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Reducing Patient Supply Waste Through Nurse Education to Improve Quality of Patient Care in
the Clinical Microsystem

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Clinical Leadership Theme

As the clinical nurse leader (CNL) in this project, I utilized a table entitled the “[CNL] Essential 2: Organizational and Systems Leadership” (*Competencies and Curricular Expectations for Clinical Nurse Leader Education and Practice*, 2013) and its competencies to focus on the cost effectiveness and quality of patient care. With the help of the CNL competencies and collaboration with the healthcare team, we reduced patient supply waste in the clinical microsystem to increase not only the quality of patient care but also staff efficiency and satisfaction (*Competencies and Curricular Expectations for Clinical Nurse Leader Education and Practice*, 2013).

Statement of the Problem

Throughout nursing school and my career, I have worked at various hospitals to gain experience in providing the best patient care. I have observed acute care facilities and cultures, and from my observations and experiences, I have seen that things are done differently in each of these places. However, what is common among all of these settings is patient supply waste, and this is a problem in some places more than in others. From my microsystem analysis in the orthopedic surgical unit, I see that we are in need of an improvement project for reducing patient supply waste. In patient rooms, there are always extra supplies for personal cleaning, intravenous therapy, respiratory management, and wound care. In isolation rooms, there are even more supplies because each nurse with each shift brings supplies into patient rooms just in case they are needed. When in a hurry, nobody wants to go back into the supply room to get something else that is needed, especially after donning protective clothing and equipment. Coming out of the isolation rooms means that they would have to process back out (take out the gown and gloves, discard them, and wash hands) and back in (wash hands and don the protective

clothing and equipment) again, ultimately creating even more waste; therefore, nurses anticipate what might be needed in a room and take extra supplies just in case. The supplies are kept in drawers to keep rooms tidy, but when they are invisible and forgotten, the cycle of waste continues. All supplies (even unopened ones) are discarded at patient discharge due to the Centers for Medicare and Medicaid Services (CMMS) requirements and hospital infection prevention precautions (Riebling, 2009). By reducing all of this waste, I hoped to increase patient satisfaction and care.

Project Overview and Rationale

My CNL project aim was to reduce patient supply waste in the clinical microsystem by 50% by the end of the second quarter of 2017. This was carried out in a 19-single-room adult orthopedic unit in an acute care hospital, in the Bay Area of California. After I conducted my observational audit of the unit on various shifts, I concluded that there was no consistency with barcode scanning for patient supplies; however, since there was a slower pace on the night shift, compliance was better on that shift.

Nevertheless, taking extra supplies, just in case, into patient rooms is still a problem. During the unit assessment, three challenges were identified with barcode scanning patient supplies. First, nurses want to scan the supplies at a later time when they are less busy; however, this is wishful thinking. Nurses are busy (in a 1:5 patient assignment) with nursing assessment, diagnosis, planning, implementation, and evaluation of patient care. Next nurses document patient care, communicate with staff and patients, and collaborate with the interdisciplinary team. They also talk to families to address questions and concerns, and they educate family members on new medications or discharge planning. Therefore, if the nurses are in a hurry (which is the case most of the time), they do not scan the supplies. In addition, there are only

three Dynamaps (machines that take vital signs such as blood pressure, temperature, and oxygenation) that are functional in this 19-patient-room unit. Nurses are delayed because they are waiting for their colleagues to finish before they start their own patient rounds. On average, it takes about 15 minutes (twice per shift and as needed) to find a machine to start taking vital signs. If they find the Dynamap is in an isolation room, then they need to wipe it down and decontaminate it, which takes even longer. This wasted RN time creates a barrier to consistent barcode scanning especially in light of preexisting pressures and constraints in this inpatient unit.

Second, technical problems contribute to the practice of not scanning supplies at certain times, such as when the computer system is down or the scanner is not functioning properly. Sometimes it takes weeks to get the computer fixed. In such instances, we are supposed to write down every supply name, barcode number, date, and time on a logging sheet, along with our initials; however, I have never seen this done before, even though I have witnessed time-consuming technical problems over the years. Moreover, nobody has ever been held accountable for not recording the used supplies. It is my view that the manager needs to communicate what the expectations and responsibilities are for staff, and to make sure that the computer and/or scanner gets fixed as soon as possible.

