fontanelles can be used as landmarks to determine the position of the fetus in relation to the pelvis.



The four sutures are:

1. **FRONTAL SUTURE** – lies between the two frontal bones, and extends anteriorly from the sagittal suture.
2. **CORONAL SUTURE** – extends transversely from the anterior fontanelle, and lies between the parietal and frontal bones, crossing one temple to another.
3. **LAMBDOID SUTURE** – extends transversely from the posterior fontanelle and separates the occipital bone from the two parietal bones.
4. **SAGITTAL SUTURE** – lies between the two parietal bones and divides the skull into left and right halves.

**Fontanelles** are where two or more sutures meet. The relevant fontanelles are:

5. **ANTERIOR FONTANELLE** – also called *Bregma*, located at the junction of the sagittal, frontal and coronal sutures. It is diamond shaped and measures about 3x2 cm. It becomes ossified, or closes, at about eighteen months of age.
6. **POSTERIOR FONTANELLE** – or *Lambda*, is located where the sagittal suture meets the two lambdoid. It is much smaller than the anterior fontanelle. It is triangular shaped. This fontanelle closes at six to eight weeks after birth.

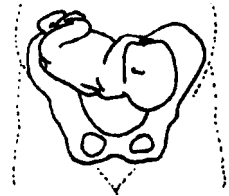
## FETOPELVIC RELATIONSHIP

Determining the relationship of the fetus to the uterus and pelvis will aid the midwife to understand normal birth, as well as to screen for high-risk births and for those at risk for prolonged labor. There are five terms used to define the fetopelvic relationship:

1. **LIE:** This is the relationship of the long axis of the fetus to the long axis of the mother. There are two lies:

- a. **LONGITUDINAL LIE** – This is the normal lie. It can be cephalic (head down), or breech (butt or feet down).
- b. **TRANSVERSE LIE** – The fetus lies sideways across the pelvis. Oblique lie occurs when the fetus lies at a slant.

### TRANSVERSE LIE

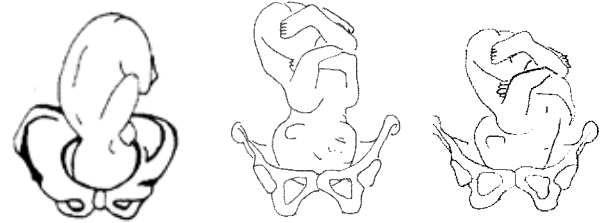


2. **PRESENTATION:** Refers to the part of the fetus which lies over the pelvic inlet.

The three primary presentations are:

- a. **CEPHALIC** – Head or cephalic, face or brow. Compound presentation is when a hand comes down with the head.
- b. **BREECH** – Complete, frank and footling. Can also be kneeling.
- c. **SHOULDER** – Arm or shoulder presenting first

### CEPHALIC PRESENTATION



HEAD

BROW

FACE

### BREECH PRESENTATION



COMPLETE

FRANK

FOOTLING

SHOULDER

COMPOUND

3. **ATTITUDE:** This is the relationship of the fetal parts to each other.

The two basic fetal attitudes are:

- a. **FLEXION** – the chin touches the chest, and the arms and legs are curled in front of the body.
- b. **EXTENSION** – the head is tilted back, with the occiput toward the back.

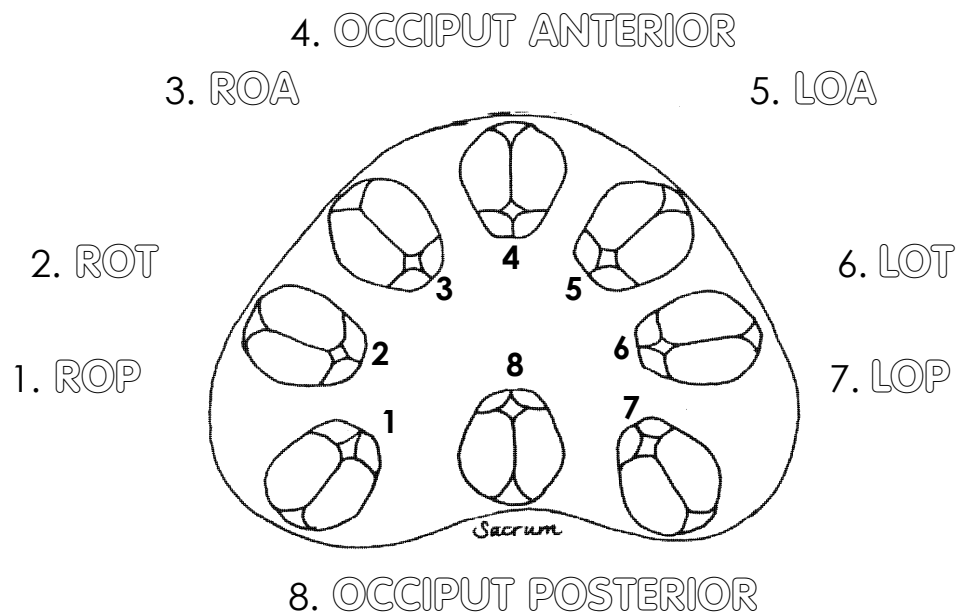
4. **DENOMINATOR:** A point on the fetus which is used as a landmark to determine position.

The various denominators are:

- a. Brow presentation – CHIN OR MENTUM
- b. Cephalic presentation – OCCIPUT
- c. Breech – SACRUM
- d. Shoulder or transverse lie – ACROMION PROCESS

5. **POSITION:** This is the relationship of the denominator of the presenting part to the front, back, and sides of the pelvis.

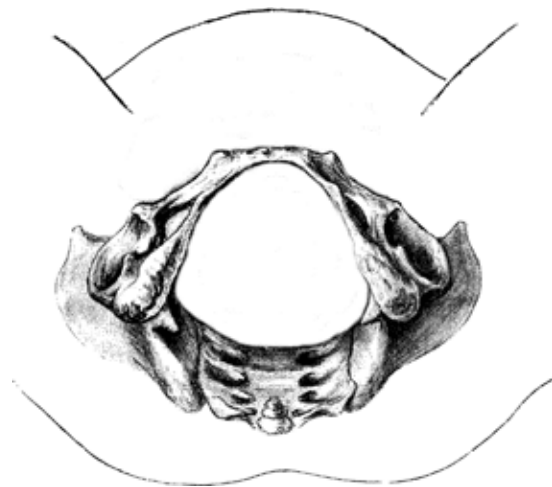
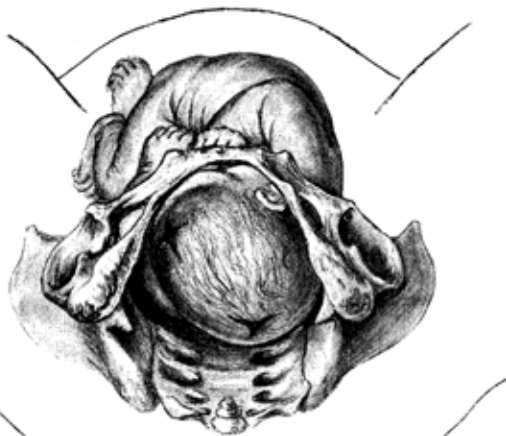
The positions of the fetus are: left occipital anterior (*LOA*); left occipital posterior (*LOP*); left occipital transverse (*LOT*); right occipital anterior (*ROA*); right occipital posterior (*ROP*); right occipital transverse (*ROT*). For breeches: left sacral anterior (*LSA*); left sacral posterior (*LSP*); left sacral transverse (*LST*); right sacral anterior (*RSA*); right sacral posterior (*RSP*); etc. In brow or face presentations it is left mentum anterior (*LMA*), etc. Some practitioners use the term "lateral" instead of "transverse," in order to avoid confusion with transverse lie. Therefore, *ROT* would be *ROL*, and so on. In shoulder or transverse positions, the term *dorsal* is used to refer to the fetal back. The position is designated as right acromion dorsal anterior (*RADA*), left acromion dorsal posterior (*LADP*), etc.



#### FETAL POSITION EXERCISE

What is the position of this baby?

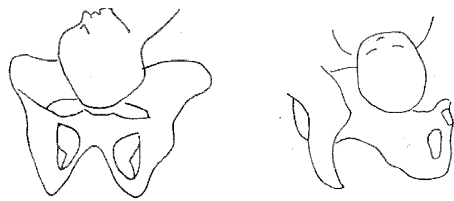
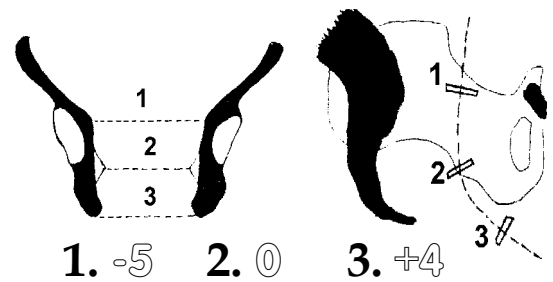
Draw the head in an ROA position



## STATION AND ENGAGEMENT

**Station** is the relationship of the presenting part to an imaginary line drawn between the ischial spines. When the presenting part is at the level of the spines, it is considered at 0 station. When it is 1 cm. above the spines, it is at -1 station. If it is 2 cm. above the level of the spines, it is -2 station. 3 cm. above is -3, 4 cm. above -4, and 5 cm. above is -5. When it is 1 cm. below the spine, it is +1 station; 2 cm. below, is +2 station; and 3 cm. below is +3 station. At 4 cm. below, it is +4 station, and the head is crowning. At +5 station, the head is out.

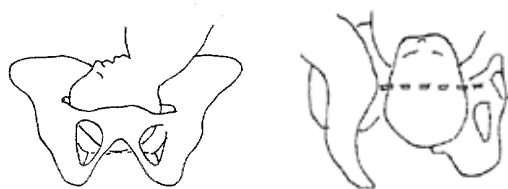
## STATION



FLOATING



DIPPING



FULLY ENGAGED

**Engagement** occurs when the widest diameter of the presenting part passes through the pelvic inlet. In the cephalic presentation, it is the biparietal diameter (between the two parietal bones). In the breech, it is the *intertrochanteric*, or between the two trochanters of the femur.

Engagement is also called “lightening,” due to the feeling of lightness the woman experiences when the head settles in the pelvis, making it easier to breathe and eat.

There is a relationship between the station of the fetal head and labor. A high head, -2 or above, may indicate disproportion or other abnormalities if seen during labor or at term with a primipara. The lower the head is in the pelvis, the shorter the labor may be. A primipara who is in labor with a baby in a high position may have a long labor and possible C.P.D.

If the presenting part is entirely out of the pelvis, it is called **floating**. If the presenting part passes through the pelvic inlet but is not engaged, it is called **dipping**. When the widest portion of the presenting part is at or below the level of the ischial spines (0 station), it is considered **fully engaged**.

## ENGAGEMENT EXERCISE

Answer the following:

1. When does “lightening” usually take place: For a primigravida at: \_\_\_ weeks;  
For a multipara at: \_\_\_ weeks.
2. What signs of “lightening” would the woman experience?
3. How could the midwife tell if the baby is:

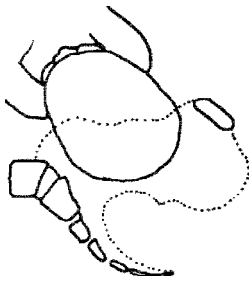
Floating:

Dipping:

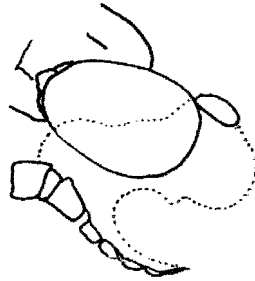
Fully Engaged:

## SYNCLITISM AND ASYNCLITISM

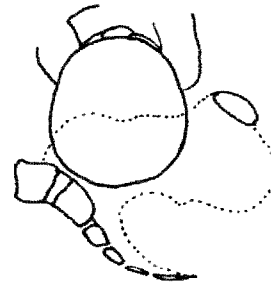
When the biparietal diameter of the fetal head is parallel to the plane of the pelvic inlet, the head is in *synclitism* which occurs when the pelvis is roomy. Both of the parietal eminences enter the pelvis at the same time, and it generally occurs with the multipara. If when it enters it is not parallel, it is called *asynclitism*. Usually, one side of the head enters at a time. If the posterior parietal bone enters first, this is posterior asynclitism, and it is normal for the primipara or those with good uterine tone. *Anterior asynclitism* occurs when the anterior parietal bones enter the pelvis first. This happens if the uterus and abdomen are pendulous.



SYNCLITISM



POSTERIOR  
ASYNCLITISM



ANTERIOR  
ASYNCLITISM

### PELVIC TYPES EXERCISE

Draw the four pelvic types.

**GYNECOID**

**ANTHROPOID**

**ANDROID**

**FLAT PELVIS**

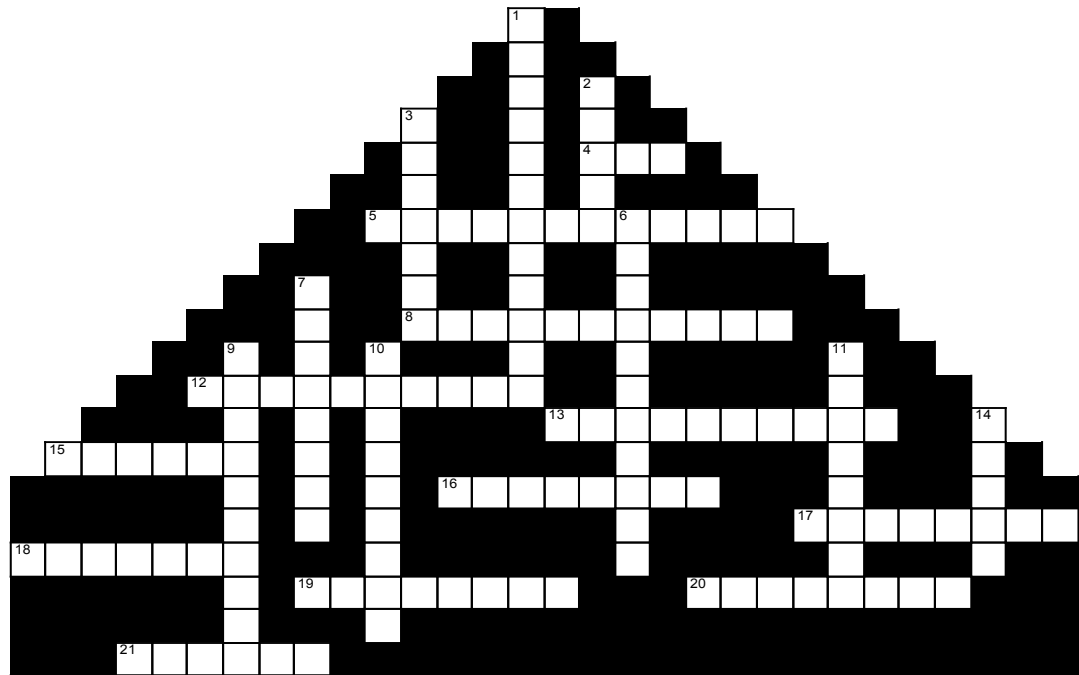
## Fetal Skull Word Search

Z  
 G O K  
 C U S F M  
 G P V L P Z H  
 I Y X L O O Z I J  
 Y L S G Y M S H N C  
 G V P A R I E T A L O  
 B R E G M A Z E F C R  
 Q O K I V B V R C I O  
 U O R T F V D I P Q N  
 L C L T S T P O C X A  
 H U S A R I B R I D L  
 G D N L T K W X W D W  
 P H A X N D W B S X  
 L J Z J O K L L I  
 Z S N L R J C  
 L H M I F

1. another name for the anterior fontanel.
2. suture that extends transversely from the anterior fontanelle and lies between the parietal and frontal bones
3. two bones located anteriorly on the skull
4. suture that extends transversely from the posterior fontanelle and separates the occipital bone from the two parietal bones.
5. bone located in the back of the skull
6. two bones which form the sides of the skull
7. fontanel located where the sagittal suture meets the two lambdoid.
8. suture that lies between the two parietal bones and divides the skull into left and right halves.



## Feto-Pelvic relationship



### Across

4. The relationship of the long axis of the fetus to the long axis of the mother.
5. Term used to designate that part of the fetus nearest the internal os
8. A point on the fetus which is used as a landmark to determine position.
12. Pelvic type where brim is oval and narrow in the transverse.
13. The mother's first perception of the movements of the fetus.
15. The point on the surface of the skull at the junction of the coronal and sagittal sutures.
16. An outward extension of the spine of the scapula

17. The situation of the fetus in the pelvis; determined by the relation of some arbitrarily chosen portion of the fetus to the right or left side of the
18. The posterior and inferior bone of the pelvis
19. The relation of the fetal members to each other in the uterus
20. The suture between the occipital and two parietal bones.
21. The chin.

### Down

1. A kidney-shaped pelvis with a flat brim.
2. The upper limit of the pelvic cavity (brim).
3. A male shaped pelvis with a heart-shaped brim. This type can present problems during birth.

6. When one of the parietal eminences enter the pelvis first
7. Belonging to the head.
9. In obstetrics, applies to the entrance of the presenting part into the superior pelvic strait and the beginning of the descent through the pelvic cana
10. The anteroposterior diameter of the pelvic inlet.
11. The normal female pelvis, with a round brim
14. Belonging to the pubis.

## THE POWERS

### MATERNAL PHYSIOLOGICAL RESPONSES TO LABOR

**Cardiovascular System:** There is a 31% increase in cardiac output. With each contraction, a large volume of blood from the placental lake is forced back into the maternal system (300-500 ml of blood per contraction). Blood pressure, pulse pressure, and mean venous pressure increase with contractions. During second stage (pushing), cardiac output can increase 40%.

**Gastrointestinal System:** Labor often begins with diarrhea as the GI motility increases. However digestion slows during labor, decreasing the absorption of food. Food eaten during first stage may be vomited later during transition. Dehydration, hypoglycemia and/or ketosis may occur in prolonged labor when preventive measures are not taken. The metabolic rate increases in order to feed large working muscles of the uterus, which leads to slightly increased body temperature.

**Respiratory System:** The respiratory rate increases as the mother breathes with her contractions, increasing the oxygen consumption up to 40% in early labor, and up to 100% in second stage. Hyperventilation can occur when breathing is too rapid.

**Renal System:** The intensity of the contractions may mask the sensation of needing to urinate, causing the bladder to become distended. Proteinuria up to +2 may occur as a result of the muscle breakdown from exercise.

**Musculo-Skeletal System:** Muscle spasms and leg cramps may occur during labor due to increased need for calcium or an electrolyte imbalance.

**Endocrine System:** Placental corticotropin-releasing hormone (CRH) triggers production of placental estrogen and prostaglandins, which increase myometrial contractility. Progesterone levels fall. Increased placental estrogen allows the increased levels of oxytocin to be utilized. There is an increase of corticotropin (ACTH) and cortisol before, during, and after delivery.

### FETAL PHYSIOLOGICAL RESPONSE TO LABOR

There is an important interplay between the fetal and maternal endocrine systems that affect labor. The fetal hypothalamus and pituitary increases cortisol secretion from fetal adrenal glands, as well as other endocrine changes. These endocrine changes influence the production of oxytocin and other labor hormones.

As labor progresses, there is a decrease in blood flow by constriction of the arterial blood supply due to the force of the uterine contractions. With each contraction, blood flow from the mother to the baby ceases for a few seconds as the uterine myometrial veins are compressed. The fetal blood pressure maintains a protective mechanism of continuing to exchange gases and nutrients during short periods, even when oxygen and blood flow are reduced. As the blood flow is reduced, the fetal blood acid-base balance is altered. A slow decrease in the fetal pH occurs in the first stage of labor, decreasing more rapidly in second stage. Normal pH values are at or above 7.25.

If the water has broken, the lack of amniotic fluid and general fluid pressure reduces placental circulation and increases cord and head compression. Thickening of the upper uterine segment reduces placental size, decreasing placenta circulation and oxygenation to the fetus.

The fetal heart rate decelerates periodically as a result of intracranial pressure. Also called "early decelerations," the FHR drops an average of 20-60 BPM early in the contraction, rapidly rebounding to its baseline. This type of deceleration is normal.

PHYSIOLOGY OF LABOR EXERCISE		
<i>Complete the following regarding maternal responses to labor:</i>		
System	Expected change	Physiological Rationale
Cardiovascular		
Respiratory		
Renal		
Gastrointestinal		
Endocrine		

## BEFORE LABOR BEGINS

There are several signs that may occur either immediately prior to labor, or sometimes days or weeks beforehand:

1. **Engagement, or “lightening,”** usually occurs two or three weeks prior to term in the primipara, and at any time for the multipara.
2. **Vaginal discharge or secretions increase,** although burning, itching, or painful discharge is abnormal and should be investigated.
3. **The cervix becomes soft and effaced** and may become dilated. Multiparous woman may be dilated several centimeters prior to labor.
4. **Persistent backache,** particularly in the lower back, may be felt.
5. **Preliminary contractions,** or “*Braxton-Hicks*” contractions, can be felt for weeks before labor and get stronger as labor approaches.
6. **Loss of mucous plug,** or “*bloody show,*” usually signals the onset of labor but can occur days or weeks before.

## PRODROMAL LABOR

Prodromal labor is the period of time just prior to labor. Some women experience 2-3 days of “*Braxton-Hicks*” or preliminary contractions or other signs/symptoms of impending labor. This may be intermittent or constant. It can frequently shorten active labor by effacing the cervix and positioning the baby. This can be difficult for the woman emotionally and physically if she has had little sleep and has experienced contractions on and off for days with no dilation.

## TRIGGERING THE ONSET OF LABOR

If there is one exact mechanism that causes the onset of labor, it has yet to be discovered. A lot of research has been done searching for one specific trigger to labor in order to prevent premature and postmature deliveries. There may be several factors, a combination of factors, or a yet-undiscovered force. Current prevailing theories include:

1. **Distention of the uterus:** The uterus stretching to a certain degree may stimulate nerve endings to trigger labor. In cases of multiple pregnancy and hydramnios, premature labor is common, supporting this theory.
2. **Hormonal action:** Which combination of hormonal mechanisms triggers labor is not totally understood, but factors include progesterone withdrawal, estrogen stimulation, prostaglandins, fetal membrane phospholipid, fetal cortisol oxytocin stimulation, and placental aging with resulting decrease of hormones.
3. **Pressure from the presenting part may trigger nerves.**
4. **Sexual activity or intercourse:** Oxytocin production is stimulated by orgasm. Intercourse provides cervical and vaginal nerve stimulation, and semen contains prostaglandins.
5. **Trauma:** Accidents, and acute illnesses have been known to bring on labor. Many women go into labor during hurricanes or during earthquakes.
6. **Laxatives:** Products such as castor oil, or **sudden diarrhea** can empty the intestines giving the uterus more room to contract.

## TRUE LABOR VS. FALSE LABOR

It can be difficult to distinguish between prodromal labor symptoms, false labor, and early labor. False labor can occur days or weeks prior to active labor, producing labor symptoms but not dilating the cervix. If the woman experiences a false labor episode, it is important to reassure her that all contractions help efface the cervix and prepare for birth, and that it is a helpful process that sometimes shortens labor.

<i>True Labor</i>	<i>False Labor</i>
Contractions are regular.	Contractions are irregular.
Contractions get stronger, longer.	Contractions stay at the same intensity.
Walking or squatting increases intensity.	Walking slows contractions.
Contractions get closer together.	Contractions stay same distance apart.
Pain starts in back and moves to front.	Pain starts in front and moves to back.
Head is fixed between contractions.	Head is ballotable between contractions.
Sleep or sedation does not stop labor.	Contractions disappear with sleep.
Cervix effaces and dilates.	Cervix does not dilate.
Descent or change in station.	No change in station.

## STAGES OF LABOR

**First Stage** (or dilating stage) — Divided into *Latent, Active, and Transition Phases*, this stage begins with the onset of labor and ends with the complete dilation of the cervix at 10 centimeters.

*Latent Phase* begins with the onset of regular contractions. Mild contractions may be present that are effacing but not dilating the cervix. If dilation does occur, fetal descent is slow. Also, moulding of the fetal skull and relaxing of the pelvic bones occur at this time. In the *Active Phase* of labor, the cervix dilates from about three centimeters to eight centimeters. The fetus descends in a progressive manner. *Transition* can begin as early as seven or eight centimeters and lasts until 10 centimeters. The contractions become very close together and of very strong intensity.

**Second Stage** (or expulsive stage) — Begins at the time of complete dilation of the cervix and continues as the uterus pushes the fetus through the birth canal. This stage ends with the birth of the baby.

**Third Stage** (or placental stage) — Begins with the birth of the baby and continues until the delivery of the placenta.

**Fourth Stage** (immediate postpartum) — Begins with the delivery of the placenta and ends when the postpartum condition of the mother stabilizes (usually one to four hours).

LABOR STAGE EXERCISE				
Complete the following:				
	<b>1st Stage: Latent Phase</b>	<b>2nd Stage: Active Phase</b>	<b>3rd Stage: Transition</b>	<b>Fourth Stage</b>
Average time, primipara				
Average time, multipara				

## LENGTH OF LABOR

While individuals vary quite a bit, the factors which influence the length of labor are: parity, fetal weight, pelvic size, fetal station, cervical effacement and dilation, emotional and physical condition of the mother, and position of the baby.

An average latent phase for a nullipara ranges from eight to 24 hours. For a multipara, six to 14 hours. Both nulliparas and multiparas can have long latent phases. Multiparas sometimes have very short active phases if they have a long latent phase labor. Nulliparas may follow the same pattern, or a prolonged latent phase may be an indication of some degree of CPD and lead to a prolonged active phase. Average time for dilation is about one centimeter an hour once active labor begins, a little faster for multiparas. Second stage is one to two hours for a nullipara and about one hour for a multipara.

Keep in mind that averages do not always apply in all situations. Many women have a slower or faster than average labor and still may be within the normal range.

In 1955, Emanuel Friedman did a landmark study on normal labor patterns and established definitions of labor progression, which are graphed on a chart and called the Friedman Labor Curve. Labors that did not follow within this pattern were defined as protracted and indicated intervention. The midwifery model has long questioned the validity of this as a criterion for normal labor patterns, and the Friedman Labor Curve is currently being reevaluated by the medical community as well.

Friedman's Definition of Protracted Labor:

Active labor: less than 1.2 cm/hr.

Active phase at rest: no dilation for 2 hours.

Protracted descent: less than 1 cm/hr.

Arrested descent: no descent for 1 hour.

### LABOR LENGTH EXERCISE

Answer the following:

1. What is the value of understanding labor patterns?
2. Is Friedman's Curve used in your medical community?

Cervical Dilation (CM)	10																			
	9																			
	8																			
	7																			
	6																			
	5																			
	4																			
	3																			
	2																			
	1																			
	0																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	<b>Hours of Labor</b>																			

Draw a normal labor pattern for a primipara

**PARTOGRAPH**

The World Health Organization is advising birth practitioners to use a Partograph (alternately called "Partogram") to assess the course of labor. A partograph is a form of charting designed to help caregivers assess the condition of mother and baby during the flow of labor. Various Partographs have been in use for over fifty years, but WHO recently modified the form to increase accuracy and make it simpler to fill out. Older versions of the Partograph included a section for Latent Phase Labor. The WHO Modified Partograph begins charting in active labor (cervical dilation >4 cms), rather than during the "latent phase".

Name	Gravida	Para	Hospital number
Date of admission	Time of admission	Ruptured membranes	hours

Fetal heart rate

Amniotic fluid Moulding

Cervix (cm) [Plot X]

Descent of head [Plot C]

Contractions per 10 mins

Oxytocin U/L drops/min

Drugs given and IV fluids

Pulse ● and BP ▲▼

Temp °C

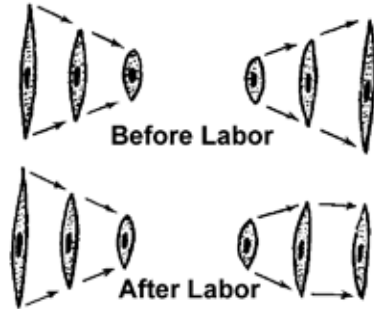
Urine { protein, acetone, volume

## PHYSIOLOGY OF FIRST STAGE

In the first stage of labor, there are seven steps that occur physiologically within the uterus which aid this amazing, complex process.

