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Medication Administration Education for Unlicensed Assistive Personnel in a Residential School

Environment

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Submitted as Partial Fulfillment for the Doctor of Nursing Practice Degree

Regis University

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MEDICATION ADMINISTRATION FOR UAP

Abstract

Nurse supervised unlicensed assistive personnel (UAP) medication administration is a frequently completed health related activity in the school environment (National Association of School Nurses [NASN], 2017). Students face potential adverse outcomes impacting the school experience from medication errors (Clay, Farris, McCarthy, Kelly, & Howarth, 2008). School nurse supervised and directed training for UAP is essential to ensure the mitigation of risk in this vulnerable population. UAPs themselves have been noted to be uncomfortable with the task and expressed a lack of understanding of policy and procedures (Canham et al., 2007; Price, Dake, Murnan, & Telljohann, 2003). It is the role and responsibility of the professional school nurse to provide oversight, supervision and training of UAP and ensure safe medication delivery to students (State of Maine, Department of Education [DOE], 2017). The discussed project is an online medication administration module, which streamlined the staff education process in a small residential school. The project findings demonstrated increased knowledge and comfort level after the training intervention supporting ongoing education of UAP in this setting.

Key words: DNP project, unlicensed assistive personnel, medication administration, residential school

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MEDICATION ADMINISTRATION FOR UAP

Executive Summary

Title: Medication administration education for UAP in a residential school environment

Problem

Medication administration, “is one of the most common health-related activities performed” (NASN, 2017, para. 4) in the school environment, and often involves the use of unlicensed assistive personnel (UAP). The clinical problem was inconsistent delivery of medications in the residential secondary school environment, related to unlicensed assistive personnel.

Purpose

This project was intended to serve as a quality improvement endeavor to educate UAPs through online learning modules in medication administration best practices and safety.

Goal

The primary goal was to maintain the health and safety of students. The outcomes directly related to nurse training and education of UAP. This educational intervention was structured to provide an easily assessable, convenient method of increasing confidence level and knowledge in medication administration.

Plan

This study was quantitative in nature, and compared a change after an educational intervention. Impact was measured by a pre/post survey for UAP’s completing online education based on the *School Health Manual Guidelines for Medication Administration* (State of Maine, DOE, 2017).

Findings

Analysis demonstrated a statistically significant change in UAP confidence and knowledge after the educational intervention, with 86% of eligible UAP participating. A secondary finding in the pre survey was a higher level of knowledge in those that reported having had training at this specific facility in past, regardless of experience or position. This lends support for ongoing and regular education for unlicensed staff regardless of background.

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Medication Administration Education for Unlicensed Assistive Personnel in a Residential School Environment

Nurse supervised unlicensed assistive personnel (UAP) medication administration is a frequently completed health related activity in the school environment (National Association of School Nurses [NASN], 2017). Students face potential adverse outcomes impacting the school experience from medication errors (Clay, Farris, McCarthy, Kelly, & Howarth, 2008). School nurse supervised and directed training for UAP is essential to ensure the mitigation of risk in this vulnerable population. UAPs themselves have been noted to be uncomfortable with the task and expressed a lack of understanding of policy and procedures (Canham et al., 2007; Price, Dake, Murnan, & Telljohann, 2003). It is the role and responsibility of the professional school nurse to provide oversight, supervision and training of UAP and ensure safe medication delivery to students (State of Maine, Department of Education [DOE], 2017). The following discussed project is an online medication administration module, which streamlined the staff education process in a small residential school. The project findings demonstrated increased knowledge and comfort level after the training intervention supporting ongoing education of UAP in this setting.

Problem Recognition/Definition

Statement of Problem

Medication administration in the school environment, “is one of the most common health-related activities performed” (NASN, 2017, para. 4), and often involves the use of unlicensed assistive personnel (UAP). It is the role and responsibility of the professional school nurse to provide oversight and supervision of UAP and ensure safe and effective medication delivery to students (State of Maine, Department of Education [DOE], 2017). In the residential

environment, medications cannot be deferred to a caregiver after hours, and students may receive scheduled or as needed medications from a nurse or UAP during the school day, in the dorm environment or while off campus on school-sponsored trips. The clinical problem was inconsistent delivery of medications in the residential secondary school environment, related to administration by unlicensed assistive personnel.

PICO Statement

The PICO question under consideration was: will instituting a formal online, module-based training program on medication administration safety for unlicensed assistive personnel (UAP) in a residential school increase UAP's confidence in, and knowledge of, medication administration. The population was unlicensed assistive personnel (UAP), consisting of any faculty and staff that may potentially administer medications in the 2017-2018 academic year. The intervention was a self-paced online module on medication administration procedures and safety, specific to the facility. There was no comparative as there was no standard medication administration education in place. After the project it was anticipated UAP should describe an improved confidence in, and knowledge of, medication administration process as evidenced by an anonymous pre and post intervention survey.

Historically, there was no consistent or structured yearly training program in place for staff in this facility, though brief education was offered at orientation or individually as needed by nurses. The state guidelines for schools noted that a training program must be implemented yearly if UAP's are to administer medications (State of Maine DOE, 2017). In this facility, nurses noted medication logs were left unsigned and students regularly missed doses of routine medications. The UAP were anecdotally noted by nursing staff to be uncomfortable with the task, and medication errors went unrecognized.

This practice problem was relevant to Doctorate of Nursing Practice (DNP) as a multi-layered issue involving delegation, supervision and education by the registered professional nurse, or as it is more commonly termed, the school nurse. It was also one that the literature describes as a specialty-wide issue that is often problematic in non-healthcare environments, where nurses are supervised by administrators (NASN, 2014). It fit well with the recommended DNP focus, “on practice that is innovative and evidence-based, reflecting the application of credible research findings” (AACN, 2006 p. 4). A system-wide protocol needed to be established that reached beyond nursing and the school health center to involve other staff, to make effective change in the facility’s medication delivery system that required full collaboration across the facility.

Significance, Scope and Rationale

The project needed to involve the health team, administration, faculty, staff, and coaches to be an effective intervention. It was small-scale in a very specific practice setting, with a core goal of enhancing student safety. The risk of potential adverse outcomes secondary to medication errors was high if the status quo was maintained. Safe delivery of medications in the academic environment has been identified as a common concern across schools and is an issue in schools nationwide (American Association of Pediatrics [AAP], 2009; Clay, et al., 2008; Gordon & Barry, 2009; NASN, 2017). Regular and structured UAP training has been identified as best practice by multiple guiding organizations (AAP, 2009; NASN, 2017; State of Maine DOE, 2017). This intervention would also provide clear evidence to demonstrate the organizational commitment to Maine State Guidelines for schools (State of Maine DOE, 2017).

Foundational Theory

There are several advanced practice nursing outcome measures addressed by the project; health care policy, advocacy in health care, inter-professional collaboration, clinical prevention and population health (Zaccagnini & White, 2017). All of these outcomes link to the National Association of School Nurses (NASN), *Framework for 21st Century School Nursing Practice*, which provides, “student centered nursing care”, (NASN, 2016, para 1) and emphasizes the use of evidence-based care. This framework was used to provide structure and support for the quality improvement project and helped to enhance focus for a school based intervention.

This was an integration initiative, as per Boyer’s Model of Scholarship (Nilbert, n.d.). It involves collaboration with other nurses, administration of the school and UAPs, all of which were focused on the core of student safety. This was in keeping with the NASN Frameworks, which acknowledges several key principles that are relevant, including care coordination, leadership, and quality improvement (NASN, 2016). The ultimate goal was to have a program the nursing staff coordinate and supervise to support and educate the UAP in safe medication delivery. The nurse needed to be a leader and collaborate within the organization’s system for quality improvement to enhance student safety.

Culture of the facility was a major consideration in selection of secondary foundational theory. The facility’s routines and habits were well established and the project would be requiring a system wide culture change. Organizational Culture Theory, as developed by Schein (1990), a non-nursing grand theory was selected to address this issue and is a model that can assist in overall culture change in an organization. Schein (1990) developed a visual representation of the model with assumptions at the core, followed by espoused values and all surrounded by artifacts and symbols. Artifacts are the most exterior layer and are visible parts of

an organization, such as an emblem for business. The middle layer is espoused values, which are the rules and standards of the business. The innermost layer is the assumptions of the organization and conduct not always recognized by individuals (Schein, 1990).

In these layers of the organization, the outer most is the easiest to alter, and as the layers proceed to the core, or the assumptions, they become more difficult to adapt and change. For example, it is easier to change the design of a company's product, the artifacts, than to change a behavior of its employees, the assumptions (Schein, 1990). This is relevant to the project as previous training on medication safety has been sporadic for returning staff and not well defined. Introducing a routine of yearly training, and an increased awareness of medication safety will require staff to adjust ineffective routines that have been historically well established. Changing the packaging of the medications would be a relatively easy change, representing a change of the artifacts. However, changing the assumptions, such as the workflow of UAP medication delivery and shifting the focus to medication safety, would be much more difficult.

Langan-Fox and Tan (1997) note there are multiple documents that explore culture change in an organization, often with differing opinions on what organizational culture is. The authors note that Schein's model is more comprehensive and offers a framework for evaluation of a culture (Langan-Fox & Tan, 1997). This model can be easily fit to various settings and a residential school with long-standing traditions, or assumptions, fits with the model well.

This theory was also chosen for its relevance because medication administration in the independent school environment must be a collective effort, not limited to nursing staff. Successful and safe medication administration relies on effective communication, education, and training and strong system wide commitment. This theory lends support to the idea that effective instruction may make the layers of the culture more congruent and therefore enhance the safety

and consistency of medication administration to the students. School nurses are essential in the organizational structure to ensure a, “culture of safety” that can reduce errors (NASN, 2017, para. 7). All efforts to improve the process must be generated and directed by the professional school nurse to enact meaningful and evidenced-based practice change.

As this was also an adult education project, a learning theory was needed. Knowles Theory of Andragogy (Knowles, 1980) was selected as a fit for the intervention. The five core concepts, self-concept, the experience an adult learner brings to learning, their readiness to learn, their orientation to learn and also their motivation to learn (Knowles, 1980) can be used to frame the education. The first concept that was incorporated into the educational intervention was that it was self-directed. It was offered online at the UAP’s own pace and given a window of almost two months to complete. Encouragement to complete within the first two weeks of school and prior to any dorm duty or off campus trips was highlighted. Secondly, it was goal oriented, with student safety emphasized repeatedly. The intervention was also relevant to experience as many of UAP had been within the residential school environment for some time, and the learning acknowledged this familiarity. Finally, the education was practical and anchored to real world as this was a duty that multiple staff have been required to do on a frequent basis.