Finally, even though there are two supply rooms on this floor, they are small; therefore, some supplies are stored in the hallway closet. There is no way to barcode scan the supplies unless staff would take them into the supply room to scan, which is not realistic either.

I sought to accomplish my goal of reducing supply waste by generating awareness of the supply costs and waste in the unit. To achieve this goal, I emphasized that it is important for the registered nurses (RNs) and certified nurse assistants (CNAs) to scan all patient supplies consistently. Furthermore, I encouraged staff to take only what is needed into the patient rooms

and not to store any supplies in drawers. I provided the RNs and CNAs with reeducation in in-service trainings and in huddles. In addition, with the help of a charge nurse, we were able to review all of the supplies to see if we could eliminate anything to save space in order to create organization, cleanliness, and efficiency in the utility rooms.

When the unit audit was completed after the patient discharges, I was able to calculate the estimated average cost of discarded patient supplies with the help of the Par Level Sheet. (This sheet is the list of supply prices and their codes.) The cost is about \$50 per patient, which is \$25,000 annually (an average of 500 patients per year); however, it is unknown if the supplies were scanned and charged to the patients, or if they were not scanned and considered the unit's resource loss. In either case, there is significant waste. (See appendices for costs, root causes, a fishbone diagram, and SWOT analysis [Strengths, Weaknesses, Opportunity, and Threat]; University of Kansas, 2015).

Upon analyzing the findings, I sought to address two challenges on this unit: to accomplish my goal of increasing barcode scanning of supplies through staff education, and to recommend the purchasing of needed equipment so that nurses could increase their efficiency. For example, there are only three Dynamaps that are functional in the unit. Nurses have to wait for each other to start their patient rounds; there are 47 nurses on this floor on various shifts (3 shifts/24 hours). On average, it takes about 15 minutes (twice per shift and as needed) to find a Dynamap to start taking vital signs. The total average wasted RN time searching for a machine is calculated to be 264 hours, or \$17,100 monthly and \$188,100 annually. If we could eliminate the wasted RN time by obtaining more Dynamaps, we would increase nurse efficiency, which could then in turn increase the barcode scanning.

Therefore, I endeavored to increase staff efficiency by proposing the purchasing of four Dynamaps for the unit. If we invest \$12,812 for four Dynamaps, then we can increase staff efficiency by preventing the wasted RN time as they search for a functional machine to start patient rounds (Cardiology Shop, 2017). With increased nurse efficiency with the new Dynamaps, we hope to save \$188,100 the first year and \$203,100 the second year; this will also help reduce supply waste. By reducing patient supply waste in the microsystem, I hope to save \$12,500 (50%) for the first year, and \$15,000 for the second year, with the compliance of barcode scanning and taking only what is needed into patient rooms. The purchase of new Dynamaps will help decrease staff frustrations and stress, which will be evidenced by positive patient experiences and which will increase the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores. All of this will bring more reimbursement for the organization and increase the overall quality of patient care and staff satisfaction. (See Appendices D and E for calculations.)

As discussed previously, these were the reasons that drove me to embark on this project. I believe we can all make a difference in helping others, even with small changes. My global aim was to increase the quality of patient care by reducing patient supply waste in the microsystem to help save costs while increasing staff efficiency and improving overall patient and staff satisfaction.

Methodology

Lewin's three-stage change theory (as cited in Kritsonis, 2011) was utilized in this quality improvement project. Using this change theory was important in order to "break down" or "dismantle previous mindsets" in order to be successful. This theory helped us implement the educational interventions and embed them successfully into our unit culture.

During the unfreeze phase, we let go of our old habits, values, attitudes, and behaviors. First, I interviewed the nurse manager and my preceptor about the project to get their insights and perspectives. Second, I spent 50 hours rounding the unit and doing observational audits on barcode scanning use and checking post-discharge patient rooms to see what was wasted; I also asked questions (see Appendix A for staff survey) of the RNs, CNAs, and those who work in housekeeping to see what they observed or thought about the issue of supply waste. Then I had the chance to look at the unit Par Level Sheet for supplies. By collaborating with the unit manager and a charge nurse, I was able to review the supply rooms to see if we could eliminate any unused supplies in order to help consolidate them.

