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Survey of Pharmacology Education in Entry-Level Physical Therapy Programs

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University of North Dakota

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SURVEY OF PHARMACOLOGY EDUCATION IN
ENTRY-LEVEL PHYSICAL THERAPY PROGRAMS

by

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Bachelor of Science in Nursing
University of Cincinnati, 1983
Bachelor of Science in Physical Therapy
University of North Dakota, 1994



An Independent Study

Submitted to the Graduate Faculty of the

Department of Physical Therapy

School of Medicine

University of North Dakota

in partial fulfillment of the requirements

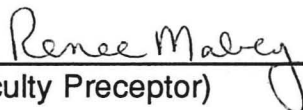
for the degree of

Master of Physical Therapy

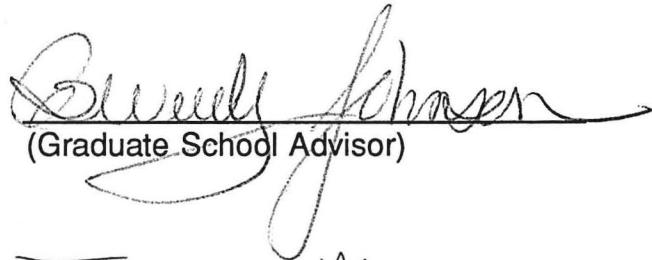
Grand Forks, North Dakota

May
1995


This Independent Study, submitted by Daniel C. Weaver in partial fulfillment of the requirements for the Degree of Master of Physical Therapy from the University of North Dakota, has been read by the Faculty Preceptor, Advisor, and Chairperson of Physical Therapy under whom the work has been done and is hereby approved.



(Faculty Preceptor)



(Graduate School Advisor)



(Chairperson, Physical Therapy)

PERMISSION

Title Survey of Pharmacology Education in Entry-level
Physical Therapy Programs

Department Physical Therapy

Degree Master of Physical Therapy

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ABSTRACT

The purpose of this survey research is to document the current status of education in pharmacology in the curriculum of entry-level physical therapy programs. A questionnaire was sent to the 135 entry-level physical therapy programs located in the United States and accredited by the American Physical Therapy Association. The director or faculty member responsible for pharmacology instruction in 96 (71.1%) of the entry-level physical therapy programs participated in the five-part survey.

The questionnaire results indicate that nearly all of the program respondents (98.9%) incorporate pharmacology content into existing required courses and/or have in his or her curriculum a required course specifically in pharmacology. The majority of the respondents (61.5%) perceive their program adequately covers the topic of pharmacology for the entry-level physical therapy graduate. The lack of time or space within an existing curriculum was the most frequently listed factor prohibiting improvement. Suggestions for improving future entry-level physical therapy education in pharmacology are given.

CHAPTER 1

INTRODUCTION

The educational preparation of health care professionals who prescribe, dispense, and/or administer medications has always emphasized an extensive background in pharmacology. In recent years other health care professions like physical therapy have recognized the growing importance of having a strong background in pharmacology. One reason for this recognition amongst physical therapy clinicians and educators alike is due to the changing and expanding role of physical therapists as health care providers in today's evolving system of health care. For example, with direct access available in 44 states, physical therapists are the entry point into the health care system for a growing number of patients. With this expanded role there is a greater responsibility for physical therapists to have a holistic understanding of the patients they evaluate and treat; this understanding includes knowledge of a medication's effects and side effects and knowledge of the medication's influence on a patient's response to rehabilitation.

Another example of the changing role of physical therapists is related to the demographics of the patient population. For example, persons age 65 years and older are emerging as a major patient population for physical

therapists. In general the elderly have twice as many disabilities compared to persons under the age of 65. The elderly also exhibit an increased use and misuse of therapeutic medications.^{1,2} For practitioners and students, this only reinforces the importance of a comprehensive understanding of pharmacology.

Although it is recognized that physical therapy practitioners of the 1990s and beyond need to have a strong background in pharmacology, to date there is no data describing the status of pharmacology education in the curricula of entry-level physical therapy programs. The purpose of this survey research is to determine the extent of pharmacology instruction that currently exists in the curriculum of entry-level physical therapy education programs.

CHAPTER 2

LITERATURE REVIEW

The use of therapeutic medications occurs across the age spectrum. From pediatrics to geriatrics, drug therapy often plays an important role in the medical management of patients seen by physical therapists. Over the counter and prescription medications can have a multitude of effects, resolving some symptoms and precipitating others. For physical therapists, understanding the role, actions, and side effects of medications is an important part of the process of accurately evaluating and treating patients. For current and future physical therapy students it is essential that comprehensive programs of physical therapy education include a strong background in pharmacology.

The literature review is divided into three sections. The first section is a discussion of pharmacology relative to physical therapy services; the second section is a discussion of pharmacology relative to physical therapy education; and the third section is a summary of the purpose of the study and the six research questions addressed by the study.

Pharmacology Relative to Physical Therapy Services

Society's health care needs and the delivery of health care continues to change. Advances in medical science and technology, increasing efforts to

control health care costs, the shifting of care from inpatient to ambulatory settings and the aging population are all examples of forces that are influencing the evolution of America's health care.³ As a result of these influences, the clinical practice of physical therapy is also changing. Physical therapists now treat patients with increasingly complex acute and chronic pathokinesiological problems under a variety of settings and referral mechanisms.

The Patients

The expanding elderly population demonstrates the changing health care needs of our society and the changing practice of physical therapy. Between 1985 and 2020, it is estimated that the population 65 years and older will increase by more than twice as much as the total population. By the year 2000, 12% of the US population (32 million people) is projected to be over the age of 65. Subsequently, increasing numbers of elderly will be seen by physical therapists in a variety of treatment settings. Treating this population means addressing problems related to multiple chronic conditions and activity limitations. It also means being aware that the elderly account for approximately 30% of prescription and 40% of nonprescription drug usage; frequently for the elderly, medical treatment involves 2 or more medications.² With the increased drug usage in the elderly, there is also the increased potential for adverse drug reactions, drug interactions and noncompliance. In order to accurately evaluate and provide appropriate treatment interventions, it

is necessary for physical therapists to have a strong background in pharmacology.