Review of Evidence

Literature Selection and Scope of Evidence

In conducting a literature review on this practice problem, both the Cumulative Index to Nursing and Allied Health Literature (CINAHL) and Medline databases were used. The terms “school”, “medication administration” and “unlicensed assistive personnel” were searched. The search resulted in 379 articles when all three terms were used, with an increase when only two of the search terms were utilized. A total of 13 articles were selected with particular attention paid

to the journals specific to the school-nursing specialty and pediatric focus (see Appendix A). There were four Level VII (Thompson, 2011) articles that included descriptions of implemented programs, discussion of medication administration safety. Eight Level VI (Thompson, 2011) articles discussing single studies, survey of nurses, administrators and UAP on topic of medication administration were used. One Level III (Thompson, 2011) article, a quasi-experimental design after educational intervention was also included. The relevant literature can be found organized in Appendix A. Several guiding agency documents were also utilized, including the *State of Maine – School Health Manual* (State of Maine DOE, 2017), the position statement from the NASN on medication administration (NASN, 2017) and the policy statements from American Association of Pediatrics (2009; 2016).

One theme that quickly emerged was that all stakeholders, including school nurses, administration, staff and parents, had concern for safe medication administration for students (AAP, 2009, Clay, et al, 2008; Gordon & Barry, 2009; Gursky & Ryser, 2007; NASN, 2017). All stakeholders wanted focus to be on student safety through process. It was generally recognized that potentiating student health also potentiates student success in the academic environment (AAP, 2009).

Guidelines

There were several guiding agencies and organizations that discuss the need for safe medication practices. The Committee on School Health noted that protocols to prevent medication errors and staff training were essential in the administration of medication in a school setting (AAP, 2009). They recognized the need for delegation, but stressed the importance and the central role of the professional school nurse in safe medication administration (AAP, 2009). The Maine State Guidelines noted that a training program to ensure safety, guided by the school

nurse, must be implemented if UAP's are to administer any medications in this environment (State of Maine, DOE, 2017). The guidelines offered suggestions for instruction, but did not require a specific type or format for the education. It was noted the professional school nurses' responsibility to understand state guidelines and nurse practice acts in the formation of any policy or procedure for medication administration (NASN, 2017).

The National Association of School Nurses *Medication Administration in Schools: Position Statement* (2017) is one of the school nurse's guiding documents in providing evidenced-based care related to medication administration. This document specifically addressed the need for UAP training and education to reduce potential errors. As the expert, the school nurse should be the leader in efforts in procedural development, training of UAPs, and supervision of the process to ensure student safety (NASN, 2017). There must also be frequent and ongoing evaluation of processes by the school nurse to ensure quality and safety (AAP, 2009; NASN 2017).

Medications in the Academic Environment

Historically, school nurses were placed to help decrease absenteeism, but that role has evolved to a broader practice, including medication administration and involves a team both in the school and in the community (AAP, 2016). The process and safety of medication administration in the academic setting is not well defined, and there was extensive discussion of potential for errors within the literature when using UAPs (Canham, et al., 2007; Gordon, & Barry, 2009; McCarthy, Kelly, & Reed, 2000; Wilt & Foley, 2011). Missed doses were listed as the most common error in several discussions (Clay, et al., 2008; Canham, et al., 2007; Kelly, McCarthy, & Mordhorst, 2003; McCarthy, et al., 2000; Richmond, 2011) and have been anecdotally noted in this project setting though no formal tracking method is in place.

Despite the increase in students with medical needs, there is limited data collection happening in schools overall (Richmond, 2011; Robert Wood Johnson Foundation, 2010). No data could be found specific to UAP medication administration in residential schools. There was a frequent call to increase research on the topic specific to schools (Bergen, 2011; Clay et al., 2008; Gordon & Barry, 2009; Litarowsky, Murphy, & Canham, 2004; Richmond, 2011; Wilt & Foley, 2011). Furthermore, UAPs themselves were noted to be uncomfortable with the task and expressed a lack of understanding of policy and procedures (Canham et al., 2007; Price, et al., 2003).

Litarowsky, Murphy, and Canham (2004) concluded that a training intervention for UAPs can demonstrably increase knowledge and confidence in a health related topic. Though this was a small-scale study, specifically addressing the treatment of anaphylaxis, the positive impact suggested that further study on UAP knowledge and confidence after education may be valuable. This study parallels well with the proposed small scale UAP education project.

A retrospective study of medication administration in eight public schools in California reinforced the need for yearly continuing education of unlicensed assistive personnel (UAP) and the nurses' responsibility for ongoing year round assessment of process (Canham, et al., 2007). The authors noted the discomfort of UAPs administering medications and clearly define the requirements of a medication administration policy. Medication administration in the school setting can augment academic success and general health and is an essential service, even when there is not a professional nurse present (NASN, 2017), but care must be taken to mitigate risk of error. Medication errors increase chances of adverse outcomes and UAPs administering medication in school is a, "safety issue that can potentially lead to litigation" (Canham, et al., 2007, p. 27). The risk to students if untrained UAP are used can include diminished health and

academic outcomes, and represent liability for the organization and individual school nurse (AAP, 2009).

Family Experiences

From the family perspective, parents and students seen in an urban hospital were surveyed on the medication experience in schools (Clay, et al., 2008). The authors found a high incidence of medication errors that could impact a student's school experience, such as missed doses of medications prescribed to assist focus. There are adverse outcomes associated in the school age child when medication routines are disrupted (AAP, 2009; Clay et al., 2008). This supports that medication delivery is particularly problematic in the school setting and organizational teamwork is imperative in a successful protocol. References specific to the residential setting were noted to be limited in the literature. School nursing is an isolated specialty, and residential school nursing an even smaller subset.

Responsibility of Medication Administration

A secondary point that appeared was the confusion among school administrators on who is responsible for medication management; with the administration feeling they were ultimately responsible and not the nurse (Farris, McCarthy, Kelly, & Gross, 2003). This is untrue and the need for nurses and administrators to understand their Nurse State Practice Act was repeated (Ficca, & Welk, 2006; Kelly, McCarthy, & Mordhorst, 2003; Wilt & Foley, 2011). It is acknowledged that professional school nurses must be in control of delegation, coordination and oversight and offer expertise in this health related function (Farris, McCarthy, Kelly, & Gross, 2003; Ficca, & Welk, 2006; Gordon & Barry, 2009; Kelly, et al., 2003; McCarthy, et al., 2000; NASN, 2017; Price, et al., 2003; Wilt & Foley, 2011).

Project Plan and Evaluation

Strengths, Weaknesses, Opportunities and Threats

In looking at the project plan and evaluation, the intervention had several strengthening factors. Overall staff dedication to student success is high in this environment. Faculty and staff function *in locus parentis*, meaning in the place of the parent (Collins Dictionary of Law, 2017) in the residential environment, and staff take this position very seriously. Each student is assigned a faculty advisor and the relationship often becomes close, with staff willingly invested in each student. This dedication extends to the administration as well. Many are alumni or have had their children attend the school and have a personal investment in success. There is a deep commitment organizationally to the school and the students.

Another strength was the strong and experienced nursing staff in place and available around the clock to provide ongoing support. There were three full time nurses available to UAP for questions. Additionally, the Associate Head of School, and supervising administrator of the health center, was a nurse and recognized the need for safety training. Nursing was already afforded a strong autonomy and respect in the organizational culture and administration was receptive to concerns.

This particular school caters to a very healthy student population, secondary to a strong competitive winter sports program, with limited medical needs. Unlike public schools, independent schools have selective admissions can refuse or restrict a student with complex needs due to the nature of residential school. This limits the medications that must be administered by UAP.

There was already an online platform in place in the school and supportive informational technology personnel. As the setting was a school there was a cultural awareness of the value of

education and training and overall interest in the intervention. The platform has been used by faculty to instruct and was familiar to them.

In discussion of weaknesses, demand on UAP time was an issue. This training represented a block of time when faculty and staff least could afford to spare it, at the start of the school year. Requiring additional training time for a new process was a consideration. Because of the time commitment, UAP and administration needed to buy-in to the project and its value.

Other weaknesses included very few of the UAPs had any medical background, though several coaches held various first aid certifications. There was a general lack of knowledge about safety and medications, which can create an atmosphere where this aspect of health is not a priority. Policy and procedures on medication administration had been housed in the Health Center and not readily available to staff to review. This was also compounded by typical staff turnover and regular intake of winter coaching staff.

Delivery itself was complicated as well. There were students needing medications in all variety of settings, on and off campus. The majority of medications were distributed in the Health Center during day hours and provided by nursing, but students received medications in the dormitories or while off campus on trips. Due to the active winter sports program, students traveled extensively with coaching staff and often left with little notice. Although the healthy student population was a strength, there were still medications with some complexity given. For example, during the time of the project intervention, several students had multiple “as needed” medications available in the dorms’ medication lock boxes for after-hours administration.

In the medical and nursing literature, there has been an increased awareness of the impact to medication errors. Overall, health care is recognizing the need for solid systems and procedures to decrease risk. Although there is limited data on schools specifically, there is

tremendous data in the health care world. This represented an opportunity to extend this awareness to the school environment. Concurrently, the administration of the institution had recently become aware of a variety of school safety initiatives in the industry that created an openness to change allowing for an enhanced opportunity.

There was no set standard for education for unlicensed assistive personal (UAP). There were multiple materials available and even a training guide developed by the state, but it had little relevance in this setting. There was very little guidance available specific to the needs of the residential environment. All materials and training needed to be adapted, and represented an outside negative influence. The challenges faced in this specific setting were very different from public, day schools where there may have been well established training. As well, state law was variable from state to state and differs from public to independent school.

Driving and Restraining Forces

The driving forces behind the project primarily centered on student safety and were in keeping with the structural frameworks provided by the National Association of School Nurses, *Framework for 21st Century School Nursing Practice* (NASN, 2016). They evolved from Health Center staff concerns about recurrent medication errors including missed, incorrect or uncharted medication doses. The school was student focused, as evidenced by their mission (Gould Academy, 2017), which spoke to a safety project such as this. Additionally, as an educational facility, staff valued instructional concepts and saw worth in education generally, just by nature of the culture.

Some of the restraining forces were related to the organizational resistance to change. As is highlighted in Organizational Culture Theory (Schein, 1990), this type of change can be difficult to effect. The project was challenging well-established patterns and values. With

limited health care exposure, the staff may not be aware of the dangers inherent in medication administration. The student population was also overall very healthy, and staff rarely saw a complex medical issue. Scheduling the training was also a potential restraining force. Staff are already expected to work long hours due to the residential nature of the school and finding time to fit in one more training may have been difficult.

Need, Resources and Sustainability

The need for the project was demonstrated through the literature review noting this being a national issue experienced in other schools (Canham, et al., 2007; Gordon, & Barry, 2009; McCarthy, Kelly, & Reed, 2000; Wilt & Foley, 2011) and not unique to the residential environment. The literature review also demonstrated UAP education is considered best practice and in keeping with safety standards (AAP, 2009; State of Maine, DOE, 2017; NASN 2017). Prior to implementation, the medication errors nursing staff were noting and general lack of knowledge, provided impetus for change. Finally, there was the potential for legal ramifications. If the facility was not adhering to best practice this left the school, nurses and staff at risk for litigation (Canham, et al., 2007).