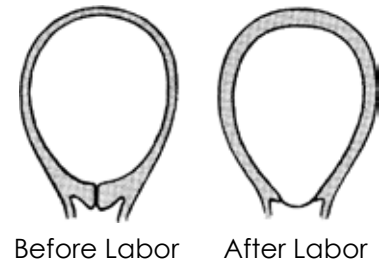
1. **Contraction and retraction of the uterine muscle.** Uterine contractions are controlled by the nervous system and are under the influence of hormones secreted by the endocrine system. Contractions generally begin occurring about every twenty minutes, then gradually get stronger and closer together. In transition, they occur one or two minutes apart. Retraction occurs when the uterine muscle fibers contract, and some of that contraction is maintained within the fibers, even after the contraction is over. Because the uterine muscle does not completely relax, this retraction causes the upper uterine segment to become shorter and thicker, which allows the

### Retraction of Uterine Muscle



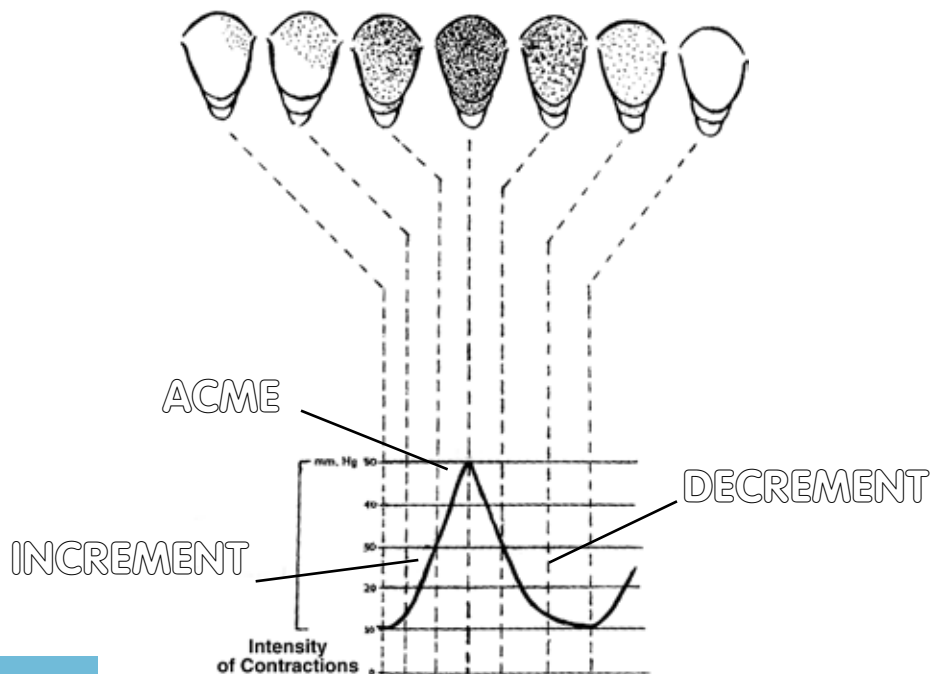
lower segment to thin out.

Uterine capacity is diminished due to retraction of the uterine muscle. All of this is to aid the expulsive forces. Each contraction begins at the fundus and spreads downwards. The contraction is stronger in the upper region, and by the time it reaches the lower segment it is diminished. This is called fundal dominance.



Contractions have a rhythmic pattern consisting of three phases: **increment** - the period in which the intensity increases; **acme** - wherein the peak of contraction is the strongest; and **decrement** - the period of decreasing intensity. Fundal dominance peaks at the acme of the contraction.

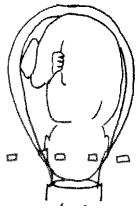
### FUNDAL DOMINANCE



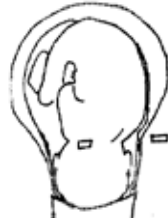


2. **Formation of the upper and lower uterine segments.** At the end of pregnancy, the uterus is divided into two segments. The upper uterine segment is the thicker, more contractable part and the lower segment is the thin, stretchable part. When labor begins, the retracted muscle fibers in the upper segment pull on the lower segment, causing it to stretch.

### Formation of the upper and lower uterine segment



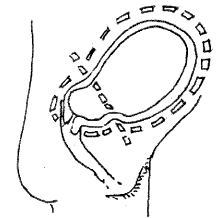
In early labor, the retraction ring is barely visible.



Force of the uterine contraction is in the upper segment.

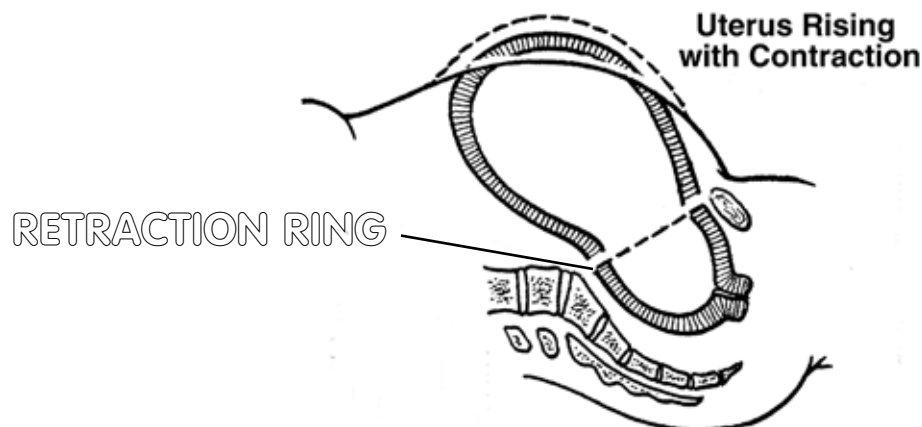


Thinning of the lower segment.



Formation of the retraction ring.

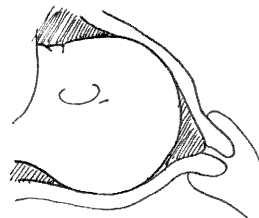
3. **Development of the retraction ring.** The ridge where the two segments meet is called the *retraction ring* or *Bandl's ring*. It is present during every labor and is normal as long as it does not rise past the symphysis pubis.



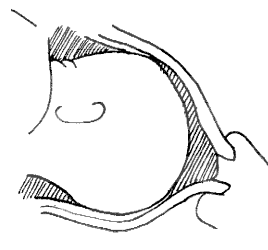
4. **EFFACEMENT or thinning of the cervix.** The cervix effaces somewhat before labor, and when labor begins, the muscle fibers surrounding the internal os are drawn upwards and become a part of the lower segment.



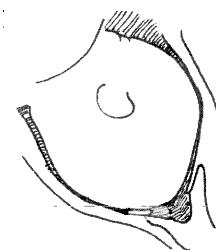
1. 1 CM.  
0% EFF.



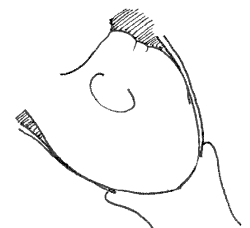
2. 2 CM.  
30% EFF.



3. 3 CM.  
40% EFF.

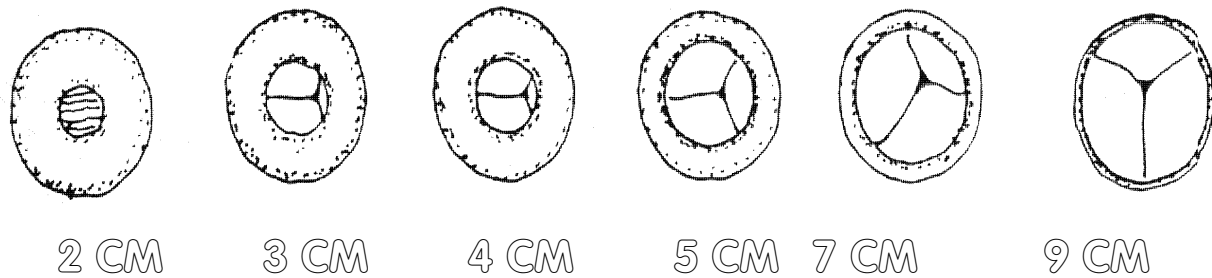


4. 7 CM.  
80% EFF.

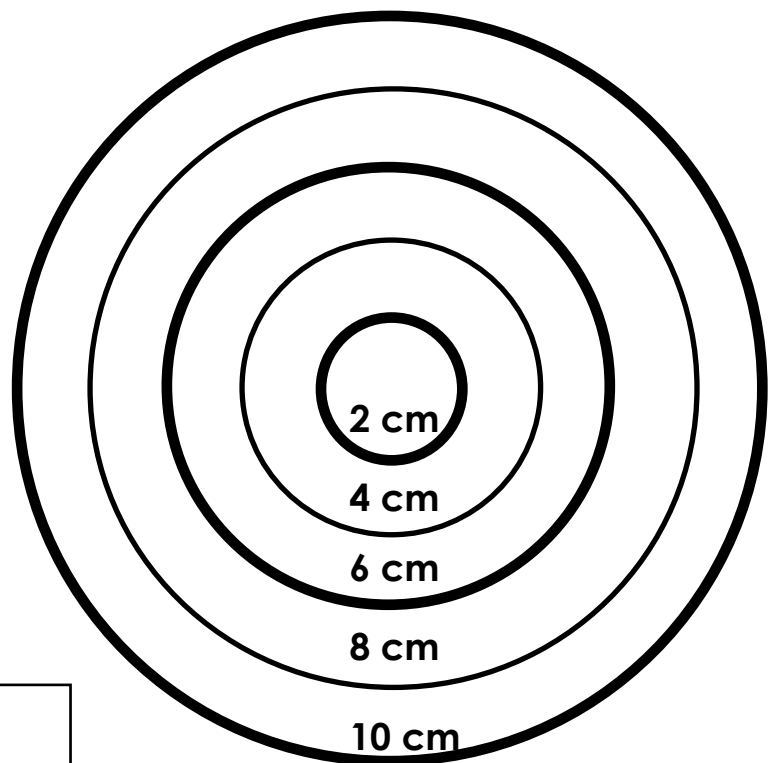


5. 10 CM.  
100% EFF.

5. **DILATION** occurs. Dilation can occur somewhat before labor begins, usually not more than one or two centimeters. A well-flexed head or presenting part can aid dilation, as will the uterine contractions. Loss of the mucous plug ("bloody show") occurs with dilation in most cases.



CHECKING  
CERVICAL DILATION



**EXERCISE**

Draw and cut 10 circles out of heavy paper from 1 to 10 centimeters in diameter. Practice estimating the diameter of each.

6. **Formation of the bag of waters.** When the lower uterine segment stretches, the chorion becomes detached. The increased pressure causes a loosened part of the sac of fluid to bulge into the cervical os. The head fits snugly into the cervix, creating the water in front of the head, the *forewaters*. The remaining water is born with, and after, the baby, the *hindwaters*. While the membranes are still intact, the pressure on the fetus exerted by the uterus is equalized by the fluid. This is called *General Fluid Pressure*, and it helps keep excessive pressure off the placenta, cord and fetus, decreasing the chances of fetal hypoxia.

7. **Rupture of the membranes or breaking of the waters.** This usually occurs at the end of the first stage, but can occur at the onset of labor or any time during labor. The waters protect and cushion the fetus from excessive trauma, and should not be artificially ruptured to hasten labor without just cause, such as fetal or maternal distress.

LABOR PROGRESS EXERCISE				
<i>Complete the following using times and numbers:</i>				
	1st Stage, Latent Phase	1st Stage, Active Phase	1st Stage, Transition	2nd Stage
Frequency of contractions				
Duration of contractions				
Intensity of contractions				
Cervical effacement				
Cervical dilation				

PAIN RELIEF EXERCISE	
<i>Describe the how the following methods are used toward pain relief during labor:</i>	
Water	
Massage	
Heat	
Acupressure	
Relaxation Breathing	
Focused Breathing	
Hypnosis	
Positioning	
Environment	

## MECHANISM OF LABOR

Beginning with engagement and continuing until birth, the baby engages in a series of actions which are called the mechanism of labor. The majority of these actions occur during the second stage. Each presentation has a slightly different mechanism of labor, and the following is a mechanism for LOA position:

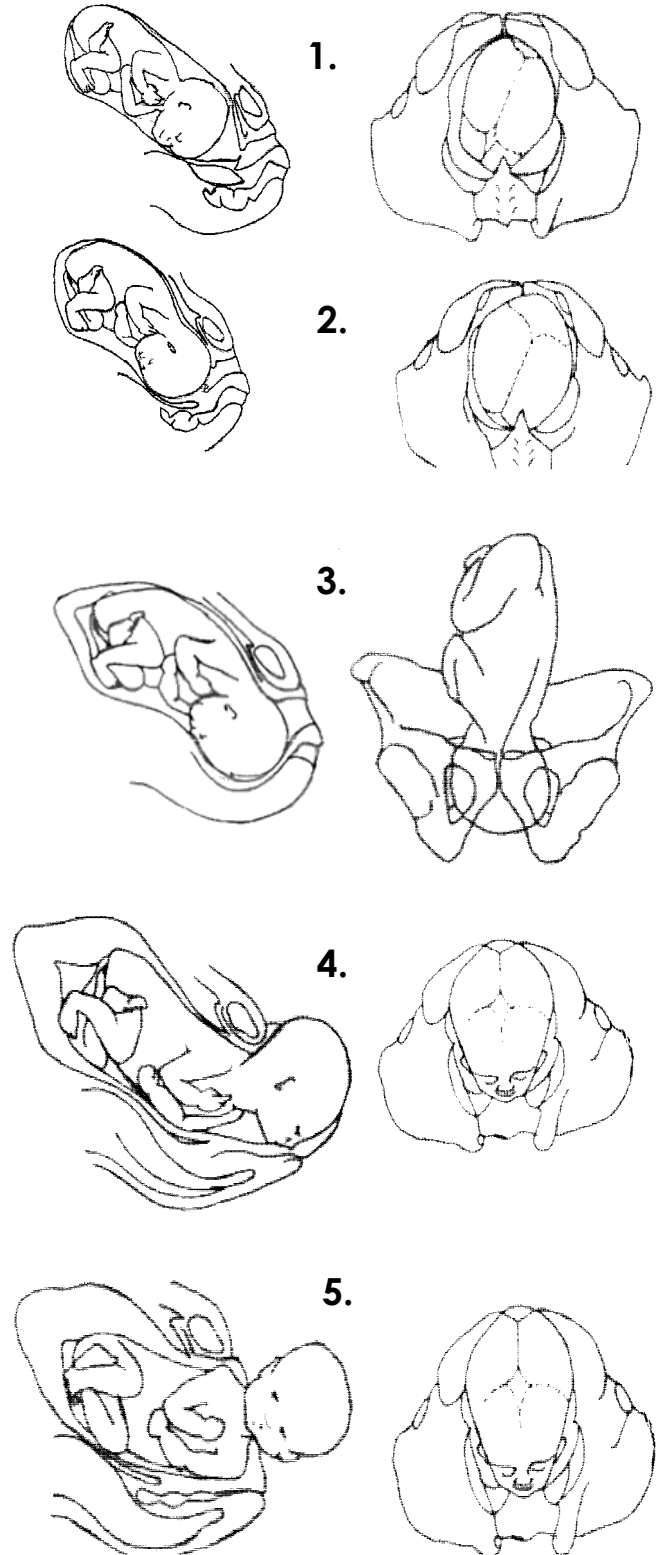
**1. DESCENT:** This begins with engagement and continues as the baby is passed through the birth canal. Descent occurs due to the downward pressure of the contractions, by pushing during the second stage, and by the force of gravity.

**2. FLEXION:** Partial flexion occurs beforehand normally, and it is increased as there is resistance to descent. The baby's chin should touch its chest. When proper flexion occurs, the diameter of the head is reduced by nearly one centimeter as it passes the pelvic brim. Complete flexion usually takes place at the pelvic inlet, but it can occur earlier or later.

**3. INTERNAL ROTATION:** The head enters the pelvis in a transverse or diagonal position. When it reaches the pelvic floor, the occiput rotates to the front LOA, but occasionally it will rotate to the sacrum LOP. When the occiput has been *posterior* during labor LOP or ROP, it frequently rotates to an *anterior* position at this time.

**4. EXTENSION:** After the occiput emerges from the pelvis, the head extends or deflexes with the chin leaving the chest. At this point crowning occurs. Then the head, face and chin are born, usually face down.

**5. EXTERNAL ROTATION:** This action is also called **RESTITUTION**. After the head is born it restitutes, or turns, to one side or the other. If it was an LOA presentation, it will turn to the left. The shoulders internally rotate at this point from a horizontal plane to a diagonal plane. Usually the anterior shoulder is born first, then the posterior, then the rest of the body is born.



# Positions for Labor



Walking is helpful and can speed up labor.



Leaning over a bed, person, or chair can help with back labor.



Squatting creates maximum pressure, speeding up labor even more than walking.



Semi-upright position can be restful without slowing down labor.



Tailor sitting helps stretch ligaments. can allow access for back massage.



Leaning upright on someone

## THE PSYCHE

Labor and birth are among the most intense and challenging events a woman can experience. By reducing fear and anxiety, and by using breathing and relaxation techniques, labor and birth can be positive and rewarding. While having a baby can be very painful and intense, when a woman delivers without drugs or anesthesia, it is an empowering experience that will be with her lifelong.

Women have a wide variety of influences that affect their experience of childbearing. In cultures where birth is non-medicalized, women do not expect pain medication. They have a greater acceptance of birth as a normal, natural event; this reduces their perception of how painful birth is. Culture, our mothers, the media - all influence how we perceive childbirth. If a woman is tense and/or afraid, it can slow or stop labor. If a woman has been sexually abused, she may have psychological issues about her body and pain that may affect how she gives birth. Our minds have a powerful influence on our bodies.

Labor is hard work. The more a woman is prepared for it, the better her experience will be. Preparation for labor comprises many different aspects, and the midwife's role is to assist the parents in preparing for their birth in any way possible – physically, mentally, and emotionally. Having a baby will be a great change, and preparation is the key to a smooth transition. Education during prenatal care will be the biggest help. Attending childbirth classes, reading, talking to other parents, and seeing films on birth and parenting will all help educate the prospective parents. When parents are educated and aware, they can better make their own choices about their birth. They then will ultimately have more control over their own birthing and have a much more satisfying experience.

Fear and tension can slow or even stop a labor. Education, counseling, and awareness are tools the midwife uses to help women overcome fears and have a more relaxed and empowering birth.

### EXERCISE: PSYCHOLOGICAL ASPECTS OF LABOR

1. Describe some possible mental/emotional responses to labor the woman may experience.
  
  
  
  
  
  
  
  
  
  
2. List factors that may influence a woman's psychological or emotional state during childbearing.

## MONITORING FETAL WELL-BEING

Of all the duties midwives have, fetal monitoring is one of the most important. There are few things in life that are more precious than the life of a baby. Parents choose midwives because they want the best possible care for their baby. Parents want more than a birth experience; they want a healthy baby. Some choose to deliver outside of a hospital because they believe it is the best choice to minimize unnecessary interventions, have control over their births, and stay with their babies. Home birth is a philosophy, not a place. It is about having the healthiest baby possible. With vigilant monitoring of the fetus during labor, through listening to heart tones and other signs, midwives can predict if a baby will be distressed, and can take appropriate actions as needed. Sometimes that may mean a simple intervention done at home. Other times transport to a hospital may be needed.

The science of fetal monitoring was born in 1958 with the introduction of the electronic fetal monitor. These instruments record, second by second, changes in fetal heart rate, while simultaneously measuring uterine contractions. Patterns were discovered that correlated the types of changes the fetal heart rate makes in relation to the contractions. Fetal monitoring can



show changes such as the normal compression on the head, as well as signs of anoxia, when the fetus is in danger. This became such a useful tool that soon most women in hospitals became routinely hooked to electronic fetal monitoring machines.

While this may be needed in some high risk cases, it hinders women's ability to move freely in labor, slowing their labor down, causing more pain. The cascade of interventions that follow often ends with a Cesarean section. Also, electronic fetal monitoring strips became evidence in medical malpractice cases, used to make a charge that a Cesarean was not done soon enough. Studies such as that documented in 2003 in the *Journal of Perinatal Education* by Mary Lou Moore have shown that routine electronic fetal monitoring does not necessarily improve outcomes. Routine EFM can increase Cesarean rates, many of which are done for legal, not medical reasons. Intermittent monitoring using a fetoscope has been shown to be just as effective in most situations.



Midwives who practice outside of the hospital generally do not use electronic fetal monitoring machines, but listen to the fetal heart during contractions in labor, using their ears and their knowledge of FHT patterns to monitor fetal well-being in labor. This is one of the arts of midwifery that improves with time and experience. A midwife listens to the heart rate often; during labor, before, during, and after contractions. She can chart the changes during the contraction, much the same way a print out from the machine can do, by using graph paper. Fetal heart beats are counted in 10-second increments, multiplied by 12, and charted. After some time of charting each one out, she learns how to do it by ear; she can listen during a contraction and tell you if it is a late deceleration or an early one. It is difficult to tell good beat-to-beat variability by ear alone, however with time and experience, midwives can tell healthy babies from sick ones from the sound of their little hearts, simply by listening to them during contractions to see if they are stressed. The uterine contraction can be monitored during the increment phase, the acme, and the decrement phase by observing the mother, watching the uterus, and feeling the uterus by hand. By feeling mother's bellies, over and over, midwives learn by touch, what machines read.



Plan on spending some time learning fetal monitoring, if you are unable to take a course, there are some great free resources on the Internet, including tutorials. Recommendations change periodically on definitions and interpretation, so it is important to keep your knowledge and skills current. Although midwives may not carry electronic fetal monitoring devices it is important to understand the standardized system of how monitor tracings are interpreted. The same terminology is used for electronic tracings as well as auscultated readings. Learning the same methods in interpretation of monitor tracings can enhance client safety and reduce confusion if transfer of care occurs.

### Three Categories of Interpretation (Lyndon & Ali, 2009)

#### Category I -Normal

- Baseline FHR 110-160
- Baseline variability moderate
- Accelerations may or may not be present
- No late or variable decelerations
- Early decelerations may be present

#### Category II-Indeterminate

##### Baseline rate

- Bradycardia not accompanied by absent variability
- Tachycardia

##### Baseline FHR variability

- Minimal baseline variability
- Absent baseline variability not accompanied by recurrent deceleration
- Marked baseline variability

##### Accelerations

- Absence of induced accelerations after fetal stimulation
- Periodic or episodic decelerations
- Recurrent variable decelerations accompanied by minimal or moderate baseline variability
- Prolonged deceleration > 2 minutes < 10 minutes
- Recurrent late decelerations with moderate baseline variability
- Variable decelerations with other characteristics, such as slow return to baseline, "overshoots," or "shoulders"

#### Category III-Abnormal


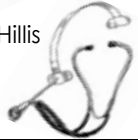







Absence of variability AND one or more of the following:

- Recurrent late decelerations
- Recurrent variable deceleration
- Bradycardia
- Sinusoidal Pattern



## FETOSCOPE EXERCISE

Complete the following:

Type	Advantages	Disadvantages	Cost
Pinard Horn 			
DeLee Hillis 			
Allen Type 			
Leff scope 			
Doppler - Medasonic 			
Doppler - Huntleigh 			
Doppler - Ime; 			
Other Doppler Models			
Electronic Fetal Monitors - Baby Dopplex 			
Electronic Fetal Monitors - Versalab Antepartum 			
Other EFM Models			

## FETAL MONITORING KEY TERMS

*Define the following:*

1. Baseline
2. Moderate and marked bradycardia
3. Moderate and marked tachycardia
4. Internal vs. external fetal monitoring
5. Beat to beat variability
6. Short term variability (minimal, moderate, and marked)
7. Long term variability
8. Baseline variability
9. Accelerations
10. Early decelerations

Fetal Monitoring Terms con't.

11. Late decelerations (mild, moderate and severe)

12. Variable decelerations

13. Sinusoidal wave patterns

14. Intermittent auscultation

15. Aerobic respiration

16. Anaerobic respiration

17. Hypoxia

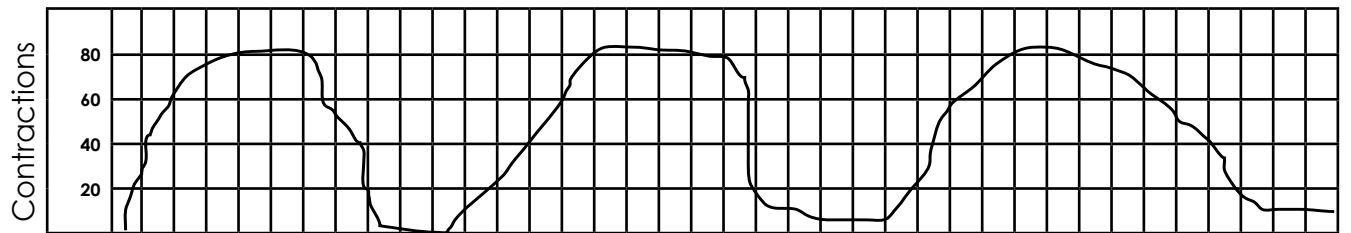
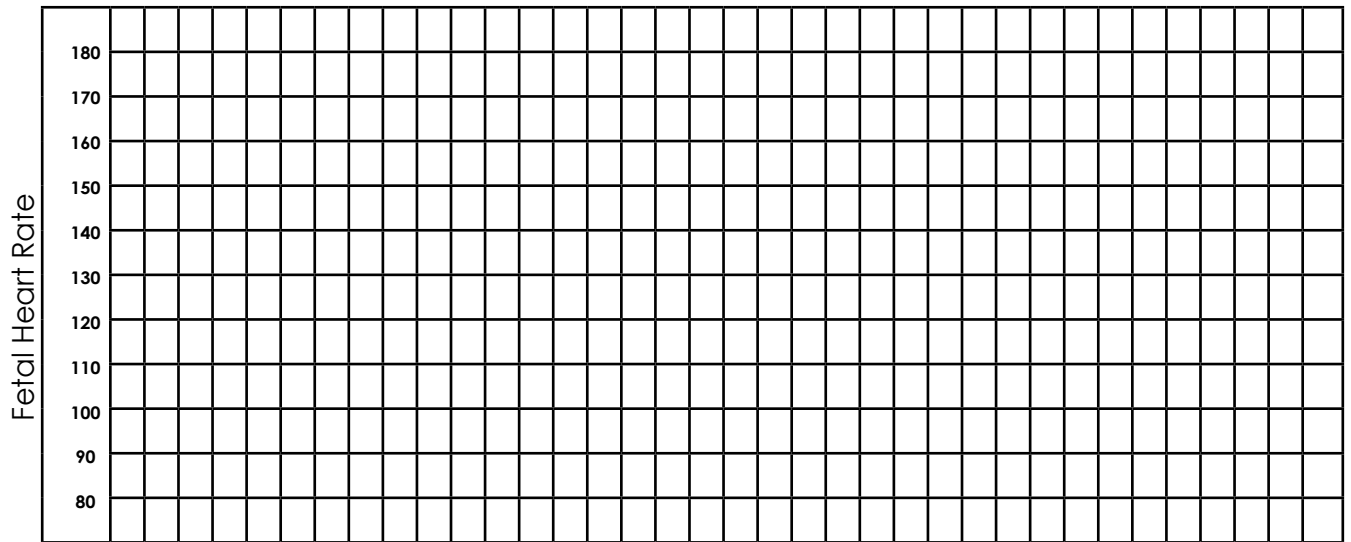
18. Metabolic Acidosis