In the United States, the development and introduction of new drugs occurs daily and the clinical use of therapeutic medications continues to grow. Many of these medications can directly influence a patient's response to treatment, and treatment should therefore be adjusted. For example, knowing when a drug has its peak effect and scheduling a patient's therapy session accordingly may dramatically improve the therapy session. Knowing a drug's therapeutic effects can help the practitioner understand the patient's response to the drug along with any interaction, positive or negative, to physical therapy treatments. For instance, a patient taking a peripheral vasodilator for high blood pressure may experience significant hypotension when placed in a hot whirlpool. Being cognizant of the potential adverse interaction between the medication and therapy, the physical therapist may take extra precautions or choose an alternative therapy treatment.⁴

Health Care Delivery

With the changing health care needs of society, the delivery of health care services has also evolved. One specific example is the recent movement toward direct access to physical therapy services. The role of physical therapists in many states has expanded, promoting practitioners that are more independent. According to the APTA, physical therapists can now perform initial patient evaluations without physician referral in 44 states. In 30 of these

states, direct access also allows the physical therapist to treat patients without physician referral. With this new found independence, however, comes increased responsibility and accountability for the well being of the patient. One must know the effects of prescribed and over the counter medications and how medications might impact a patient's clinical presentation or course of treatment.

Pharmacology Relative to Physical Therapy Education

As health care needs and delivery have changed, so has the direction of the physical therapy profession. Since the late 1970s, the American Physical Therapy Association (APTA) has promoted the development of graduate entry-level programs; the growth of advanced clinical specialty areas; the growth of clinical research; and the initiation of state legislation granting direct access to physical therapy services.^{3,5}

As the profession changes, physical therapy educational programs must continuously implement changes that reflect the goals and growth of the profession.⁶ Implementing these changes involves the development, coordination, evaluation and revision of specific instructional courses, units and learning experiences. Development and evaluation gathers information about the educational program, reviews current curriculum content, and obtains educators' opinions on the curriculum. The results provide information for curricular retention and revisions. With curricular revision, students are assured of receiving an education that prepares them for practice.

In recent years, several studies evaluating specific curriculum content in physical therapy education programs have been published. The status of burn management, geriatrics, obstetrics-gynecology and human anatomy instruction in physical therapy curricula have been reported.^{1,7-9} There is, however, no data describing the status of pharmacology instruction in the entry-level physical therapy curricula. In addition, APTA accreditation standards do not specifically address the need for pharmacology instruction. The standards do state, however, that curricula consist of a "combination of didactic, clinical, and research experiences that are reflective of contemporary practice in physical therapy."¹⁰

The Purpose of the Study

Although there have been studies on curriculum development and evaluation that address specific topics in physical therapy education, there are no data on the state of pharmacology instruction. The purpose of this survey research is to document the current status of pharmacology education. Specifically, the research addressed the following questions: (1) How is pharmacology course content currently incorporated in physical therapy curricula? (2) Which pharmacology topics are included in these programs? (3) Have there been any curriculum changes related to pharmacology, from 1990 to the present? (4) Do respondents feel their current program adequately covers the topic of pharmacology? (5) Is there a relationship between the type of entry-level program (undergraduate vs graduate) and questionnaire

responses pertaining to the incorporation of pharmacology content, pharmacology topics, program changes and program adequacy? (6) Is there a relationship between those programs which reside in states that allow direct access versus physician referred access and questionnaire responses pertaining to the incorporation of pharmacology content, pharmacology topics, program changes and program adequacy? The results of this survey are available to all entry-level physical therapy programs, to be utilized in the process of curriculum evaluation, review and revision.

CHAPTER 3
METHODOLOGY

Procedure

A survey was mailed to the 135 entry-level physical therapy programs located within the United States and accredited by the American Physical Therapy Association (APTA). Each questionnaire included a cover letter and a postage paid return envelope. From each program, the director or faculty member responsible for pharmacology was invited to participate in the five-part survey. A follow-up postcard was sent two weeks after the original mailing. This served as a reminder for those who had not completed and returned the questionnaire and as a thank you for participating in the survey research. Survey procedures were conducted in accordance with and the consent of the University of North Dakota Institutional Review Board's policies and procedures (Appendix A).

Survey Construction

The questionnaire was developed from a review of current literature and advisement from University of North Dakota Physical Therapy faculty. The majority of the questions in the 36-item survey were of a closed-ended format. Open-ended questions were used to obtain the respondent's personal opinion

as to whether the topic of pharmacology is covered adequately in his or her program. A copy of the questionnaire can be found in Appendix B.

Research Questions

The survey was comprised of five parts designed to address the following research questions:

1. How is pharmacology course content currently incorporated in physical therapy curricula? (e.g., Is there a required and/or elective course in pharmacology? Is pharmacology incorporated within other required courses? Is there a required textbook for pharmacology? Is there a P.T. faculty member teaching pharmacology?)
2. Which pharmacology topics are included in these programs? (e.g., general principles, pharmacokinetics, narcotic analgesics, non steroidal anti-inflammatory drugs, cardiovascular drugs, endocrine pharmacology, substance abuse, etc.)
3. Have there been any pharmacology changes from 1990 to the present? If so, are the changes relative to: The number of courses? The number of credit hours? The availability of instructional materials? The availability of faculty expertise? Faculty interest? The number of examination questions or course projects?
4. Do respondents feel their current program adequately covers the topic of pharmacology?

5. Is there a relationship between the type of entry-level program (undergraduate vs graduate) and questionnaire responses pertaining to the incorporation of pharmacology content, pharmacology topics, program changes and program adequacy?
6. Is there a relationship between those programs which reside in states with direct access versus physician referral and questionnaire responses pertaining to the incorporation of pharmacology content, pharmacology topics, program changes and program adequacy?

Data Analysis

In order to maintain confidentiality, survey responses remained anonymous. Following the return of the questionnaires, all data were reported in aggregate and analyzed for descriptive trends. A chi square test for independence was also used to determine if there was a statistically significant relationship between the following:

1. The type of entry-level program (undergraduate vs graduate) and questionnaire responses pertaining to the incorporation of pharmacology content, pharmacology topics, program changes and program adequacy.
2. The type of access to physical therapy services (direct vs physician referred) in a program's state and questionnaire responses pertaining to the incorporation of pharmacology content, pharmacology topics, program changes and program adequacy.

CHAPTER 4

RESULTS

Ninety-six (71.1%) of the 135 accredited entry-level physical therapy education programs, participated in the five-part, 36-item questionnaire. Fifty (57.5%) of the responding programs (n=87) are located in states that allow direct access (evaluation and/or treatment) to physical therapy services. Of the 89 programs responding, 38 are undergraduate and 51 are graduate level (Fig. 1). The following survey results are presented according to the specific research question they address.

Research Question #1: How is Pharmacology Course Content Currently Incorporated in Physical Therapy Curricula?