Next came the change phase. After I identified the root causes of the problems (see Appendix B), I shared my findings and estimates of wasted staff time and wasted supplies with the unit manager and charge nurses. I educated the nurses regarding the significance of reducing supply waste and how this impacts our patients, staff, and organization. My aim was to foster awareness of the patient supply waste in this microsystem on various shifts, days, and weekends. I talked not only with the RNs, but also with the CNAs, to help change the unit culture for positive outcomes.

At the final stage, or the freeze phase, we stabilized and reinforced the new behaviors, attitudes, and values by encouraging staff to use the barcode every time supplies were needed and to take only what was needed into patient rooms. We also thanked everyone for supporting this quality-improvement project in the role of patient advocates. The most important element in this phase, and in this project, was the continuous reeducation carried out not only by the team leader and the charge nurses but also by the nurse manager in the unit, as without holding staff accountable for supplies that were either not scanned or wasted, compliance would be low.

To evaluate the project's effectiveness, I conducted a final observational audit in the unit and interviewed staff to receive feedback. Unfortunately, I could not obtain the unit profit-and-loss sheet in time to review; however, I was able to estimate again the reduced supply waste in the unit. This time it was about \$35 per patient, which proves that the educational interventions helped reduce waste (\$7,000 for this year already even though had to complete the project before end of second quarter due to school deadlines).

Data Source/Literature Review

The aim of my CNL project was to reduce patient supply waste in the microsystem by 50% by the end of the second quarter of 2017. The project was conducted in a 19-bed adult orthopedic unit in an acute care hospital in San Jose, California. Patients are admitted into this unit due to musculoskeletal problems or fractures, such as hip fractures and corrective surgeries, or patients may have degenerative joint disease or need hip or knee replacements. On each shift, there are at least four staff RNs, a charge nurse, and two CNAs. Nurses work closely with physicians, surgeons, wound care nurses, physical and occupational therapists, dietitians, a social worker, and a case manager for discharge planning.

For the literature review, I used research questions to help find relevant information. It was difficult to find evidence-based research (EBR) and evidence-based practice (EBP) articles for reducing patient supply waste specifically; however, I was still able to find current relevant articles. These qualitative and quantitative articles were used in this paper to support my CNL project. They examine the ethical, social, clinical, economic, or political aspects of healthcare system, not only on the microsystem level but also on the macrosystem level.

Medicare was supposed to be the first attempt toward the universal health coverage; however, it only covers the elderly and the disabled. Then there was the Affordable Care Act

(ACA), also known as “Obamacare”; this was another attempt toward universal health coverage. Next the Trump administration proposed a new healthcare bill that was called the American Healthcare Act, which was designed to repeal and replace Obamacare. However, Congress decided not to vote on this bill because members couldn’t agree on what was in the bill. At the present moment of writing this paper, it is unclear whether they will go back to try and fix this bill or come up with a new one. It is clear, nevertheless, that if this bill had become law there would be an additional 14 million uninsured citizens in United States, not to mention that insurance premiums would skyrocket for the elderly. The Congressional Budget Office (CBO; 2017) estimated that the proposed plan would leave 52 million Americans uninsured.

Moreover, the Trump administration proposed a 20% import tax on all Mexican import products, which also includes medical supplies. Unfortunately, this new tax will increase the patient supply costs and services; therefore, healthcare costs will climb even more, which will ultimately affect the quality of patient care (Yu, 2017).

A new trend has developed over the last decade. This includes pay for performance in the healthcare system rather than fee for service; thus, hospital reimbursement has been linked to the quality of patient care. For example, if a patient falls or develops any of the following, such as a pressure ulcer, a catheter-associated urinary tract infection (CAUTI), or a hospital-acquired infection such as Methicillin Resistant Staphylococcus Aureous (MRSA), or if a patient is rehospitalized within 30 days of discharge, then the organization loses reimbursement for care related to those events (Centers for Medicare & Medicaid Services [CMMS], 2017). The healthcare system is complex and unpredictable, and the costs are high. With the new administration in government, there will be changes that will affect our fragile healthcare system

and patients. Therefore, it is important to identify the source of waste and implement EBPs in our microsystem.