19. Metabolic Acidemia

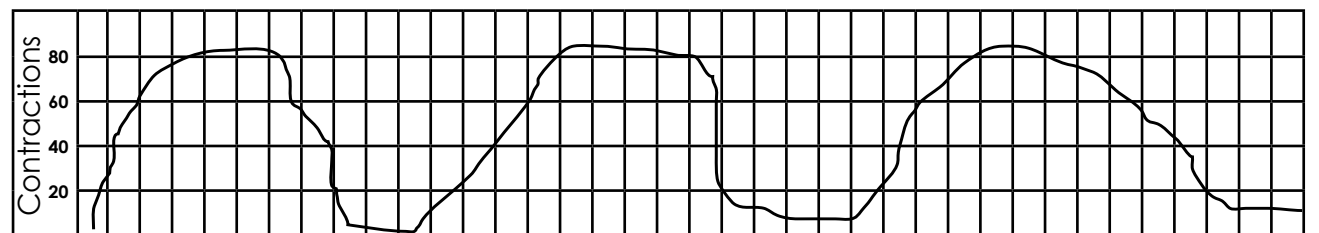
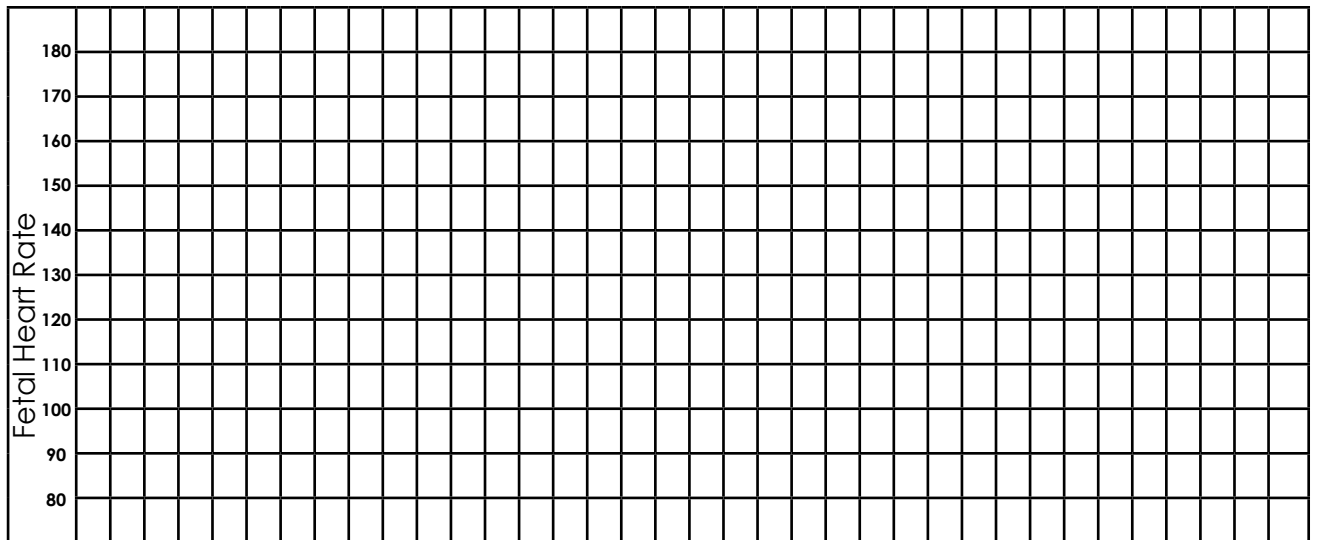
20. Significant Metabolic Acidemia

CAUSES OF DISRUPTED FETAL OXYGENATION PATHWAY EXERCISE	
Level of Oxygenation Pathway	Potential Disruptions in otherwise healthy pregnant women
Maternal lungs	
Maternal blood	
Maternal heart	
Maternal vasculature	
Uterus	
Placenta	
Umbilical cord	
Fetal blood	

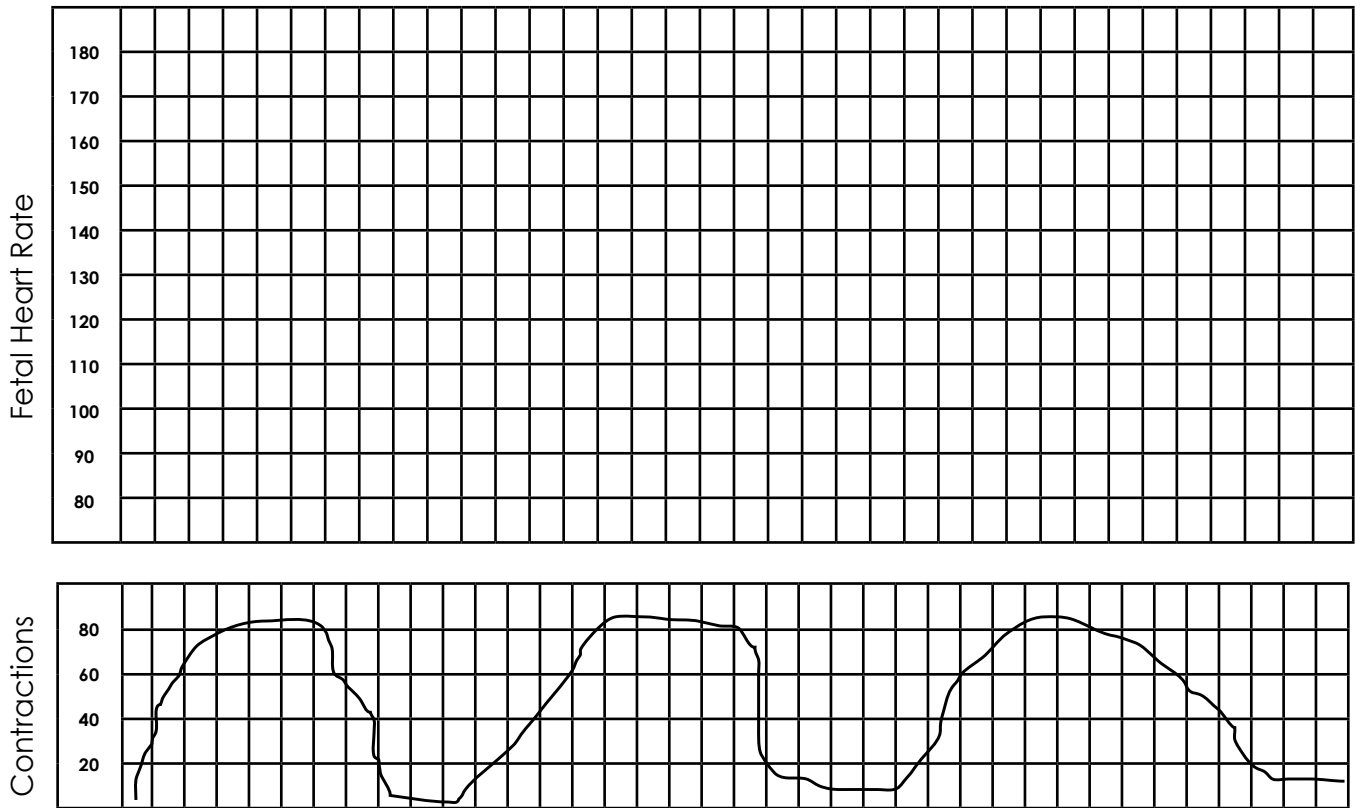
FETAL MONITORING EXERCISE		
<i>Complete the following:</i>		
Draw this pattern.	Possible causes	Midwifery interventions
Tachycardia		
Bradycardia		
Decreased variability		
Late decelerations		
Early decelerations		
Variable decelerations		



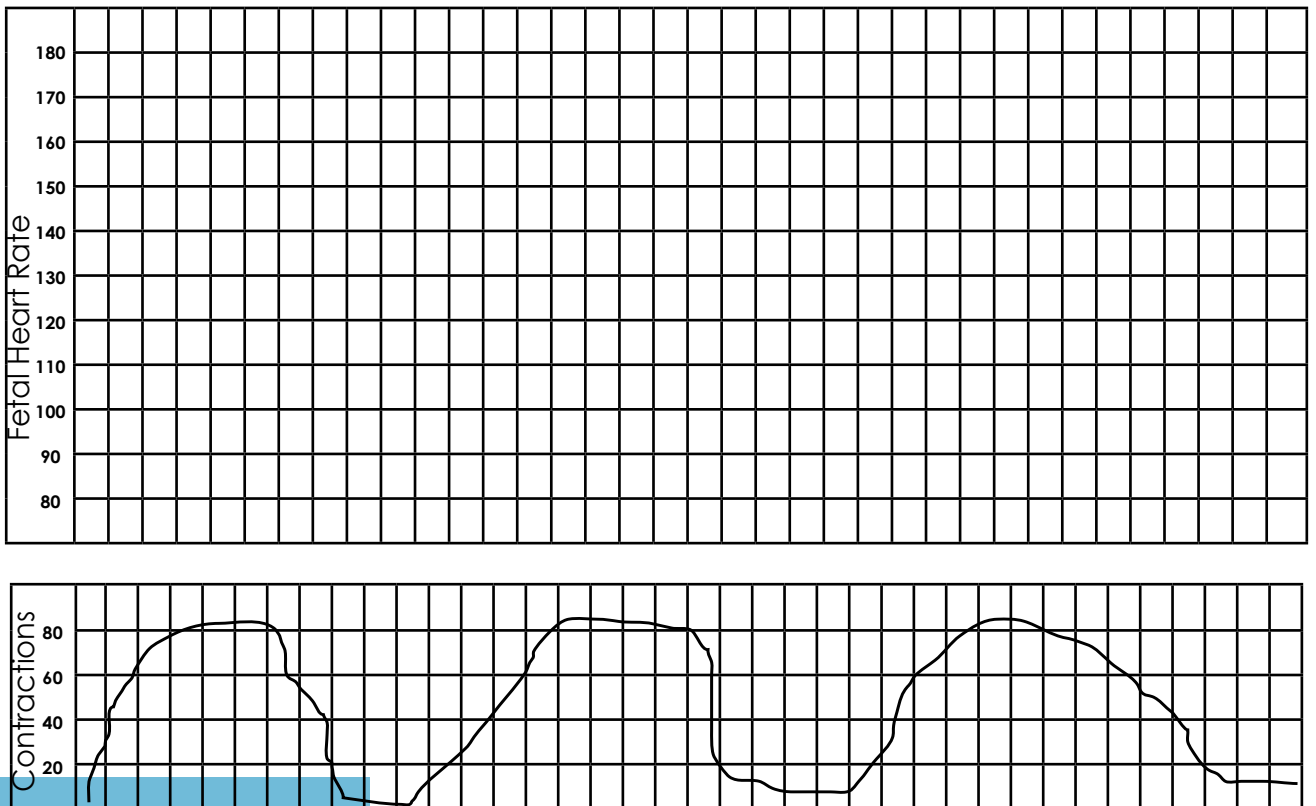
Draw an FHT pattern of good Beat to Beat Variability.



Draw an FHT pattern of Early Deceleration.



Draw an FHT pattern of Variable Decelerations.



Draw an FHT pattern of Late Decelerations.

## A MIDWIFE'S ROLE IN NORMAL LABOR OUTSIDE OF THE HOSPITAL

Every midwife has her own method of caring for a woman in labor. Each individual labor is so different, that it is important to be flexible. Be open to making changes in your labor management techniques as you learn and broaden your experience. A midwife's best tools are knowledge, patience, intuition, and faith in the natural birth process, as well as the humility to know when to ask for help.

1. **Observation** – being aware of each individual labor pattern, and making sure that all falls within the normal range.
2. **Monitoring/Charting** – checking vital signs of both mother and baby, monitoring dilation and the progress of labor, evaluating the well-being of the mother and baby. Accurate record-keeping is essential to providing professional quality care.
3. **Support** – giving emotional and mental support to the laboring woman and advice to her family. Keeping the labor environment calm and relaxed is very important. Labor coaching includes helping with breathing, relaxation techniques, and massage.
4. **Knowledge of the birth process** – A good background in the physiology of birth is essential. Experience and knowledge of the normal range of labor will help the midwife to recognize complications.
5. **Confidence in the normalcy of birth** – respecting the birth process, and the woman's inner feelings, allowing her to labor and birth as she chooses.

### LATENT PHASE (0-4 CM.)

1. **Ascertain true from false labor.** Sometimes, it can be difficult to differentiate between “false labor”, prodromal labor, and the latent phase. It is helpful in reducing the mother's stress to let her know accurately what is going on and what she might expect.
2. **Make sure mother is well rested.** She should sleep when needed. Resting or dozing between contractions is better than no sleep in a long labor. If it is the middle of the night and she is in early labor, she should sleep. Or take an afternoon nap if during the day. Water tubs can be very helpful for relaxing the woman enough for sleep.
3. **She should get enough nourishment to sustain her body through active labor.** High-carbohydrate, high protein foods should be eaten early in labor. In active labor, foods high in glucose and easily digestible are recommended. Blood sugar needs to be kept up. If she is feeling nauseous, ice chips are helpful. Fruit juice popsicles are easily tolerated. Sport drinks, e.g, “Recharge” are great during labor, as they are high in sodium, potassium and electrolytes. Small sips of protein blender drinks, yogurt, or kefir work well. Her regular vitamins should be taken as well as labor supplements, such as alfalfa, as early in labor as possible, as digestion is slowed by labor. In hospital births, women are not allowed to eat because of fear of aspiration in case of general anesthesia, so IV's are sometimes used to assure glucose and hydration levels. At home, our alternatives to IVs are maintaining adequate hydration and nourishment.
4. **Mother should be up and active.** Walking, squatting, and doing regular activities are encouraged for as long as possible. Walking outside, getting fresh air, stimulating circulation, and utilizing gravity are very important to shorten labor.
5. **Frequent showers, baths or birth tubs.** Warm water is very beneficial for relaxation and pain relief. However, be aware that reclining for long periods of time can slow labor down, as can too much time, too early in a birthing tub.



6. **Good charting and monitoring should be done.** FHR, should be done periodically during the latent phase stage of labor. BP should be checked every 4 hours (if no problem). Temperature is taken every two hours if membranes are ruptured, otherwise every four hours. *Write down anything pertinent or abnormal in the chart.* Dilation checks should be minimal in early labor. If membranes are ruptured, NO dilation checks until very late in labor. Note contraction frequency, intensity, and duration. Urine should be checked for ketones periodically.
7. **Give parents space or privacy.** In a long early phase, the midwife may want to go home if she lives close, or go out for lunch or take a walk. Sometimes a woman feels uncomfortable if she is not progressing quickly and everyone is waiting for her; “A watched pot never boils”.
8. **Give support as needed.** Massage, breathing with her, relaxation exercises, visualization, or just being present or available if needed, are all valued forms of support.
9. **Her bowels should be empty.** Most women get diarrhea or loose stools in early labor, which gives the uterus more room to contract. If she has been constipated, some midwives recommend a “Fleets” type enema to speed up labor. This type of enema cleans the lower bowel using a small amount of water and is relatively non-invasive. Enemas are not recommended if membranes are ruptured or the woman declines.
10. **Be patient.** Do not try to hasten or interfere with the normal progression of labor unless indicated medically (PROM, exhaustion). Let parents know you’re not in a hurry—and don’t be in one.

### ACTIVE LABOR (5-8 CM.)

1. **Vital signs are monitored with increased frequency as labor progresses.** Listen to fetal heart rate during a contraction, and chart on a graph. Do this several times during the course of labor to monitor FHR and the stress of the contractions on the baby. Check heart tones every 30 minutes during active labor. Internal exams (dilation checks) should be kept to a minimum.
2. **Maternal hydration and blood sugar needs to be maintained.** It’s best if she can eat and drink, light, easily digested foods, proteins and carbohydrates, dairy products. Sports-type electrolyte drinks should be given frequently. If she is nauseous, ice chips, juice “popsicles,” and small frequent sips are more easily tolerated.
3. **Sleep if she is tired, walk or squat if she is awake.** In order to prevent maternal exhaustion, she needs to get enough sleep or even rest or doze between contractions if she is tired. However, if she is not sleeping, ideally she should be up. Staying in bed in active labor can slow labor down. Walking and squatting *will* shorten labor.
4. **Keep bladder empty.** The increased pressure of contractions can mask the sensation of having to urinate, so she may need to be reminded periodically.
5. **Be tuned in with the mother.** Support and encourage her, respecting her wishes. She may need coaching, massage, and attention from her midwife, or she may want privacy, space with her or from her partner, and not to be touched. She usually must remain focused during the contractions, so avoid distractions (people talking during contractions, etc.).
6. **Help her find a comfortable position, and change positions periodically.** Most women instinctively choose good positions in which to labor. Women labor standing up, on their side, squatting, rocking, reclining, or on their hands and knees. In a hard active labor, contractions can be so intense that it is difficult for women to move and/or verbalize their wish to change position. Sometimes the most comfortable position may be one that is slowing labor down. While respecting women’s wishes is important, sometimes the midwife needs to be directive and give specific instructions.

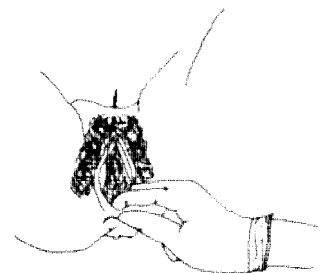
7. **Be set up and ready with equipment and supplies in case of a more rapid progression.** Maintain sterile technique and use gloves, aprons, and drapes when appropriate. Use universal precautions to protect yourself from any contact with her body fluids.
8. **Respect the natural birth process.** Be encouraging of progress made; be patient if progress is slow. Nature has her own timetable. Intervention (breaking the waters, herbs, etc.) may speed up labor, but it interferes with nature's process and should be done only if indicated.

### TRANSITION (8-10 CM.)

1. **Be prepared for the following symptoms:** vomiting and/or nausea, shakes, chills, hot flashes or sweats. The woman may be crabby or anxious, have difficulty with her breathing technique, and have a hard time relaxing or maintaining control during contractions. She may not want to be touched, or she may need a lot of energy and attention.
2. Provide **eye contact and help with breathing.** Her partner or a birth attendant is most helpful at this time. A calm, relaxed, and centered environment is essential.
3. **Equipment and supplies should have been previously set up.** Avoid a bustle or runaround in transition. Complete final preparations in supplies, heating oil, blankets, etc.
4. **Empty bladder.** If she does not want to walk to the bathroom, towels or a bowl on the floor work fine if no bedpan is available.
5. **Continue to monitor and chart FHR** every 15 minutes, and maternal vital signs.

### SECOND STAGE (10 CM - CROWNING)

1. **Avoid premature pushing.** Holding off pushing until the urge is irresistible avoids cervical tears and edema. Breathing or panting the head through the cervix is appropriate in many cases. The pushing urge is very similar to the sensation of needing to have a bowel movement. If she has the feeling only during the contractions, it's probably the baby's head pushing on the rectum and she is completely dilated and ready to push. Observe and follow what the woman's body is doing.
2. **Help the mother into a good pushing position.** When dilation is complete and the urge is strong to push, squatting or semi-squatting positions use the force of gravity. She may need leverage or support. A good position for the midwife to stretch the perineum and have good access is for the mother to push with her chin on chest, hands behind knees, and a support person or pillows against a wall to maintain upright position. Some midwives bring birthing stools that work well for this purpose. When allowed a choice women deliver in standing positions, squatting, or other positions that are awkward for the midwife but comfortable for them. Be prepared to be flexible and accommodating.
3. **Assist her breathing methods (if needed).** She may do an exhale type of pushing, respond to her body's urges with a grunting noise, or release her breath and then bear down. In long second stages, the breath-held pushing method is recommended, where the woman holds her breath for 5-8 seconds, bearing down with the force of the breath.
4. **Monitor vitals more closely.** Check FHR every 15 min. to as often as after every contraction as 2<sup>nd</sup> stage progresses. Perform dilation checks as necessary. Chart vital signs, quantities of blood loss (if any). If membranes rupture, note color of fluid. Note the station of the fetal head.
5. **Perineal stretching and massage should begin with pushing.** Warm olive oil is preferred by most midwives, but others use other oils or KY jelly, warm herb compresses, or warm wash cloths. Adequate support, massage, and stretching are cornerstones of preventing lacerations.

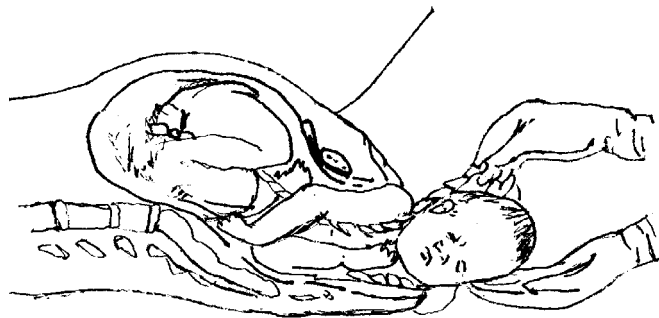


### 6. Use sterile technique and standard precautions.

Use under-bottom drapes ("chux"), sterile gloves, birthing apron, hair cover, and eye protection. Avoid direct contact with blood, urine, feces, meconium, and amniotic or vaginal secretions.

### NORMAL DELIVERY MANAGEMENT

- 1. FHR monitored through crowning.** The color of the scalp should be a dark pink. If the baby continues to have good heart tones, the slow, controlled delivery of the head can continue.
- 2. Continue perineal stretching.** Warm compresses (herbs or just warm water) are helpful at this time. Perineal support is a must. Support using your hand upwards with a 4x4 gauze pad over the anus, loosening the perineal skin.
- 3. Pushing should stop at or before biparietal appear at the outlet.** Gentle, slow delivery of head (unless FHR depressed) is optimum. This is often called the "ring of fire" because of the burning sensation. Assist mother with blowing or panting to avoid pushing. Pushing between contractions is one technique used at this stage, as the woman has more control.



LIFTING THE CORD OVER THE HEAD

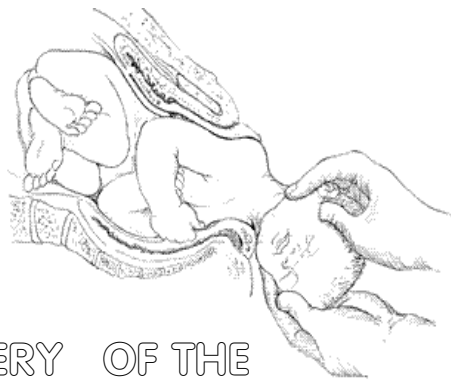
Or have the woman not push, allowing the force of the contraction to push the head out slowly to prevent tearing.

**4. As soon as nose and mouth appear, suction with a bulb syringe.** Some midwives do not suction routinely.

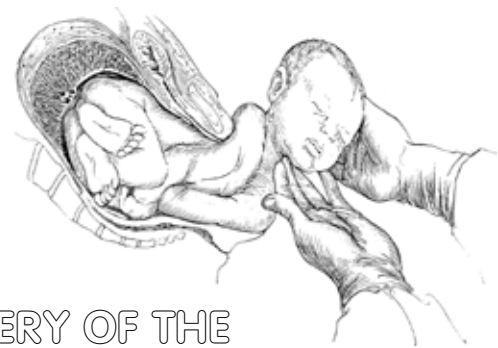
**5. Check for cord around neck.** Slip over head if loose or clamp and cut if needed. Continue suctioning as head restitutes.

**6. Continue perineal support to prevent tears with shoulders.** Sometimes the body

delivers with the same contraction as the head, otherwise with the following contraction.



DELIVERY OF THE ANTERIOR SHOULDER



DELIVERY OF THE POSTERIOR SHOULDER

- 6. After the head is born and restitution is complete:** Give slight *downward traction* on the head to deliver the anterior shoulder, slight *upward traction* for posterior shoulder. If delivery occurs in an upright position, this is often not necessary.
- 7. Use both hands to support the head as the rest of the body is delivered.** As the baby is being born, the mother or father can reach down and deliver the rest of the body if desired.
- 8. Assess baby's condition. Dry and warm baby.** Check that breathing has started, color is improving, limbs are well-flexed, heart rate is good. Place the baby sideways on its mother's

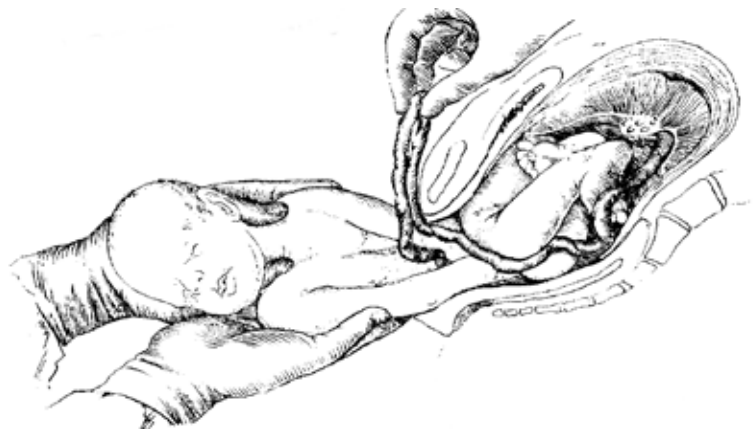
abdomen, skin to skin contact, with its head down (for postural drainage). Cord is still attached. Make sure baby is warm and dry; keep head covered or put hat on. Further evaluation and 1 and 5 minute APGAR scores can take place with baby still on abdomen, if baby is doing well.

9. **After cord stops pulsing.** Put cord clamps or hemostats one inch apart and cut between the two clamps with the baby's side 1 inch from umbilicus.

The father or another family member may want to cut the cord.

10. **Keep light away from baby's eyes.** Continue to observe baby, but allow parents space to bond, look at, and enjoy baby. Mother may need assistance nursing for the first time. Some babies want to nurse immediately, while others wait 15 minutes to an hour.

*See Chapter 11 on Third Stage Management and Chapter 12 on Newborn Assessment.*



## DELIVERY OF THE REST OF THE BODY

### LABOR MANAGEMENT EXERCISE

*Every practitioner "manages" labor differently; what would you do differently than what is outlined here?*

## WATER BIRTH EXERCISE

Answer the following:

1. What are some advantages of laboring in the water?
2. What are some disadvantages or possible risks?
3. What are some advantages to delivering in the water?
4. What are some disadvantages or possible risks?
5. How can you maintain Standard Precautions in a water birth?
6. At what should the water temperature be maintained?

## INTRAPARTUM CARE EXERCISE

1. What tools will you bring to monitor the mother and fetus during labor?
  
  
  
  
  
  
  
  
  
  
2. How often will you check the fetal heart rate?  
1-5 cm:  
5-7cm:  
7 -10 cm:  
During pushing:
  
  
  
  
  
  
  
  
  
  
3. How often should maternal temperature be taken in labor?
  
  
  
  
  
  
  
  
  
  
4. How will you be able to tell if the mothers is getting dehydrated?
  
  
  
  
  
  
  
  
  
  
5. When and how often should you palpate the uterus and why?
  
  
  
  
  
  
  
  
  
  
6. What are some signs that may occur in normal labor that signify risk?
  
  
  
  
  
  
  
  
  
  
7. How do you know a labor is going on too long?
  
  
  
  
  
  
  
  
  
  
8. How often should BP be taken during labor?
  
  
  
  
  
  
  
  
  
  
9. In addition to infection, what are other physiologic risk factors with rupture of membranes for over 12 hours in labor.
  