Eighty three (89.2%) of the responding programs indicated that pharmacology content is incorporated within required courses. The number of hours dedicated to pharmacology was identified by 79 respondents. Twenty eight programs (35.4%) spend 0-5 hours, 34 programs (43.0%) spend 6-10 hours and 17 programs (21.5%) spend greater than 10 hours of lecture time on the topic of pharmacology.

Having a required course specifically in pharmacology was reported by 33 of the programs. The number of credit hours for the course varied. The

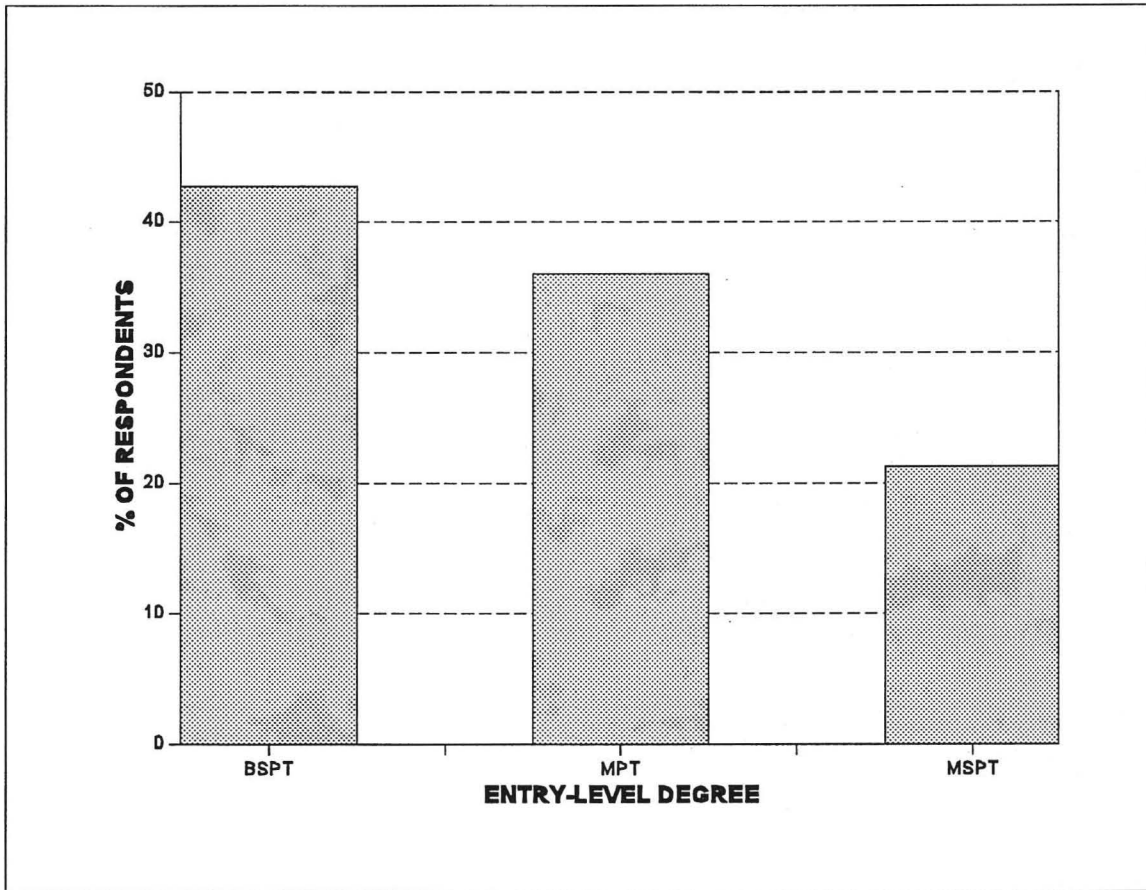


Fig 1--Percent of respondents participating in the pharmacology survey differentiated by the type of degree program offered (n=89).

majority of the programs require a 1 credit (43.8%) or 2 credit (37.5%) course in pharmacology, while 18.8% of the programs require a 3 credit course. Seven programs (7.3%) reported having an elective course in pharmacology.

Thirty-eight (39.6%) of the respondents require a textbook in pharmacology. Table 1 lists the pharmacology textbooks these programs use. The majority of the respondents require *Pharmacology in Rehabilitation* by Charles Ciccone.

Most programs (69.8%) report a faculty member is responsible for teaching pharmacology. The profession of the faculty member teaching pharmacology varies. Table 2 lists the percentages of faculty members teaching pharmacology, categorized by profession.

Research Question #2: What Pharmacology Topics are Included in These Programs?

In order to identify pharmacology topics most frequently covered in entry-level physical therapy programs, participants responded to a list of 14 potential topics. Each topic was identified as an elective, required, or not covered topic within the program. Ninety-seven percent of the programs responding include cardiovascular and autonomic pharmacology; 96% of the programs include non steroidal anti-inflammatory drugs. A complete listing of the pharmacology topics and the frequency of coverage can be found in Table 3.

Research Question #3: Have There Been any Curriculum Changes Related to Pharmacology From 1990 to the Present?

Table 1. Pharmacology Textbooks Utilized by Survey Respondents*

Pharmacology Textbooks

- Ciccone CD. Pharmacology in Rehabilitation. Philadelphia, Pa: FA Davis Company; 1990.
- Eddy L. Physical Therapy Pharmacology. St. Louis, Mo: Mosby-Year Book; 1991.
- Clark WG. Goth's Medical Pharmacology. 13th ed. St. Louis, Mo: Mosby-Year Book; 1992.
- Deglin JH, Vallerand AH. Davis's Drug Guide for Nurses. Philadelphia, Pa: FA Davis Company; 1995.
- Harvey RA, Champe PC, eds. Lippincott's Illustrated Reviews: Pharmacology. Philadelphia, Pa: Lippincott; 1992.
- Skidmore-Roth L. Mosby's Nursing Drug Reference. St. Louis, Mo: Mosby-Year Book; 1993.
- Smith CM, Reynard AM, eds. Textbook of Pharmacology. Philadelphia, Pa: Saunders; 1992.
- Wingard, et al. Human Pharmacology. St. Louis, Mo: Mosby-Year Book; 1991.
-

* Listed in order of frequency of utilization.