The HCAHPS is a publicly reported national survey on a patient's experience of the hospital care that he or she received. CMMS (2017) reimbursement has been linked not only to the clinical measures (70%) but also to the patient experience (30%); therefore, HCAHPS scores are valuable measures that indicate the quality of care each hospital provides (American Hospital Association, n.d.). The CMMS benchmark for patient experience, such as communication with nurses and doctors, responsiveness of hospital staff, pain management, and communication about medicines and discharge information, is 75% and the national average is 72%. This community hospital's average is 61.8%, whereas the orthopedic unit's average is 68.6%. Even though this unit's average is better than the overall hospital score, we still have room for improvement to provide the best possible patient care.

I examined the Par Level Sheet and the Hospital Chargemaster. The latter lists each supply and its costs to patients. There is a major difference between the prices in these two lists. If we can help reduce the waste even by a small amount, this will not only help our unit and organization, but it will also help our patients' budgets. For example, one 1L 0.9% NS is \$1.978; a solution 0.9% NACL 10ml flush a box (30 in a box) is \$16.250; a D5% NS is \$2.383 to the organization. On the other hand, one 1L 0.9% NS is \$85; a single flush 0.9% NACL 10 ml flush is \$41.20; and a D5% NS is \$214 to patients (Office of Statewide Health Planning and Development, 2017).

According to the Institute for Healthcare Improvement (IHI, 2017a), patient care should be safe, effective, timely, equitable, and efficient. By increasing staff efficiency, we can provide safe and effective patient care. Therefore, we nurses, as patient advocates, need to "[a]ssume a

leadership role of an interprofessional healthcare team with a focus on the delivery of patient-centered care and the evaluation of quality and cost-effectiveness across the healthcare continuum” (*Competencies and Curricular Expectations for Clinical Nurse Leader Education and Practice*, 2013, pg. 10).

To Err Is Human is a well-known report (IHI, 2017a) that was designed to raise awareness of healthcare errors and the tragic patient deaths that result from these errors. Then, in 2001, a more detailed report was released: *Crossing the Quality Chasm*. This report stated: “Not only is the current health care system lagging behind the ideal in large and numerous ways, but the system is fundamentally and incurably *unable to reach the ideal*. In order to begin achieving real improvement in health care, the *whole system* has to change” (The Institute for Healthcare Improvement, 2017a, para. 2). Hence, we need to integrate safe, effective, patient-centered, timely, and efficient care for all in order to close the gap in the healthcare system.

Nursing, with its 2.5 million members, is the largest healthcare profession in the United States. It is in this era of a complex system of health and reimbursement that we can make a difference in our unit by simply monitoring and scanning all the supplies and by taking only what is needed into patient rooms (Sherman, 2012).

Timeline

I began my CNL project on January 30, 2017, by conducting a microsystem analysis and observational auditing of supply waste. Next I completed the literature review. I continued with nurse education to implement the evidence-based research and practices in this microsystem. I completed a final evaluation at the beginning of April 2017. During this audit I found a reduction in supply waste (see Appendix G). Unfortunately, I have not yet gotten any responses from the board members regarding my business proposal to buy new machines, and I may not

hear from them until the end of spring semester of 2017. Nevertheless, I believe that I have started making a difference in the unit with my project.

Expected Results

Education and awareness will increase barcode scanning; this increased efficiency will not only reduce the costs, but it will also increase hospital revenue. More resources, equipment, and staff training will be available, and all of this will increase patient satisfaction and HCAHPS scores for our organization. We nurses, as patient advocates, can make a huge difference by making small changes in our patients' lives.

Summary Report

In my final CNL project, I sought to reduce patient supply waste in the microsystem by 50% by the end of the second quarter of 2017. The project was conducted in a 19-single-room adult surgical/orthopedic unit in a community hospital, in San Jose, California. There were 33 staff RNs and 14 PRN RNs who worked on various shifts. I started the project by meeting with my preceptor and the nurse manager in the unit. I gathered information for a microsystem analysis involving the 5 P's: (Purpose, Patients, People, Processes, and Patterns) and hospital HCAHPS scores. I then continued doing observational audits for supply use, barcode scanning, supplies in patient rooms, staff efficiency, and challenges facing nurses and their time constraints (Godfrey, Nelson, & Batalden, 2004).