Fortunately, the resources for this specific project were already in place representing a limited financial commitment to implement the project. The online learning system was already in use at the school, the staff were already familiar with navigation and there were no associated extra financial costs with its use. A course platform was granted to the Health Center and the Informational Technology department acted as a resource. The survey was collected using the cloud-based site, SurveyMonkey™ (2017) and only basic features were accessed, used free of charge. The primary cost to this specific project was nurse time and time for UAPs to complete the training.

If the project were to be repeated, the financial costs would need to be factored (see Table 1). An online platform would need to be in place to make the project viable. This is realistic as most schools now use online learning as a component of education. Depending on the platform, there may be an associated cost to extending use to the education. SurveyMonkey™ fees would need to be factored if more extensive statistical features were used. If not, a software package such as SPSS would need to be purchased. Again the primary costs, somewhat hidden, would be staff time. It takes nursing time to create, initiate and maintain and staff time to complete. This cost would vary depending on the number of staff needing training.

Table 1. Project Resources

| | |
|--|--|
| Online Platform | Varied depending on platform in place |
| Survey Monkey | \$99/month |
| Statistical software Using free Survey Monkey) | \$99/month for subscription Or \$1250 purchase of basic package |
| Nurse Time <ul style="list-style-type: none"> • Est. start up time 40/hrs • Initiation time 2 hrs • Maintenance time 4 hours/month | \$30/hour (Current per diem rate at school) |
| Staff Time <ul style="list-style-type: none"> • Est. time 0.5 -1/hr per year per staff | \$15-30/hour (depending on staff experience, position) |

Sustainability of this project in this particular facility is generally favorable. As there are limited financial resources required, it has a strong selling point to administration. Nursing staff are salaried and already in place and can provide updates and maintenance as needed. UAP staff time remains the primary drain. However, with the use of the online platform this allows the staff to complete at a time most convenient to them.

At the time of this writing, the Health Center online page continues to be active on the platform with support from administration. After the project completed, the survey links specific

to the project were removed and the education was kept in place for any staff incoming over the winter term, such as winter ski coaches. The Health Center expectation is to develop a streamlined training for returning staff for the following academic year that would meet the public school standards of yearly education. It would also help keep staff aware of any policy changes and adapt content as new issues arise. At the time of this writing a second module has been added to allow staff to access state mandated training. This allows the staff to log in at their convenience and work at their own pace, as opposed to lengthy meetings.

Feasibility, Risks, and Unintended Consequences

For risks or unintended consequences there was a possibility of educational fatigue. With building modules there was concern that staff would simply get tired and perhaps not complete appropriately. During the course of this project this was not an issue noted, but may be of concern in future if use of this delivery system continues. One risk not anticipated and heard anecdotally from staff after implementation, was that they were stressed by the education. Several UAP noted that they had never worried about the process before, but now nervous about it. One staff member stated to the author, “I was happier ignorant”. The debate might be if this is a true unintended consequence or a healthy fear. Nervousness about a high-risk activity might denote that staff are taking the responsibility seriously. As long as they are not paralyzed by the fear, or avoid medications because of it, it may actually be an unintended benefit.

Stakeholders and Project Team

The stakeholders related to this project were all invested in student safety, with the main stakeholder the student and their families themselves. Certainly, the health center staff, the nurses, who were primarily responsible for medication safety in the school environment were also key stakeholders. Beyond this, the schools primary mission was student success, of which

student safety was essential. The administration and Board of Trustees should expect best practice in all services including medication administration. The UAP themselves were directly involved in the task and were required to be active participants in the educational offering.

Due to the limited scope and small size of the project, the team was essentially limited to one member, the Director of Health Services and coordinator of the initiative. However, key support was provided by Health Center nurses, the Associate Head of School, who was the direct supervisor of the Health Center staff, and also by the Director of Technology. The author's university chair and mentor was involved in project planning and refinement. Human resources and their division head, the Chief Financial Officer, also had to green light the project as it involved staff training.

Cost-benefit Analysis

The risk of potential adverse outcomes if the status quo was maintained was very high. There is a higher risk of medication errors when UAP's are not trained and educated in safety procedures (NASN, 2017). Not implementing change on this safety related issue leaves the students and organization vulnerable to adverse outcomes. Prior to implementation, there had been several medication errors with distinct and noticeable impacts on student health. There were no tracking systems in place in the organization to note medication errors, so the extent of the clinical issues in this specific facility were not well defined. This represented the primary reason this topic was chosen for quality improvement. The risks to the students, the litigations risks to the school and the professional risks all played a key component in importance.

Costs of medication errors are well defined in acute care, but very little data on error rates and cost exist for the school setting (IOM, 2007). Medication errors are at higher risk when UAP's are not trained and educated in safety procedures (NASN, 2017). With the understanding

that health impacts academic success (AAP, 2009), and the ability of a student to remain effectively in school, the stakes are high. The National Association of School Nurses notes that students must be, “healthy, safe and ready to learn” (NASN, 2016, p.218).

One of the selling points to the facility’s administration was the risk analysis from a legal standpoint. If there is non-adherence to the best practice by regularly training UAP in this high-risk task, the school is vulnerable for fault. This was a priority concern for the nursing staff on a professional level and as supervisors of the process, a risk to licensure.

Mission, Vision and Goals

This project intended to serve as a quality improvement endeavor to educate UAPs through online learning modules in medication administration best practices. The primary goal was to maintain the health and safety of students in the residential environment.

The mission of the school centers on the student and preparation for an excellence driven, ethical life (Gould Academy, 2017). This student-centered mission was congruent with the mission of the project and keeps the student well-being at the core, consistent with the project structural support, *Framework for 21st Century School Nursing Practice* (NASN, 2016).

Process and Outcomes

In the school-nursing specialty, the typical nurse-sensitive outcomes are unlike acute care. School nursing has been noted to have a shortage of identified outcomes that demonstrate quality care (Bergren, 2011). As a profession, school nurses may be unable to advocate for their value without pointing to indicators that measure and reflect their impact. This subspecialty functions within a non-medical environment, and faces a deep lack of understanding. Expertise of the nurse in developing policy and ensuring safety in student medication management is essential in school environments (NASN, 2017).

The outcomes for the project were directly related to education of unlicensed assistive personnel (UAP). It has been noted with UAPs in a public school setting, a common theme of discomfort with giving medications echoed throughout the literature (Canham, et al., 2007; Price, et al., 2003). This educational intervention would ideally increase confidence level and knowledge of medication administration, and therefore increase student safety. The organization sensitive outcomes to achieve that goal were:

1. 100% of eligible UAP will complete training by 10/15/2017.
2. UAP will demonstrate an increased knowledge of medication administration as evidenced by pre/post survey scores.
3. UAP will report an increased confidence with medication administration as evidenced by self-reported pre/post survey scores.

Logic Model

The conceptual model acknowledged (see Figure 1) administration was needed as input to support the implementation of the project and the need for staff training. UAPs participation were required inputs, as they were engaged in the training. The Canvas online learning platform was used to deliver the education, as well as the cloud-based data collection tool, Survey Monkey for data collection.

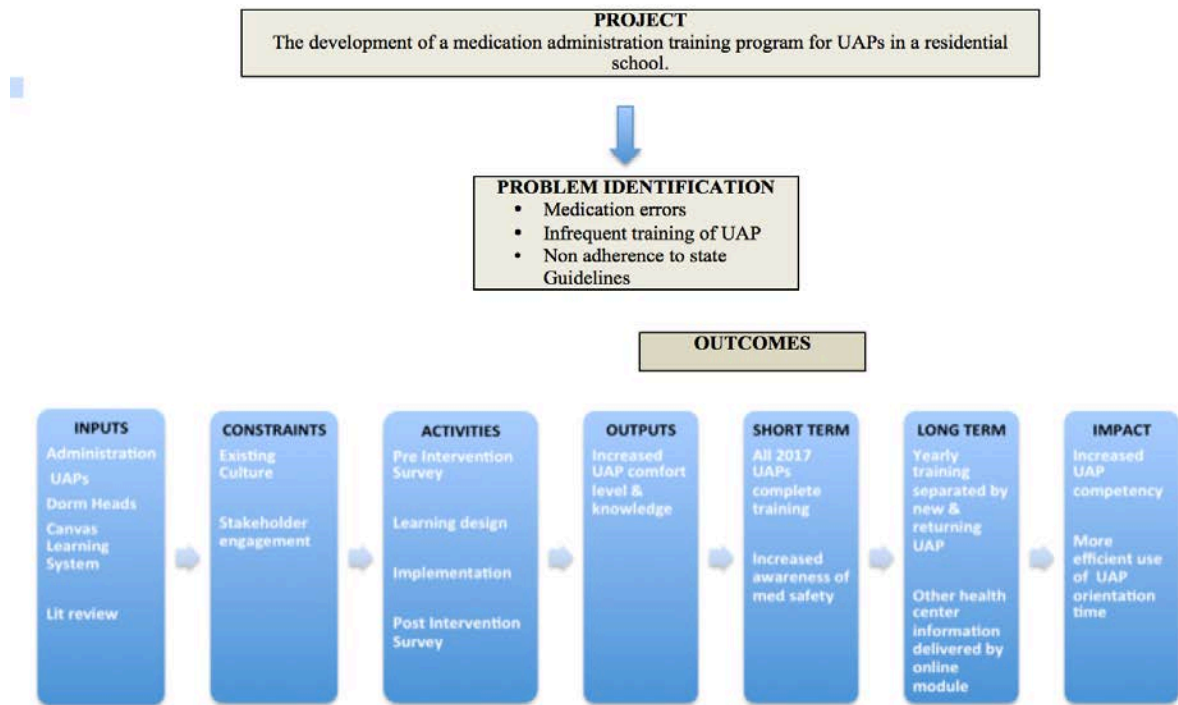
A constraint would be the culture of the organization. This shift to the online platform, and extra demand on the UAP time might have been seen negatively. This may have adversely impact the stakeholder buy-in for the project. Administrative stakeholders needed to be informed of potential adverse outcomes of continued UAP unfamiliarity of best practice and safety standards. Securing buy-in by emphasizing safety and potential risk was helpful combating this.

The intervention was the online learning for any UAP who may be required to administer medications. The training was based on the State of Maine *School Health Manual Guidelines for Medication Administration* (2005). The content was adapted to the setting as the predominant medication route was orally administered and a UAP is rarely, if ever, asked to administer any other medications.

The other adaption was acknowledging and emphasizing the round-the-clock availability of the nursing staff. Those participating were asked to complete a pre and post survey measuring knowledge of medication administration safety and confidence in procedure. The outputs then measured increased confidence level of the UAP and an increase in knowledge.