Table 2. Percentages of Faculty Members Teaching Pharmacology in Entry-Level Physical Therapy Programs

Profession	Percent
Physical Therapy	16.4
Medicine	1.5
Pharmacy	38.8
Nursing	3.0
Other	16.4
More than one of the above	23.9

Table 3. Percentage of Specific Pharmacology Content
in Entry-Level Physical Therapy Curriculum

Pharmacology Content Topic	E*	R*	NC*	n^a
General principles in pharmacology	3.3	90.0	6.7	90
Pharmacokinetics	6.8	72.7	20.5	88
Effects of drug therapy on physical rehabilitation	4.5	93.2	2.3	88
Narcotic analgesics	9.5	83.3	7.1	84
Non steroidal anti-inflammatory	3.3	95.6	1.1	90
Drugs affecting skeletal muscle	4.5	91.0	4.5	89
Central nervous system pharmacology	6.7	87.7	5.6	90
Endocrine pharmacology	5.7	80.7	13.6	88
Cardiovascular & autonomic pharmacology	1.1	96.7	2.2	90
Respiratory drugs	4.4	88.9	6.7	90
Cancer chemotherapy	16.1	57.5	26.4	87
Chemotherapy of infections	16.9	51.8	31.3	83
Substance abuse	16.3	51.1	32.6	86
Pharmacology issues in the management of geriatric patients	9.0	83.1	7.9	89

^aTotal number of respondents.

*E=Elective, R=Required, NC=Not Covered.

Respondents were asked to identify the amount of program changes in pharmacology content since 1990. Using a scale of 1=decrease, 2=no change, and 3=increase, 46.0% of the respondents noted an increase in the number of courses with pharmacology content, while 54.0% indicated there was no change. Fifty percent of the respondents reported an increase in the availability of instructional material on pharmacology, and the remaining 50% reported no change. Table 4 identifies the amount of change in pharmacology content in entry-level programs as perceived by the respondents.

Research Question #4: Do Respondents Feel Their Current Program Adequately Covers the Topic of Pharmacology?

Respondents were asked to give their opinion on whether their programs adequately cover the topic of pharmacology for the entry-level physical therapy graduate. Over 61% perceive their program as adequate (Fig. 2). Thirty-five (38.5%) respondents believe their program does not adequately cover pharmacology. These latter respondents would like to increase the amount of pharmacology content within their curriculum, either through a separate course or by integrating content into existing courses. However, the overwhelming majority of the respondents report a lack of time within the existing curriculum. Other reports of problems include a lack of faculty expertise and faculty interest.

Research Question #5: Is There a Relationship Between the Type of Entry-Level Program (undergraduate vs graduate) and Questionnaire

Table 4. Percentages of Respondents Identifying Amount of Change in Pharmacology Content in Entry-Level Physical Therapy Programs Since 1990

	Decrease	No Change	Increase	n ^a
Number of courses with pharmacology content	0	54.0	46.0	87
Number of credit hours in pharmacology	0	77.6	22.4	85
Availability of instructional material	0	50.0	50.0	86
Availability of faculty expertise in pharmacology	2.3	60.9	36.8	87
Extent of faculty interest in pharmacology	1.1	56.4	42.5	87
Number of pharmacology examples in exams/projects	1.2	45.3	53.5	86

^a Total number of respondents.

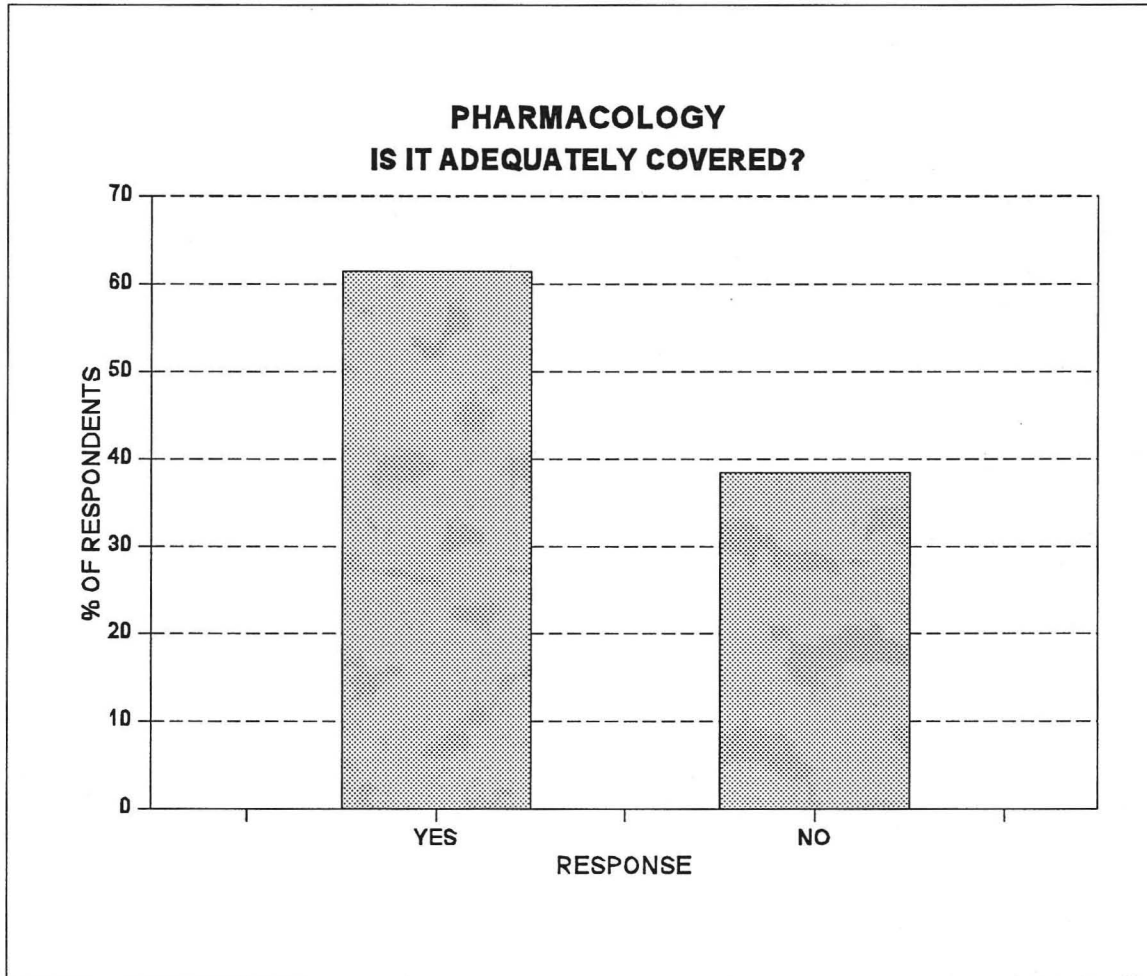


Fig 2.--Respondent's perception regarding program adequacy (=91).