  
  
  
  
  
  
  
  
  
10. What are the signs of labor progressing normally?



## DELIVERY SYNOPSIS

Code # \_\_\_\_\_ Mother's name \_\_\_\_\_ Father/Partner's name \_\_\_\_\_  
 Address \_\_\_\_\_ Phone \_\_\_\_\_  
 DOB \_\_\_\_\_ LMP \_\_\_\_\_ EDD \_\_\_\_\_ # wks gest. \_\_\_\_\_ G \_\_\_\_\_ T \_\_\_\_\_ P \_\_\_\_\_ A \_\_\_\_\_ L \_\_\_\_\_  
 Significant History \_\_\_\_\_ Risk factor at onset \_\_\_\_\_ Blood type \_\_\_\_\_ Last Hb \_\_\_\_\_  
 Midwife \_\_\_\_\_ Assistant \_\_\_\_\_ B/U Dr. \_\_\_\_\_ Ped. \_\_\_\_\_  
 Date of delivery \_\_\_\_\_ Time of birth \_\_\_\_\_ Labor status at arrival \_\_\_\_\_ Time Departure \_\_\_\_\_

### Mother

Date/Time labor began \_\_\_\_\_ / \_\_\_\_\_  
 Latent \_\_\_\_\_ Active \_\_\_\_\_ Total: hrs \_\_\_\_\_ / \_\_\_\_\_ min  
 2nd stage began \_\_\_\_\_ duration \_\_\_\_\_  
 Date/Time ROM: \_\_\_\_\_ / \_\_\_\_\_ Total \_\_\_\_\_ (hrs/min) Spont. \_\_\_\_\_  
 Induced \_\_\_\_\_ Meconium \_\_\_\_\_  
 Color/viscosity \_\_\_\_\_  
 Complications of labor \_\_\_\_\_  
 Meds/herbs: \_\_\_\_\_  
 O<sub>2</sub>: None \_\_\_\_\_ Labor \_\_\_\_\_ Delivery \_\_\_\_\_  
 Maternal position at delivery \_\_\_\_\_  
 Delivery: Spon. \_\_\_\_\_ Forceps \_\_\_\_\_ C/sec \_\_\_\_\_  
 Perineum: Intact \_\_\_\_\_ Tear \_\_\_\_\_ Epis \_\_\_\_\_ Repaired \_\_\_\_\_  
 By \_\_\_\_\_  
 Notes \_\_\_\_\_  
 Placenta: Time \_\_\_\_\_ Exam \_\_\_\_\_  
 Immediate PP: Fundus \_\_\_\_\_ EBL \_\_\_\_\_ cc  
 2 Hr PP: Pulse \_\_\_\_\_ Orthostatic \_\_\_\_\_  
 BP \_\_\_\_\_ Lochia \_\_\_\_\_ Fundus \_\_\_\_\_  
 Breastfeeding \_\_\_\_\_  
 Notes \_\_\_\_\_

### Infant

Name \_\_\_\_\_  
 Sex \_\_\_\_\_ Est. Gest. age \_\_\_\_\_  
 Weight \_\_\_\_\_ Length \_\_\_\_\_ Head \_\_\_\_\_  
 Presentation/Position at delivery \_\_\_\_\_  
 APGAR: 1 min. \_\_\_\_\_ 5 min. \_\_\_\_\_ 10 min. \_\_\_\_\_  
 Nuchal cord: \_\_\_\_\_ times (Loose/tight) Cut \_\_\_\_\_  
 Suction: None \_\_\_\_\_ Bulb \_\_\_\_\_ DeLee \_\_\_\_\_  
 Resuscitation: None \_\_\_\_\_ Blow by O<sub>2</sub> \_\_\_\_\_  
 Bag/mask \_\_\_\_\_ Mouth-to-mouth \_\_\_\_\_  
 Intubate \_\_\_\_\_ CPR \_\_\_\_\_ Stimulation \_\_\_\_\_  
 MEDS: Eyes \_\_\_\_\_ Vit K \_\_\_\_\_ Other \_\_\_\_\_  
 Initial exam: Gen. Appear. \_\_\_\_\_  
 Color \_\_\_\_\_ Heart rate \_\_\_\_\_ Resp. \_\_\_\_\_  
 Lung sounds \_\_\_\_\_ EENT \_\_\_\_\_ Abd \_\_\_\_\_  
 Spine \_\_\_\_\_ # Cord vessels \_\_\_\_\_ Genitals \_\_\_\_\_  
 Anus \_\_\_\_\_ Hips \_\_\_\_\_ Extrem. \_\_\_\_\_  
 Reflexes: \_\_\_\_\_  
 First feed @ \_\_\_\_\_ breast \_\_\_\_\_ bottle \_\_\_\_\_  
 2nd hr. recheck: Heart rate \_\_\_\_\_ Resp \_\_\_\_\_  
 Temp \_\_\_\_\_ Color \_\_\_\_\_ Other \_\_\_\_\_  
 Activity \_\_\_\_\_ Nursing \_\_\_\_\_

**NOTES:** \_\_\_\_\_  
 \_\_\_\_\_

### Transfer to Hospital

**When:** Antepartum \_\_\_\_\_ Intrapartum \_\_\_\_\_ Postpartum \_\_\_\_\_ Infant only \_\_\_\_\_  
**Indication:** \_\_\_\_\_  
**Results:** \_\_\_\_\_



## SELF-TEST

### True/False:

1. \_\_\_\_\_ Losing the mucous plug is a late sign of labor.
2. \_\_\_\_\_ A consistent heart rate of 120 all through a contraction is a sign of concern.
3. \_\_\_\_\_ ROP presentation is common with an anthropoid-shaped pelvis.
4. \_\_\_\_\_ General fluid pressure is part of what decreases fetal hypoxia.
5. \_\_\_\_\_ Fundal dominance is the stretching of the lower segment.
6. \_\_\_\_\_ The endocrine system slows down by 70% during labor.
7. \_\_\_\_\_ The denominator of a brow presentation is the occiput.
8. \_\_\_\_\_ At +4 station you can see the baby's head.
9. \_\_\_\_\_ Posterior asynclitism is normal for the primipara.
10. \_\_\_\_\_ Variable decelerations of the fetal heart rate is a sign of cord compression.

### Multiple Choice

11. In a vertex presentation, if the sagittal suture is transverse or oblique, but closer to the symphysis than the promontory, a specific condition exists. It is called:
  - A) posterior asynclitism.
  - B) internal rotation.
  - C) anterior asynclitism.
  - D) extension.
  - E) restitution.
12. The physiologic retraction ring occurs at the:
  - A) internal os.
  - B) external os.
  - C) level of the round ligament insertion.
  - D) junction of the upper & lower uterine segments.
  - E) level of broad ligament insertion.
13. During normal labor the uterus:
  - A) becomes thicker in all segments.
  - B) differentiates into two distinct portions.
  - C) develops a Bandle's ring.
  - D) becomes thinner in all segments.
  - E) becomes tender in the upper segment.

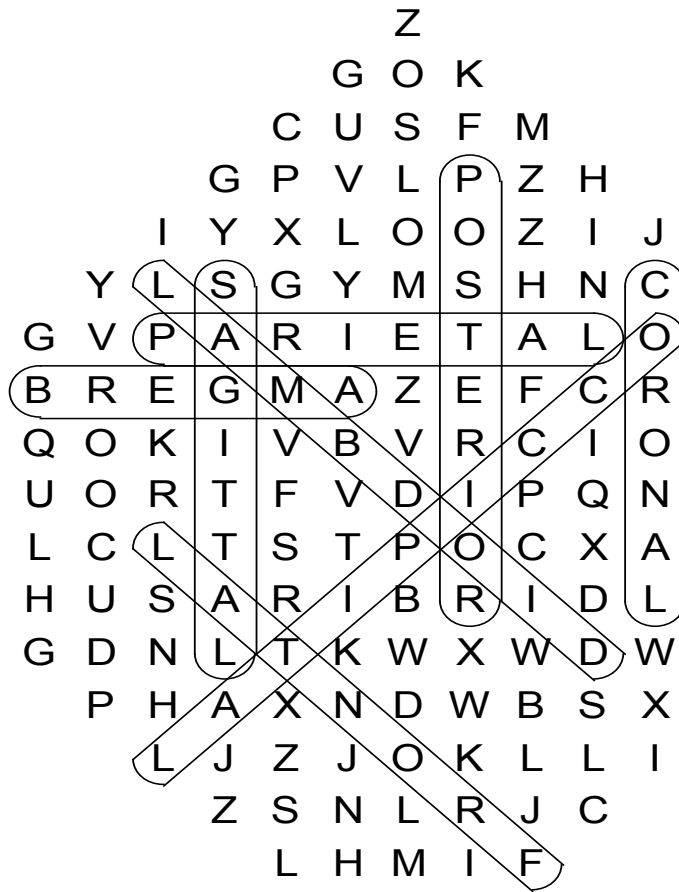
List if it is a sign of true or false labor:

14. \_\_\_ Descent or change in station.
15. \_\_\_ Contractions stay the same distance apart.
16. \_\_\_ Contractions get stronger and longer.
17. \_\_\_ Sleep or sedation does not stop labor.
18. \_\_\_ Head is ballotable between contractions.
19. \_\_\_ Contractions are irregular.
20. \_\_\_ Walking increases intensity.

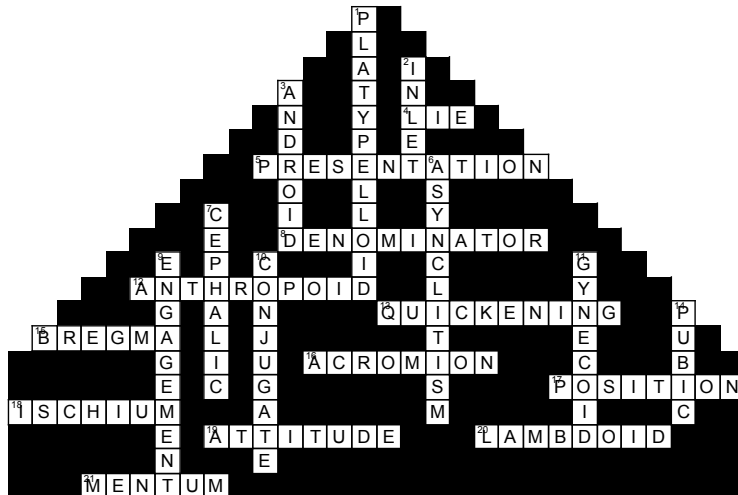
### Answers:

Fetal Skull Word Search

PUZZLE ANSWER KEY



Feto-Pelvic relationship



# Chapter 11

## Placenta & Postpartum

### OBJECTIVES

*After completing this chapter, the student should be able to:*

1. Describe the structure of the placenta.
2. List the functions of the placenta.
3. Identify the signs of placental separation.
4. Describe normal third and fourth stage management.
5. Describe the process and normal progress of uterine involution.
6. List the changes to body systems during the postpartum period.
7. List common postpartum discomforts, causes and comfort measures.
8. Describe what is involved in postpartum follow up care.
9. Explain how to give a six-week postpartum exam.
10. Identify the degree of perineal laceration.
11. Identify the four stages of maternal role attainment.
12. Describe types and kinds of postpartum mood disorders.



## POSTPARTUM KEY TERMS

*Define these terms:*

1. Orthostatic
2. Dyspareunia
3. Boggy uterus
4. Postpartal chill
5. Ecchymosis
6. Diastasis recti
7. Uterine atony
8. Involution
9. Diuresis
10. Diaphoresis
11. Homan's Sign
12. Hematoma

## THE PLACENTA

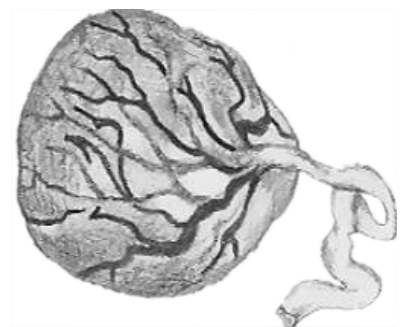
The placenta is the primary organ of fetal life support. The functions of the placenta are:

1. **Respiratory** – The fetus receives its oxygen supply from oxygenated maternal arterial blood. Oxygen is carried to the placenta in maternal blood in the form of **oxyhemoglobin** ( $\text{HbO}_2$ ). The oxygen then gets passed to the fetus for its use. Then carbon dioxide ( $\text{CO}_2$ ) is passed back to the mother. This is all done through diffusion, and no blood is exchanged.
2. **Nutritional** – This function is also called **alimentary or digestive**. All food products pass through the placenta to the fetus. The placenta breaks down complex foods into simpler compounds for easier assimilation by the fetus. For example, the placenta further breaks down proteins into amino acids. Fat soluble vitamins (A, D, E) are stored in the placenta and are passed through slowly. Fats, lipids, and cholesterol also pass through slowly. Some substances are transported by active transport, or by simple diffusion.
3. **Endocrine or hormonal** – There are hormones that are yet to be identified that are present in the placenta. Many hormones are produced by the feto-placental unit, a complex interaction between fetal endocrine glands and the placenta. Placental hormones includes: *progesterone, estrogens, human chorionic gonadotrophin (HCG), human placental lactogen (HPL), human chorionic somatomammotrophic hormone (HCS), adrenocorticotrophic hormone (ACTH), and melanocyte stimulating hormone (MSH)*.
4. **Storage-Barrier** – The placenta stores some substances before passing them on and acts as a barrier for most bacterial organisms. Viruses, however, pass through easily. As a filter, the placenta functions poorly, as all drugs and other potentially harmful substances are passed to the fetus. It is therefore especially important that pregnant women avoid alcohol and all other potentially dangerous substances including drugs, except as prescribed for indicated conditions.
5. **Excretory** – The placenta aids the process of excreting  $\text{CO}_2$  from the fetal blood.

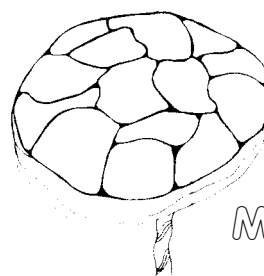
### STRUCTURE OF THE PLACENTA

The placenta is composed of chorionic villi and blood vessels which contain fetal blood. The chorionic villi are embedded in the decidua basalis area of the decidua. The choriodecidual spaces contain maternal blood. There are two surfaces:

1. The **FETAL SIDE** of the placenta is the surface that is nearest the fetus. The insertion of the umbilical cord, and the branches of the umbilical veins and arteries are located on the fetal side. It is covered with two membranes, the chorion and the amnion, which tuse together to form the sac, the sac contains the fetus and the amniotic fluid.
2. The **MATERNAL SIDE**, which is attached to the decidua, contains many lobules called *cotyledons*. The cotyledons are separated by furrows known as *sulci*. Frequently, there is a whitish, gritty substance on the maternal side of the placenta called *calcareous deposits*.



FETAL SIDE



MATERNAL SIDE

## THE PLACENTA AND THIRD STAGE

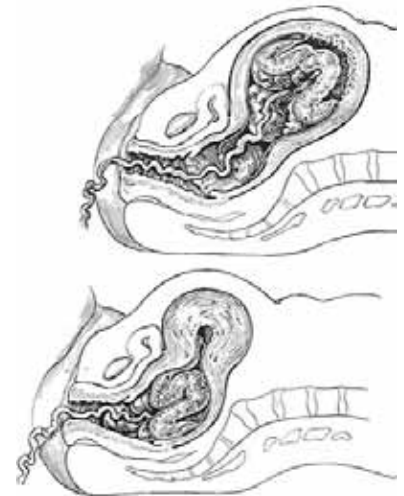
During labor, the uterus begins the placental separation process by reducing and compressing its size, which is completed after the birth (usually within ten minutes, but sometimes longer). The uterine contractions and retractions thicken the wall of the uterus and reduce the upper uterine segment, so the area at the placental site is diminished. The placenta becomes thicker and more compact.

After the baby is born, the uterus contracts, causing the placenta to detach from the uterine wall. A small amount of bleeding (30 to 60 cc.) usually occurs with separation. If the placenta does not separate totally, hemorrhage can occur. After separation and delivery of the placenta, the uterus contracts strongly, and various mechanisms take place that will prevent the excessive loss of blood.

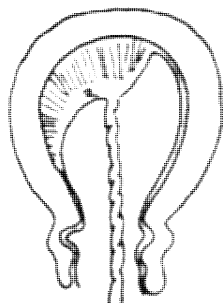
If the birth attendant tries to deliver the placenta before complete separation has occurred, hemorrhage and/or retained placenta may occur. Patience and observation are your most important tools during third stage.

### SIGNS OF PLACENTAL SEPARATION:

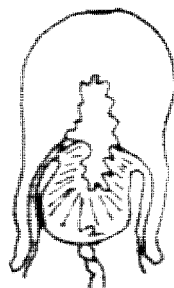
1. **Cord lengthening** — This is the most reliable sign. A hemostat placed near the vulva can help determine the amount the cord lengthens.
2. **A small gush of blood** (30-60 ml.) occurs as the placenta separates. However, bleeding does not always indicate that separation is completed.
3. **The uterus becomes more globular shaped.** As the placenta drops into the lower segment, the uterus rises above the umbilicus. When checking the fundus during third stage, be very gentle; no fundal pressure or massage is used until the placenta is delivered.



*Uterus Changing Shape*



ATTACHED



SEPARATED

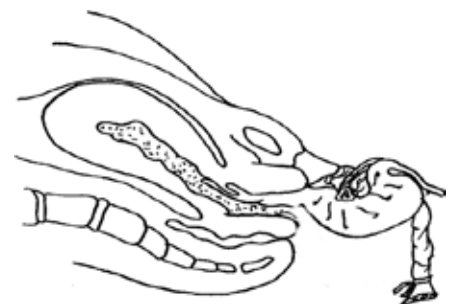


3RD STAGE  
COMPLETE

When the placenta delivers fetal side first, it is called the



SCHULTZ MECHANISM



When the placenta delivers maternal side first, it is called the  
DUNCAN MECHANISM

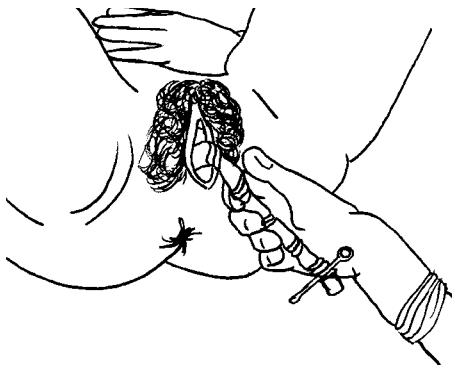
## NORMAL THIRD STAGE CARE

### Immediately following birth:

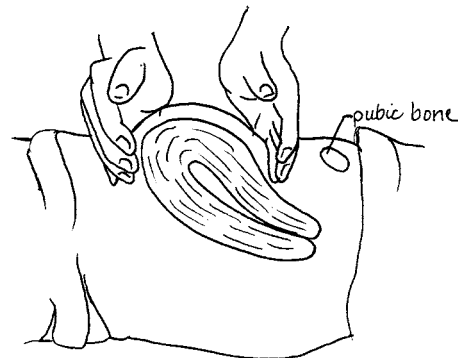
*(While assistant is observing and caring for newborn)*

1. **Measure & chart blood loss.** Observe for signs of placental separation, cord lengthening, shape of uterus, gush of blood. Average total blood loss is 250-500 cc (1-2 cups).
2. **Monitor and chart mother's vitals.** Pulse checked very often, blood pressure initially and every 15 minutes if no problems. Pulse will show changes first. Do not massage fundus with placenta still in.
3. **Encourage baby to nurse.** If baby is not interested in nursing immediately, provide nipple stimulation if is placenta delayed.
4. **Wait for the placenta to separate.** Be patient, but if it is fully separated, get it out. It may take anywhere from 1 to 30 minutes. After placenta has separated, pay attention to uterine contractions, by palpation and mother feeling a cramp. A full bladder may slow placenta delivery.
5. **Gentle cord traction.** With mother pushing, contractions present, and placenta completely separated, slow, steady cord traction will deliver the placenta. Do not pull too hard and rush delivery, or delay too long, which increases blood loss. Twist entire placenta 3 times as it is coming out and very slowly and gently allow trailing membranes to deliver. Squatting is sometimes done to deliver the placenta, but it can present problems if the woman is faint or light-headed. Chart time and type of placental delivery.
6. **Fundal massage immediately after the placenta is out.** This will expel clots or placenta pieces before cervix closes, as well as help clamp uterus down to prevent hemorrhage. Massage firmly while "guarding" the uterus (from inversion) with your other hand.

### CONTROLLED CORD TRACTION



### MASSAGING WHILE GUARDING THE UTERUS



### THIRD STAGE EXERCISE

1. What are the three signs of placenta separation?
2. If the placenta is delayed, what do you check for?
3. How long can you safely allow the placenta to stay in?

## PHYSIOLOGIC &amp; ACTIVE MANAGEMENT OF THIRD STAGE

	Physiologic Management	Active Management
Define and give examples		
Advantages or possible benefits		
Disadvantages and/or risks		



## NORMAL FOURTH STAGE CARE

1. **Observe, measure, and chart blood loss.** Tinctures or herbs may be given to prevent excessive blood loss. Monitor and chart pulse and BP every 15 minutes if no problems.
2. **Push fluids.** Herb tea (shepherd's purse, alfalfa), water, fruit juice. At least 2 quarts should be drunk during the first 3 hours to replace lost fluid volume.
3. **Prevent distended bladder.** It may encourage uterine atony.
4. **Examine perineum and vagina for lacerations.** Repair if needed.
5. **Chart orthostatic pulse, when the mother gets up for the first time.** Watch for lightheadedness, dizziness. Midwife should stay a minimum of two hours postpartum, longer if necessary.
6. **Examine placenta.** Wear gloves, and be careful not to come in contact with blood. Look for missing pieces or chunks. Examine both sides. Also examine membranes for missing pieces.

### THIRD & FOURTH STAGE EXERCISE

1. List tasks of the primary midwife during third and fourth stage.

2. List tasks of the apprentice/assistant midwife during third and fourth stage.

## POSTPARTUM PHYSIOLOGY

There are numerous physiologic changes which occur, from immediately following the birth through the first six weeks, that return a woman to a non-pregnant state. This period of time is also called the puerperium.

**The Integumentary System:** Stretch marks and the linea negra fade, and there may be temporary hair loss. There is usually diaphoresis due to an accelerated metabolic rate and the body's need to excrete the extra plasma volume.

**The Musculo-skeletal System:** Occasional pain in the coccyx remains following birth. Sore muscles may be present for a day or two after birth. Joints and ligaments loosened during pregnancy regain their tone, improving joint stability.

**The Respiratory System:** With the diaphragm no longer pushed up by the fundus, any shortness of breath should go away immediately.

**The Urinary System:** There is an increase in diuresis during the first few days. Stress and trauma during birth may swell the urethra, making urination difficult immediately after birth. There may be stinging and pain from periurethral tears. Stress incontinence may occur due to the stretching of the pelvic floor muscles.

**Gastrointestinal System:** Commonly there is a delay in bowel movement for two or three days after the birth, allowing time for the area to heal. The strain of second stage may aggravate hemorrhoids, if present.

**Nervous system:** Shaking or Postpartal Chill is very common immediately following delivery. It may be a hormonal stress reaction or from fluid loss.

**Cardiovascular System:** Platelets and white blood cells increase to protect the woman from hemorrhaging. However, this can increase the risk of thrombosis, especially if varicose veins are present. Plasma volume decreases back to pregravid levels.

**Endocrine System:** Progesterone levels decrease with prolactin produced by breastfeeding. Thyroid levels can fall, leading to postpartum depression. Mood swings are common from the huge hormonal fluctuations.

**The Reproductive System:** Immediately following the birth of the baby and delivery of the placenta, the uterus contracts, constricting the blood vessels, and involution begins. Involution is the process of the uterus returning to its pre-pregnant state. Much of this process is caused by autolysis. In autolysis, the myometrial muscle cells, uterine muscle protein and connective tissue collagen, which have built up and strengthened the uterus during pregnancy, are broke down into simpler compounds by enzymes that dissolve most of the muscle fibers.

## INVOLUTION

On day one (immediate postpartum), the fundus is at or just below the umbilicus. The fundus will reduce its size about one finger breadth (1cm) per day until the 10th day, when it is no longer able to be palpated. It weighs 1000 grams immediately postpartum, 500 grams at seven days, 350 grams at 14 days. The cervix closes over the next two weeks.

Along with the reduction in size, the superficial layer of the decidua necroses, or dies, and is discharged in the vaginal flow, or lochia.

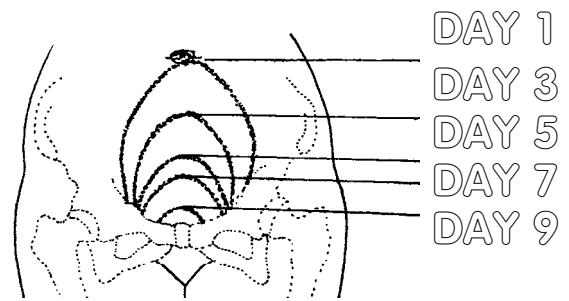
**Lochia** is the vaginal discharge from the uterus following birth. It consists of blood from the placental site, shedding decidua, vaginal epithelial cells, leukocytes, and erythrocytes. Initially, it is dark red with both fresh and old blood; this is called **Lochia Rubra**. This stage lasts 2-3 days and, after the 1st day, the quantity may approximate a menstrual period. **Lochia Serosa** is the stage from about the third to the tenth day. The discharge is pinkish in color, with occasional red. **Lochia Alba** is the whitish-yellow discharge that persists on and off from 10 days to 6 weeks postpartum. Some women experience a return to the reddish lochia rubra at 3 or 4 weeks, or with an increase of physical activity or sexual intercourse. However, bright red blood, tender uterus, large clots, or heavy bleeding may be indicative of retained placental fragments or a late postpartum hemorrhage.

**After-cramps** (or after-pains) are the periodic contractions which can be felt by the mother, which contract the uterus, aiding the process of involution and reduction of blood flow. Usually, the more children a woman has borne, the more painful the cramps. They generally occur with breastfeeding and can be quite uncomfortable, as breastfeeding stimulates oxytocin production, thereby contracting the uterus. Heating pads, etc., should not be used to relieve discomfort, because the uterus needs to contract. However, calcium, red raspberry and St. John's wort tea are recommended. Ibuprofen can be given if cramping is severe.

The **perineum** is very sore after delivery but gradually improves over the next several days. Small lacerations, skin splits, are very common. Larger lacerations or episiotomy repairs may be present. Vascularity is very high in this region, and it usually heals very quickly.

The **breasts** usually increase in size, more so on day 3-5 when the milk comes in.

**Menstrual periods** do not resume for about a year in mothers who breastfeed through the night, due to the hormones that suppress ovulation. Mothers who work, feed the baby solids early, and/or do not sleep with their babies ovulate earlier. Some women have some lochia rubra which can be mistaken for a period, six to seven weeks after delivery. A side effect of suppressed ovulation is diminished libido. In addition, breastfeeding hormones can reduce vaginal blood flow or increase vaginal dryness, which can lead to painful intercourse.



UTERUS DAY 1



UTERUS DAY 6

POSTPARTUM PHYSIOLOGY EXERCISE				
Describe the physiological changes that occur in the postpartum period.				
	1st 24 hours	1-3 days	3-10 days	10days - 6 weeks
Vital Signs				
Urinary system				
Gastrointestinal system				
Endocrine system				
Renal system				
Uterus				
Vagina/ Perineum				
Lochia				

## PERINEAL CARE

Women often have perineal tears or lacerations to some degree after birth. Midwives work very hard to prevent tears, but sometimes a quick delivery, a big head, or weak tissues can lead to lacerations. Episiotomies are rarely done by midwives; and with evidence showing they often cause more trauma than simple lacerations, they are no longer as common in hospital settings. Perineal lacerations may range from what is called “skid marks”, or skin splits, which are mild, all the way to fourth-degree tears. First-degree tears are often not sutured. Deeper lacerations that are not sutured, or that are sutured improperly, or that get infected, can cause problems such as urinary or rectal incontinence, fistulas, cystoceles, rectoceles and/or have long-term impact on sexual function.

Whenever lacerations are present, it is the midwife’s responsibility to assess the degree of the tear, suture if needed or refer the mother to someone else for repairs. Most home-birth midwives do not repair fourth-degree lacerations. In addition to the immediate care of the perineum, midwives observe for proper healing, may use herbs to assist healing, or use other comfort measures.

### CARE FOR PERINEAL TEARS

1. To prevent stinging and burning during urination, use a peri-bottle to squirt warm water or herb tea (sage, urvi usi) over the area.
2. Keep area as clean and dry as possible; change pad often.
3. Use ice packs the first 24 hours. Wet and freeze menstrual pads when you first get to the birth; they make great ice packs.
4. After 24 hours, use warm water sitz baths with herbs or plain water for comfort.
5. Do not use powdered herbs such as goldenseal, or herbal salves directly on tears; they can impede healing or create growth medium for bacteria.
6. Mother should not squat or sit cross-legged. Avoid climbing stairs if possible. If there is a high bed, use a step stool.
7. “Tucks” or witch hazel pads can help with itching while healing.

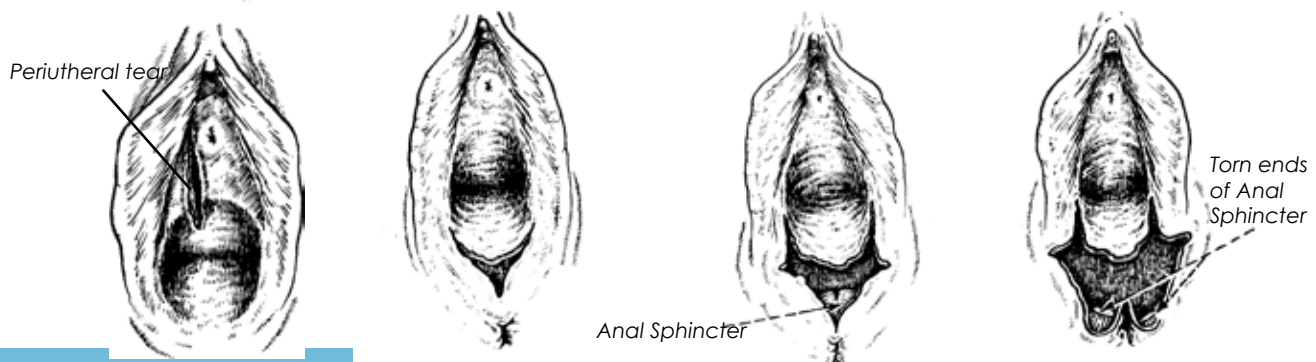
### PERINEAL LACERATION DEGREES

**First degree:** involves the fourchette, hymen, labia, skin, vagina, vulva.

**Second degree:** involves the pelvic floor, perineal muscles, vaginal muscles.

**Third degree:** involves the anal sphincter, rectovaginal septum.

**Fourth degree:** involves the anal mucosa, rectal mucosa.



1ST DEGREE

2ND DEGREE

3RD DEGREE

4TH DEGREE

## EVALUATING PERINEAL HEALING

In the course of postpartum care, the laceration or repair should be checked for healing. While sore, there should not be excessive pain, redness, swelling, pus or drainage, nor a foul odor. The mother should not be running a fever nor feeling malaise (feeling ill). The REEDA scale is a method of determining the degree of perineal healing. It uses the criteria of redness, edema, ecchymosis, drainage and approximation to evaluate healing. This is checked by examining the perineum. Use gloves and a flashlight, with the woman lying on her back or side.