The short-term goals were for all UAP to complete the training with the hypothesized increased knowledge and confidence. Long term, the UAP will be divided each year into cohorts, where returning staff can complete a streamlined and condensed training and new incoming staff will receive the full education. As noted, there are other educational offerings focused on health center topics, such as concussion care, that could be offered in this format and stand to benefit the health and wellness of students.

Overall, the assumed impact of this project was increase in UAP competency in medication delivery. Utilizing the online delivery system in a self-paced manner could also increase the efficiency of the UAP yearly orientation. Staff could participate at any time, regardless of scheduling. Any staff that are hired though the school year could easily access the self-paced module which would assist in their orientation without repeated drain on nursing time.

Figure 1. Conceptual Model

Population and Sampling

The environment of the project was a private, non-profit, residential boarding school. In this non-clinical setting, there were approximately 260 students, the majority of whom board, as opposed to day students. Faculty and coaches were the primary UAPs involved with medication delivery in the dorms, off campus trips and when a nurse was unavailable. There were a few other individuals, such as business office staff, which were assigned dorm duties and were included in this convenience sample. The number of potential participants was tallied at 71. This was a quasi-experimental, one group pretest and posttest design, with no randomization and no control group. While not the best of methods, it was the most reasonable for this setting, and assigning a control group would have been inappropriate. As this was a small sample size, in a relatively specialized area, this was the most reasonable approach.

Protection of Human Subjects

The school had no formal policy or procedure for research and IRB approval, and was granted exempt status from Regis University (see Appendix B). Approval from the Head of School, Associate Head of School and the Chief Financial Officer, who supervises Human Resources, was also sought. None of the three were involved in the survey or education, as they do not provide meds to students. The Head of School gave official signed permission (see Appendix C). The project was introduced to the population at the start of the school year 2017. Emphasis was placed on the ease and flexibility of both the timing and training completion in effort to encourage participation.

As the project was not looking directly at the students, nor their educational practices, there were no special criteria in relation to the school environment (US Department of Health and Human Services, Office for Human Research Protections, 2017). Participation was voluntary and the participants could withdrawal at any time. There was no identifying information collected, nor any protected health information. Participants were asked for a code word for both the pre and post survey to give the ability to match answers if desired during data analysis. SurveyMonkey™, an online survey tool, was used to collect the data. Participants were reassured there was no connection to the survey and their employment. The project involved minimal risk for the participants, consisting of possible discomfort with perceived testing. The participants were all the age of majority and the investigator is not considered a UAP supervisor. A letter preceded the survey and explained that participation implies consent, (see Appendix D), and the survey was presented as totally voluntary and all replies confidential. Also, when the project was introduced, participants were encouraged to see nursing staff with any questions that might arise, either in person or via email. Approximately ten staff did contact nursing after with content and

follow up questions.

Tool

This project included a pre and post survey for the unlicensed assistive personnel (UAP) completing the education (see Appendix E). The data collection of the survey looked specifically at the PICO question of confidence and knowledge. The survey was completed through SurveyMonkey™ from embedded links in the learning module to encourage participation. The organization and faculty often use SurveyMonkey™ for informal data collection, and were generally familiar with its use, which was a benefit

This study was quantitative in nature, comparing a change after an intervention. The survey contained the same knowledge and confidence questions both pre and post education. A 10 point scale was used to assess subjective data such as confidence. Multiple choice and fill in the blank were used for knowledge. There was one question on creation of a personal code, four demographic questions, four subjective questions and ten knowledge questions for a total of 19 questions on the pre survey (see Appendix E). The post survey was identical, minus the demographics questions that were eliminated from the posttest.

Lavin, Slepiski and Kasper recommend selecting a subject matter expert that, “is familiar with those for whom the project is intended” (2007, para 16). The former State School Nurse Consultant of Maine, N. Dube, who was also one of the core developers of the Maine State Guidelines for UAP medication training (personal communication, May 4, 2017) was used as a resource for the overall project. These guidelines were created by a multidisciplinary group, including the Maine School Health Advisory Committee (2005) and went through multiple revisions and review processes to establish content validity (personal communication, N. Dube, May 4, 2017).

Previous surveys in the literature have been used to measure UAP comfort level and these were used as a guide to format comfort questions. Specifically, Price, et al. (2003), completed a large-scale survey of UAP and the survey tool included questions that would be relevant in this setting. That tool was developed using face validity after a literature search, and review by multiple content area experts (Price et al, 2003). The questions for this project were adapted for use in the subjective portion with small changes to reflect the environment of a residential school. Several of the initial research questions were omitted, as they were not relevant to this practice setting and in a desire to decrease length of survey.

Content questions were directly related to objectives of the education, such as medication error recognition and safety procedures. These questions were adapted and guided by the state *School Health Manual* suggestions for UAP training (State of Maine, DOE, 2017). The content questions were also reviewed by the project's subject matter expert, with minor wording changes incorporated. Overall, the tool for this project was established by a combination of face and content validity by modeling previous research and use of a content expert.

A pilot run was considered, but discounted, as the target population was small. The Cronbach Alpha did return as low at 0.448 (see Table 2). There are several possible explanations for this. It was a newly created tool, taken from a variety of sources and adapted to use in this specific environment. The tool contained multiple styles of questions and the number of questions were limited (Tavakol, & Dennick, 2011). All of these can contribute to the low score and which would need to be addressed prior to recreating the project in future.

Table 2. Cronbach's Alpha

| Reliability Statistics | |
|-------------------------------|-------------------|
| Cronbach's Alpha | N of Items |
| .448 | 18 |

Project Findings and Results

Objective One 100% of Eligible UAP Will Complete Training by 10/15/2017

The first objective was to have all UAP with potential to administer medications in the organization in the academic year 2017-18 complete online training within six weeks of return to campus. While this goal was not achieved there was significant participation, with 86% of the eligible faculty, staff and coaches participating, meeting the threshold of >80% participation. There were a total of 71 eligible participants, with 66 logging into the training, 61 completing the pretest and 50 completing the posttest.

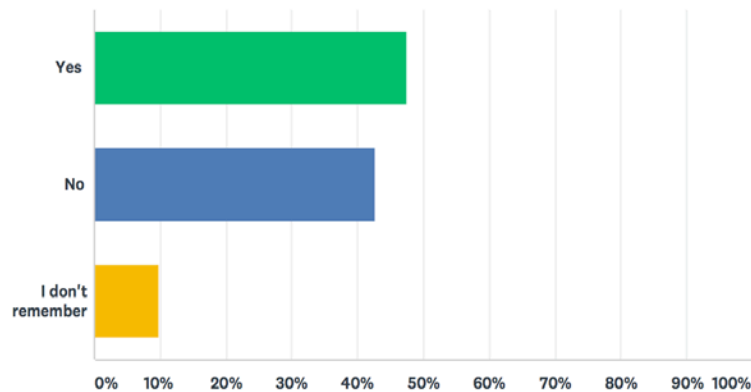
As was representative of the population, faculty made up the predominant group logging into the training.

On the demographics section UAP were asked if they had ever received training at the facility. Institutionally, over 50% did not receive training or did not remember receiving training, highlighting the need for a formalized process (Figure 2).

Figure 2. Training History

Q5 Have you ever received training at this school to administer medications?

Answered: 61 Skipped: 0

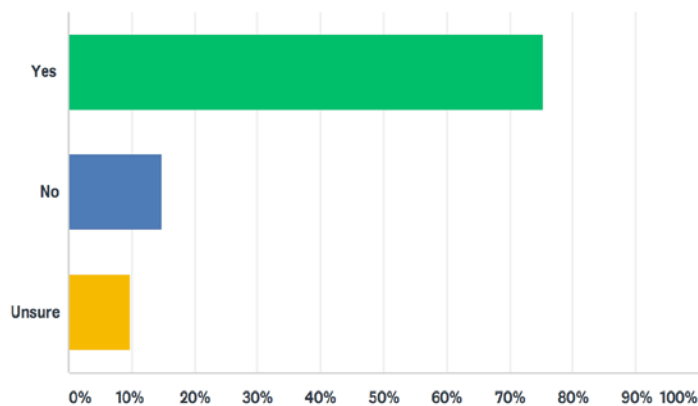


UAP were asked if they believed medication administration was a part of their job (see Figure 3). A surprising 75% of UAP responded positively, possibly suggesting a willingness to perform the task.

Figure 3. Medication Administration as a Job Responsibility

Q6 Do you believe that medication administration is part of your job?

Answered: 61 Skipped: 0



Objective Two UAP Will Demonstrate an Increased Knowledge of Medication

Administration as Evidenced by Pre/post Survey Scores

At the initiation of the data analysis, a decision was made to not use the participant codes to match up answers. Firstly, with the small sample size there were 11 pretests that would have to be discarded in analysis, as they did not complete the posttest. Secondly, when looking at overall objectives, the individual scores were not relevant. The primary objective was overall confidence and knowledge and could be captured with mean scores. A t test was used on the population means as opposed to a paired samples t test where codes would have been utilized. Answers were coded as correct or incorrect regardless of style of question (see Appendix E).

Overall, UAP knowledge improved after the intervention. P-value showed significance, and mean values showed positive increases. Four out of ten knowledge questions showed a statistically significant positive change. Six out of ten showed no statistically significant change, and out of those, three mean scores were increased and three mean scores decreased (see Appendix F).

Using a t-test, four out of ten questions showed statistically significant positive increase (Appendix F);

- Question 10 regarding medication refusal ($t = -2.858$, $p\text{-value} = 0.006$)
- Question 12 regarding the Five Rights ($t = -9.8$, $p\text{-value} = < 0.001$)
- Question 16 regarding documentation ($t = 5.687$, $p\text{-value} = < 0.001$)
- Question 17 also regarding documentation ($t = 2.333$, $p\text{-value} = 0.24$)

Three of the ten questions showed a mean increase that was not statistically significant (where $p\text{-value} > 0.05$). Though not statistically significant, the mean scores increased slightly showing positive change. These questions were;

- Question 15 regarding medication refusal (mean pre 20.92, post 20.98)
- Question 18 regarding law (mean pre 20.48, post 20.52)
- Question 19 regarding medication identification (mean pre 20.90, post 20.96)

Finally, three questions showed decrease in mean score. While not statistically significant the drop in mean scores may suggest the content or the following questions need revision;

- Question 11 medication error (mean pre 20.24, post 20.22)
- Question 13 medication ID (mean pre 20.94, post 20.90)
- Question 14 as needed medications (mean pre 20.78, post 20.70)

No specific statistic was completed on question number nine regarding medication errors.

UAP were asked if they had ever made a medication error. This was more informational and very site specific and simply included for general information. Raw data only was used. There was an increase from 8% of respondents stating they had ever made an error on the pre test to 32% in the posttest (see Figure 4 and Figure 5). This correlates with the anecdotal comments received from several staff that they were unaware of medication errors in general.