**Responses Pertaining to the Incorporation of Pharmacology Content,
Pharmacology Topics, Program Changes and Program Adequacy
(Research Questions 1-4)?**

Responses were analyzed for statistically significant relationships using the chi square test for independence. The incorporation of pharmacology content, pharmacology topics, program changes and program adequacy (research questions 1 through 4) were examined relative to the level of the program (undergraduate vs graduate). Many of the questions, however, could not be tested with confidence since the expected frequencies did not meet the chi square test for independence restrictions. The following results include only those questionnaire responses where the restrictions and assumptions of the chi square test for independence were maintained.

Three survey questions addressed pharmacology content. Respondents were asked if they currently: (1) Require a course in pharmacology? (2) Require a textbook in pharmacology? (3) Have a faculty member responsible for teaching pharmacology? Results were analyzed relative to the level of the program (see Table 5). The only significant difference between undergraduate and graduate levels is the requirement of a textbook. Nine (23.7%) undergraduate programs as compared to 25 (49%) graduate programs require a textbook in pharmacology.

Seven questions pertaining to pharmacology topics (research question #2) were similarly analyzed and the results are presented in Table 6. There

Table 5. Frequencies and Percentages of **Positive** Responses From Entry-Level Undergraduate and Graduate Program Respondents Relative to Pharmacology Content.

Question	Undergraduate		Graduate		Chi ²	p	
	n ^a	%	n	%			
Does your program currently:							
• Require a course specifically in pharmacology?	11	28.9	19	38.0	.79	.37	
• Require a textbook in pharmacology?	9	23.7	25	49.0	5.9	.02*	22
• Have a faculty member responsible for teaching pharmacology?	24	63.2	37	72.5	.89	.35	

^a Total number of respondents indicating a positive response.

* Statistically significant at $P \leq .05$.

Table 6. Percentages and Frequencies of Respondents From Undergraduate and Graduate Programs That **Require** Specific Pharmacology Topics (Research Question #2).

Topic	Undergraduate		Graduate		Chi ²	p
	n ^a	%	n	%		
• Pharmacokinetics	22	62.9	38	79.2	2.69	.10
• Narcotic Analgesics	25	73.5	41	89.1	3.30	.07
• Endocrine Pharmacology	28	77.8	40	81.6	.19	.66
• Cancer Chemotherapy	18	51.4	29	61.7	.87	.35
• Chemotherapy of Infections	14	42.4	25	54.3	1.09	.29
• Substance Abuse	13	39.4	29	60.4	3.46	.06
• Geriatric Pharmacology	29	80.6	40	83.3	.11	.74

^a Total number of respondents.

was no significant difference in pharmacology topics presented between undergraduate and graduate entry-level programs.

Three survey questions addressed program changes (research question #3). Results were analyzed relative to undergraduate and graduate programs (see Table 7). There was no significant difference in program changes within the last 5 years between the undergraduate and graduate entry-level programs.

Questionnaire responses relative to program adequacy (research question #4) were also divided according to program level. The differences between programs are statistically significant ($p \leq .05$). Eighteen (48.6%) undergraduate program respondents ranked their curriculum as adequate, while 36 (72.0%) of the graduate program respondents ranked their program's coverage of pharmacology as adequate.

Research Question #6: Is There a Relationship Between Those Programs Which Reside in a State With Direct Access Versus Physician Referred Access and Questionnaire Responses Pertaining to the Incorporation of Pharmacology Content, Pharmacology Topics, Program Changes and Program Adequacy (Research Questions 1-4)?

Using the chi square test for independence, responses were examined for statistically significant relationships. The incorporation of pharmacology content, pharmacology topics, program changes and program adequacy (research questions 1 through 4), were analyzed relative to the type of access to physical therapy services within the program's home state. Many of the

Table 7. Frequencies and Percentages of Respondents From Undergraduate and Graduate Programs With an Identified Recent **Increase** in Pharmacology Content (Research Question #3).

	Undergraduate		Graduate		Chi ²	p
	n ^a	%	n	%		
• Number of courses with pharmacology content	16	45.7	21	43.8	.03	.86
• Number of credit hours in pharmacology	7	20.0	11	23.4	.14	.71
• Availability of instructional materials	17	50.0	24	50.0	.00	1.00

^a Total number of respondents.

response frequencies did not meet the restrictions of the chi square test for independence; the following results include only those responses that fall within the restrictions and assumptions of the chi square test for independence.

The results show no statistically significant difference in pharmacology content, topics, changes, and adequacy relative to the type of access in the state in which the program resides. The only exception noted was the statistically significant difference ($p \leq .05$) in the number of courses with pharmacology content since 1990 (research question #3). Twenty-six (55.3%) of the respondents whose program resides in a state with direct access indicated an increase, while only 10 (29.4%) of the respondents whose program resides in a physician referral state indicated an increase.

Frequency of responses pertaining to the incorporation of pharmacology content, pharmacology topics and program changes (research questions 1 through 3) can be found in Tables 8, 9 and 10 respectively. The results are categorized by the type of access (direct vs physician referral) to physical therapy services in the state where the respondent's program resides.

Table 8. Frequencies and Percentages of **Positive** Responses Pertaining to the Incorporation of Pharmacology Content and Categorized by the Type of Access.

Question	Direct Access		Physician Referral		Chi ²	p
	n ^a	%	n ^a	%		
Does your program currently:						
▪ Require a course specifically in pharmacology?	14	28.6	16	43.2	1.99	.16
▪ Require a textbook in pharmacology?	18	36.0	16	43.2	.47	.49
▪ Have a faculty member responsible for teaching pharmacology?	37	74.0	23	62.2	1.39	.24

27

^a Total number of respondents indicating a positive response.

Table 9. Percentages and Frequencies of Respondents From Programs Which Reside in States With Direct Access or Physician Referral That **Require** Specific Pharmacology Topics.

Topic	Direct Access		Physician Referral		Chi ²	p
	n ^a	%	n ^a	%		
▪ Pharmacokinetics	37	78.7	21	61.1	2.79	.09
▪ Narcotic Analgesics	36	81.8	28	82.4	.01	.95
▪ Endocrine Pharmacology	39	81.3	27	77.1	.21	.65
▪ Cancer Chemotherapy	25	55.6	20	57.1	.02	.89
▪ Chemotherapy of Infections	20	45.5	18	54.5	.62	.43
▪ Substance Abuse	24	53.3	17	50.0	.09	.77
▪ Geriatric Pharmacology	39	83.0	28	80.0	.12	.73

^a Total number of respondents.