During this process, I also completed a staff survey and examined the unit Par Level Sheet and the Hospital Chargemaster for a rundown on supplies in order to get an overall understanding of our unit and organization. After I analyzed my findings I shared them with my preceptor and the unit nurse manager regarding the need for an improvement project.

Furthermore, I continued with staff education to bring awareness of supply waste and unscanned

supplies in the unit. I estimated the average cost of discarded supplies as \$50 per patient, which is \$25,000 annually, at the beginning of the project.

I identified the problems that contributed to the nurses' stress and their not scanning patient supplies. For example, the limited number of Dynamaps in the unit, which causes nurses to search for a functional machine, hinders staff efficiency and results in wasted RN time; this problem puts pressure on nurses and leads to unscanned supplies and loss of unit resources. On average, it takes about 15 minutes (twice per shift and as needed) to find a Dynamap to start taking vital signs. Consequently, the total average wasted RN time is calculated to be 264 hours, or \$17,100 monthly and \$188,100 annually.

To solve the issue of searching for the Dynamaps, I proposed a business plan to purchase four Dynamaps. Having the new machines will augment nurse efficiency and help to increase the barcode scanning. I educated the nurses on the significance of reducing supply waste and how this impacts our patients, staff, and organization. It is my hope to sustain this project in the unit, with the help of staff volunteers (so far, I have found only one volunteer) on each shift and embed this project into the unit culture. With this project, I learned that gathering the baseline data can be as challenging as implementing an improvement project in a patient unit. I used a PDSA (Plan-Do-Study-Act) cycle to keep me organized with the project, and I incorporated EBR, EBPs, and multiple tools such as 5P's, SWOT analysis, root cause analysis/a fishbone diagram, and a Likert scale nurse survey to help me analyze the microsystem in this project. All of these tools assisted me in being successful and staying within my timeline (Institute for Healthcare Improvement, 2017b).

To evaluate the project's effectiveness, I completed a final observational audit in the unit, interviewed the staff, and estimated once again the supply waste in patient rooms. This time the

average estimate was \$35 per patient room, which results in \$7,000 in savings already. Even though I did not reach my goal of a 50% improvement, this was still a great start to help improve not only the quality of patient care, but also patient and staff satisfaction.