Figure 4. Medication Error History Pretest

Q9 If you have given medications in a school setting before, have you ever made a medication error?

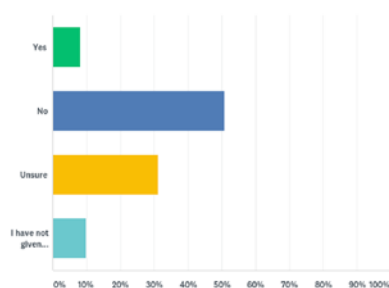
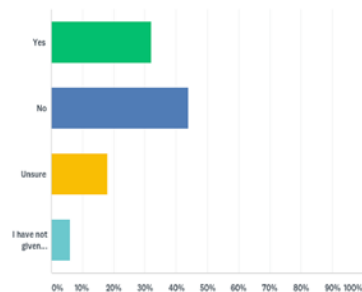


Figure 5. Medication Error History Posttest

Q4 After completing the training, do you think you have ever made a medication error?



In further exploring knowledge, demographics were analyzed for links. As these items were independent, a one-way analysis of variance (ANOVA) was completed (see Appendix G). The respondents position at the facility, faculty, coach or staff, showed no statistically significant correlation to knowledge on pre survey (no p-values < 0.050 for questions 7-19).

The question asking for years of experience in any school setting showed statistically significant correlation to two knowledge questions (see Appendix G). Question number 17, which discussed medication documentation (p-value = < 0.001, f – 3.796) and question number 19 regarding medication identification (p- value = 0.003, f -2.734) showed a correlation. With only two questions demonstrating this link, this suggests years of experience had minimal impact on initial knowledge.

Respondents gave answers on years of experience in this particular facility (see Appendix G). The one-way ANOVA showed no statistically significant correlation (no p-values < 0.050 for questions 7-19), suggesting there was no impact of time at employment on knowledge.

Finally, respondents were asked to report if they ever received training at this particular facility (see Appendix G). This one-way ANOVA analysis showed statistically significant correlation to three questions. Question number 7, regarding self-reported preparation (p-value =

0.041, $f = 3.382$) question number 9 on medication errors ($p\text{-value} = 0.038$, $f = 3.472$) and question number 19 on medication identification ($p\text{-value} = 0.031$, $f = 3.684$) all had statistically significant correlations. These findings might suggest that previous training had the most positive impact on knowledge scores. In looking at all the one-way ANOVA results it might suggest that that experience had limited impact, but training had a strong positive impact, supporting routine and regular UAP education.

Objective Three UAP Will Report an Increased Confidence with Medication

Administration as Evidenced by Self Reported Pre/post Survey Scores

The second objective addressed related to UAP self-reported confidence with medication administration and was asked on both the pretest and posttest. The questions on both confidence and preparedness were grouped in this category. The Wilcoxon Signed Ranks test was used to evaluate confidence and preparedness pre and post as a scale was used, and it was ordinal data (see Appendix H). Both questions demonstrate a statistically significant increase in ratings, matching the objectives. Specifically, UAP ratings of preparedness demonstrated a *statistically significant increase* after the intervention (see Appendix H). UAP ratings of confidence demonstrated a statistically significant increase after the intervention as well ($P\text{-value} = < 0.001$, mean pre 6.61, post 8.42).

This objective was further evaluated using a Spearman's Rho test on the confidence and preparedness questions to evaluate for a correlation between the two items, preparedness and confidence (see Figure 6). Spearman's Rho testing of the questions showed a strong correlation. If the participant rating was high for one of the items on the pretest, then they would likely rate the other item high and also true of the posttest (pretest $p\text{-value} = 0.908$, posttest $p\text{-value} = 0.963$). However, there was no cross correlation. For example, if they rated their confidence high

in the pretest there was no correlation to preparedness in the posttest (see Figure 6).

Figure 6. Spearman's Rho Test of Confidence and Preparedness

| Correlations | | | PRT7 | PRT8 | POT7 | POT8 |
|----------------|------|-------------------------|--------|--------|--------|--------|
| Spearman's rho | PRT7 | Correlation Coefficient | 1.000 | .908** | .102 | .118 |
| | | Sig. (2-tailed) | . | .000 | .483 | .415 |
| | | N | 61 | 61 | 50 | 50 |
| | PRT8 | Correlation Coefficient | .908** | 1.000 | .100 | .144 |
| | | Sig. (2-tailed) | .000 | . | .488 | .319 |
| | | N | 61 | 61 | 50 | 50 |
| | POT7 | Correlation Coefficient | .102 | .100 | 1.000 | .963** |
| | | Sig. (2-tailed) | .483 | .488 | . | .000 |
| | | N | 50 | 50 | 50 | 50 |
| | POT8 | Correlation Coefficient | .118 | .144 | .963** | 1.000 |
| | | Sig. (2-tailed) | .415 | .319 | .000 | . |
| | | N | 50 | 50 | 50 | 50 |

** . Correlation is significant at the 0.01 level (2-tailed).

Limitations, Recommendations and Implications for Change

Limitations

There were several limiting factors for this project. This was a small-scale educational intervention for a tight-knit employee group that were easy to connect with. The project design was very site specific, tailored to an independent residential school and would be difficult to generalize to the public, day school setting. As this was a relatively unique environment, the training reflected the generally healthy and well student body with limited medications. There were also geographical limitations as board of nursing and state requirements vary state to state and may not be relevant elsewhere.

Recommendations

Overall there is a recommendation for further research in keeping with the recommendations of much of the available published work on the topic of medications and UAP use in schools. The lack information on medication safety in the school setting leaves a void in

the pursuit of evidence-based practice. There is also a distinct lack of information specific to the unique environment of a residential school. Without evidence to guide practice, the specialty of independent nurses is forced to interpret and utilize non-specific data.

The project would need revision if there were an attempt to recreate. The education itself needs refinement and clarification to reflect the needs of a particular facility. Also, in light of the low Cronbach's Alpha score, the survey tool would need to be edited to potentially increase value and specificity of the data obtained. Actions that could increase this score include expanding the number of questions while limiting the types of questions.

Implications for Change

Potential general implications of the information obtained during this project include support for regular unlicensed assistive personnel (UAP) education on medication safety. The results also support the concept that education may have more value than experience in the setting. As the independent residential school is a unique environment, there is a clear need for more data to support practice change.

The information obtained may be more useful in the facility itself. The findings support the continued and regular education of UAP within this setting to potentiate student safety. An area for further study in this facility might include focus on medication errors. As there is currently no tracking system, data revealed through careful monitoring might help pinpoint focus for future education on medication safety. The positive results would also support the use of this platform for continuing education for UAP on other topics. Since project completion, a learning module has been added for UAP training on a state topic and two new modules are under development for launch in the next academic year, all with the full support of the administration.

In looking overall health policy implications, the lack of information available suggests a

need to clarify and expand discussion on UAP use and role in the school setting. Clarity on general health related topics and how they impact an independent or residential school

Conclusion

Nurse supervised UAP medication administration in the school environment is a frequently completed health related activity. Students face potential adverse outcomes impacting the school experience from medication errors (Clay et al., 2008). School nurse supervised and directed training and education for UAP are essential components and are required to ensure the mitigation of risk in this vulnerable population. This project of an online medication administration module streamlined the staff educational process in a small residential school. In this unique environment the training demonstrated a significant positive impact on UAP knowledge and confidence in medication administration safety.

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Appendix A

Systematic Review Evidence Table Format [adapted with permission from Thompson, C. (2011). Evidence table format for a systematic review. In J. Houser & K. S. Oman (Eds.), Evidence-based practice: An implementation guide for healthcare organizations (p. 155). Sudbury, MA: Jones and Bartlett.]

1.

| | |
|---|--|
| Article/Journal | Medication administration practices of school nurses. Journal of School Health, 70(9), 371 – 376. |
| Author/Year | McCarthy, A.M., Kelly, M.W., & Reed, D. 2000 |
| Database/Keywords | CINAHL School nurse, medication administration |
| Research Design | Survey of nurses |
| Level of Evidence | Level VI Seven Tiered level of evidence, Melnyk, B. M., & Fineout-Overholt, E. (2005). |
| Study Aim/Purpose | Assess, “the current practices of school nurses giving medications in schools” p. 371 |
| Population/Sample size Criteria/Power | Random sample of 1000 school nurses, members of the NASN (out of an estimated 40,000 school nurses at the time of the study) Usable number of surveys returned was 649 |
| Methods/Study Appraisal Synthesis Methods | A confidential survey |
| Study tool/instrument validity/reliability | Survey was developed thru author experience and expert review, literature review and guidelines, pilot trial used, primarily closed-ended questions |
| Primary Outcome Measures/Results | High rate of med errors, confusion among nurses on delegation to UAP and nurse practice law *use of UAP showed a significant relationship with med errors, 3.1 times more likely to have a med error p. 374 |
| Conclusions/Implications | Need for further research Need for national guidelines “Problems exist with administration of medications to children in schools” p. 376 Level of errors are not acceptable, safety concerns of current practices |
| Strengths/Limitations | Strengths: Large sample size Representatives from all but one state responded Limitations: |

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| | <p>Possibly skewed data due to nurses being part of a professional organization and thus more likely to be cognizant of issues (“school nurses that are NASN members may be more likely to develop medication guidelines” than school nurses that are not members” p. 376)</p> <p>Survey relied on memory and estimates</p> <p>The survey only looked at nurses so is not an accurate sample of how school districts who do not have nurses admin meds</p> |
| Funding Source | None noted |
| Comments | <p>2000 – 17 years old</p> <p>76% of respondents use UAP to administer medications, with 77% of those receiving in-service education</p> <p>49% report a med error in the last school year, missed doses was the most common</p> <p>Procedures for dispensing non prescription meds are less defined, possible conflict with States Nurse Practice Acts</p> <p>Concerns noted in storage of refrigerated medications in non locked containers, transferring of meds to non original containers</p> <p>Many nurses noted confusion of if they are even permitted to delegate med admin UAP per their State Nurse Practice Act.</p> <p>Question raised – med errors, in schools with BSN/MSN errors are reported more frequently but is this an effect of a more professional attention to the issue?</p> <p>Possible practice changes to improve safety, ie network with pharmacy for storage solutions</p> |

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| Article/Journal | <p>An audit of medication administration: A glimpse into school health offices</p> <p><i>Journal of School Nursing</i>, 23(1), 21-27.</p> |
| Author/Year | <p>Canham, D.L., Bauer, L., Concepcion, M., Luong, J., Peters, J., & Wilde, C.</p> <p>2007</p> |
| Database/Keywords | <p>MEDLINE</p> <p>School nurse, medication administration</p> |
| Research Design | Retrospective review of medical records |
| Level of Evidence | <p>Level VI</p> <p>Seven Tiered level of evidence, Melnyk, B. M., & Fineout-Overholt, E. (2005).</p> |
| Study Aim/Purpose | Evaluate the med admin process at multiple school sites, looking at safe and accurate med admin, management, & documentation. |
| Population/Sample size Criteria/Power | 8 public school sites in Northern California, 154 medications, all elementary schools |