Table 10. Percentages and Frequencies of Respondents From Programs Which Reside in States With Direct Access or Physician Referral With an Identified Recent Increase in Pharmacology Content.

	Direct Access		Physician Referral		Chi ²	p
	n ^a	%	n ^a	%		
• Number of courses with pharmacology content	26	55.3	10	29.4	5.36	.02*
• Number of credit hours in pharmacology	13	27.7	5	15.2	1.74	.19
• Availability of instructional materials	23	50.0	17	50.0	.00	1.00

^a Total number of respondents.

* Statistically significant at $P \leq .05$.

CHAPTER 5

DISCUSSION

Incorporation of Pharmacology Content

While there are no specific physical therapy accreditation requirements addressing the need for pharmacology instruction, nearly all of the programs provide at least a basic foundation in pharmacology. Ninety-five (98.9%) of the programs surveyed incorporate pharmacology into existing courses and/or require a course specifically in pharmacology. Only one respondent reported that their program neither incorporates nor requires a course in pharmacology.

Although not statistically significant, there is a general trend showing that a greater percentage of graduate entry-level physical therapy programs require a course specifically in pharmacology (Table 5). This may be related to having more time and/or room within graduate entry-level curricula for a required course in pharmacology.

Pharmacology Topics

Ten of the 14 pharmacology topics addressed in the questionnaire are included in the curricula of more than 80% of the responding programs (Table 3). These results are a reflection of the ongoing efforts by the majority of the entry-level physical therapy programs to improve pharmacology education.

Program Changes

Forty programs (46%) have increased the number of courses with pharmacology content in the past five years (Table 4). Of the programs located in states with direct access, 55.3% indicated an increase in the number of courses with pharmacology content since 1990 as compared to an increase amongst 29.4% of the programs residing in physician referral states (Table 10). Why such a difference exists between entry-level physical therapy programs residing in states with direct vs physician referral access is difficult to answer without further research. There may, for example, be a greater emphasis placed on improving pharmacology education amongst educators in states with direct access.

While no program identified a decrease in the number of credit hours in pharmacology, only 19 (22.4%) of the respondents reported an increase in the number of credit hours. This may be related to a lack of time or room in the current curriculum, as reported by many of the programs.

Program Adequacy

Although 56 (61.5%) respondents perceive their program adequately covers the topic of pharmacology, 35 (38.5%) respondents believe their program does not. Many of the respondents reported that the lack of time or space within the current curriculum limited their ability to implement positive changes. This may explain why a significantly ($p \leq .05$) greater percentage of undergraduate entry-level program respondents (51.4% as compared to 28% of

the graduate entry-level program respondents) perceive the coverage of pharmacology as inadequate. A few respondents, for example, whose programs are making the transition from the undergraduate to graduate level indicate the coverage of pharmacology will be more than adequate once the transition is complete.

One respondent commented on how his or her program addresses the problem of adequately covering pharmacology when there is no room to add a course:

Students present an in depth report on 1 drug to the class and include inferences for physical therapy. " With all the extra out of class assignments, students are doing quite a lot with pharmacology. This approach has evolved as a sneaky way to increase pharmacology, because [we] cannot add another course to current curriculum--we are at [the] credit hour limit."

CHAPTER 6

CONCLUSION

This survey research quantifies the status of pharmacology education in entry-level physical therapy programs. The results of the questionnaire are available to all entry-level physical therapy programs, to be utilized in the process of curriculum evaluation, review, and revision.

As educators, the majority of the respondents perceive their program's instruction in pharmacology as adequate. However, the importance of ongoing curriculum development, evaluation, and revision related to the improvement of pharmacology education continues to grow. Future studies surveying recent program graduates would be beneficial. Graduates' thoughts and opinions on the quality of instruction in pharmacology and areas that need improvement are an important part of the curriculum development and evaluation process.

Networking amongst entry-level physical therapy programs would also be beneficial. Creative and effective measures to improve the quality of pharmacology instruction in an already full curriculum could be shared with other programs struggling with similar problems. This would ensure that future physical therapy students are adequately prepared with a strong background in pharmacology.

APPENDIX A

35
UNIVERSITY OF NORTH DAKOTA'S
INSTITUTIONAL REVIEW BOARD

DATE: October 3, 1994

NAME: Dan Weaver DEPARTMENT/COLLEGE Physical Therapy

PROJECT TITLE: Survey of Pharmacology Education in Entry-Level Physical Therapy Programs

The above referenced project was reviewed by a designated member for the University's Institutional Review Board on OCTOBER 4, 1994 and the following action was taken:

- Project approved. EXPEDITED REVIEW NO. ____.
Next scheduled review is on _____.
- Project approved. EXEMPT CATEGORY NO. 2. No periodic review scheduled unless so stated in REMARKS SECTION.
- Project approved PENDING receipt of corrections/additions in ORPD and approval by the IRB. This study may NOT be started UNTIL IRB approval has been received. (See REMARKS SECTION for further information.)
- Project approval deferred. This study may not be started until IRB approval has been received. (See REMARKS SECTION for further information.)
- Project denied.
(See REMARKS SECTION for further information.)

REMARKS: Any changes in protocol or adverse occurrences in the course of the research project must be reported immediately to the IRB Chairman or ORPD.

cc: R. Mabey, Adviser
Dean, Graduate School

 10/4/94
Signature of ~~Chairman~~ designated IRB Member, Date
UND's Institutional Review Board

If the proposed project (clinical medical) is to be part of a research activity funded by a Federal Agency, a special assurance statement or a completed 596 Form may be required. Contact ORPD to obtain the required documents. (7/93)

**THE GRADUATE SCHOOL
UNIVERSITY OF NORTH DAKOTA**

(Check One)

Outline of Independent Study Thesis Dissertation Project Design Student Dan Weaver Date 10/19/94Proposed Title Survey of Pharmacology Education in Entry-level Physical Therapy ProgramsAnticipated Date of Graduation May, 1995

Description of the nature of the problem/study, the procedure or methodology to be followed, and the proposed results:

The clinical use of therapeutic medications is extensive and continues to grow. Having a strong background in pharmacology has always been important for those professionals who prescribe, dispense and/or administer medications. It is now recognized, however, that other health related professions like physical therapy must also have a fundamental knowledge of pharmacology. For the physical therapist, knowledge of pharmacotherapeutics is important because various drugs can influence a patient's response to certain rehabilitative procedures.