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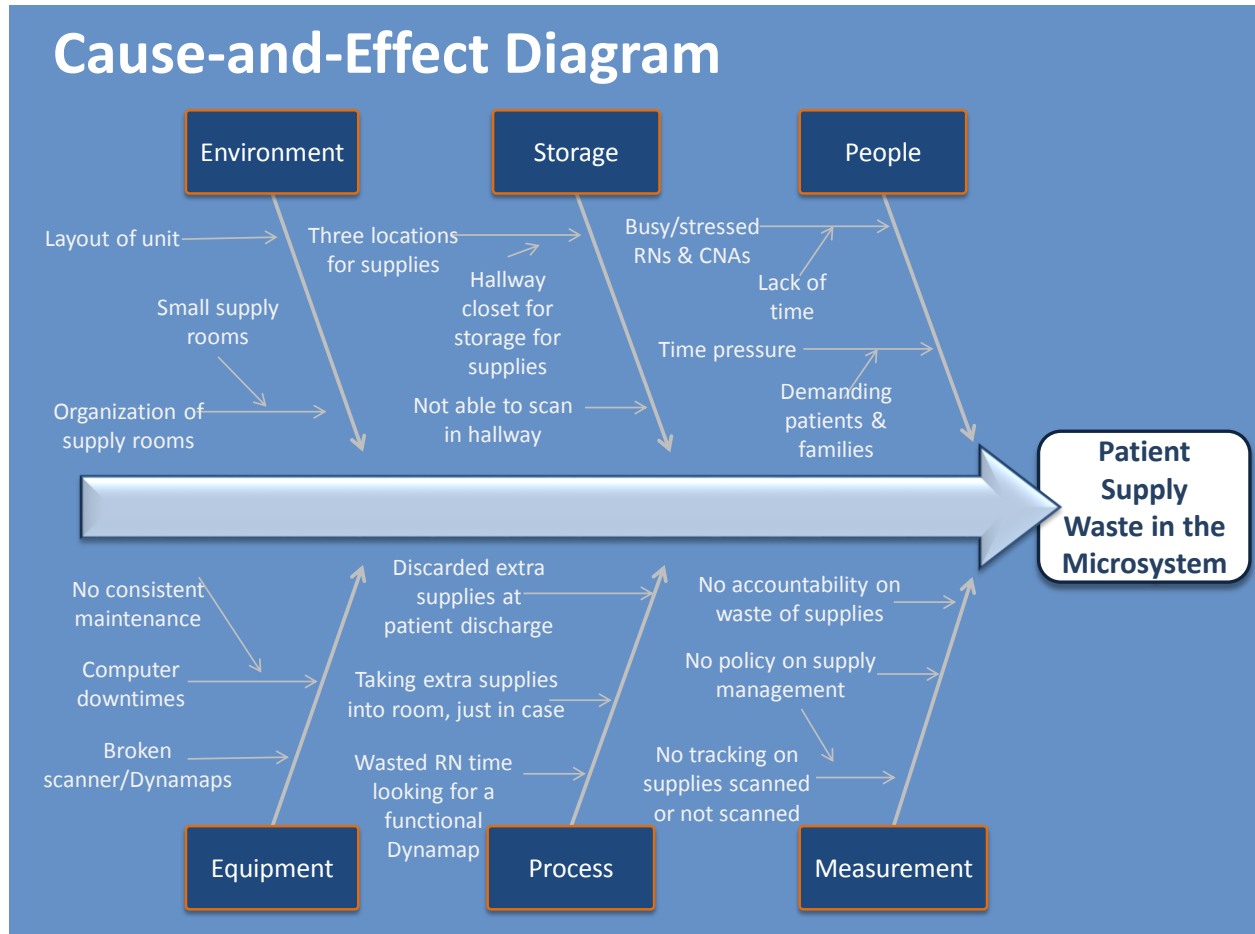
Appendix A

Nurse Survey on Patient Supply Waste in the Microsystem

Question	Never	Rarely	Sometimes	Most of the time
1. Are there enough Dynamaps in your unit for nurses?				
2. Are you wasting time looking for a Dynamap to start your patient rounds?				
3. Are the Dynamaps functioning properly?				
4. Are the Dynamaps fixed quickly?				
5. Is barcode scanning used consistently for patient supplies?				
6. Do you think nurses or CNAs are taking extra supplies into patient rooms?				
7. Do you see extra supplies in patient rooms?				
8. Is there supply waste in the unit?				

Appendix B

Root Cause Analysis (Fishbone Diagram)



Appendix C

SWOT Analysis**STRENGTHS**

- Teamwork and collaboration among RNs, CNAs, and physicians
- Friendly staff
- Nurse leader support
- Well-organized supply rooms
- Electronic charting

WEAKNESSES

- Unit with small rooms
- Old bulky equipment
- Broken Dynamaps with no regular maintenance
- No consistency in barcode scanning
- Technical problems
- Frequent float RN staff
- Hallway closet storage for supplies— not able to scan supplies

OPPORTUNITIES

- Education
- Increased accountability and responsibility of staff
- Bringing awareness of patient supply waste
- Reduced costs and increased reimbursement
- Increased patient-centered care and quality of care
- Increased patient and staff satisfaction
- Volunteer opportunity for unit champion to reduce supply waste

THREATS

- Noncompliance
- Loss of unit resources
- Reduced HCAHPS scores
- Reduced patient and staff satisfaction
- Reduced organization reimbursement
- Reduced quality of patient care
- Reduced staff benefits