REEDA SCALE					
Points	Redness	Edema	Ecchymosis	Discharge	Approximation
0	none	none	none	none	closed
1	within .25 cm bilaterally	perineal, < 1 cm	within .25 cm bilaterally or .5 cm unilaterally	serum	skin separation < 3mm
2	within .5 cm bilaterally	perineal or vulval between 1-2 cm	between .25-1 cm bilaterally or .5-2 cm unilaterally	sero-sanguineous	skin and subcutaneous fat separation
3	> .5 cm bilaterally	perineal or vulval >2 cm	>1 cm bilaterally or > 2 cm unilaterally	bloody, purulent	skin and subcutaneous fat and fascial separation
<b>score</b>					

### PERINEUM EXERCISE

Complete the following:

1. If a laceration goes through the anal sphincter, it is a \_\_\_\_ degree tear.
2. If a laceration goes through the vaginal mucosa to the perineal muscle, it is a \_\_\_\_ degree tear.
3. If a laceration involves the anal sphincter, it is a \_\_\_\_ degree tear.
4. If a laceration goes through the perineal muscle to the anal sphincter, it is a \_\_\_\_ degree tear.
5. If the perineum has some bloody discharge, is open about 4 mm, is red about .5 cm on both sides, has no swelling or bruising, the REEDA score is \_\_\_\_.
6. If the perineum has no discharge, is open about 2 mm, is red about .25 cm on both sides, has about 1 cm of edema, and 3 cm of bruising, the REEDA score is \_\_\_\_.
7. If the perineum has a serum discharge, is open to the fascia layer, is red about 1 cm on both sides, has about 2 cm of edema on all sides, and 2 cm of bruising, the REEDA score is \_\_\_\_.

## Postpartum Word Search

U  
 O Z V  
 K A C V O  
 E D B I T I H  
 H E U L C E N N O  
 T E S N A R Y U O T I  
 F R W B C R X I U A N B  
 X G V J A H N H H V U S  
 U I H A N S U Q O X B N  
 L T T A U T O L Y S I S  
 V W G A R B U R T T Q D  
 U Y P U J T J A E Z R V  
 F J W W I Y L F Y S T A  
 K Q O B Z K N C F W T  
 N L K Q K N W Q L

1. The stage of lochia 10 days to six weeks postpartum
2. The enzymatic digestion of excess cytoplasm and thrombosis.
3. When the placenta is delivered maternal side first
4. When the uterus returns to its prepregnant state
5. A score method of checking vaginal the perineum for healing
6. The name of the lochia the first 3-4 days postpartum
7. When the placenta is delivered fetal side first
8. the stage of lochia from 4-10days postpartum

## MATERNAL POSTPARTUM ASSESSMENT

A usual postpartum visit schedule is one home visit at 24 hours and one at three days, with a newborn visit at 2-3 weeks and postpartum visit at 5-6 weeks. More visits may be scheduled for those women who have had problems, some midwives routinely include more postpartum visits.

### 24 HOUR VISIT:

Note and chart the following:

**Breastfeeding** – Should be well established, although often the milk is not yet in.

**Uterus** – The fundus should be felt just under the umbilicus not tender to the touch, although upon palpation, cramping may occur.

**Bleeding** – Lochia should not be excessive, although loss of a few large (egg size) clots are pretty usual at this time.

**Perineum** – Review perineal care instructions with mother; ask about pain or irritation. Exam for hematomas or signs of infection.

**Vital signs** – Temperature, pulse, BP all should be normal.

**Rest and Activity** – Should be getting enough rest, may be a little sore but should be able to get up and around with no problems such as dizziness or pain.

**Elimination** – Ask about bowel movements; may not occur for a few days following birth due to the labor; should be urinating normally; burning or stinging may be present but not serious pain.

**Eating & Drinking** – She should have a good appetite and be thirsty when nursing.

**Bonding** – Mother should be making eye contact with baby, holding baby close to body, cooing or speaking softly to the baby.

**Feelings** – How does she feel about the birth? The midwife may be able to explain or clarify things that occurred during the birth that will be helpful.

If not already done, fill out and have the mother sign the **birth certificate**.

### THREE-DAY POSTPARTUM EXAM:

Chart all of the following:

**Breastfeeding** – The milk should be in. Engorgement may be a problem.

**Uterus** – The fundus should be felt halfway between the umbilicus and the pubis. It should not be tender to the touch; cramps should be minimal including after-cramps.

**Bleeding** – Lochia should be tapered off and not more than an average menstrual period.

**Perineum** – Examine the perineum for healing under good light; no edema, inflammation, or signs of infection should be present. Some itching is normal at this stage.

**Vital Signs** – All should be normal.

**Rest and Activity** – May be resuming some of her normal household activities, still taking naps and getting adequate rest.

**Elimination** – Bowel movements should have resumed. If not, a stool softener may be indicated. No significant amount of pain or burning during urination is usually present by the third or fourth day.

Be respectful of the family's choices and beliefs. Women of different cultures have various customs, routines and expectations in the immediate postpartum period; examples include special foods or drinks, avoiding hot or cold, and involvement with family members.



**SIX-WEEK POSTPARTUM EXAM:**

Assess overall condition. Note if there has been illness or infection in postpartum period; viruses, colds, flu, infections, and fever.

**Vitals:** Blood pressure, weight, temperature, pulse.

**Lab:** Hemoglobin/Hct, PAP (if needed).

**Emotional/mental state** – How is mom feeling? How is her partner relating? Is there support from family or friends? Does she have other children? How are they doing with new baby? Does mom feel under stress; have help with household chores; have any time to herself? Is she depressed or sad? How does she feel her birth went?

**Bonding**--Does mom: call baby by name; express disappointment in sex of baby; hold infant close; make eye contact; be affectionate with baby; appear resentful or insecure with baby?

**Rest & sleep** – Where does baby sleep? How many hours does baby sleep at night? Is baby awake or fussy at night? Is mom able to nap during the day?

**Nutrition** – Is mom continuing her prenatal vitamins or taking others? Does her dietary intake include sufficient calcium, protein, calories, iron? Does she have help with meal preparation? Is she getting sufficient fluid intake?

**Breastfeeding** – Is baby: gaining appropriate weight; appearing well-nourished and hydrated; nursing full-time; taking bottle or supplements (if so, why, what, & how much)? Is mother apprehensive or nervous about breastfeeding or about exposing her breasts while nursing? How long does she plan to breastfeed? Does she have: soreness or pain with nursing; cracked or bleeding nipples; hard, engorged breasts?

**Sex and contraception** – Has she resumed intercourse? Is there pain or discomfort? Does she have a plan for birth control? Does she need information, education, or referral for contraception?

**Elimination** – No constipation or urinary discomfort should be present.

**Abdomen** – Check for *diastasis recti*: This is a separation of the rectus muscle of the abdominal wall which may occur during pregnancy, especially in women with poor muscle tone. Begin by palpating the area below the umbilicus to the pubis, then above the umbilicus to the xiphoid process. Check first in a state of relaxation then. Then have mother lift her head while lying on her back and feel again. If separation is present, it is measured and charted by cms above and below umbilicus. It is usually charted, e.g., diastasis 6 cm (length) X 1 cm (width).

**Kidneys** – No Costo-Vertebral Angle (CVA) tenderness should be felt.

**Lungs** – Should sound clear with no fluid.

**Breasts** – Should be soft; prominent veins are normal, nipples should not have cracking or bleeding. Slight asymmetry between the two breasts is normal.

**Uterus** – Should be unable to be palpated.

**Lochia** – By six weeks, it should be about gone or only a slight increase in discharge. Occasionally, lochia rubra appears up to eight weeks and is frequently mistaken for menses.

**Vagina, perineum, & anus** – Any lacerations or episiotomy should be well healed. No cystocele or rectocele should be present. Muscle tone is evaluated by having woman Kegel with examiner's finger inside. No irritation or redness, or abnormal discharge. Hemorrhoids are noted if present.

**Cervix** – The os should be a closed, lateral slit. Blood or lochia is sometimes noted on inspection.

**Lower Extremities** – There should be a negative Homan's sign, and no tenderness or warmth should be felt. Homan's sign checks for thrombophlebitis. It is done with the woman's legs stretched out and relaxed. The foot is then grasped and dorsiflexed. No pain or discomfort should be felt.

## POSTPARTUM RECORD

..... # \_\_\_\_\_

Mother's Name \_\_\_\_\_  
L & D Complications \_\_\_\_\_

Baby's Name \_\_\_\_\_  
DOB \_\_\_\_\_ Time \_\_\_\_\_ Birth wt. \_\_\_\_\_

Date _____	Day/hrs PP _____	<b>1ST VISIT</b>	Phone _____	Home _____	Office _____	Hosp. _____
<u>MOTHER</u>			<u>BABY</u>			
Temp _____	BP _____		General _____	Color _____		
Pulse _____	Lochia _____		Lungs _____	Heart _____		
Fundus _____	Pain _____		Resp. _____	Temp. _____		
Urine _____	BM _____		Urine _____	BM _____		
Rest _____	Fluids _____	Cord _____	Eyes _____			
Activity _____			Activity _____	Reflexes _____		
Breasts/nursing _____			Feeding _____	Wt. _____		
Perineum _____			Birth Cert. _____	PKU _____		
<b>Notes</b> _____						
_____						
<b>Examiner</b> _____						

Date _____	Day/hrs PP _____	<b>2ND VISIT</b>	Phone _____	Home _____	Office _____	Hosp. _____
<u>MOTHER</u>			<u>BABY</u>			
Temp _____	BP _____		General _____	Color _____		
Pulse _____	Lochia _____		Lungs _____	Heart _____		
Fundus _____	Perineum _____		Resp. _____	Temp. _____		
Urine _____	BM _____		Urine _____	BM _____		
Rest _____	Fluids _____		Cord _____	Eyes _____		
Activity _____			Activity _____	Reflexes _____		
Breasts/nursing _____			Feeding _____	Wt. _____		
<b>Notes</b> _____						
_____						
<b>Examiner</b> _____						

Date _____	Day PP _____	<b>3RD VISIT</b>	Phone _____	Home _____	Office _____	Hosp. _____
<u>MOTHER</u>			<u>BABY</u>			
HCT/Hg _____	BP _____	Weight _____	General _____	Color/jaundice _____		
Lochia _____	Perineum _____		Weight _____	Length _____		
Activity/job _____			Head _____	Activity _____		
Breasts/nursing _____			Feeding _____			
<b>Notes</b> _____						
_____						
<b>Examiner</b> _____						

Date _____	Week PP _____	<b>6 WEEK</b>	Phone _____	Home _____	Office _____	Hosp. _____
<u>MOTHER</u>			<u>BABY</u>			
Pelvic exam _____			Weight _____	Length _____		
Breasts/nursing _____		Weight _____	Feeding _____			
Lab _____			General _____			
BC plan _____			Pediatrician _____			
<b>Notes</b> _____						
_____						
<b>Examiner</b> _____						

## POSTPARTUM EXAM EXERCISE

Complete the following chart for a physical exam on postpartum woman:

Area Examined	Normal Findings	1-6 hrs	24 hrs	72 hrs	6 wks
Vitals					
Weight					
Breasts; Nipples					
Perineum; Vagina					
Cervix					
Lungs					
Abdomen					
Skin					

POSTPARTUM DISCOMFORTS EXERCISE				
Complete the following:				
Describe/Define	When it occurs	Cause	Treatments	Risks or Danger Signs
<i>Afterpains</i>				
<i>Perineal discomfort</i>				
<i>Hemorrhoids</i>				
<i>Difficulty urinating</i>				
<i>Shaking</i>				
<i>Varicose veins</i>				
<i>Night sweats</i>				
<i>Fatigue</i>				
<i>Constipation</i>				
<i>Stress incontinence</i>				
<i>Diastasis recti</i>				
<i>Sore Muscles</i>				

## POSTPARTUM ADJUSTMENT

Holistic postpartum care is more than assessing the mother and baby for potential problems; it involves the whole family and how they integrate the baby into their lives. When a mother feels nurtured and cared for, it has a positive impact on her parenting and her relationship with her baby, her partner and her entire family.

Women, particularly with the first baby, count on their midwives for advice, attention and care during the postpartal period. As her care for the mother ends, the midwife helps the mother make a smooth transition into motherhood and helps the family integrate the baby into their lives. The midwife has established a unique relationship with the new family; she should know about the support system, the plans for who is returning to work and when. She will know what kind of household help the mother has or whether she belongs to a church or community that brings meals the first few days or week. Does she have family visiting to help? Does she have help with the other children?

On follow-up visits, the midwife can assess how well the mother is bonding with the baby, how breastfeeding is going, or if the mother is stressed or depressed. The midwife should not be above helping out herself; sometimes folding laundry or doing a load of dishes while chatting with the woman may be the most helpful thing.

The midwife may not be able to provide all the support services a new parent needs, but she should know the community resources, and have referrals for postpartum doula care, if her service does not provide it. She should know the local parenting support groups, La Leche League meeting times and other resources for new parents. Clients trust and respect their midwives and are open to learning. Through education, midwives can foster bonding and positive parenting that will make a lifelong impact on the child's and family's lives.

It is important for the midwife to have knowledge of how the postpartum physical changes impact the emotions, as well as learning common psychological responses and changes women typically make in the postpartum period.

### MATERNAL ROLE ATTAINMENT

In 1985, Ramona Mercer theorized the process in which women learn mothering behaviors and are comfortable in the role of mother. This process follows four stages of acquisition:

1. **Anticipatory Stage:** Occurs during pregnancy. She looks to other mothers and her own mother for role models. There is social and psychological adaptation to what is expected.
2. **Formal Stage:** Begins when baby is born. The mother looks to others for guidance: her own mother and others in her social system or network.
3. **Informal Stage:** Begins when the mother starts making her own choices about mothering. She develops her own style of mothering, not conveyed by her mother nor the social system.
4. **Personal Stage:** Final stage, when she is comfortable in her role as a mother. She has confidence and competence and experiences the joys of motherhood.

## POSTPARTUM ADJUSTMENT EXERCISE

Answer the following:

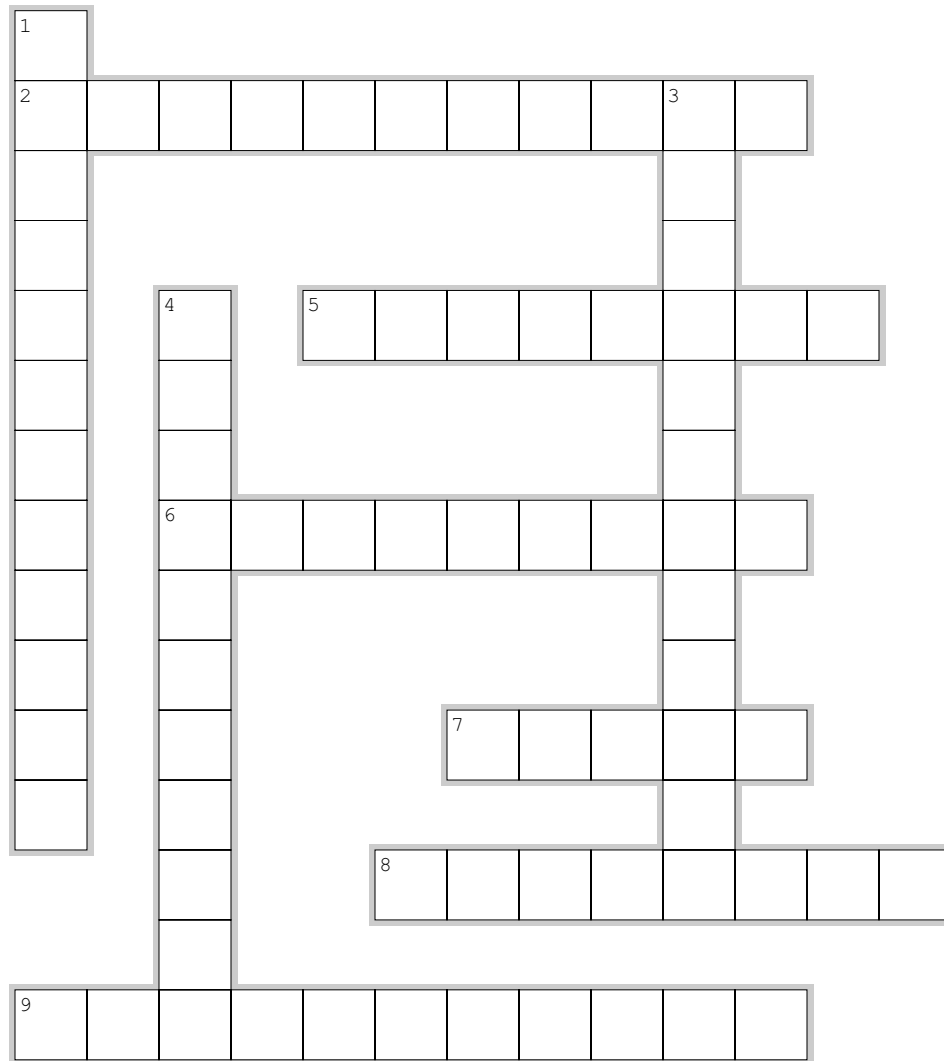
1. How are families with new babies today different than in the past?
2. Describe the four stages of maternal role attainment.
3. List some stressors a new parent may experience and some prevention strategies.
4. How can families with older siblings help them adjust to the new baby?
5. What are some signs that the mother is not bonding, is depressed, stressed, or is not making a healthy adjustment?

## POSTPARTUM SEXUALITY EXERCISE

Answer the following:

1. How does a woman's body image and sexuality change after giving birth?
2. How might a couple's relationship change after the birth?
3. When should sexual intercourse resume after delivery?
4. How will you bring up sexual issues in postpartum care?
5. How can you prepare a woman and her partner for a change in libido or sexual function?
6. What practical advice can you give a woman?
7. What practical advice can you give a woman's partner?

## Postpartum Crossword



### Across

2. Standing upright after sitting or lying down
5. Mass of blood that forms in a tissue
6. The most serious type of postpartum mood disorder
7. Boggy uterus
8. Excess urination
9. Painful intercourse

### Down

1. normal for the first few days after delivery
3. The inability to control excretory functions
4. sweating



## POSTPARTUM EMOTIONS

**Postpartum Mood Reactions** also called postpartum depression or “baby blues”, affect as many as 75% of new mothers. About 10% of new mothers experience a longer, more severe depression, starting about 2-4 weeks after the birth and lasting a much longer period. Twenty-five percent or more are still depressed at the baby’s first birthday. Although women who have a history of depression or emotional problems are at added risk, there is a physiological and biochemical component to this condition, which can affect anyone. Low thyroid function is a common cause and is easily checked.

Women can experience episodes of sadness, irritability, anxiety, headaches, weeping or difficulty sleeping. More extreme symptoms can include sleep disturbances, guilt, mood swings, weight changes, appetite changes, hostility, profound feelings of hopelessness, inadequacy, and a general disinterest in life.

The mild form of “baby blues” often begins about the third day and is usually over within two weeks of the birth. More serious postpartum mood disorders can have a profound effect on the entire family if unrecognized or untreated.

Some women with postpartum depression have found help in counseling or medical treatment with antidepressant drugs and postpartum depression support groups. Additional education and compassion are needed for women experiencing postpartum depression.

POSTPARTUM MOOD DISORDERS EXERCISE			
<i>Complete the following:</i>			
Define Disorder	Time of Onset	Identifying Symptoms	Risk Factors
Postpartum Anxiety			
Panic Disorder			
Postpartum Depression			
Postpartum Psychosis			

## SELF-TEST

### True/False

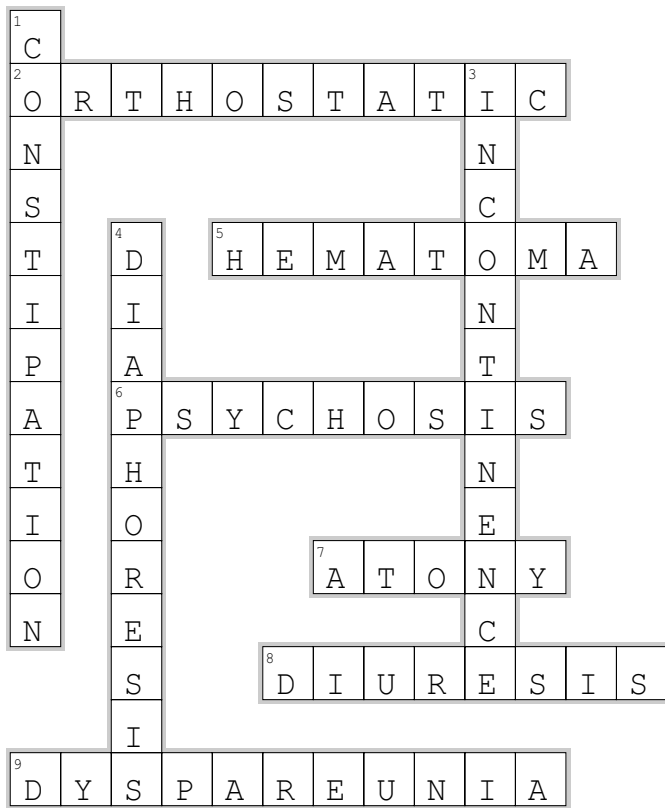
1. \_\_\_ The uterus should be about the size of a grapefruit by the two-week postpartum visit.
2. \_\_\_ The placenta acts as a filter to protect the baby from harmful substances ingested by the mother.
3. \_\_\_ The Duncan mechanism is when the fetal side of the placenta comes first.
4. \_\_\_ A distended bladder can cause the placental delivery to become delayed.
5. \_\_\_ Lochia Alba lasts from 10 days to 6 weeks.
6. \_\_\_ A temperature over 101.5 is normal on the third day when the milk comes in.
7. \_\_\_ A laceration that goes to the anal sphincter but does not involve it is a 2<sup>nd</sup> degree tear.
8. \_\_\_ Lochia Rubra lasts from 10 days to 3 weeks.
9. \_\_\_ Breastfeeding women who do not sleep with their babies ovulate sooner than those who do.
10. \_\_\_ REEDA score is used to assess maternal/infant bonding.

### Multiple Choice

11. You are assessing a woman at the two-weeks postpartum visit. Her uterus is 1 finger's breath below her umbilicus and sore to the touch. What further assessments should you make?
  - A) Rebound tenderness.
  - B) The woman's temperature.
  - C) Homan's sign.
  - D) Check for diastasi recti.
12. In order to assess for diastasis recti, the midwife should instruct the mother to:
  - A) Perform the pelvic tilt.
  - B) Do a kegel.
  - C) Raise her head from the bed.
  - D) Relax her abdominal muscles.
13. Your client, Martha, G3, P2, had a nice homebirth and is breastfeeding well. On the second day postpartum home visit, Martha's uterus is 2 cm below her umbilicus. This is a result of:
  - A) Normal involution.
  - B) Subinvolution.
  - C) Retained placental fragments.
  - D) Overdistention of the uterus.
14. The third stage of labor:
  - A) Begins with complete dilation of the cervix.
  - B) Ends when the the mother is stabilized.
  - C) Begins at the delivery of the baby.
  - D) Begins with the urge to push.
15. A third degree tear involves the:
  - A) The anal mucosa, rectal mucosa.
  - B) The anal sphincter, rectovaginal septum.
  - C) The pelvic floor, perineal muscles, vaginal muscles.
  - D) The fourchette, hymen, labia, skin, vagina, vulva.

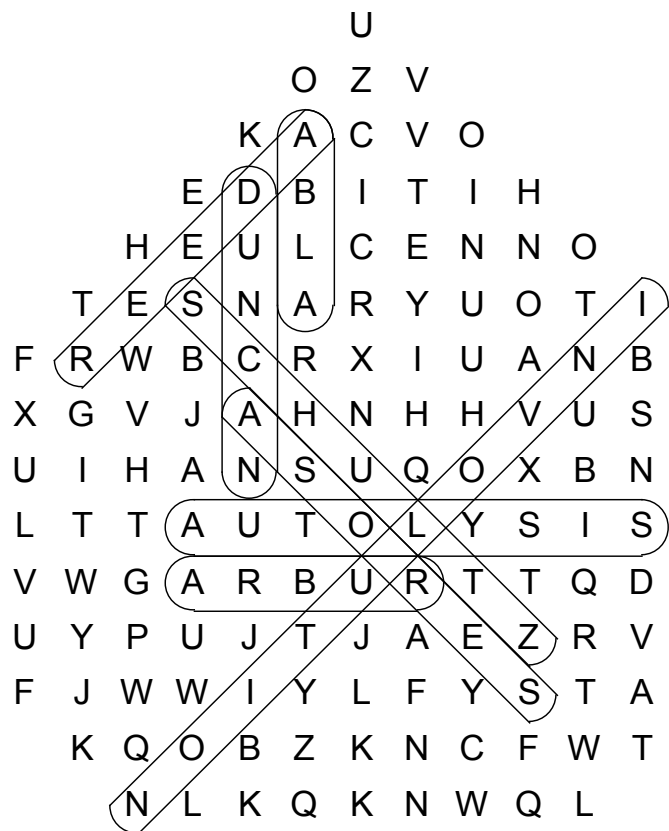
### Answers:

1. False, 2. False, 3. False, 4. True, 5. True, 6. False, 7. True, 8. False, 9. True, 10. False, 11. B, 12. C, 13. A, 14. C, 15. B.



*PUZZLE ANSWER KEY*

Postpartum Word Search



# Chapter 12

## Normal Newborn

### OBJECTIVES

*After completing this chapter, the student should be able to:*

1. Understand the midwife's role and responsibilities in the care of the neonate.
2. Describe the four factors that are thought to stimulate the newborn to take its first breath.
3. Describe the four steps in the immediate care of the newborn, including:
  - a. Preventing heat loss, including cold stress and its implications;
  - b. Clearing the airway: suction methods and pros and cons of each;
  - c. How to perform APGAR assessment, its values, and timing;
  - d. Clamping and cutting the umbilical cord.
4. Describe how to assess neonatal respirations and heart rate, and the normal values of both.
5. Define bonding, its importance, and ways to encourage it.
6. Demonstrate how to give a physical exam on a newborn, including identifying the normal newborn reflexes.
7. Determine an infant's gestational age using the Dubowitz/Ballard Score
8. Explain common procedures for the newborn, including indications, rationale, and reasons why parents might choose not to do them:
  - a. Vitamin K ;
  - b. Newborn Screening (PKU);
  - c. Circumcision;
  - d. Eye prophylaxis.
9. Identify physiologic jaundice of the newborn, and differentiate it from pathological jaundice.
10. Describe the midwives' role in newborn parent education.



*Daphne's grandson Zane whom she delivered, 9/7/2000*

## MIDWIFERY CARE OF THE NEWBORN



The midwife begins her newborn care prior to the delivery of the baby. She knows the mother's prenatal health, e.g., if she is anemic, if she smokes, or if other risk factors are present. Throughout the labor the midwife has been monitoring the fetus, and she knows if the labor was difficult, the baby may be stressed. She should know the position, the gestational age, and have an estimation of fetal weight prior to delivery. She knows how the water looked when it broke, and how the fetal heart tones have sounded all through labor. Sometimes, unexpectedly a baby is born who has trouble, but in most cases, a midwife is prepared.

As the baby is being delivered, the midwife places the baby in the mother's arms, calmly assessing the baby from there, keeping the energy peaceful and joyful. Witnessing when the parents look at their baby for the first time is part of the unique and special privileges of midwifery. Midwives respect this time as precious and work whatever care or procedures they need to do around protecting this period.

Within the first few hours after delivery, the midwife does an examination on the baby to make sure the baby is healthy. This is done with the parents in the room. If any issues come up that may need additional referral or treatment, she can explain them to the parents. Midwives follow baby and mother closely the first few days. If questions or problems come up, the midwife can answer them or give appropriate referrals.