The purpose of this survey research is to obtain a baseline of information, documenting the current status of education in pharmacology in the entry-level physical therapy programs. A questionnaire will be sent to the 135 entry-level physical therapy programs located in the United States and accredited by the American Physical Therapy Association. From each program, the director or faculty member responsible for pharmacology will be asked to participate in the five part survey.

The questionnaire will be designed to address the following questions: (1) How is pharmacology course content currently incorporated in physical therapy curricula? (2) What pharmacology topics are included in these programs? (3) Has there been any curriculum changes related to pharmacology, from 1990 to the present? (4) Do respondents feel their current program adequately covers the topic of pharmacology? (5) Is there a relationship between the type of entry-level program and responses to questions 1 through 4? (6) Is there a relationship between those programs which reside in states that allow direct access to physical therapy services and responses to questions 1 through 4?

All data will be reported in aggregate and analyzed for descriptive trends. The results of this survey will be shared with University of North Dakota Physical Therapy faculty and all other entry-level programs who request results.

Signatures of approval as specified in the "Degree Requirements" section of the Graduate Bulletin:

Renee Macey

Deeely Jensen

THIS OUTLINE MUST BE FILED IN THE GRADUATE SCHOOL BEFORE ADVANCEMENT TO CANDIDACY.

EXPEDITED REVIEW REQUESTED UNDER ITEM _____ (NUMBER[S]) OF HHS REGULATIONS
 EXEMPT REVIEW REQUESTED UNDER ITEM 3 (NUMBER[S]) OF HHS REGULATIONS

UNIVERSITY OF NORTH DAKOTA
 HUMAN SUBJECTS REVIEW FORM
 FOR NEW PROJECTS OR PROCEDURAL REVISIONS TO APPROVED
 PROJECTS INVOLVING HUMAN SUBJECTS

PRINCIPAL INVESTIGATOR: Dan Weaver TELEPHONE: 772-9131 DATE: 10/03/94

ADDRESS TO WHICH NOTICE OF APPROVAL SHOULD BE SENT: P. O. Box 7027 UND Stn Grand Forks, ND 58202

SCHOOL/COLLEGE: School of Medicine DEPARTMENT: Physical Therapy PROPOSED PROJECT DATES: 10/03/94-05/01/95

PROJECT TITLE: Survey of Pharmacology Education in Entry-level Physical Therapy Programs

FUNDING AGENCIES (IF APPLICABLE): N/A

TYPE OF PROJECT:
 NEW PROJECT CONTINUATION RENEWAL DISSERTATION OR THESIS RESEARCH STUDENT RESEARCH PROJECT
 CHANGE IN PROCEDURE FOR A PREVIOUSLY APPROVED PROJECT

DISSERTATION/THESIS ADVISER, OR STUDENT ADVISER: Renee Mabey

PROPOSED PROJECT: INVOLVES NEW DRUGS (IND) INVOLVES NON-APPROVED USE OF DRUG INVOLVES A COOPERATING INSTITUTION

IF ANY OF YOUR SUBJECTS FALL IN ANY OF THE FOLLOWING CLASSIFICATIONS, PLEASE INDICATE THE CLASSIFICATION(S):

MINORS (<18 YEARS) PREGNANT WOMEN MENTALLY DISABLED FETUSES MENTALLY RETARDED
 PRISONERS ABORTUSES UND STUDENTS (>18 YEARS)

IF YOUR PROJECT INVOLVES ANY HUMAN TISSUE, BODY FLUIDS, PATHOLOGICAL SPECIMENS, DONATED ORGANS, FETAL MATERIAL, OR PLACENTAL MATERIALS, CHECK HERE _____

1. ABSTRACT: (LIMIT TO 200 WORDS OR LESS AND INCLUDE JUSTIFICATION OR NECESSITY FOR USING HUMAN SUBJECTS.)

The clinical use of therapeutic medications is extensive and continues to grow. Having a strong background in pharmacology has always been important for those professionals who prescribe, dispense and/or administer medications. It is now recognized, however, that other health related professions like physical therapy must also have a fundamental knowledge of pharmacology. For the physical therapist, knowledge of pharmacotherapeutics is important because various drugs can influence a patient's response to certain rehabilitative procedures.

The purpose of this survey research is to obtain a baseline of information, documenting the current status of education in pharmacology in the entry-level physical therapy programs. A questionnaire will be sent to the 140 entry-level physical therapy programs accredited by the American Physical Therapy Association. From each program, the director or faculty member responsible for pharmacology will be asked to participate in the five part survey. Results from this survey will be shared with University of North Dakota Physical Therapy (UND PT) faculty and all other entry-level programs who request results.

PLEASE NOTE: Only information pertinent to your request to utilize human subjects in your project or activity should be included on this form. Where appropriate attach sections from your proposal (if seeking outside funding).

2. PROTOCOL: (Describe procedures to which humans will be subjected. Use additional pages if necessary.)

Subjects- Directors and/or faculty members responsible for pharmacology from the one hundred forty entry-level physical therapy programs, will be asked to participate in the five part survey. Confidentiality will be maintained by keeping the subject's responses anonymous. A listing of program addresses will be obtained from the American Physical Therapy Association.

Survey development- The questionnaire was developed from a review of current literature and input from UND Physical Therapy faculty. The following questions are addressed: (1) How is pharmacology course content currently incorporated in physical therapy curricula?; (2) What pharmacology topics are included in these programs?; (3) Has there been any curriculum changes related to pharmacology, from 1990 to the present?; (4) Do respondents feel their current program adequately covers the topic of pharmacology?; (5) Is there a relationship between the type of entry level program and responses to questions 1 through 4?; and (6) Is there a relationship between those programs which reside in states that allow direct access to physical therapy services and responses to questions 1 through 4?.

Procedure- Each questionnaire will be mailed with a postage paid, return envelope. A cover letter will also be included requesting program director and/or appropriate faculty member participation in the survey research. Confidentiality of individual responses will be assured by maintaining the respondents anonymity.

A projected return date has been set for November 1, 1994. All subjects will receive a follow-up post-card mailing, two weeks after the original mailing. This will serve as a reminder to complete and return the questionnaire, and as a thank you for those who have already returned their questionnaire. All data will be reported in aggregate and analyzed for descriptive trends.

3. **BENEFITS:** (Describe the benefits to the individual or society.)

Curriculum evaluation is an important process in the continuing effort to improve physical therapy education. The questionnaire results could benefit all entry-level physical therapy programs as they seek to evaluate and improve their curriculum content specific to pharmacology. For future physical therapy students, this could mean being better prepared as practitioners to deal effectively with the population's health care needs during the 1990's and beyond. Ultimately, this could mean better and more comprehensive treatment of future patients seeking physical therapy services.