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| | All UAP are trained in CPR and First Aid and receive annual training on medication admin from nsg staff |
| Methods/Study Appraisal Synthesis Methods | A medication audit form was created, data was taken from the medical record (logs, records, authorization forms, prescription labels) then compared for transcription accuracy, timing accuracy, total times given accuracy |
| Study tool/instrument validity/reliability | Use of medication audit form |
| Primary Outcome Measures/Results | Med errors were found in all of the study's categories, total depended on school. Other issues were also discovered such as storage of medications, not notifying school nurse as per policy, meds without permission to give, oral dosing not measured properly, multiple expired medications. Out of 154 meds prescribed, 22 transcribed incorrectly |
| Conclusions/Implications | Continuous eval process & occasional review needed, UAP needs yearly refresher training, nurse must stay on top of medications in the school setting. The audit tool can point to problems and guide further training Results demonstrate multiple med errors, similar to McCarthy, Kelly & Reed, 2000 It is school nurses responsibility to make sure UAPs are trained and understand safety measures p. 27. Nurse must assess logs and UAPs periodically through the year and not just at annual training. Guidelines should clearly state: Who is responsible for med admin Who can the tasks be delegated to How meds should be stored How the process should be documented Amount of training UAPs need How to recognize and handle med errors Plans for meds on sports trips/field trips Self administration |
| Strengths/Limitations | Strengths: statistically significant data, new, unexpected discoveries Limitations: small sample size, geographically limited. In relevance to clinical problem this was not a boarding school |
| Funding Source | Student project in the Clinical Nurse Specialist in School Nursing class at San Jose State University |
| Comments | UAP often feel uncomfortable with the giving of medications. |

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| | <p>Strong support for practice problem focused on UAP med administration</p> <p>“The consistency of findings in this and other previous studies supports the importance of identifying strategies to increase the accuracy of medication administration in the school setting” p. 27</p> <p>Literature review noted 10 studies in last 10 years, “A common theme in all 10 studies was the medication administration in school was problematic” p. 22</p> <p>“School nurses are the only school personal with the health care knowledge and they are often are left to interpret and implement medication administration policies” p. 23</p> <p>UAP training was 5 rights of safe med admin, student, drug, dose, time, route s well as discussion of medication side effects appropriate documentation and storage of medications. P. 23</p> <p>“Delegating medication administration to UAP is a consistent practice throughout the United States” p. 26</p> <p>Use of UAPs in administering medication in school is a, “safety issue that can potentially lead to litigation” p.27</p> |
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| Article/Journal | Evaluation of an anaphylaxis training program for unlicensed assistive personal <i>Journal of School Nursing</i> , 20(5), 279-284. |
| Author/Year | Litarowsky, J.A., Murphy, S.O., & Canham, D.L. 2004 |
| Database/Keywords | MEDLINE Unlicensed assistive personnel, school |
| Research Design | An educational intervention was designed with 53 participants, with measures before and after the intervention |
| Level of Evidence | Level VI Seven Tiered level of evidence, Melnyk, B. M., & Fineout-Overholt, E. (2005). |
| Study Aim/Purpose | “The purpose of this research was to measure the effectiveness of a theory-based anaphylaxis recognition and epinephrine auto-injector training program created for UAPs in the high school setting.” p. 279 |
| Population/Sample size | 53 UAP from seven high schools in California urban area |

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| Criteria/Power | |
| Methods/Study Appraisal Synthesis Methods | Training and education with knowledge and “perceived self-efficacy” measured pre/post intervention (anaphylactic emergency) |
| Study tool/instrument validity/reliability | Pre/post test was reviewed by 6 school nurses |
| Primary Outcome Measures/Results | <p>“Significant improvement” pre vs. post intervention</p> <p>“Theory-based training programs can be effective in addressing both knowledge and self-efficacy.”</p> <p>Supports a project based on educational interventions for UAPs</p> |
| Conclusions/Implications | Further study using this model and theory on other health based knowledge and UAPs may be useful, esp measurement of confident of UAPs after training. |
| Strengths/Limitations | <p>Limitations: No control group, instruments of data collection were revised, generalization based on small sample size, time constraints restricted long term evaluation</p> <p>Study dated 2004, 12 years ago</p> |
| Funding Source | Not noted, all from same school district. However, “The videotape and EpiPen training devices used in the training program for this study were provided by Dey, Inc., in Napa, California” |
| Comments | <p>Though not the same as a routine med admin, the plan of a teaching intervention and safe med delivery parallels well with project.</p> <p>Unexpected benefit allowing the school nurse to interact with a wide variety of staff</p> |

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| Article/Journal | Family perceptions of medication administration at school: Error risk factors and consequences <i>The Journal of School Nursing</i> 24(2), 95-102. |
| Author/Year | Clay, D., Farris, K., McCarthy, A.M., Kelly, M.W., & Howarth, R. 2008 |
| Database/Keywords | CINAHL Medication administration, school |
| Research Design | Interview survey |

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| Level of Evidence | Level VI Seven Tiered level of evidence, Melnyk, B. M., & Fineout-Overholt, E. (2005). |
| Study Aim/Purpose | “This study examined medication administration from the child and parent perspectives to (a) determine problems children experience with medicines at school, (b) clarify risk factors for medication errors, and (c) examine the perceived impact of medication errors on school performance and social relationships” p. 97 |
| Population/Sample size Criteria/Power | Children 8 - 18 years being treated at a large Midwestern Children’s Hospital in diabetes, asthma, and Attention Deficit Hyperactivity Disorder (ADHD) clinics. Included 75 parents–child dyads with diabetes, 37 with ADHD, and 45 with asthma. |
| Methods/Study Appraisal Synthesis Methods | Survey and interview |
| Study tool/instrument validity/reliability | Semi structured interview, developed based on the clinical and research expertise of the study authors, review of recommended guidelines and the survey was a previously used from McCarthy et al 2000. Survey was piloted |
| Primary Outcome Measures/Results | 50% of children taking ADHD med reported problems 25% of children with asthma and 15.3% of children with diabetes. 28% of kids reported med errors at school. Most common error was missed dose “Medication non adherence at school, which includes medication administration errors such as missing a dose, may potentially lead to a variety of educational, social/emotional, and physical consequences. These results indicate that the impact of missing medication on children with ADHD appeared to have a greater effect on schoolwork and friendships, while the physical consequences appeared to vary widely based on health condition.” |
| Conclusions/Implications | Future research should examine these trends across multiple medical centers. Reinforces need for education for school personal. “Indicate an ongoing need for school nurses to participate in |

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| | supervising medication administration.” |
| Strengths/Limitations | Limitations: self reported, all participants from the same treatment center, less generalizable |
| Funding Source | “Supported by a grant from the Obermann Center for Advanced Studies Spelman Rockefeller Grant, The University of Iowa, Iowa City, IA.” |
| Comments | 28% of students reported an error in taking their med, suggestion was that when students shared the responsibility for medication administration there were less errors. Agreement with the theme that medication administration in the school setting is problematic. Meds require “systematic collaboration” p. 101 |

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| Article/Journal | A Training Program for Unlicensed Assistive Personnel <i>The Journal of School Nursing</i> , 23(2) 92-97. |
| Author/Year | Gursky, B.S., & Ryser, B.J. 2007 |
| Database/Keywords | CINAHL Unlicensed Assistive Personnel, school |
| Research Design | Case study |
| Level of Evidence | Level VI Seven Tiered level of evidence, Melnyk, B. M., & Fineout-Overholt, E. (2005). |
| Study Aim/Purpose | To describe, “how one school district developed and implements a training program for UAP using its school nursing staff” |
| Population/Sample size Criteria/Power | One school district in Florida 135 completed |
| Methods/Study Appraisal Synthesis Methods | A planning committee was formed and designed an 80-hour workshop (10 day course with 33 topics) on health issues in the schools, taught by the school nurses and school NPs. Program developed by the Health Science and Public Education adult program of the school district. Updated every 2 years by nurses doing evidence review. |
| Study tool/instrument validity/reliability | Planning committee development |
| Primary Outcome Measures/Results | A “positive” impact on the school district as they “now better understand the delegation process and have a renewed appreciation for the importance of registered nurses in maintaining excellent health care delivery to students” p. 95 |

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| Conclusions/Implications | Due to the course the school district now has a trained UAP in each school |
| Strengths/Limitations | Not a formal study, evaluations are solicited by the staff, not noted in article. |
| Funding Source | School district |
| Comments | <p>Supervision and monitoring are 2 essential components in delegation</p> <p>“While there are many tasks and procedures delegated in schools, medication administration is one of the most common”. P. 93</p> <p>Suggest that evaluation of med error pre and post intervention is a good measure of effectiveness of training program.</p> |

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| Article/Journal | Delegation guided by school nursing values: Comprehensive knowledge, trust and empowerment. <i>Journal of School Nursing</i> , 25(5), 352 – 360. |
| Author/Year | Gordon, S.C., & Barry, C.D. 2009 |
| Database/Keywords | MEDLINE Unlicensed assistive personnel, school |
| Research Design | Using the community nursing practice model Qualitative descriptive design and inquiry group method were used, p. 357 |
| Level of Evidence | Level VI Seven Tiered level of evidence, Melnyk, B. M., & Fineout-Overholt, E. (2005). |
| Study Aim/Purpose | “Explore the values guiding the delegation of nursing task to UAP in school setting from the perspective of the school nurse”. P. 356 |
| Population/Sample size Criteria/Power | School nurses at the annual meeting of FASN (Florida Association of School Nurses), group sessions, 64 nurse with diverse backgrounds |
| Methods/Study Appraisal Synthesis Methods | Group sessions approx. 1-1.5 hours, recorded and complied with data categories |
| Study tool/instrument validity/reliability | Qualitative, but can be reproduced, as questions to begin discussion were standard with groups |
| Primary Outcome Measures/Results | Data categories identified Comprehensive knowledge Trust Empowerment |

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| Conclusions/Implications | <p>“Delegation in this study was described as a knowledge process of building and sustaining trusting connections among students, school nurses and UAPs” p. 359</p> <p>“Empowerment together with the values of trust and comprehensive knowledge provide a framework for a deeper understanding of the delegation process.” p. 359</p> <p>“The values represented in this study support the recognition of UAP as stakeholders in the care of students in school settings and suggest interventions that support and sustain trusting relationships between the school nurse and UAP are needed. Interventions may include moving from a rule-based to a value-based orientation in the development of education programs designed to enhance school nurse delegation knowledge and skills.” P. 359</p> <p>Suggestion that use of delegation decision grids, and clear definitions are useful interventions P. 359</p> |
| Strengths/Limitations | <p>Limitations - Small sample size, geographically limited</p> <p>Strengths - Limited other qualitative studies noted, reproducible</p> |
| Funding Source | Florida School Nurse Research Initiative |
| Comments | <p>Noted discussion on the remoteness of nurse delegation in school nursing (as opposed to in an acute care facility) creating a unique issue. P. 354</p> <p>Discussion – school nurses “across the country share concerns regarding the impact of delegating medication administration to UAP on the health and safety of school age students” p. 355</p> <p>Most studies have been quantitative but they note more qualitative studies are needed p. 355</p> <p>Five Rights of Delegation (NCSBN 1995) 1. Task, 2. Circumstance, 3. person delegating, 4. Directions or communications, 5. Circumstances p. 353</p> |