The midwife continues her care for weeks after delivery. Along with the physical health of the baby, the midwife is observing the maternal/child attachment process to make sure that bonding is occurring. As well as newborn health care, the midwife also educates on parenting and baby care. She often teaches attachment parenting, co-sleeping, extended breastfeeding, and keeping the baby with the family as much as possible.

The midwife plays an important role in establishing and maintaining breastfeeding, one of the most important things we can do for the long-term health of the child.

The family may have very different customs or cultural beliefs about caring for the newborn. As long as nothing endangers the health or safety of the baby, those beliefs should be respected.

Because the midwife is so much more involved with the family than the typical doctor/patient relationship, the midwife may be able to assess and intervene earlier in a variety of situations; for example, women at risk for child abuse, or a baby with failure to thrive. The midwife is required under law in most states to report even suspected abuse or neglect. A baby with failure to thrive may need home visits from the public health nurse.

The midwife's role in caring for the newborn expands beyond her personal skills to networking within the community, knowing what resources are available, such as support groups and classes available for new parents.

Most midwives recommend that all newborn babies be evaluated by a physician or nurse practitioner trained in the care of newborns within the first week or two after birth. This not only is good in case there are any conditions present that the midwife may have missed, but also establishes an important connection with whomever will be the child's health care provider if the child gets sick, or who will be doing the well-baby care.

Over the next six weeks, midwifery care gradually ends, with the care of the baby transferred to another health care provider. The midwife has set a foundation, has given the parents information and resources to draw from in order to continue healthy patterns that will hopefully stay with the family life-long.

## NEONATAL KEY TERMS

Define the following:

1. Apical pulse
2. Apnea
3. Arrhythmia
4. Aspiration
5. Bradycardia
6. Central cyanosis
7. Diaphragmatic breathing
8. Flexion
9. Lanugo
10. Meconium
11. Retractions
12. Stridor
13. Transient Tachypnea
14. Tachycardia
15. Thermoregulation

## IMMEDIATE CARE OF THE NEWBORN

As soon as the baby is born, it should be placed skin-to-skin on the mother's abdomen, dried off and then covered with a warm receiving blanket. Put a cotton hat on the baby right away; a newborn loses a lot of heat through its head. Keep the baby warm. Make sure the baby is breathing well. Suction the airway if needed. Auscultate lungs. Listen to heart rate. Evaluating, suctioning, and warming and drying the baby can all be done on the mother's abdomen.

Keeping the baby on its mother helps maintain its temperature, regulates breathing, and reduces stress. For its entire existence, all this baby has known is the presence of its mother. The sound of her voice, her constant gentle movement, the sound of her heartbeat and breathing have always been there. Being separated immediately following birth from its mother is stressful to the baby and should only be done if absolutely necessary.

The baby should start breathing and crying right away, within the first minute. A little stimulus may need to be given to get the baby going. Drying vigorously with the blanket is usually all it takes, though sometimes you may need to flick the little feet. Some babies only give one initial cry; others wail away. If the baby is not actively crying, it should be pink, moving, with good heart tones and respirations. The baby should have the initial APGAR assessment done at one minute, then again at five minutes.

### *Immediate Care Steps:*

1. Baby on mom.
2. Dry and prevent heat loss.
3. Clear airway and check breathing, stimulate if needed.
4. Assess with APGAR.
5. Cut cord after pulsing has stopped and enough time has passed.

### NEWBORN'S FIRST BREATH EXERCISE

*Describe the five factors that are thought to stimulate the newborn to take its first breath.*

Mechanical Events:

Chemical Stimuli:

Thermal Stimuli:

Sensory Stimuli:

Physical Stimuli:

*If the baby is born underwater, what are important considerations that may affect the first breath?*

### KEEPING THE BABY WARM

Preventing cold stress in the neonatal period is very important. Cold stress is defined as a rectal body temperature measurement less than 97.6° F (36.5° C). Full-term neonates have a very limited ability to shiver to produce heat, and preterm infants have none. Their thermoregulatory systems are immature, making them more vulnerable to changes of environmental temperature. They rely on non-shivering thermogenesis, the oxidation of brown adipose tissue, or burning brown fat to produce heat when cold. Preterm, postdate, and small for gestational age (SGA) infants are born with very little brown fat and consequently are more prone to cold stress. These stores of brown fat help a baby regulate its temperature for the first weeks and months until the thermoregulation system matures.

Cold stress may lead to hypoxia and hypoglycemia due to the energy requirements needed to maintain body heat. Signs include poor feeding, lethargy, bradycardia, tachypnea, cyanosis, shallow and irregular respirations, apnea, feeble cry, irritability, and mottling or pallor. If unrecognized or untreated, cold stress can result in very serious and very sad outcomes.

Fortunately, cold stress is simple to prevent. Keep birthing rooms warm; drying the baby off right away is very important. Use warm receiving blankets to dry the baby; bring a heating pad to warm blankets. This can be done without separating mother and baby. If you are a little vigorous in drying off a baby, that is often all the stimulus it needs to take that first breath and cry. Be sure and discard the first wet blanket or two, and keep the baby in a dry blanket. After drying the baby, some midwives use a chux pad to wrap the baby, using the plastic backing as additional insulation.

#### HEAT LOSS EXERCISE

*Explain the methods of heat loss from the newborn's body surface to the environment:*

Convection

Radiation

Evaporation

Conduction



## CLEARING THE AIRWAY

As the baby's body is coming through the birth canal, the chest is being squeezed like a tube of toothpaste, pushing the mucous and amniotic fluid into the nose and mouth. As the body is born, the release of pressure causes the lungs to expand. The baby takes the first breath with whatever is in the nose and mouth. Using a bulb syringe or other suctioning device is a method of clearing the passages to make breathing easier, as well as preventing blood or meconium from being aspirated into the lungs. Suctioning with a bulb syringe is done routinely in most practices, as it is a very non-invasive procedure. In my experience, babies born underwater have more fluids and often need more suctioning than land-born babies. Some midwives do not use a suction device, and instead use a gauze pad to wipe away the mucous, which does a similar job. They also rely on drainage and keep the baby's head low in order to use posture and gravity to help.

For most of my years practicing, it was believed that if meconium was present, suctioning well was critically important, preventing the baby from meconium aspiration syndrome, a life-threatening condition. In these cases, as soon as the head was born, the nose and mouth were suctioned thoroughly using a bulb syringe, electronic suction or a DeLee suction device developed for that purpose. Sometimes the babies were intubated after delivery to make sure there was no meconium in the trachea or on the vocal cords that could be inhaled into the lungs. Midwives all carried and used DeLee or related suction devices. Vair and colleagues (2004) and other researchers are showing these devices may not be effective in preventing meconium aspiration syndrome as previously thought; routine suctioning and intubation of all babies with meconium is being reevaluated.



SUCTIONING WITH  
BULB SYRINGE

SUCTIONING EXERCISE		
Complete the following:		
Device	Describe how to use	Indications for use
Bulb syringe		
DeLee Trap		
Res-Q- Vac		
Electronic Suction		

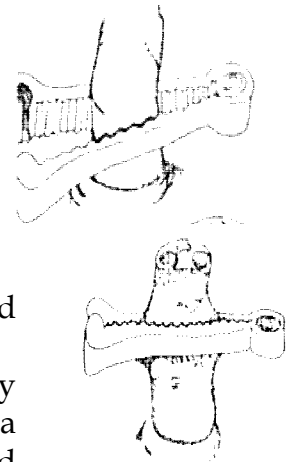
## CUTTING OF THE UMBILICAL CORD

The cord is not generally cut right away; the cord provides the baby with some additional oxygen as well as important cells. The cord is cut when it has stopped pulsing, or sometimes not until after the delivery of the placenta. The baby can be dried, suctioned, and in most cases, resuscitation assistance given (if needed) while still attached to the mother. There are small amounts of oxygen still being received by the baby for a short time after birth. There may be additional benefits in delayed cord clamping, due to the increase in stem cells the baby receives.

Usually the father, significant other, or a family member cuts the cord. Often we wait for someone to get the camera. When the cord is cut initially, it is cut long, 8-10 cms from the umbilicus. This is done for several reasons: to disturb the baby as little as possible, to collect blood for Rh typing if needed, or in rare cases if the baby has problems, a longer cord is used for umbilical catheterizations.

Method:

1. Clamp one hemostat 8-10 cms from the umbilicus, another hemostat 1-2 inches from the first. Place a 4x4 gauze pad behind to catch spilled blood, and have the father or family member cut between the two clamps with a sharp pair of scissors that has been previously sterilized.
2. Place the hemostat close to the baby's body to prevent it from being pulled as the mother and baby move about.
3. When you are ready to examine and weigh the baby (usually after the baby nurses and things are settled a bit), then the cord is cut shorter. Place a plastic cord clamp or cord tie about 1 inch from the baby's abdomen, and cut the cord very close to the clamp, between the clamp and the hemostat.



CLAMPING THE CORD



TYING THE CORD

CORD CLAMPS EXERCISE		
Complete the following:		
Type of Device	Advantages	Disadvantages
Tape		
Cotton ties		
Hollister (plastic)		
Stainless steel		
Averbach Cord Bander		

## CORD CLAMPING EXERCISE

Answer the following:

1. How long should the cord remain intact before clamping and cutting?
2. What are the benefits of delayed cord clamping?
3. What are possible risks of delayed cord clamping?
4. What occurs in the newborn cardiovascular system as a result of cord clamping?
5. If the baby is having respiratory problems should the cord be cut right away?
6. What are potential benefits to the mother of cutting the cord after the placenta has separated?
7. What are potential long term benefits to the child from delayed cord clamping?

## APGAR SCORE

Named for Virginia Apgar, the pediatrician who developed its use, this is a scoring system to give birth attendants a rapid method for evaluating the newborn. It can be used to assess the immediate condition of the baby, as well as to predict the longer-term outcome.

APGAR scoring is based on five signs ranked in order of importance. Each sign is given a score of 0, 1, or 2, depending on the level or degree of response -- 0 being no or absent; 1, some or diminished response; 2, adequate or normal responses. The score is then added, and the total is used as a tool to evaluate the baby. A perfect score is 10. A score of 6 and under represents a baby at risk. The score is done at 1 minute following birth and again at 5 minutes. If there are problems, it is repeated again at 10 minutes and 20 minutes.

1. **HEART RATE** - pulse beat per minute, strength.
2. **RESPIRATORY EFFORT** - breathing attempts, crying.
3. **MUSCLE TONE** - flexion, or response of extremities.
4. **REFLEXES** - reaction to stimuli, irritability, grimace.
5. **COLOR** - presence or degree of cyanosis.

### Useful mnemonics:

#### CHART

C = color  
H = heart rate  
A = activity (reflexes)  
R = respirations  
T = tone

#### APGAR

A = appearance (color)  
P = pulse (heart rate)  
G = grimace (reflexes)  
A = activity (tone)  
R = respirations

APGAR Score		
	<u>1 min. 5 min.</u>	
<b>Heart Rate</b>		
Absent	0	0
Below 100	1	1
Above 100	2	2
<b>Respiratory Effort</b>		
Absent	0	0
Weak cry	1	1
Strong cry	2	2
<b>Reflex Response</b>		
No response	0	0
Grimace	1	1
Cough/Sneeze	2	2
<b>Muscle Tone</b>		
Limp	0	0
Some flexion	1	1
Well flexed	2	2
<b>Color</b>		
Pale/blue	0	0
Body pink/extremities blue	1	1
All pink	2	2
<b>TOTAL</b>		

## APGAR EXERCISE

Fill out 1 minute APGAR scores for the following:

1. Crying at birth, has good vitals and reflexes, has blue feet and hands: \_\_\_\_\_
2. Isn't yet breathing, has a heart rate of 110, some reflexes, and is blue and flaccid: \_\_\_\_\_
3. Is gasping, has a heart rate of 130, some reflexes, and is blue and flaccid: \_\_\_\_\_
4. Is breathing, has a heart rate of 124, has a grimace, and is blue and flaccid: \_\_\_\_\_
5. Is crying, has a heart rate of 140, is active, and is pink and well flexed: \_\_\_\_\_

## NEONATAL PHYSIOLOGY EXERCISE

*Describe the physiological changes that occur in the neonatal period:*

SYSTEM	1ST HOUR	2-24 HOURS	1-3 DAYS	3 DAYS - 28 DAYS
Cardiovascular				
Urinary				
Gastrointestinal				
Endocrine				
Respiratory				
Integumentary (include temp)				
Musculoskeletal (weight, height)				

## NEUROBEHAVIOR TRANSITION EXERCISE

*Describe the neurobehavior transition of the newborn:*

	<b>First Period of Reactivity</b>	<b>Period of Decreased Activity</b>	<b>Second Period of Reactivity</b>
Description			
Activity			
Time			
Midwifery role			

## BONDING

Bonding is the term for the close emotional tie that develops between parents and baby at birth. In 1976, researchers Marshall H. Klaus and John H. Kennell showed that for humans, just as for other animals, there is a “sensitive period” at birth when mothers and newborns are uniquely programmed to be in contact with each other and develop a beneficial bond to each other. By comparing mother-infant pairs who bonded immediately after birth with those who didn't, they concluded that the early-contact mother-infant pairs later developed a closer attachment.

While bonding is a process that begins in pregnancy and continues throughout the first year of the child's life, there is clearly a very special connection that occurs within the first minutes and hours after birth. This process of bonding not only is between mother and child, but partner and child, siblings, as well as other family members. Bonding during this biologically sensitive period gives the parent-infant relationship a head start on healthy relationships.

One of the single most important tasks of midwifery is protecting that bonding process. Parent-infant bonding is the process in which the baby learns how to love and connect with other human beings.

Midwives know that when families are bonded, it creates healthier relationships, and healthier people are happier and more peaceful. Midwives help the world become more peaceful, one baby at a time.



Daphne's Grandchildren  
Lyric and Gaia, 2010

### BONDING EXERCISE

Answer the following:

1. List ways to facilitate maternal-infant bonding after delivery and in the first weeks.
  
2. List ways to facilitate bonding between infant and woman's partner after delivery and in the first weeks after delivery.
  
3. Explain reciprocal components of bonding between mother and baby.
  
4. Describe signs of poor maternal attachment.

## THE NEWBORN EXAM

A complete head-to-toe newborn exam should be done before the midwife leaves the home. It can be done on the bed where the parents can watch. Some conditions are not apparent at birth and may need a follow-up check by either the midwife or the baby's health care provider. A good form is a big help when doing newborn exams, so everything gets checked and charted. Often if there is one congenital problem with the baby, there are more, so if anything arises in the course of an exam that seems unusual, a referral or phone call may be in order.

**General appearance:** Color should be pink to red. Baby should be breathing well, crying if stimulated. Flexion of the limbs to the trunk should be evident. There should be no obvious deformities.

**Skin:** The skin should be warm and pink. Slight cyanosis of nail beds up to 4 hours of age is within normal limits. Pallor, grayness, or cyanosis is abnormal. Note any lesions or birthmarks on skin.

SKIN EXAMINATION EXERCISE		
Condition	Define and Describe	Implications for Care
Milia		
Erythema toxicum neonatorum		
Harlequin color changes		
Acrocyanosis		
Seborrheic dermatitis		
Ecchymosis		
Petechiae		
Cavernous hemangioma		
Capillary hemangioma		

**Head:** Measure and chart circumference. Averages 32-38 cm or 13-15 inches. Note sutures, fontanelles, and molding of skull. There should be no depressions in the skull nor bulging fontanelles.

**Eyes:** There should be no abnormal discharge or pus. Redness or conjunctival hemorrhage is frequently seen. If epicanthic folds are noted, other signs should be checked. If the light is dimmed, the baby should open the eyes and look around.

**Ears:** Position of ears is noted. Low-set ears are associated with congenital abnormalities. Check that the openings are present.

**Neck:** Should be supple, with a full range of motion. Palpate for abnormal masses or goiter.

**Nose:** The nose may be pushed out of shape for the first few days. Sneezing is common. No nasal flaring should be present. Nasal mucous and discharge are common and can be easily aspirated with a bulb syringe. Check that each nostril is open by blocking one, then the other.

**Mouth:** Check for cleft lip; insert finger and feel roof of mouth to check for cleft palate. Occasionally babies are born with teeth. A protruding tongue is a sign of Down's syndrome. Sucking reflexes should be noted.

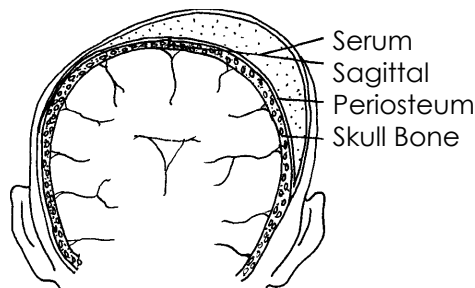


HEAD EXAMINATION EXERCISE		
Condition	Define and Describe	Implications for Care
Hydrocephaly		
Facial palsy		
Pseudoptosis		
Subconjunctival hemorrhage		
Pseudostrabismus		
Thrush		
Cephalohematoma		
Caput succedaneum		
Epicanthic folds		
Epstein's pearls		

A **Caput Succedaneum** is a swelling of serum and blood into the tissue of the scalp. Usually caused from the pressure of a tight-fitting cervix on the head during labor.

A caput:

- is present at birth;
- may cross a suture line;
- disappears within a few days;
- pits on pressure;
- is benign, requires no treatment,

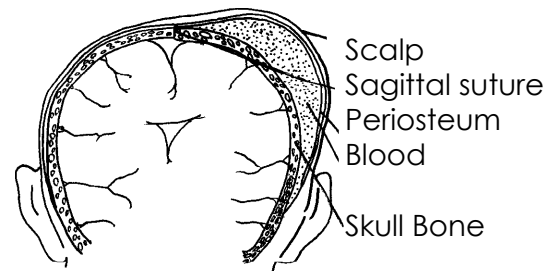


CAPUT SUCCEDANEUM

A **Cephalohematoma** is a collection of blood under the periosteum (the covering of the skull). It generally occurs in cases of CPD.

A cephalohematoma:

- appears after 12 hours;
- never crosses a suture line;
- tends to grow larger;
- persists for weeks;
- does not pit on pressure;
- is benign, requires no treatment.



CEPHALOHEMATOMA

**Chest:** Check respiratory rate. Normal range is 40-60, but can be as low as 30 in a sleeping infant. Retractions of the chest should not be present.

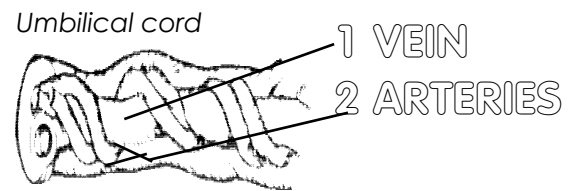
**Lungs** are auscultated for abnormal signs such as rales, rhonchi, or grunting. No retractions of the chest should be present. Breathing sounds should be bilateral. Clavicle should be straight and intact.

**Heart** is auscultated and rate counted. Normal range is 120-160 bpm. Up to 180 if crying. Down to 100 if deeply sleeping.

**Breasts:** Normal breast enlargement is 5 cms or more at term; breasts should be flat with only two symmetrical nipples. Nipples may be slightly engorged or may have colostrum-like fluid, due to maternal hormones. Chart size of breast tissue.

CHEST EXAM EXERCISE		
Condition	Define and Describe	Implications for Care
See-saw Respirations		
Polycythemia		
Barrel Chest		
Sternal Retractions		
Rhonchi		
Laryngeal Stridor		
Atelectasis		
"Witch's Milk"		
Funnel Chest		
Transient Tachypnea		

**Abdomen:** On palpation, the liver and spleen should not feel enlarged. No abnormal masses should be felt. Umbilical cord is checked for 3 vessels. A distended or tender abdomen with prominent veins should not be evident.



ABDOMEN EXAM EXERCISE		
Condition	Define and Describe	Implications for Care
Umbilical hernia		
Pyloric stenosis		
Inguinal hernia		
Scaphoid abdomen		
Granuloma of the umbilicus		

**Genitalia:** Edema in both sexes is normal. Male scrotum is often enlarged. Discharge or pseudo-menses from the female vagina may also occur. Rarely, ambiguous genitalia occur, or variations of hermaphroditism. Testes are palpated and should be descended. Femoral pulses are palpated and should be equal. Urination is noted to rule out obstruction, as is passage of meconium. Newborn should urinate and pass meconium within 24 hours.

**Rectal temperature:** Normal range is 97.6-99.6° F, depending on room temperature and how warm baby is kept.

GENITAL EXAM EXERCISE		
Condition	Define and Describe	Implications for care
Smegma		
Phimosis		
Meatal atresia		
Cryptorchidism		
Hydrocele		
Orchiditis		
Pseudomenstruation		

**Extremities:** Digits are counted and checked for “webbing.” Full range of motion of all extremities should be noted. The hips are checked for dislocation or clicks when abducted.

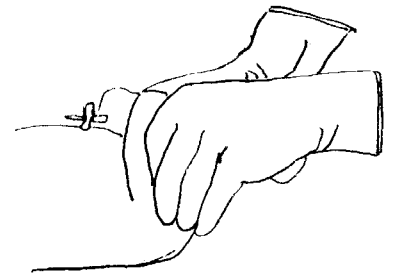
**Spine:** With baby on abdomen, the spine is checked for spina bifida, scoliosis or other deformity. Pilonidal sinus is noted, if present.

**Screening for congenital hip dislocation (Ortolani's maneuver):** Congenital hip dislocation occurs in 0.1-0.2% of all newborns and is more common in breech babies and girls. Dislocation of both hips occurs 25% of the time. It has no obvious symptoms in the neonate but can cause long-term and serious problems if untreated. With early treatment it is almost always 100% cured. Treatment ranges from soft splints to casts. Because the consequences are so serious in undiagnosed cases, it is recommended to have all newborns examined by a physician/practitioner who sees babies every day.

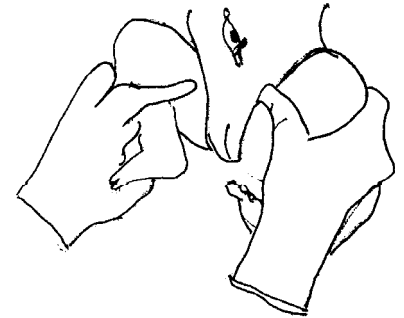
First, simply observe the legs for symmetry. The leg with a hip dislocation will often appear shorter and have less mobility. The creases of the infant's thigh will frequently not match up.

1. Lay the baby on its back on a firm flat surface, with its feet facing you.
2. Gently grasp the infant's legs with your thumbs on the top of the infant's inner thighs and your middle and ring fingers pressing on the top of the infant's femur bones from the back.
3. Abduct the legs by flexing the knees and hips to a 90° angle.
4. While stabilizing one leg in this position, gently rotate the leg out to the side, until the leg is on the bed.
5. Move the leg back to the original position.
6. While stabilizing the leg you just rotated, repeat steps 4 and 5 with the other leg.

If you hear a low-pitched clunk, and/or feel the femur slip in its position relative to the hip-socket, the hip may be dislocated.



ORTOLANI'S  
MANEUVER



EXTREMITIES AND SPINAL EXAM EXERCISE		
Condition	Define and Describe	Implications for Care
Erb's Palsy		
Talipes		
Spinal Bifida		
Scoliosis		
Pilonidal Sinus		
Simian Crease		
Polydactyly		
Syndactylism		

## REFLEXES

All reflexes should be present to reflect good neurological development:

**Rooting** – When finger or nipple is placed on cheek, baby turns towards it.

**Grasp** – Baby grasps finger with hand.

**Sucking** – Baby sucks nipple or finger.

**Moro (Startle)** – If baby is startled or dropped slightly, baby straightens arms out while the knees flex.

**Plantar** – Toes curl under if finger or other object is pressed against the balls of the feet.

**Babinski** – All toes hyperextend, if finger or other object is run along outside edge from toe to heel.

**Hand-to-Mouth (Babkin) Reflex** – Stroke newborn's cheek or put finger in baby's palm; baby will bring his fist to mouth and suck a finger

**Swimmer's (Gallant) Response** – Hold baby prone while supporting belly with hand, stroke along one side of baby's spine; baby flexes whole body toward the stroked side.

**Crawling Reflex** – Newborn placed on abdomen, baby flexes legs under him and starts to crawl.

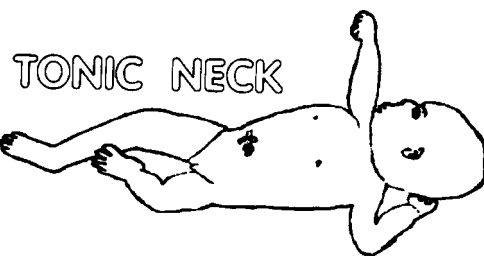
**Walking** – When baby is held upright, it raises one foot.

**Tonic neck (Fencing)** – When head is rotated leftward, the left arm (face side) stretches into extension; on the opposite side, the right arm flexes up above head. Opposite reaction if head is rotated rightward.

ROOTING

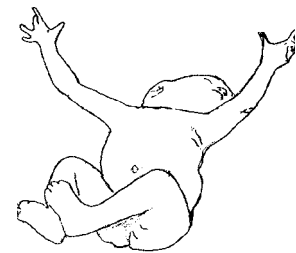


GRASP

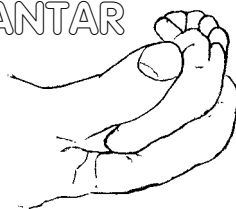


TONIC NECK

MORO



PLANTAR



BABINSKI

SWIMMER



WALKING

## GESTATIONAL AGE ASSESSMENT

Assessing a baby's physical maturity can be an important part of care, especially for women with uncertain due dates who did not get an ultrasound. Some babies are small or large for their gestational age and need specialized care. A useful tool to estimate gestational age is an examination called the Dubowitz/Ballard exam. It evaluates a baby's appearance, skin texture, motor function, and reflexes. The physical maturity part of the exam is done within the first two hours of birth. The neuromuscular maturity examination is completed within 24 hours after delivery.

**Physical maturity:** The physical assessment part of the Dubowitz/Ballard exam assesses physical characteristics that appear different at different stages of a baby's gestational maturity. Babies who are physically mature usually have higher scores than premature babies.

Points are given for each area of assessment, with a low of 1 or 2 for extreme immaturity to as much as 4 or 5 for postmaturity.

- Skin - ranges from sticky and red to smooth to cracking or peeling.
- Lanugo (the soft downy hair on a baby's body) is absent in immature babies, then appears with maturity, and then disappears again with postmaturity.
- Plantar Creases - These creases on the sole of the feet range from absent to covering the entire foot, depending on the maturity.
- Breast - The thickness and size of breast tissue and areola (the darkened nipple area) are assessed.
- Eyes and ears - It is noted whether eyes are fused or open, and the amount of cartilage and stiffness of the ear tissue are assessed.
- Genitals, male - The presence of testes and appearance of scrotum, from smooth to wrinkled are noted.
- Genitals, female - The appearance and size of the clitoris and the labia.

A score is assigned to each assessment area. Typically, the more neurologically mature the baby, the higher the score. When the physical assessment score and the neuromuscular score are added together, the gestational age can be estimated. Scores range from very low for immature babies (less than 26 to 28 weeks) to very high scores for mature and postmature babies.



Full Term Infant

### GESTATIONAL AGE ASSESSMENT EXERCISE

Answer the following:

1. Why is learning gestational age assessment important for midwives?
2. You deliver a baby you expect to be 37 weeks by dates. She weighs 5 lbs 2 ozs, and has a total Ballard score of 24. How did she get that score?