4. **RISKS:** (Describe the risks to the subject and precautions that will be taken to minimize them. The concept of risk goes beyond physical risk and includes risks to the subject's dignity and self-respect, as well as psychological, emotional or behavioral risk. If data are collected which could prove harmful or embarrassing to the subject if associated with him or her, then describe the methods to be used to insure the confidentiality of data obtained, including plans for final disposition or destruction, debriefing procedures, etc.)

Risk to the subject is minimal. Survey responses will remain anonymous and results will be reported in aggregate, there by protecting confidentiality.

- 5. **CONSENT FORM:** A copy of the **CONSENT FORM** to be signed by the subject (if applicable) and/or any statement to be read to the subject should be attached to this form. If no **CONSENT FORM** is to be used, document the procedures to be used to assure that infringement upon the subject's rights will not occur.

Describe where signed consent forms will be kept and for what period of time.

No consent form will be utilized. Each subject will receive a letter introducing the study and inviting their participation by completing the enclosed questionnaire. The return of the completed questionnaire will be an implied voluntary consent.

Returned surveys will be kept by the University of North Dakota Department of Physical Therapy for a minimum period of two years following the completion of the study.

- 6. For **FULL IRB REVIEW** forward a signed original and thirteen (13) copies of this completed form, and where applicable, thirteen (13) copies of the proposed consent form, questionnaires, etc. and any supporting documentation to:

Office of Research & Program Development
University of North Dakota
Box 8138, University Station
Grand Forks, North Dakota 58202

On campus, mail to: Office of Research & Program Development, Box 134, or drop it off at Room 101 Twamley Hall.

For **EXEMPT** or **EXPEDITED REVIEW** forward a signed original and a copy of the consent form, questionnaires, etc. and any supporting documentation to one of the addresses above.

The policies and procedures on Use of Human Subjects of the University of North Dakota apply to all activities involving use of Human Subjects performed by personnel conducting such activities under the auspices of the University. No activities are to be initiated without prior review and approval as prescribed by the University's policies and procedures governing the use of human subjects.

SIGNATURES:

Car Weaver
Principal Investigator

DATE: 10/3/94

Renee Mabey
Project Director or Student Adviser

DATE: 10-3-94

Training or Center Grant Director

DATE: _____

APPENDIX B

Dan Weaver BSN, SPT
University of North Dakota
Dept. of Physical Therapy
P. O. Box 9037
Grand Forks, ND 58202-9037
(701) 777-2831

Attn: Program Director or
Pharmacology Faculty

Dear Program Director/Faculty Member,

As you well know, curriculum development and evaluation are important processes in the continuing efforts to improve physical therapy education.

The purpose of this survey is to obtain a baseline of information, documenting the status of education in pharmacology in the entry-level physical therapy programs.

Your participation in the survey is vital if any meaningful results are to be obtained. By answering this survey you will, of course, be assisting my efforts toward completing the requirements of graduate study at the University of North Dakota, Department of Physical Therapy. Beyond this, I believe, the survey results could benefit all entry level programs as they seek to refine and modify their curriculum content related to pharmacology.

The survey does not need to be signed, and you are assured that your responses will remain anonymous and confidential.

Please answer all of the questions and return the completed survey in the enclosed envelope by **November 1, 1994**.

Thank you for your cooperation.

Sincerely,

Dan Weaver, BSN, SPT

Survey of Pharmacology Education in Entry-level Physical Therapy Programs

** All sections of the education survey should be completed by the program director or faculty member responsible for pharmacology.

Part I is designed to determine how pharmacology is currently incorporated in your program.

Please circle the response that best identifies your curriculum.

Does your program currently:

- A. Require a course specifically in pharmacology? Yes No
 -If yes, how many credits? 1 2 3 4
- B. Offer as an elective a course in pharmacology? Yes No
 -If yes, how many credits? 1 2 3 4
- C. Incorporate pharmacology content within other required courses in your program? Yes No
 -If yes, how much lecture class time is dedicated to the topic of pharmacology? 0 - 5hr 6 - 10hr >10hr
- D. Have a required text book for pharmacology? Yes No
 -If yes, what is the title of the text? _____
- E. Have a faculty member responsible for teaching pharmacology? Yes No
 -If yes, what is their profession? (please circle) Physical Therapy Pharmacy
 Medicine Nursing
 Other

Part II is designed to identify pharmacology course content that is required in your curriculum or offered as an elective.

Please **circle** the response that best identifies how the material is covered in your program.

- 1 = Elective
- 2 = Required
- 3 = Not Covered

<u>Pharmacology Content Topic</u>	<u>Elective</u>	<u>Required</u>	<u>Not Covered</u>
General principles in pharmacology (eg. therapeutic effects & side effects)	1	2	3
Pharmacokinetics (eg. absorption, distribution, action, metabolism & elimination of drugs)	1	2	3
Effects of drug therapy on physical rehabilitation	1	2	3
Narcotic analgesics	1	2	3
Non steroidal anti-inflammatory drugs	1	2	3
Drugs affecting skeletal muscle (eg. muscle relaxants)	1	2	3
Central nervous system pharmacology (eg. anti-epileptic drugs, sedative-hypnotic agents, anti-depressants, anti-anxiety drugs)	1	2	3
Endocrine pharmacology (eg. corticosteroids)	1	2	3
Cardiovascular & autonomic pharmacology	1	2	3
Respiratory drugs	1	2	3
Cancer chemotherapy	1	2	3
Chemotherapy of infections	1	2	3
Substance abuse	1	2	3
Pharmacology issues in the management of geriatric patients	1	2	3

Part III addresses the amount of change in the pharmacology content of your program since 1990.

For each of the following items please indicate the amount of change by using the following scale and circle your response.

- 1 = Decrease (D)
2 = No Change (NC)
3 = Increase (I)

	D	NC	I
A. Number of courses with pharmacology content	1	2	3
B. Number of credit hours in pharmacology	1	2	3
C. Availability of instructional materials	1	2	3
D. Availability of faculty expertise in pharmacology	1	2	3
E. Extent of faculty interest in pharmacology	1	2	3
F. Number of pharmacology related examples in exams or course projects	1	2	3

Part IV

1. Do you feel your current curriculum adequately covers the topic of pharmacology for the entry level physical therapist? Yes No
(please circle)

-If no, what changes would you like to implement?

(Use the back of this page for additional comments)

-Are there specific problems prohibiting the implementation of these changes?

If so please indicate the problems.

(Use the back of this page for additional comments)

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