Appendix D

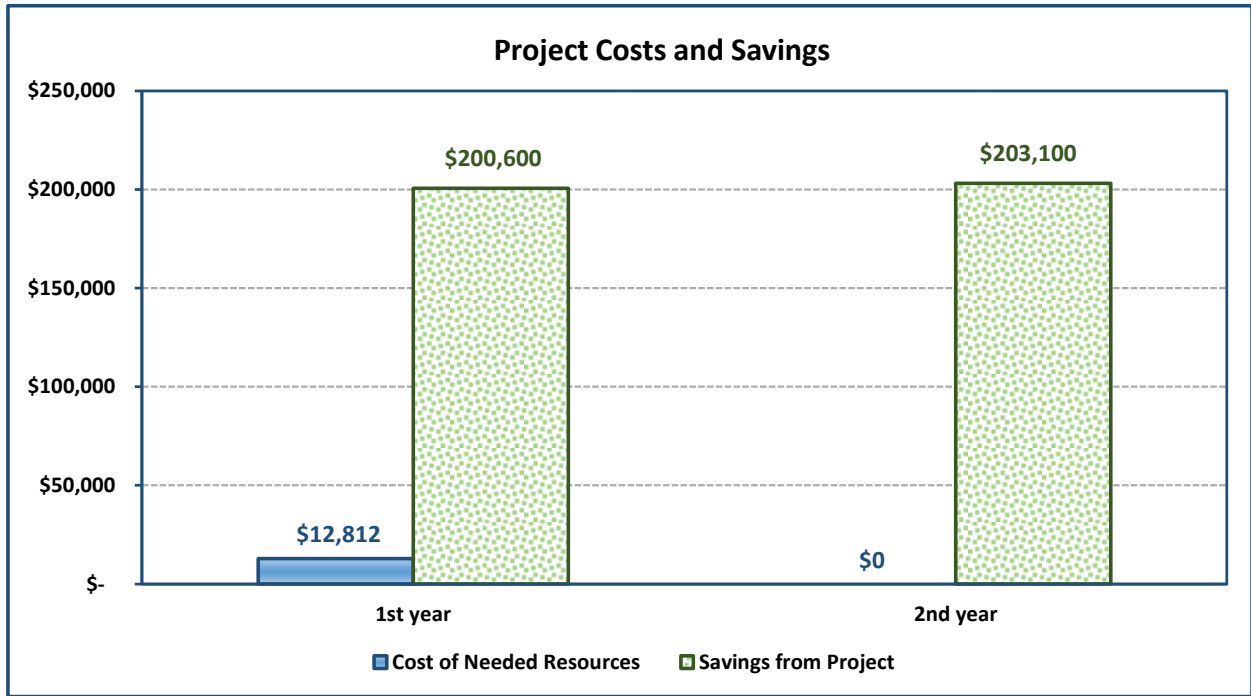
Wasted RN Time and Costs to the Organization

Total RNs in orthopedic unit	Average wasted time looking for a working Dynamap	Average wasted RN hours per month	Average wasted RN salary and resources
33 Staff RNs (work 4 shifts per week x 4 weeks in a month) 16 shifts each	About 30 min/shift (15 min x 2 per shift since q4hrs vital sign monitoring)	If one staff nurse wastes on average 30 min per shift, that is 30 min x 4 per week = 2 hrs x 4 per month = 8 hrs of wasted time.	Average RN salary in the Bay Area, California is \$60/hr. Therefore, \$60 x 8 hrs = \$480 per nurse per month. 33 staff RNs x \$480 per month = \$15,840 \$15,840 x 11 months (4 week vacation per year) = \$174,240 annually wasted RN time = resources
14 PRN RNs (work 3 shifts per month)	About 30 min/shift (15 min x 2 per shift since q4hrs vital sign monitoring)	If one PRN (float) nurse wastes on average 30 min per shift, which is 30 min x 3 per month = 1.5 hrs	\$60 x 1.5 hrs = \$90 per nurse per month. 14 PRN RNs x \$90 = \$1,260 \$1,260 x 11 months = \$13,860 annually wasted float nurse time = resources
Total projected cost of RN wasted time per year			\$174,240 + \$1,260 = \$188,100