# Ballard Score

### NEUROMUSCULAR MATURITY

NEUROMUSCULAR MATURITY SIGN	SCORE						RECORD SCORE HERE
	0	1	2	3	4	5	
POSTURE							
SQUARE WINDOW (WRIST)							
ARM RECOIL							
POPLITEAL ANGLE							
SCARF SIGN							
HEEL TO EAR							
TOTAL NEUROMUSCULAR MATURITY SCORE							

**SCORE**

Neuromuscular \_\_\_\_\_

Physical \_\_\_\_\_

Total \_\_\_\_\_

**MATURITY RATING**

TOTAL MATURITY SCORE	GESTATIONAL AGE (WEEKS)
5	26
10	28
15	30
20	32
25	34
30	36
35	38
40	40
45	42
50	44

### PHYSICAL MATURITY

PHYSICAL MATURITY SIGN	SCORE						RECORD SCORE HERE
	0	1	2	3	4	5	
SKIN	gelatinous red, transparent	smooth pink, visible veins	superficial peeling, & or rash few veins	cracking pale area rare veins	parchment deep cracking no vessels	leathery cracked wrinkled	
LANUGO	none	abundant	thinning	bald areas	mostly bald		
PLANTAR CREASES	no crease	faint red marks	anterior transverse crease only	creases ant 2 3	creases cover entire sole		
BREAST	barely percept.	flat areola no bud	stippled areola, 1-2mm bud	raised areola, 3-4mm bud	full areola 5-10mm bud		
EAR	pinna flat, stays folded	sl curved pinna, soft with slow recoil	well-curv pinna, soft but ready recoil	formed & firm with instant recoil	thick cartilage ear stiff		
GENITALS (Male)	scrotum empty no rugae		testes descending, few rugae	testes down good rugae	testes pendulous deep rugae		
GENITALS (Female)	prominent clitoris & labia minora		majora & minora equally prominent	majora large, minora small	clitoris & minora completely covered		
TOTAL PHYSICAL MATURITY SCORE							

**Reference**  
Ballard JL, Novak KK, Driver M. A simplified score for assessment of fetal maturation of newly born infants. *J Pediatr* 95:769-774, 1979

**GESTATIONAL AGE (weeks)**

By dates \_\_\_\_\_

By ultrasound \_\_\_\_\_

By score \_\_\_\_\_

## Newborn Reflexes Word Search

L F Q  
 W A D V P  
 M Q W G S S X  
 R O A A E U Q  
 K O O R D L C I B  
 C O G D O K K J V  
 G Y T V H Q S C I Z Q  
 G Q I B T N R O X N O  
 F E N C I N G Y D C G  
 X T G B W Y D D I U W  
 R Z A G L R U Q A V N  
 C B L G H S U T J F W

1. When the sole of the foot is firmly stroked, the big toe bends back toward the top of the foot and the other toes fan out.
2. Tonic neck reflex called the \_\_\_\_\_ position
3. Stroking the palm of a baby's hand causes the baby to close fingers
4. In response sound or movement baby throws back head, extends arms and legs
5. When the corner of the baby's mouth is stroked or touched baby will turn head
6. Occurs when the roof of the baby's mouth is touched.
7. The baby appears to take steps or dance when held upright with feet touching a solid surface.
8. To avoid pain, for example when the heel is pricked for a PKU, the leg and foot jerk backwards and the opposite leg and foot push forward.



## COMMON PROCEDURES WITH NEWBORNS

### VITAMIN K

Vitamin K influences the production of prothrombin, part of the body's blood clotting mechanism. It is produced from the bacterial flora in the intestine. It takes a few days following birth for enough to be produced in some infants to affect blood clotting. Hemorrhagic disease of the newborn is caused by a lack of vitamin K. This is a very rare condition; however, if it is present, and if there is birth trauma, or surgery, or even if circumcision is performed, hemorrhage can occur, endangering the life of the baby. Consequently, it is now the standard of care (even a law in many areas), that all babies are given a vitamin K injection routinely at birth to prevent this disorder. It is given as Vitamin K Phytonadione (aquaMephyton), 0.5-1.0 mg in an IM injection in the lateral thigh muscle.

Some midwives only recommend vitamin K when there has been birth trauma or bruising, or if there is a planned circumcision or other surgery. Other midwives give it orally as an alternative. Another approach is to boost the circulating vitamin K in the mother's bloodstream just prior to birth, as some may be passed on to the fetus. This is done by giving herbs (alfalfa and shepherd's purse) and acidophilus tablets.

Whatever approach is used, inform parents about vitamin K and hemorrhagic disease of the newborn and allow them to make an informed choice. If they decline the injection, have them sign a waiver.

VITAMIN K EXERCISE	
Advantages to routine Vitamin K	Disadvantages
<i>Describe how to administer Vitamin K</i>	
Standard dosage for IM	
Standard dosage for Oral	
Location for an infant IM injection	
Correct length and gauge of needle	

### EYE PROPHYLAXIS

There are various organisms found in the genital tract of the mother, such as E coli, chlamydia, or gonorrhea, that can cause infective conjunctivitis or blindness. Most states in the U.S. require some type of eye prophylaxis by law. Originally silver nitrate was used, which burned and hurt the baby's eyes. Today, erythromycin antibiotic ointment is used instead. It does not burn or interfere with eyesight. It must be placed in the eyes within two hours of delivery.

### NEWBORN SCREENING TEST (PKU TEST)

The newborn screening test is a routine blood test, also called the PKU test. While it screens for phenylketonuria (PKU), it also tests for other hidden metabolic diseases of the newborn. A small sample of blood is taken from a heel or finger stick, put on a special card and sent to the lab for testing. It is most accurate if taken when the infant is 3-4 days old, and then repeated at 2-3 weeks old. Because many of the diseases this test picks up have no symptoms at birth, brain damage and other problems can result if they are missed. Newborn screening tests have reduced the number of severe and moderately retarded children these diseases have caused.

NEWBORN SCREEN EXERCISE		
<i>Complete chart</i>	<b>Define</b>	<b>Risks to Newborn</b>
Galactosemia		
Maple Sugar Urine Disease		
Congenital Hypothyroidism		
Cystic Fibrosis		
Tyrosinemia		
Hypermethioninemia		
Homocystinuria		
Phenylketonuria		

## CIRCUMCISION

**Male circumcision** is the surgical removal of the sleeve of skin and mucosal tissue called the prepuce or the foreskin, which normally covers the glans (head) of the penis. Although the American Academy of Pediatrics does not recommend it as a routine procedure, it is still done often enough in the U.S. to be considered routine.

Circumcision is a very painful procedure for the newborn, and the anesthesia used is not 100% effective and has side effects. Rare complications of circumcision include hemorrhage or damage done to the penis if not done correctly. Foreskin contains a concentration of specialized sensory cells that plays an important role in penile sensation and sexual satisfaction.

The only medical indication for circumcision is a rare condition called phimosis, where the foreskin is so tight urine cannot pass through.

Unless a parent wishes to circumcise for religious reasons, midwives should educate both parents about the risks of circumcision and the benefits of keeping their son intact. Many times parents choose circumcision because they think everyone does it, or the father wants his son to be just like him, or is afraid he will be teased or thinks that an uncircumcised penis is unclean. There are great websites, books and handouts against circumcision that midwives can provide their clients.

The human body was created perfectly. We are not born with any other extra parts we need to cut off to keep clean.

**Female Circumcision**, also called *female genital mutilation* (FGM). FGM is a custom among certain Muslim cultures primarily from Africa and parts of the Middle East. It can involve infibulation, clitoridectomy, and clitoral circumcision. It is intended to reduce sexual pleasure in the female. It can have very detrimental effects on childbearing. It is condemned and illegal in most parts of the world. However, midwives gaining their experience in internships in Muslim countries should be aware they may serve mothers who were tortured as children or as babies and should be aware and prepared to resist pressure to perform such torture on babies.

### CIRCUMCISION EXERCISE

List reasons why male circumcision should not be done except for religious reasons.

Discuss the practice of female circumcision and the midwifery implications.

## HEARING SCREENING

Hearing loss is one of the most common congenital anomalies, occurring in approximately 2-4 infants per 1,000. Early identification and intervention can prevent severe psychosocial, educational, and linguistic repercussions. Infants who are not identified before 6 months of age have delays in speech and language development. Intervention at or before 6 months of age allows a child with impaired hearing to develop normal speech and language, like his or her hearing peers.

Over 35 states in the U.S. have legislation regarding newborn hearing screening programs, and the test is done routinely in the hospital. It is painless and not invasive for the baby and can be done with the baby in the mother's arms. Babies born outside of the hospital should be referred to a hearing specialist for the newborn hearing screening test.

## GLUCOSE TESTING

Neonatal hypoglycemia is a condition that occurs when there is an abnormally low level of blood glucose, less than 40 mg/dl in the first 24 hours of life and 40-50 mg/dl thereafter. 80-90mg/dl is considered normal. It is common practice in some hospitals to test all babies' blood sugar with a heel stick. While it is only a slightly painful procedure for the newborn, it is often unnecessary. Hypoglycemia occurs in about two of 1,000 babies, including preterm and high risk babies; the numbers are much lower in full-term infants from healthy mothers.

Glucose is an essential nutrient for the brain. Abnormally low levels have the potential to produce long-term neurological damage to the baby. There is a normal dip in blood glucose 2-4 hours after delivery. Breastfeeding is usually the only treatment a hypoglycemic baby needs, with the exception of some high-risk conditions. Breastmilk does have enough glucose to maintain blood sugar, and the biggest risk is a baby who is not able to nurse. There are times when glucose is given to hypoglycemic babies in order to give them enough energy to nurse.

Checking the baby's blood glucose can be done with a heel stick and a glucometer at home; but unless a baby is symptomatic and not nursing, it is not done routinely by midwives. However, midwives do need to be aware of the risk of hypoglycemia, especially with bigger babies, and to make sure they nurse early and often. If untreated, hypoglycemia can cause thermoregulatory problems, tremors, seizure activity, respiratory distress, apnea, and cyanosis, convulsions, and coma.

### Infants at risk:

- Premature, small for gestational age or growth-restricted babies may have too few glycogen stores or an immature liver function.
- In babies who are large for gestational age, babies over 9.5 lbs, or babies born to diabetic mothers, the baby's insulin production can use up the existing glucose that was present from the mother's blood.
- A baby who suffers from perinatal asphyxia is also at risk.

**Symptoms** include jitteriness, hypotonia, lethargy, irritability, listlessness, and poor feeding.

Fortunately **treatment** is simple for otherwise healthy term babies -- have them breastfeed. Breastmilk may need to be expressed and fed with an eyedropper or syringe if the baby is not nursing well. Glucose or sucrose can be given with a bottle if needed, but breastmilk is best. Careful follow-up is needed with these babies, but once they are alert, responsive, and feeding well, there is usually no need for repeated glucose tests.

## NEONATAL FOLLOW-UP CARE

### UMBILICAL CORD CARE

The umbilical cord should be kept clean and dry as it dries up and falls off anywhere from 5 days to 2 weeks after birth. Do not put dried herbs such as goldenseal or any other substance on the cord. Formerly alcohol was used, but it was found that any antiseptic only delays the natural bacterial breakdown. Keeping the cord outside of the diaper is the only treatment needed. There should not be any fresh bleeding from the cord at any time, but a tiny bit of blood around the navel is common. The navel should not be immersed in water until the cord falls off.

### WEIGHT GAIN

It is normal for a breastfed baby to lose about 7% of its birth weight during the first week. A healthy term baby has some built-up stores as protection to make up from the transition from getting nutrition directly for the mother's blood to breastmilk. It is a cause for concern if the baby loses more than 10% of its birth weight the first week or loses 7% in the first 72 hours. Weight should be checked at the 24 hour visit, the 3 day visit and several times over the next month, especially if there is a concern. A midwife is a member of the baby's health care team, and if there are questions about nursing or weight gain, a midwife should use a lactation consultant as well as the child's pediatrician or other health care provider. A baby should regain his/her birth weight by two to three weeks after birth. After mom's milk comes in, the average breastfed baby gains 6 oz/week.

A healthy baby should wake on his or her own, be alert and want to nurse about eight to 12 times in 24 hours. An important indication that the baby is getting enough in, is to monitor what comes out. After the milk comes in, the baby should have 6 or more wet diapers in a 24 hour period, and have 3-4 stools daily.

### JAUNDICE

Jaundice is an elevation of bilirubin levels in the blood which gives a yellow tinge to the skin. There are several different kinds of jaundice which can occur in the neonate.

1. **Physiologic Jaundice**, also called *icterus neonatorum*, occurs with 50% of all full-term neonates and 80% of all premature neonates. In a normal, healthy full-term infant, physiologic jaundice usually occurs on the second to fourth day following birth and in most cases, disappears gradually, within a week to 10 days. Physiologic jaundice is a normally occurring, benign condition.
2. **Late Onset Jaundice**, also called breast milk jaundice, appears after the third day and may peak from the fifth to the fifteenth day. This type of jaundice can last for weeks--even months--but poses no risk to the baby; it will eventually clear up on its own. Some believe it is caused by a factor in the milk of some mothers, which seems to prolong or delay the elimination of excess bilirubin; this theory is controversial. Unless the jaundice is severe, mothers are still encouraged to breastfeed.
3. **Pathological Jaundice**, caused by Rh or other blood incompatibility, congenital abnormalities, infection, excessive bruising, drugs given to the mother, or other disease process, is jaundice that persists longer than normal. It usually appears within the first 24 hours.

**CAUSES:** Jaundice is caused by the deposit of bilirubin in the tissues. Bilirubin is the orange or yellowish pigment in the bile. In the body, new blood cells are continually being produced as old cells are broken down; the breakdown of old cells produces iron and bilirubin as by-products. The iron is stored in the liver to be used later in the manufacture of new red blood cells. Bilirubin is a by-product of this process and is disposed of by the liver. Prior to birth, this function is carried out by the mother's liver, but after the baby is born, its immature liver cannot always eliminate the bilirubin as fast as it is produced. The excess is temporarily stored in the blood and tissues, which can cause the yellowish color that is sometimes apparent in a newborn baby. This rise in bilirubin is a normal part of the process.

**ASSESSMENT:** Examine the baby in full sunlight, as some room light may make diagnosis more difficult. Physiological jaundice, yellowing of the skin, or apparent jaundice should never be present within the first 24 hours nor persist beyond seven days in the full-term baby nor persist beyond ten days in the premature infant. Whenever jaundice entirely covers the body--including palms of hands and soles of the feet--the baby should have serum bilirubin levels monitored. The degree of jaundice can also be monitored from day to day by blanching the skin and watching the color change and by checking the eyes. In dark-skinned neonates, the oral mucosa should be checked as well. Lethargy, poor rooting, sucking, or nursing, or hypotonia may be present in moderate and severe cases.

It is important to differentiate between normal physiologic jaundice and the more serious, pathological type. Whenever the level of bilirubin becomes excessive--especially in a premature or sick baby--a toxic condition known as *kernicterus* occurs.

In untreated cases, severe brain damage or death may occur. In lesser degrees, neurologic damage may show up as long-term problems with developmental delays and learning impairments, hearing loss, and retardation. Refer to a pediatrician any baby about whom you have questions.

**PREVENTION/TREATMENT:** Bilirubin is excreted by the intestines and a small amount in the urine; therefore, frequent passage of stool helps eliminate the excess. This can be encouraged by frequent nursing and by the mother drinking plenty of clear fluids. Colostrum has a laxative effect and helps eliminate the meconium in the baby's digestive tract.

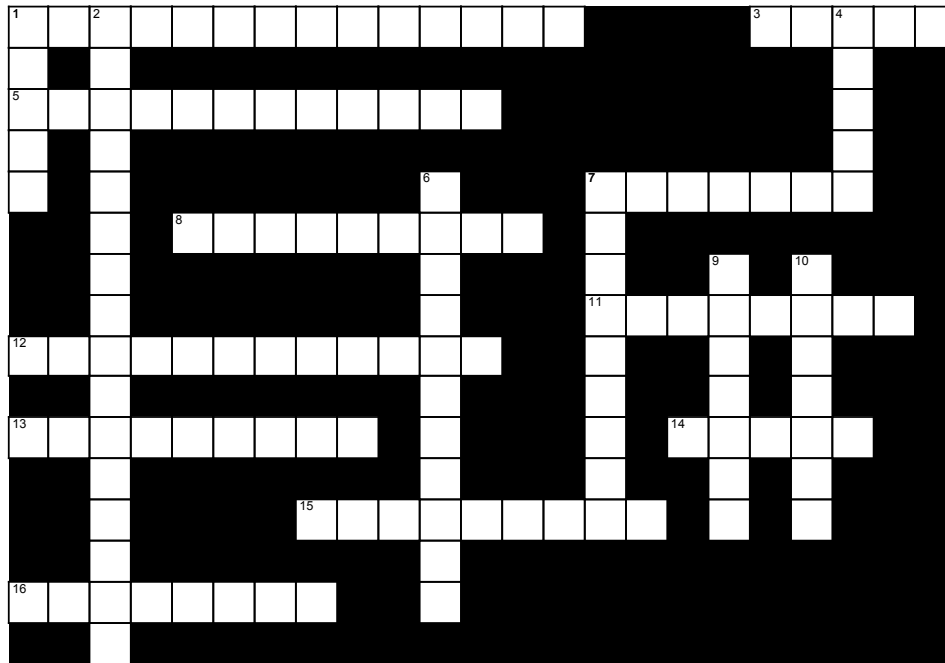
**Glucose or plain water supplements** used to be recommended to "flush" the bilirubin out of the baby's system. We have since learned that they can **interfere** with the baby's desire to nurse, which can cause a **delay** in milk production, a **slower** weight gain, and an **increased** potential for **higher** bilirubin levels.

**Phototherapy** is the process of using a high intensity light to photo-oxidize the unconjugated bilirubin into nontoxic compounds that are excreted in the urine and feces. Special "bili lights" are used in the hospital; at home we can use sunlight filtered through a window. The baby is undressed completely (make sure the room is very warm), and placed in direct light for gradually increasing periods of time. Bili-lights are not necessary unless bilirubin levels rise very quickly or go above 15 mg/dl in the first three days of life.

#### NORMAL RANGE OF SERUM BILIRUBIN LEVELS

	Full term	Premature
1st 24 hrs	2-6 mg/100ml	1-6 mg/100ml
Day 2	6-7 mg/100ml	6-8 mg/100ml
Day 3-5	4-12 mg/100ml	10-15 mg/100ml

## Newborn



## Across

1. A collection of blood under the periosteum.
3. Reflex when baby grasps finger with hand.
5. One eyelid in newborn is open while one is partially or completely shut.
7. Toes curl under if finger or other object if pressed against the balls of the feet.

8. When head is turned, the extremities on the same side straighten; on the opposite side, they flex.
11. Maneuver to check for congenital hip dislocation
12. Blue coloring of the feet and hands.
13. All toes hyperextend, if finger or other object is run along outside edge from heel to toe.
14. Distended oil glands or whiteheads.

15. Swelling in the scrotum which disappears on its own.
16. Yellowing of the skin

## Down

1. Swelling of serum and blood into the tissue of the scalp.
2. Eyes give illusion of being crossed.
4. Evaluation score given to immediately assess newborns.
6. dangerously high levels of bilirubin.
7. Dimple at the base of the spine.

9. Reflex when finger or nipple is placed on cheek, baby turns towards it.
10. When baby is held upright, it raises one foot.

## NEWBORN PARENTING EDUCATION

As midwives, we put so much emphasis on pregnancy and birth that educating parents about newborns is sometimes left out. First-time parents can be left with their new baby and very little preparation on what to expect or how to provide basic care. Often parents taking child-birth classes end up delivering before the newborn class is scheduled or find that one class is not enough. Encourage first-time parents to enroll in specific newborn parenting classes or support groups. Also, there are many wonderful books and videos that parents will find helpful. Many midwives have lending libraries for parents that include books on these topics.

Provide written check-lists and handouts in the general care of the newborn, such as cord care, bathing, diapering, rash care, dressing, burping, fussy babies, and feeding issues. Talk about ways to calm or soothe a fussy baby.

Teach parents warning signs that a child is about need of medical attention, including assessing for dehydration and fever. Provide information about infant safety car seats, changing table safety, safe sleep arrangements, medication safety, and choke hazards.

Be available for new parents to ask questions and talk.

With classes, books and films, most parents feel adequately prepared for birth and have some idea of newborn care. However, many feel overwhelmed by the sudden responsibility, the newborn's needs, and the intense physical and emotional changes that occur in the postpartum period.

The first weeks are frequently difficult as there are many adjustments to make and, often, confusing feelings. Sometimes parents expect to instantly be the super-ideal parent. Rarely are they prepared for the difficulties or confusing feelings that sometimes occur. Many parents also are unprepared for the demands of the newborn and the compromises on personal time and space.

Other typical sentiments include a feeling of disappointment or anticlimax about the birth, particularly if there was an unexpected complication. Tiredness and fatigue can last for months. They are due, in part, to the physical stress of birth, and also because most newborns have their own idea of sleep times. Fear of hurting the baby or of being unable to care for it is also common. Sometime feelings of anger or resentment spring up about the amount of time and energy the baby takes. Babies tend to be the most demanding at the "wrong" times.

### PARENT EDUCATION EXERCISE

Elaborate on newborn parent education: What should midwives teach parents, and when?



## SELF-TEST

### True/False

1. \_\_\_ An axillary temperature is one degree lower than a rectal temperature.
2. \_\_\_ A *caput succedaneum* generally appears after 12 hours.
3. \_\_\_ Vaginal bleeding can be a normal finding in a female newborn.
4. \_\_\_ If a baby is cold, its blood sugar can drop.
5. \_\_\_ A baby born with jaundice all over its body is a cause for concern.
6. \_\_\_ Most babies are suctioned at birth with a Delee mucous trap device.
7. \_\_\_ Newborns lose most of their heat from their abdomen.
8. \_\_\_ A bulb syringe is an effective suctioning device for most births.
9. \_\_\_ The umbilical cord should have 2 veins and 2 arteries.
10. \_\_\_ Babies born at home do not need their hearing screened.
11. List the normal ranges in a newborn for the following:
  - A) Respiration:\_\_\_\_\_.
  - B) Heart Rate:\_\_\_\_\_.
  - C) Bilirubin:\_\_\_\_\_.
  - D) Blood Glucose:\_\_\_\_\_.

### Multiple Choice

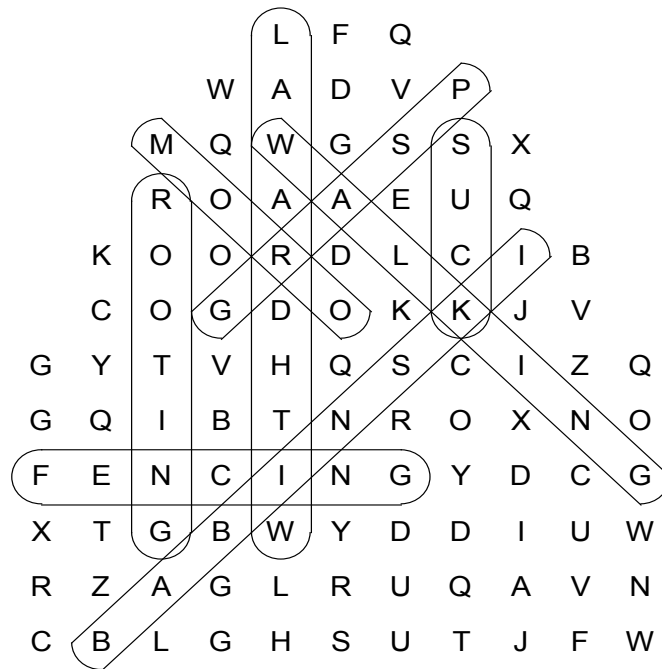
12. Vitamin K (aquamephyton) is administered to newborns to:
  - a) stimulate growth of intestinal flora.
  - b) promote absorption of fat-soluble nutrients.
  - c) speed conjugation of bilirubin.
  - d) prevent potential bleeding problems.
13. Erythromycin eye ointment is administered to newborns to:
  - a) prevent yeast infections of the eye.
  - b) prevent the transmission of chlamydia and gonorrhea conjunctivitis.
  - c) cleanse the eye of organisms picked up in the birth canal.
  - d) clear up any conjunctival hemorrhage that may occur due to pressure in the birth canal.
14. Acrocyanosis is defined as:
  - a) a blotchy, hive-like rash found on newborns.
  - b) a non-elevated purplish birth mark.
  - c) a bluish discoloration of the hands and feet.
  - d) a plugged sebaceous gland.

### Answers:

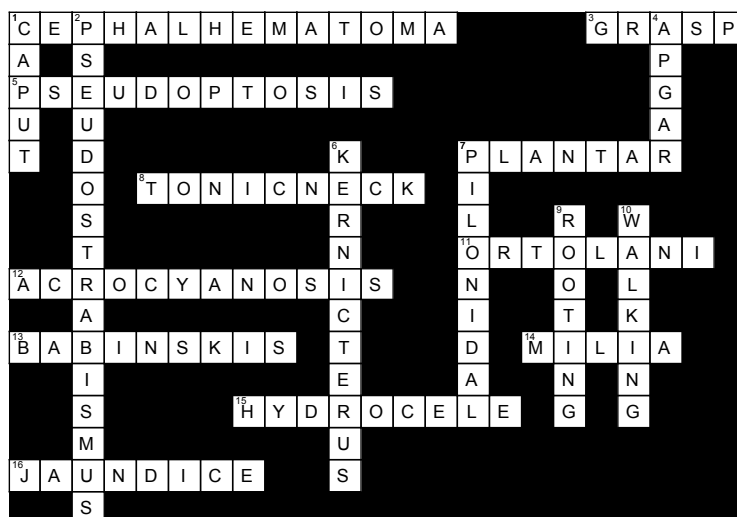
1. True, 2. False, 3. True, 4. True, 5. True, 6. False, 7. False, 8. True, 9. False, 10. False, 11. A ~ 40-60 up to 80 in the first 2-4 hours, down to 30 if sleeping B ~ 110-160 up to 180 if crying, and down to 100 if sleeping C ~ full term: 2-6mg/100ml (first 24hrs), 6-7mg/100ml (day 2), 4-12mg/100ml (day 3-5), D ~ 80-90mg/dl, less than 40-50mg/dl considered low in first 24 hrs. 12. D, 13. B, 14. C.

Newborn Reflexes Word Search

PUZZLE ANSWER KEY



Newborn



# Chapter 13

## Breastfeeding

### OBJECTIVES

*After completing this chapter, the student should be able to:*

1. Describe the midwife's role in promoting breastfeeding.
2. Identify the names and location of the functional anatomy of the breast.
3. Explain how hormones affect milk production.
4. Explain the physiological process of how milk is produced.
5. Explain what the letdown reflex is and how it occurs.
6. Describe techniques used to prevent problems in breastfeeding, including:
  - A. Positioning;
  - B. Latch on;
  - C. Removing baby from breast;
  - D. Engorgement.
7. Describe methods of pumping and storing breastmilk.



art by Bonnie Gruenburg

## MIDWIFERY SUPPORT OF BREASTFEEDING

Breastfeeding is nature's perfect method of nourishing the baby. No substitute can equal the quality of breastmilk, the nurturing connection between mother and child, the convenience, accessibility, or the value of breastfeeding. Breastfeeding is truly bestfeeding. The milk the mother produces is precisely the milk designed for her baby at that specific point in time.

Almost every woman can breastfeed. Physical inability to successfully nurse a baby is extremely rare. Many breastfeeding difficulties derive from a lack of education, support, and encouragement. In Western culture, breastfeeding, while now widely recognized as best for baby, still is not a universally socially accepted custom. Medical research clearly shows the importance of breastfeeding to the child's and mother's health.

The midwife's role in encouraging and educating women to successfully breastfeed is an essential part of her practice. From a midwife's perspective, breastfeeding is not just an option women choose, but an important health concern for both mother and the baby. Not only is breastmilk the best food for the baby in the long term, but the colostrum provides much-needed antibodies as protection against viruses and infections in the vulnerable newborn stage. Breastfed babies are at lower risk for SIDS and of a host of other illnesses. Mothers who breastfeed have better bonding with their infants and, consequently, lower incidence of child abuse. Also, lactation stimulates oxytocin, which contracts the uterus and prevents excessive bleeding, which reduces the chance of infection. Even if a mother cannot or will not provide 100% of her child's nutrition through breastfeeding she should be encouraged to breastfeed.

The midwife's responsibility extends beyond doing what she can to ensure a healthy pregnancy, delivery, and newborn; it extends to ensuring a successful breastfeeding experience as well. In women who are having particular trouble, or those with special needs, the midwife may refer the woman to a lactation consultant and continue to follow up with her. In areas where there is not a lactation consultant available, the local La Leche League leader can be a valuable resource.

Most breastfeeding problems occur in the first few weeks. If breastfeeding is well established with no significant problems in the six weeks a woman is in a midwife's care, chances are good the mother will continue to breastfeed.

Most problems women experience in breastfeeding can be prevented by education. Breastfeeding is a learned activity. In Western culture, many women did not learn breastfeeding techniques from our mothers, aunts and sisters, as in cultures where breastfeeding is a visible and a natural part of people's lives. We have to put a special emphasis on teaching women these techniques.

Start discussing breastfeeding early in pregnancy, not only with the first-time mother but with any mother who nursed her child less than one year. Encourage women to attend classes and support groups like the La Leche League. Also give educational handouts and recommend books.