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| Article/Journal | <p>Delegation of Glucagon in the school setting: A comparison of State Legislation.</p> <p><i>Journal of School Nursing</i>, 27(3), 185-196.</p> |
| Author/Year | Wilt, L., & Foley, M. 2011 |
| Database/Keywords | <p>MEDLINE</p> <p>Unlicensed assistive personnel, medication administration</p> |
| Research Design | Review of literature and exploration of existing data |

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| Level of Evidence | Level VI Seven Tiered level of evidence, Melnyk, B. M., & Fineout-Overholt, E. (2005). |
| Study Aim/Purpose | Exploration of glucagon delegation laws in the US |
| Population/Sample size Criteria/Power | Existing literature, not defined |
| Methods/Study Appraisal Synthesis Methods | Literature review |
| Study tool/instrument validity/reliability | N/A |
| Primary Outcome Measures/Results | Literature review common themes noted: legal concerns, comfort levels of the delegating nurses and UAP and med errors |
| Conclusions/Implications | <p>“It is clear from the literature that school nurse experience difficulty deciphering the laws under which they practice” p. 193</p> <p>Noted that those that make laws pertaining to delegation often have no nursing experience and nurse should be involved as consultants p. 193</p> <p>“In addition, if a school nurse makes a nursing judgment that a particular delegate would not be an appropriate person to administer emergency medication that decision must be respected and upheld.” P. 193</p> <p>“Adequate and appropriate training of UAP in the school setting will assist school nurses to ensure student safety and meet the challenges of caring for students in an emergency situation”. P 193</p> |
| Strengths/Limitations | Further research – care of the student with diabetes in the school setting, school nurses experience with glucagon delegation, frequency of delegation, and examining outcomes after delegation. |
| Funding Source | None noted |
| Comments | <p>“The delegation of procedures and treatments may be used only in compliance with individual state nurse practice acts, state regulations and guidelines.” P. 186</p> <p>“Legal authority for delegation of medication administration by school nurses comes from individual NPAs as well as educational law.” P 188</p> <p>Maine is noted to have ability to delegate glucagon administration to UAP p. 189</p> |

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| | Administrators “believe they are ultimately responsible for anything occurring in the school and nurses understand that by state law, nurses are ultimately responsible for medication administration”. P 188 |
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| Article/Journal | Elementary school secretaries’ experiences and perceptions of administering prescription medication. <i>Journal of School Health</i> , 73(10), 373-379. |
| Author/Year | Price, J.A., Dake, J.A., Murnan, J., & Telljohann, S.K. 2003 |
| Database/Keywords | MEDLINE Medication administration, school |
| Research Design | Survey directed to secretaries at elementary schools, randomized |
| Level of Evidence | Level IV Seven Tiered level of evidence, Melnyk, B. M., & Fineout-Overholt, E. (2005). |
| Study Aim/Purpose | Assessed a national, random sample of elementary school secretaries regarding their experiences and perceptions with prescription medication. “The survey offers further insight regarding whether such delegation compromises health care received by elementary school children.” P. 373 |
| Population/Sample size Criteria/Power | 600 randomly selected Elementary schools in the US, survey was sent to the school secretary. |
| Methods/Study Appraisal Synthesis Methods | 3 wave mailing procedure. Returned surveys were analyzed Statistical analysis |
| Study tool/instrument validity/reliability | A literature review was used to validate the questions, then reviewed by 5 qualified school health nurses, final instrument contained 31 items, 21 assessing perceptions and practices of the school secretaries on distributing medications. Piloted first |
| Primary Outcome Measures/Results | 26% had received NO training in med administration, those with more training felt more prepared to administer meds, 28% received less than one hour of training 85% reported no medication errors in the past year (nurses reported 48% med error, possible not recognizing errors) |
| Conclusions/Implications | School districts should hire adequate numbers of school nurses to meet medication needs Policies on med admin need to be regularly reviewed School nurse who delegate need to understand risk of liability. |

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| | UAP needs to advocate for adequate training. |
| Strengths/Limitations | <p>Limitations – strong response rate, but would non-respondents report differently? Secretaries may have responded to some questions in a “socially desirable manner”</p> <p>Closed format structure of questions.</p> |
| Funding Source | Not disclosed |
| Comments | <p>Those most commonly delegated to are often the ones with the least formal education (secretaries)</p> <p>Overall secretaries disliked administering medications.</p> <p>Noted that errors were inconsistently reported, perhaps due to the UAP not knowing that there was an error.</p> |

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| Article/Journal | <p>Medication error prevention in the school setting: A closer look. <i>NASN School Nurse</i>, 26(5), 304-308.</p> |
| Author/Year | Richmond, S.L. 2011 |
| Database/Keywords | MEDLINE Medication administration, school |
| Research Design | N/A |
| Level of Evidence | Level VI Seven Tiered level of evidence, Melnyk, B. M., & Fineout-Overholt, E. (2005). |
| Study Aim/Purpose | Review of common medication errors that occur in a school setting, prevention strategies |
| Population/Sample size Criteria/Power | N/A |
| Methods/Study Appraisal Synthesis Methods | N/A |
| Study tool/instrument validity/reliability | N/A |
| Primary Outcome Measures/Results | <p>Missed dosing is most common error reported.</p> <p>Use of UAP and high volume noted to be contributing factors in errors.</p> |
| Conclusions/Implications | <p>“A first step in reducing errors involves building a non punitive environment where there is a culture shift toward learning from errors, minimizing an averting future errors, and supporting nurses who have experienced error as a result of process or system failure.” P. 305</p> |

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| | <p>One potential way to learn from medication error and prevent future errors is to establish a medication error reporting system specific to the school environment.” P. 305 Advocating for a common language of error reporting in schools</p> <p>Call for use of technology to mitigate potential medication errors.</p> |
| Strengths/Limitations | Review only |
| Funding Source | Not disclosed |
| Comments | <p>“The standards of professional performance developed by the National Association of School Nurses identifies the need for school nurses to enhance the quality and effectiveness of their practice. Improving the safety of medication administration and preventing medication errors are examples of how nurses can demonstrate meeting this standard.” P. 304</p> <p>Effects of medication errors are difficult to assess in the school setting due to lack of study and limited data collection.</p> |

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| Article/Journal | <p>Issues of medication administration and control in Iowa schools. <i>Journal of School Health</i>, 73(9), 331 – 337.</p> |
| Author/Year | Farris, K.B., McCarthy, A.M., Kelly, M.W., & Gross, J.N. 2003 |
| Database/Keywords | <p>MEDLINE Medication administration, school</p> |
| Research Design | Descriptive, self administered survey, mailed to |
| Level of Evidence | <p>Level IV Seven Tiered level of evidence, Melnyk, B. M., & Fineout-Overholt, E. (2005).</p> |
| Study Aim/Purpose | To describe who is responsible for medication administration in Iowa schools, policies in place and med errors |
| Population/Sample size Criteria/Power | 850 principles in schools in Iowa, randomized, 396 useable surveys returned |
| Methods/Study Appraisal Synthesis Methods | Freq distribution and descriptive statistics used to evaluate the data |
| Study tool/instrument validity/reliability | Adapted from previous survey of nurses on med admin, anonymous |
| Primary Outcome Measures/Results | <p>Medication errors Rx transportation Legal and liability responsibly is murky</p> |
| Conclusions/Implications | Nurses and administration need to know the nurse codes of their states to determine legal and liability issues. Need for |

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| | written policies for field trips are necessary. Need for strategies to improve communication between school and parents. Potential diversion of prescription medication requires further study. |
| Strengths/Limitations | Limitations: Non-respondent analysis unavailable, response rate was acceptable but still limiting. Suspected under reporting of med errors |
| Funding Source | Note reported |
| Comments | Principals believed they were legal ultimately responsible but nurses stated they were in accordance with the Nurse Practice act. P. 335 |

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| Article/Journal | School nurses' experiences with medication administration. <i>Journal of School Nursing</i> , 19(5), 281 – 287. |
| Author/Year | Kelly, M.K., McCarthy, A.M., & Mordhorst, M.J. 2003 |
| Database/Keywords | CINAHL School, medication administration |
| Research Design | Survey then focus group |
| Level of Evidence | Level IV Seven Tiered level of evidence, Melnyk, B. M., & Fineout-Overholt, E. (2005). |
| Study Aim/Purpose | To describe school nurses medication administration experiences. |
| Population/Sample size Criteria/Power | Random sample of 100 members of the NASN, 649 completed then competed focus group of 25 local nurses |
| Methods/Study Appraisal Synthesis Methods | Qualitative analysis of a written survey and focus groups Comments on the 8 items from a previous study were analyzed then to clarify information obtained, 2 focus groups of school nurse were conducted |
| Study tool/instrument validity/reliability | Survey tool was developed based on information from school nurses about procedures, practices and concerns related to med admin, review of recommended guidelines, experience of investigators and critique of survey by expert consultant. Pilot trial of 25 local school nurse. |
| Primary Outcome Measures/Results | Nurses across the country have similar medication administration issues. Professional unease and potential for medication errors. |
| Conclusions/Implications | <p>“Clear guidelines for the delegation of medication administration combined with a standardized education system for UAP’s would be an important step in addressing the nurses concern”. P. 285</p> <p>“The issue of delegation warrants further study, however a minimum requirement is that all school nurses know their</p> |

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| | state nurse practice act and the laws governing the delegation of medication administration.” Written guidelines are essential |
| Strengths/Limitations | Not noted |
| Funding Source | Glaxo Wellcome/Midwest Nursing Research Society Research Grant |
| Comments | Significant variation in delegation of med admin Significant variation in comfort level with delegation Self admin was prevalent Variety of medication errors reported, most common was missed doses. UAPs with inadequate training was also concern, “delegation of medication administration to UAPs raises questions of liability, accuracy and confidentiality for the nurses”. P. 285 |