Appendix E

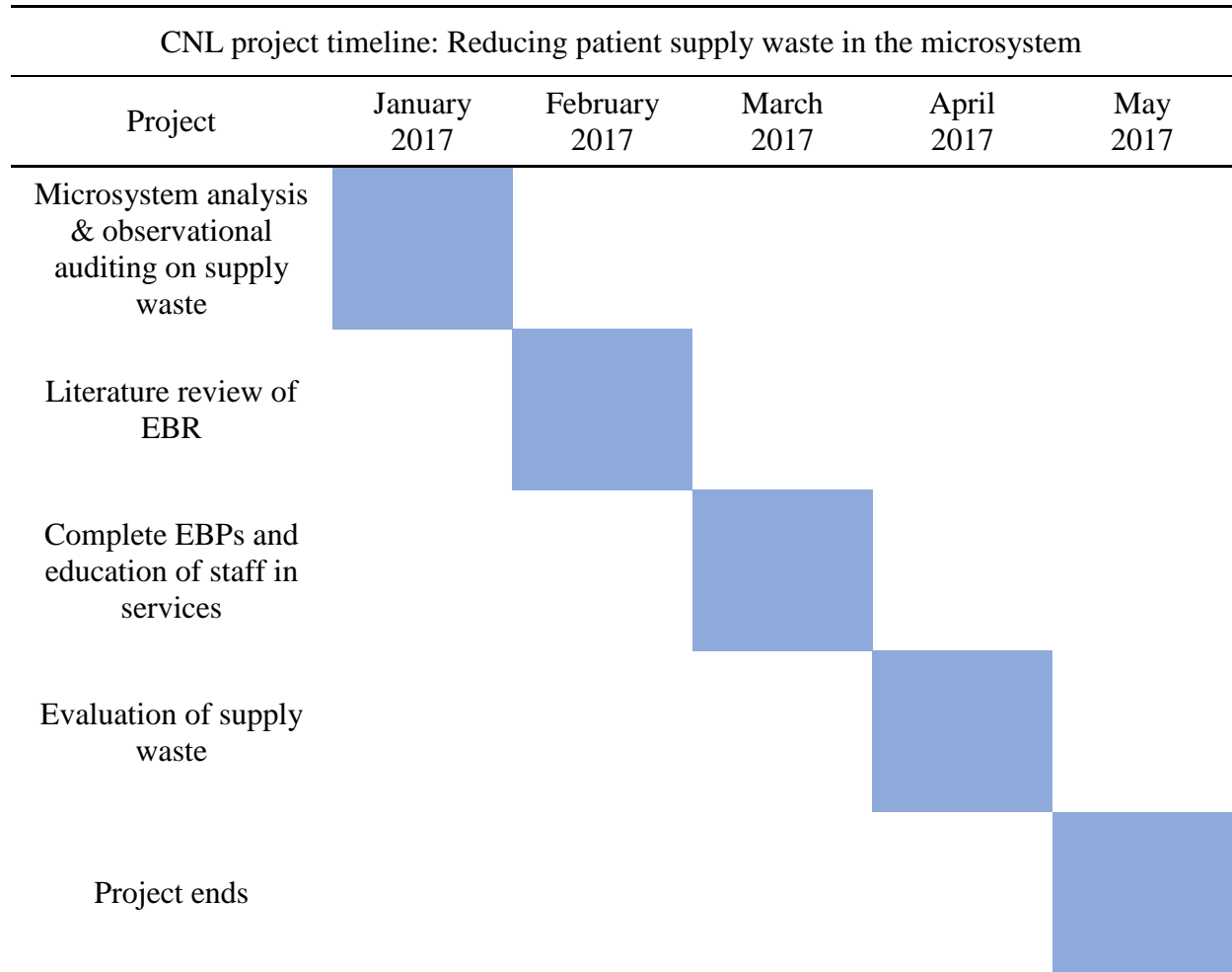
Business Plan Costs and Benefits

	Needed resources for project		Saved resources and benefits from project		
	1 st year	2 nd year	1 st year	2 nd year	
Equipment	One Dynamap = \$3,203 4 x \$3,203 = \$12,812	\$0	Equipment	\$0	\$0
Unit champions/ volunteers	\$0	\$0	Unit champions/ volunteers	\$0	\$0
Ongoing staff education by charge nurses each shift to scan all supplies and take only what is needed into patient rooms to reduce supply waste	\$0	\$0	Reduced supply waste by 50% in the unit with implementation of cost-saving measures	\$12,500	\$15,000
			Reduced RN wasted time	\$188,100	\$188,100
Total	\$12,812	\$0		\$200,600	\$203,100
				+	Increased patient and staff satisfaction
				+	Increased HCAHPS scores



Appendix F

Business Proposal Timeline



Appendix G

Reduction in Patient Supply Waste After Education of Registered Nurses