After the baby is born, show her how to position herself and the baby in order to prevent sore nipples and encourage milk flow. Show her how the baby should latch on. Observe her during at least one complete feeding to identify any problems. Reinforce that she can and will successfully breastfeed and how important it will be. If she plans on going back to work, give her information about breast pumps and storing milk. Emphasize the importance of breastmilk to her child's health and how the extra effort of pumping is going to pay off.

With education and support, most problems in breastfeeding will be prevented, and women will find the experience rewarding and enjoyable.

## BREASTFEEDING ADVANTAGES EXERCISE

List 10 advantages for the baby of breastfeeding.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

List 10 advantages for the mother of breastfeeding.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

## BREASTFEEDING KEY TERMS

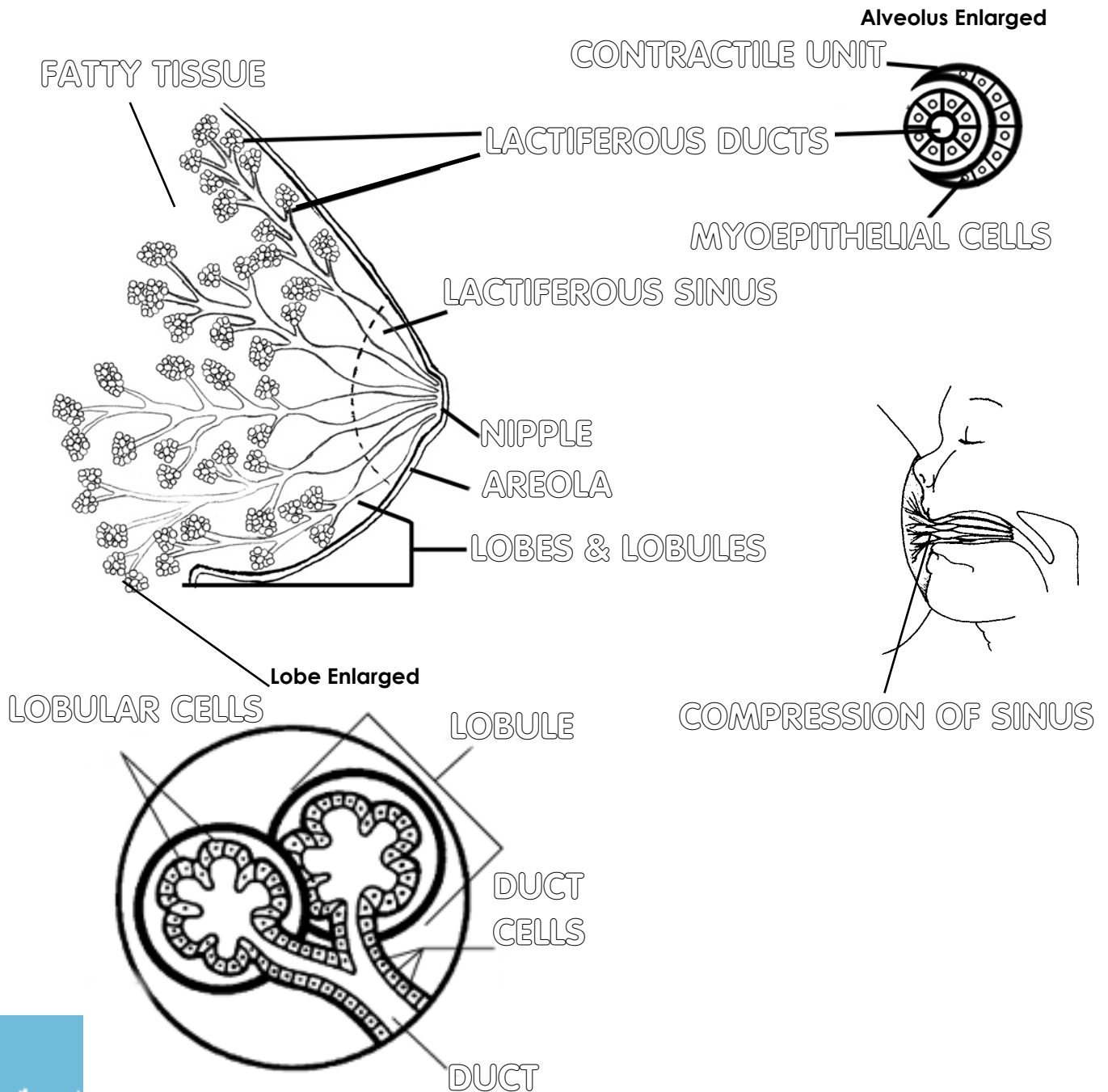
Define the following:

1. Alveoli
2. Acini Cells
3. Areola
4. Engorgement
5. Let-down/milk-ejection reflex
6. Galactagogue
7. Galactopoiesis
8. Hard palate
9. Montgomery (areolar) glands
10. IBCLC
11. Lactiferous duct
12. Lactogenesis
13. Lobe
14. Lobule
15. Mammary duct
16. Mammogenesis
17. Mastitis
18. Prolactin
19. Colostrum
20. SNS

# ANATOMY OF LACTATION

Our knowledge of the anatomy and physiology of lactation has changed with recent research using modern technology. The science of lactation is a whole area of study. This is intended as an outline of the basics. Plan on using other resources to keep your knowledge up-to-date.

The breast contains adipose (fatty) tissue and fibrous connective tissue. Each breast contains about 20 lobes, each lobes contains several lobules which at the end have alveolar in which milk is produced. The alveolus is made up of gland cells around a central duct. The milk is produced by the gland cells. Surrounding the gland cells are the myoepithelial cells which contract to cause milk ejection into the milk duct. The milk then travels down into the lactiferous ducts and into the lactiferous sinuses. The lactiferous sinuses are located under the areola of the breast. The lactiferous sinuses drain out through the nipple.



## PHYSIOLOGY OF LACTATION

The physiology of lactation occurs in three stages.

### Lactogenesis I

During pregnancy woman's breasts enter this stage to make colostrum, a thick, sometimes yellowish fluid. During this stage, high levels of progesterone inhibit prolactin, the hormone of most milk production.

### Lactogenesis II

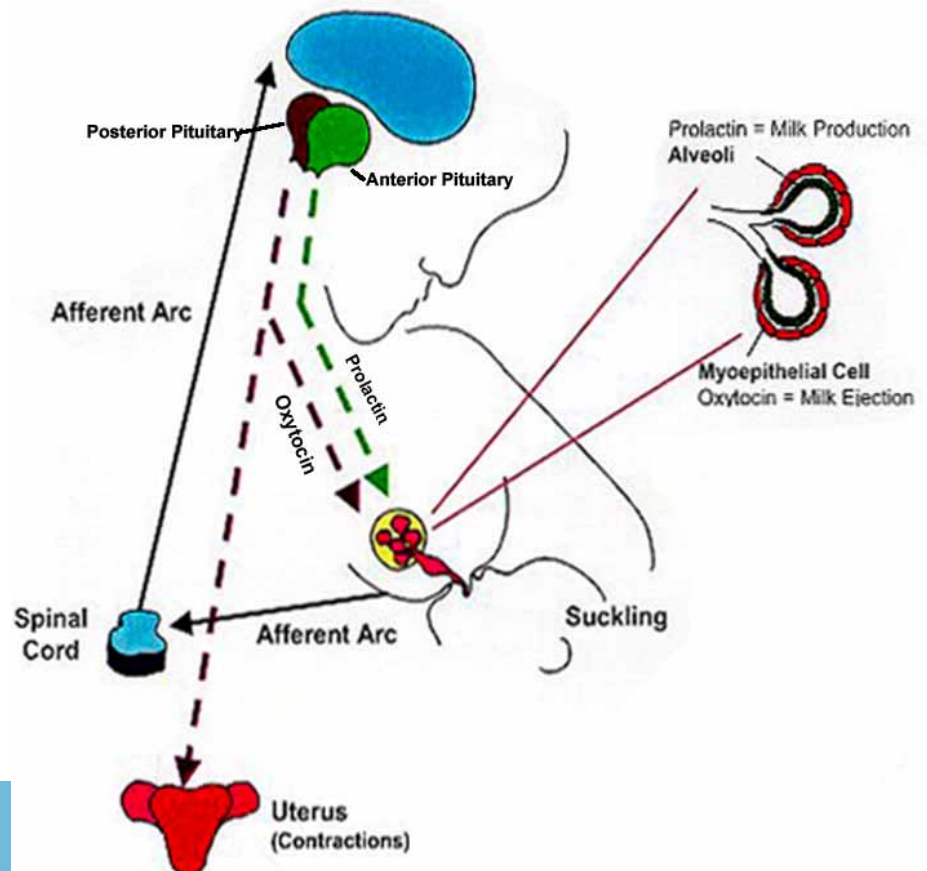
After birth, the delivery of the placenta results in a sudden drop in progesterone, estrogen, and HPL levels, this abrupt withdrawal of progesterone in the presence of high prolactin levels stimulates this stage. When the breast is stimulated, prolactin levels in the blood raise, peak in about 45 minutes, and return to the pre-breastfeeding state about three hours later. The release of prolactin triggers the cells in the alveoli to make milk. This process begins soon after birth but it may take several days for the sensation of fullness of the milk coming in is felt by the mother.

### Lactogenesis III

A few days after the birth when the milk supply is more firmly established, the local or autocrine control system begins. During this stage, the more that milk is removed from the breasts, the more the breast will produce milk. Milk supply is strongly influenced by how often the baby feeds (or pumping occurs). Fully draining each breast helps increase milk supply. This is stimulated by the sucking reflex arc.

### The Sucking Reflex (Afferent) Arc

The sucking of the breast by the infant stimulates the nipple; this sends messages to the spinal cord and subsequently to the brain. Prolactin is released from the anterior pituitary for milk production and oxytocin from the posterior pituitary for the milk let down reflex.





## LACTATION PHYSIOLOGY EXERCISE

1. Explain the hormonal control of lactation in these areas:
  - a. Mammogenesis
  
  
  
  
  
  
  
  
  
  
  - b. Lactogenesis
  
  
  
  
  
  
  
  
  
  
  - c. Galatopoiesis
  
2. Summarize factors that may interfere with the breastfeeding process:
  
  
  
  
  
  
  
  
  
  
3. Describe how a midwives role can influence the physiology of breastfeeding:
  
  
  
  
  
  
  
  
  
  
4. Define the following barriers to successful long term breastfeeding:
  - a. Biological
  
  
  
  
  
  
  
  
  
  
  - b. Psychological
  
  
  
  
  
  
  
  
  
  
  - c. Social

## TYPES OF BREAST MILK EXERCISE

*Identify the differences in benefits, basic composition and function, and compare the time they occur in relation to each other for each of the following:*

1. Colostrum

2. Transitional milk

3. Mature milk

4. What two terms formerly used for breastmilk composition recent research has shown to be not accurate?

## TECHNIQUES FOR SUCCESSFUL BREASTFEEDING

Teaching the new mother techniques early to prevent problems is an important step to ensure successful breastfeeding. If the mother experiences pain, is frustrated getting the baby to latch on, or gets a breast infection, she is much more likely to quit breastfeeding. While midwives may refer to breastfeeding specialists to continue care, educating women from birth can prevent many problems.

### POSITIONING

The single most important step in preventing sore nipples is proper latch of the baby on the breast. It will not only prevent sore nipples, but will assure the baby will stimulate the breast correctly to receive and maintain an adequate supply of milk.



- Find a comfortable position. When sitting, it is important to be well supported; a comfortable chair with arms is best.

- Bring baby to breast, not breast to baby. Use a pillow or rolled up baby blanket on the lap to help raise the baby's body to breast level. Use good posture--shoulders back, no slumping over the baby.



- One method is the *cradle hold*, where the head is held in the crook of the elbow with the arms supporting the baby's back and bottom. The baby's body is turned to face the mother's body, tummy to tummy, with his mouth at the same height as the breast.

- Another method is the *football hold*, where the head is held in the hand with the arms supporting the baby's back and bottom. The baby's body held in the crook of the elbow.



- Nursing lying down on back or side is a good way to keep baby's body close to the breast.



### SORE NIPPLE EXERCISE

List and describe methods for preventing sore nipples other than through correct positioning.

## LATCH ON

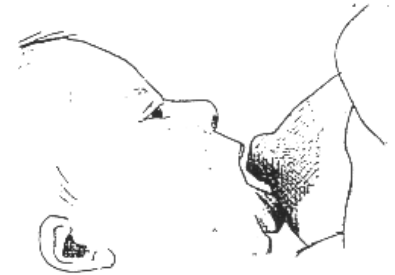
A cause of many breastfeeding problems is the baby not properly latching on to the breast for effective nursing. Enough of the breast tissue needs to be placed in the baby's mouth to compress the sinuses, expressing the milk. When just the end of the nipple is in the baby's mouth, sucking does not always encourage the let-down reflex. It also can make the nipple very sore. As much of the entire areola as possible should be placed in the baby's mouth. When the baby is latched on and feeding well, after the first few minutes to let the milk down, you should hear the baby swallowing.

Various ways to encourage successful latch on include:



- Supporting the breast by holding it in a C shape with the thumb on top and the fingers cupped underneath. Have the fingers back away from the areola, so as much as possible will be in baby's mouth.

• Have baby's mouth open wide by slightly lifting the breast, and lightly touch or tickle the baby's lower lip with the nipple. This causes the rooting reflex, which will cause the baby to open its mouth and turn towards the nipple.



## REMOVING THE BABY FROM THE BREAST

Another cause of sore nipples is improper removal of baby from breast. Simply pulling off a latched on baby from the breast causes trauma to the nipple. To avoid this, either:

- Wait until baby is full and comes off on her own. Newborns can take 15 to 40 minutes to complete a feeding. If the baby sucks and sucks and doesn't seem to want to quit, check position and latch on to assure baby is getting adequate milk.
- Do not pull baby off breast; gently insert a finger in the corner of the baby's mouth to break the suction, or pull down gently on the chin.



### LATCH ON EXERCISE

*List and describe other methods for encouraging babies to latch on. Include how to help sleepy babies latch on to flat nipples.*

## ENGORGEMENT

Normally the breasts become larger, fuller, and a little tender when the milk comes in on the second to sixth day following birth. However, breast fullness may develop into engorgement if the baby has not been feeding often or long enough. Engorgement can quickly lead to complications, such as feeding problems or slow weight gain in the baby; sore nipples; damage to the milk-producing cells, which may in turn cause an overall decrease in milk supply; and increased risk of mastitis, due to pressure within the breast and inadequate milk flow.

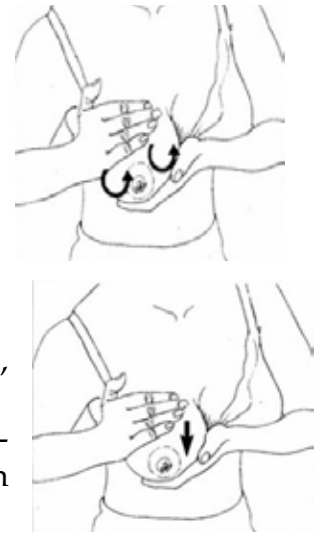
**Signs and Symptoms:** Swelling; tenderness; warmth; skin that is taut, shiny, or transparent; throbbing; and sometimes a low-grade fever. A higher fever or redness suggests mastitis.

**Prevention:** Make sure that baby is positioned and latched on correctly. Nurse frequently after birth; i.e., every 1-3 hours, with one longer sleep span in a 24-hour period, even if waking the baby is necessary to do so. Have the mother take off her shirt and sleep with the baby.

### Massaging Breasts

#### Treatment:

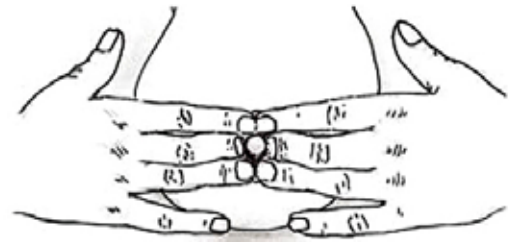
- Apply cold compresses between feedings. A bag of frozen unpopped popcorn or peas works well.
- Along with the heat or immediately after, have the mother massage each breast in a circular motion from the chest wall down to the nipple, and while nursing massage down toward the nipple.
- Allow the baby to nurse both breasts for an unrestricted amount of time, at least every 1 1/2 to 2 hours.
- If the baby does not nurse long enough to soften both breasts, hand-express or pump after nursing.
- Raw cabbage leaves can be applied between feedings. Stop applying the cabbage leaves once the swelling is reduced (they can dry up the milk).
- Reverse pressure softening (RPS) uses gentle positive pressure to soften a 1-2 inch area of the areola surrounding the base of the nipple, temporarily moving some swelling slightly backward and upward into the breast.



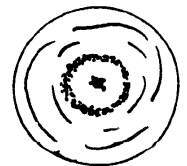
## REVERSE PRESSURE SOFTENING

### FLAT OR INVERTED NIPPLES

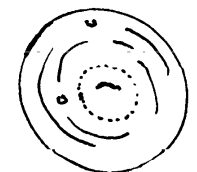
True flat nipples do not become erect when stimulated, cold or pinched. Inverted nipples are concave, or retract into the skin tissue. While both these types of nipples can present challenges for mothers, and may need assistance after delivery, mothers with these types of nipples can successfully breastfeed.



NORMAL NIPPLES



INVERTED NIPPLES



**CAUSES OF LOW MILK SUPPLY:**

**Lack of support** -- Stress and tension can inhibit oxytocin and therefore affect the let down reflex. For example, if a woman is told her baby is crying because it is hungry and she doesn't have milk, or if made to feel uncomfortable about "exposing her breasts," she may feel so tense or pressured that her body will have difficulty letting down.

**Not feeding or pumping enough. Especially giving supplemental bottles** -- Whenever the baby has a feeding from a bottle, that much less stimulus is going to the breasts. Milk is produced by supply and demand, and there will always be enough milk if no bottles are given or given rarely with breast milk. A mother who is concerned about her baby not getting enough milk should assess her baby for dehydration. A newborn should have six or more wet diapers a day. She can also count the number of stools. The baby should stool four times every 24 hours after day four. Stools should be bigger than a size of a quarter.

**Nipple Confusion** -- When an infant is given a bottle, milk flows through faster than the mother's breast milk, and the baby doesn't have to work as hard. Soon it prefers the bottle and will not nurse. Also, the bottle nipple requires a different mouth position and suction action. Newborns are especially confused by switching back and forth between breast and bottle.

**Infant Problems** -- Jaw or mouth abnormalities such as a cleft palate. Rare metabolic or digestive inability in the infant, making it unable to digest the milk it receives. A poor suck reflex which can be caused by a variety of serious neonatal illnesses.

**Poor latching technique** -- or positioning problems with mother, can cause pain and consequently less nursing.

**Breast Surgery** -- any type of breast surgery can be cause of breastfeeding problems.

**Rare maternal causes:** Hypoplastic breast tissue, rare endocrine disorders, malnutrition or significant inadequate calorie intake.

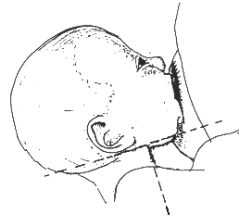
**MILK SUPPLY EXERCISE**

*List methods for increasing milk supply:*

1. Herbs
2. Physical techniques
3. Devices or equipment

## POSITIONS EXERCISE

Identify and describe the following breastfeeding techniques and how each helps.



## PUMPING AND STORING BREAST MILK

Pumping milk is often needed to relieve engorgement, to assist a woman with a baby having a weak suck, or for other breastfeeding difficulties. Also many women return to work and need to pump and store breastmilk. Pumping can be done by hand or with a variety of breast pumps.

Milk should be stored in glass or hard plastic containers or in milk storage bags made especially for breastmilk. Freeze milk in 2 to 5 oz portions or less. It is normal for pumped milk to vary in color, consistency and scent depending on diet. Do not use a microwave to thaw or warm breastmilk; it destroys important qualities.

### *Breastmilk can be stored at Room Temperature:*

- At 60 degrees for 24 hours.
- At 66-72 degrees for 10 hours.
- At 79 degrees for 4-6 hours.

### *In the Refrigerator:*

- At 32-39 degrees for up to 8 days.

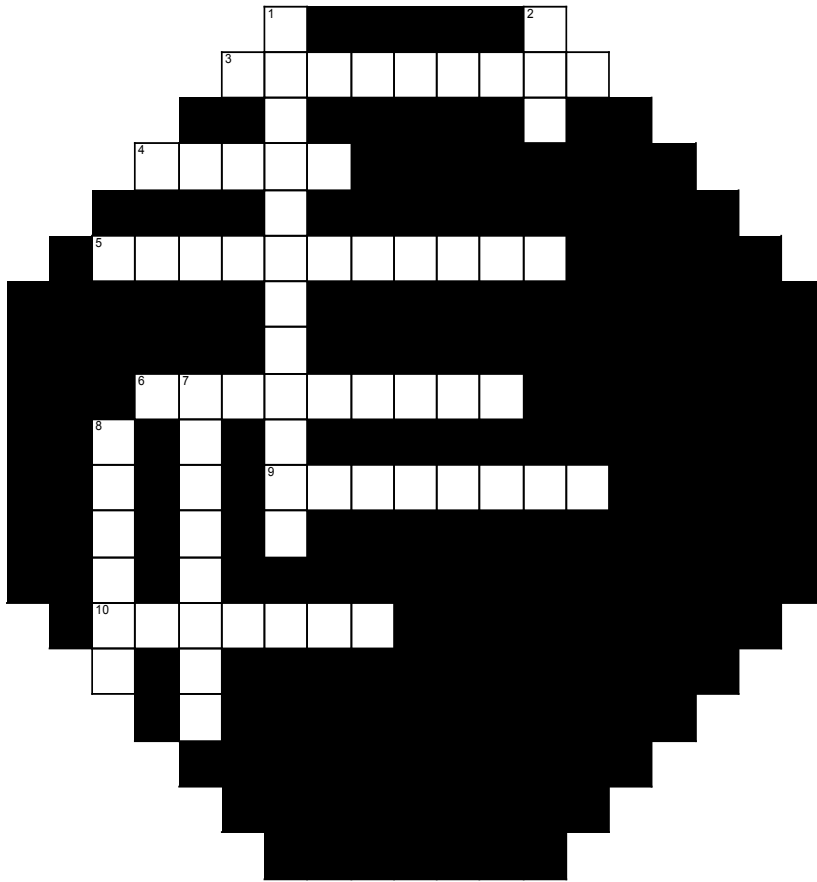
### *In the Freezer:*

- In a freezer compartment contained within the refrigerator for up to 2 weeks.
- In a self-contained freezer, either on top of or on the side of the refrigerator for 3 - 4 months.
- In a deep freezer for 6 months to 1 year.

BREAST PUMPING EXERCISE		
Complete the following:		
Describe	Advantages	Disadvantages
Hand Expression		
Cylinder pump		
Trigger-handle pump		
Squeeze-bulb pump		
Battery-operated pump		
Electric single pump		
Electric double pump		



## Lacation Crossword



## Down

1. the type of milk is secreted between about four days and ten days postpartum
2. hormone which regulates of milk supply
7. acts on the breast to produce milk ejection or "milk let down."
8. the darker part of the breast

## Across

3. is produced by the anterior pituitary to produce milk
4. type of cells that produce milk
5. ducts that carry milk toward the nipple
6. a thick, yellowish milk that is secreted by a woman's breast in the first several days postpartum
9. where milk is produced
10. the major carbohydrate in breast milk

## LACTATION PROBLEMS EXERCISE

*Answer the following:*

1. List the signs and symptoms of engorgement.
2. What are the signs and symptoms of mastitis?
3. Which women are at higher risk for breastfeeding problems?
4. What are ways midwives can help mothers to prevent breastfeeding problems?

## BREASTFEEDING EXERCISE

*List and describe at least 10 ways to tell if the baby is getting enough milk.*

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

*Describe five antenatal teaching strategies to promote breastfeeding.*

- 1.
- 2.
- 3.
- 4.
- 5.

*List methods used to help a woman with her first breast-feed right after birth.*

- 1.
- 2.
- 3.
- 4.
- 5.

## SELF-TEST

### True/False

1. \_\_\_\_\_ The milk let-down reflex can be influenced by psychological factors.
2. \_\_\_\_\_ Milk is stored in the areola of the breast.
3. \_\_\_\_\_ Colostrum is produced during lactogenesis III stage.
4. \_\_\_\_\_ Milk is stored in the lactiferous sinus.
5. \_\_\_\_\_ Breast surgery can be a cause of lactation problems.
6. \_\_\_\_\_ Colostrum is important to prevent jaundice.
7. \_\_\_\_\_ Sore nipples can be prevented with good positioning.
8. \_\_\_\_\_ Women with inverted nipples can't breastfeed.
9. \_\_\_\_\_ Breastfeeding can prevent breast cancer in the mother.
10. \_\_\_\_\_ Breastfeeding protects a woman from postpartum infection.

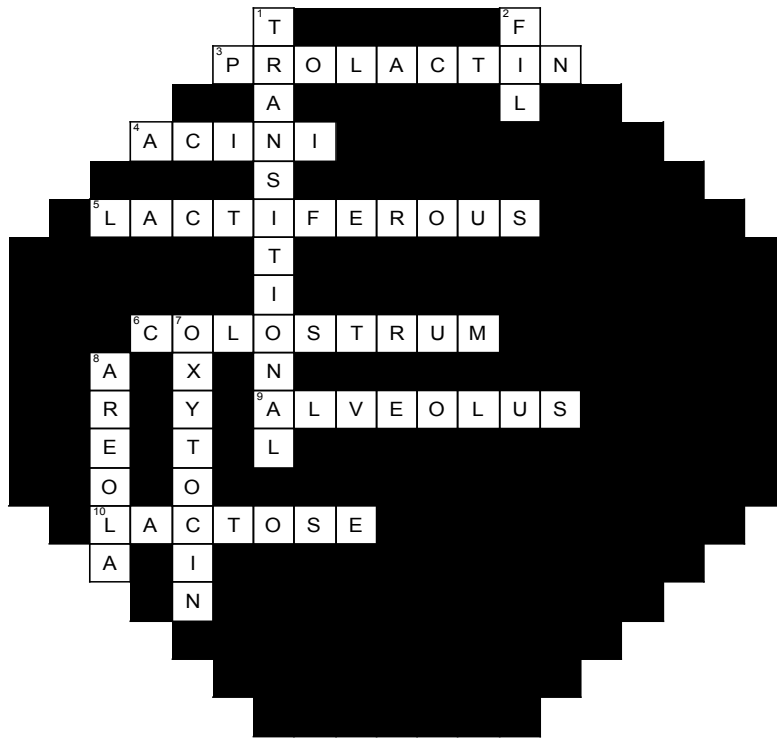
### Multiple Choice:

11. Proper latching on is important to breastfeeding in order to:
  - A) prevent premature let-down reflex.
  - B) prevent milk retention.
  - C) prevent sore nipples.
  - D) assist in bonding.
  
12. Engorgement:
  - A) is a normal condition that will go away on its own.
  - B) is a healthy sign there is enough milk.
  - C) is easily prevented by drinking enough fluids.
  - D) can quickly lead to more serious problems.
  
13. Breastfed babies:
  - A) have lower incidences of ear infections.
  - B) have lower incidences of respiratory infections.
  - C) have lower incidences of food allergies.
  - D) all of the above.
  - E) none of the above.
  
14. Prolactin is:
  - A) Produced during pregnancy.
  - B) Stimulated by the sucking reflex arc by the anterior pituitary.
  - C) Stimulated by the sucking reflex arc by the posterior pituitary.
  - D) Produced by oxytocin stimulation.
  
15. A mother can tell if the baby is getting enough milk if:
  - A) The breasts feel full or engorged.
  - B) The breasts feel emptied each time.
  - C) There are sufficient wet diapers and stooling.
  - D) The baby seems content and sleeps well.

### Answers:

1. True, 2. False, 3. False, 4. True, 5. True, 6. True, 7. True, 8. False, 9. True, 10. True, 11. C, 12. D, 13. D, 14. B, 15. C.

## Lacation Crossword



PUZZLE ANSWER KEY

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# Birthsong

*Round bellied woman  
 beautiful, radiant  
 Inner light shining  
 with the power of creation  
 Laboring, with the new life emerging  
 focusing, breathing and centering  
 Deep strength within,  
 showing without  
 Dancing the dance,  
 singing the  
 Song of Birth*

D.S. 1984