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| Article/Journal | Medication administration practices in Pennsylvania schools. <i>The Journal of School Nursing</i> , 22(3), 148 – 155. |
| Author/Year | Ficca, M., & Welk, D. 2006 |
| Database/Keywords | MEDLINE School, medication administration |
| Research Design | Written survey |
| Level of Evidence | Level IV Seven Tiered level of evidence, Melnyk, B. M., & Fineout-Overholt, E. (2005). |
| Study Aim/Purpose | Was to determine the policies and practices that PA public schools have in place regarding med admin. |
| Population/Sample size Criteria/Power | 314 state certified school nurses (45% return rate) |
| Methods/Study Appraisal Synthesis Methods | Survey analysis |
| Study tool/instrument validity/reliability | 71 question survey, modified from the Medication Administration in the school setting with content validity established. |
| Primary Outcome Measures/Results | School nurses are very concerned about issues related to medication administration. Lack of standing orders for OTCs, increase in med admin when the school nurse had |

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| | multiple responsibilities and lack of understand of the state nurse practice act. |
| Conclusions/Implications | Recommendations for practice include the development of detailed policies and procedures and collaboration among all stakeholders in the development of policies that addressed legal issues. |
| Strengths/Limitations | Limitations: self reported and not verified |
| Funding Source | None noted |
| Comments | 70% of nurse report they do not give all medications, many report unease with delegation Med admin on field trips were a concern. |

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| Article/Journal | Does school nursing matter? <i>NASN School Nurse</i> , March, 72-74. |
| Author/Year | Bergren, M.D. 2011 |
| Database/Keywords | MEDLINE School, medication |
| Research Design | n/a – Topic discussion |
| Level of Evidence | Level IV Seven Tiered level of evidence, Melnyk, B. M., & Fineout-Overholt, E. (2005). |
| Study Aim/Purpose | n/a |
| Population/Sample size Criteria/Power | n/a |
| Methods/Study Appraisal Synthesis Methods | n/a |
| Study tool/instrument validity/reliability | n/a |
| Primary Outcome Measures/Results | n/a |
| Conclusions/Implications | A call to identify school nursing sensitive out comes to reflect practice |
| Strengths/Limitations | Discussion only |
| Funding Source | None noted |
| Comments | “One of NASN’s research priorities is to identify school nurse delivery models (school nurse caseloads, credentials, experience, etc.) that are necessary to deliver quality nursing care in school to children (NASN, 2010a). In order to do that, the school nursing subspecialty must identify what outcomes can be expected as a result of quality school nursing care.” P. 72 |

Appendix B

IRB Approval



REGIS.EDU

Institutional Review Board

DATE: July 31, 2017

TO: Laura Nickerson, MSN

FROM: Regis University Human Subjects IRB

PROJECT TITLE: [1089190-1] Medication Administration for Unlicensed Assistive Personnel in the Residential School Environment

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS

DECISION DATE: July 31, 2017

REVIEW CATEGORY: Exemption category # (1,2)

Thank you for your submission of New Project materials for this project. The Regis University Human Subjects IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations 45.CFR46.101(b).

Well written.

Possible error in "disadvantages" section of consent: "...will [not] influence"

External letter of agreement should be uploaded into IRBNet by creation of a new package (as opposed to a new project) and the project can begin at that point.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact the Institutional Review Board at irb@regis.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Regis University Human Subjects IRB's records.

APPENDIX C**Copy of Letter of Approval from Organization**

Gould

Letter of Agreement

May 26, 2017

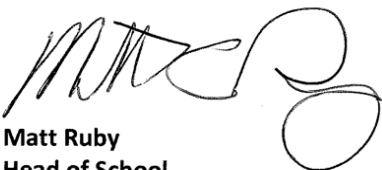
To Regis University Institutional Review Board (IRB):

I am familiar with Laura Nickerson's research project *entitled **An Education Administration Project for Unlicensed Assistive Personal in a Residential School Setting***. I understand Gould Academy's involvement to be allowing an online education offering, with concurrent online surveys of employees.

I understand that this research will be carried out following sound ethical principles and that participant involvement in this research project is strictly voluntary and provides confidentiality of research data, as described in the proposal.

Therefore, as a representative of Gould Academy, I agree that Laura Nickerson's research project may be conducted at our agency/institution.

Sincerely,



Matt Ruby
Head of School
Gould Academy

o:207-824-7704 c:207-381-7663

- Fax with original signature to (303) 964-5528
- Email as pdf file with original signature to irb@regis.edu from an official agency email address.
- Adobe electronic signature to irb@regis.edu

Appendix D

Participant Information Sheet



RUECKERT-HARTMAN COLLEGE FOR HEALTH PROFESSIONS
LORETTO HEIGHTS SCHOOL OF NURSING

Participant Information Sheet

A research project investigating online education for unlicensed assistive personnel in the residential school environment.

Medication administration is a high-risk activity in student health. I would like you to participate in a project concerning how online instruction on medication administration impacts your knowledge and comfort. This is a required capstone project for the Doctorate of Nursing Practice Program at Regis University.

What do you have to do to take part?

You will be asked to complete a brief set of survey questions regarding giving medications, both before and after, completing an education module. The online module and surveys are self-paced and relatively brief. Expect each survey to take no more than 10 minutes and the online module to take 30 minutes to 1 hour to complete.

Will your participation in the project remain confidential?

Your survey answers will be sent to a link at SurveyMonkey.com where data will be stored in a password protected, electronic format. Survey Monkey does not collect identifying information such as your name, email address, or IP address. The survey will ask for a code name that you create to help match and strengthen the data collection. No one will be able to identify you or your answers, and no one will know whether or not you participated.

What are the advantages of taking part?

You will receive no direct benefits from participating. However, your responses may help us learn more about how to increase safety for our students in medication administration.

Are there any disadvantages?

You may be uncomfortable with "tests". Please be assured this is not a "pass/fail" quiz.

Do you have to take part in the study?

Your participation in this survey is voluntary. By logging on to the survey you are agreeing to participate. You may refuse to take part in the research or exit the survey at any time without penalty.

Contact Information:

Project Researcher: Laura Nickerson DNP candidate, Regis University 207 902 0487

Project Supervisor: Dr. Lora Claywell Regis University 314-435-5228

If you have any questions related to research subjects' rights you may contact the Regis University IRB at 303-458-4206 or via email at irb@regis.edu

3333 Regis Blvd. G-8, Denver, CO 80221-1009 | REGIS.EDU

Appendix E

Data Dictionary, Survey Questions & Coding

| | Field | Data Type | Coding | Exact Question on Survey |
|--------------------------------|---|----------------------------------|---|---|
| | Pre Survey Question 1 Code Word | Word/number | N/A | Please create a code word. You will be asked to enter this again in the post training survey. |
| Pre Survey Demographics | Pre Survey Question 2 Position | Word | Faculty = 10 Coaching = 11 Other Staff = 12 | What is your primary position at the facility? Faculty Coaching Other staff |
| | Pre Survey Question 3 Years giving meds in any school | Number | Number | How many school years have you administered medications in ANY school environment, here or other school? You may enter, "0" if you have never administered medications in school |
| | Pre Survey Question 4 Years giving meds in this school | Number | Number | How many school years have you administered medications at this school? You may enter, "0" if you have never administered medications at this school |
| | Pre Survey Question 5 Training received | Word | Yes = 2 No = 1 I don't remember = 3 | Have you ever received training at this school to administer medications? |
| Pre Survey Respondent | Pre Survey Question 6 Responsibility | Word | Yes = 2 No = 1 Unsure = 3 | Do you believe that medication administration is part of your job? |
| | Pre Survey Question 7 Preparation | Number 1-10 | 1 = strongly disagree 5 = neutral 10 = strongly agree Respondent can select any number from 1 – 10 | Right now, I feel prepared to administer medications to students. |
| | Pre Survey Question 8 Confidence level | Number 1-10 | 1 = strongly disagree 5 = neutral 10 = strongly agree Respondent can select any number from 1 – 10 | Right now, I feel confident in administering medications to students. |
| | Pre Survey Question 9 Med error | Word | Yes = 2 No = 1 Unsure = 3 I have never given meds = 4 | If you have given medications in a school setting before, have you ever made a medication error? |
| Pre Survey Knowledge | Pre Survey question 10 - 19 | Multiple choice A, B, C, or D | Correct = 21 Incorrect = 20 Blank = 20 | Questions based on content |

| | | | | |
|-----------------------------------|--|---|--|--|
| | | True/false Fill in the blank | | |
| | Post Survey Question 1 | Word/number | N/A | Please enter the code word you created in the Pre Training Survey. |
| | Code Word | | | |
| Post Survey Respondent | Post Survey Question 2 Preparation | Number 1-10 | 1 = strongly disagree 5 = neutral 10 = strongly agree Respondent can select any number from 1 – 10 | Right now, I feel prepared to administer medications to students. |
| | Post Survey Question 3 Confidence level | Number 1-10 | 1 = strongly disagree 5 = neutral 10 = strongly agree Respondent can select any number from 1 – 10 | Right now, I feel confident in administering medications to students. |
| | Post Survey Question 4 Med error | Word | Yes = 2 No = 1 Unsure = 3 I have never given meds = 4 | After completing the training, do you think you have ever made a medication error? |
| Post Survey Knowledge | Post Survey question 5 - 14 | Multiple choice A, B, C, or D True/false Fill in the blank | Correct = 21 Incorrect = 20 Blank = 20 | Questions based on content |
| | | | | |
| | | | | |

Appendix F

Samples Statistics

| Paired Samples Statistics | | | | | |
|---------------------------|-------|-------|----|----------------|-----------------|
| | | Mean | N | Std. Deviation | Std. Error Mean |
| Pair 1 | PRT10 | 20.74 | 50 | .443 | .063 |
| | POT10 | 20.94 | 50 | .240 | .034 |
| Pair 2 | PRT11 | 20.24 | 50 | .431 | .061 |
| | POT11 | 20.22 | 50 | .418 | .059 |
| Pair 3 | PRT12 | 20.20 | 50 | .404 | .057 |
| | POT12 | 20.90 | 50 | .303 | .043 |
| Pair 4 | PRT13 | 20.94 | 50 | .240 | .034 |
| | POT13 | 20.90 | 50 | .303 | .043 |
| Pair 5 | PRT14 | 20.78 | 50 | .418 | .059 |
| | POT14 | 20.70 | 50 | .463 | .065 |
| Pair 6 | PRT15 | 20.92 | 50 | .274 | .039 |
| | POT15 | 20.98 | 50 | .141 | .020 |
| Pair 7 | PRT16 | 20.32 | 50 | .471 | .067 |
| | POT16 | 20.84 | 50 | .370 | .052 |
| Pair 8 | PRT17 | 20.90 | 50 | .303 | .043 |
| | POT17 | 21.00 | 50 | .000 | .000 |
| Pair 9 | PRT18 | 20.48 | 50 | .505 | .071 |
| | POT18 | 20.52 | 50 | .505 | .071 |
| Pair 10 | PRT19 | 20.90 | 50 | .303 | .043 |
| | POT19 | 20.96 | 50 | .198 | .028 |

| Paired Samples Test | | | | | | | | | |
|---------------------|---------------|--------------------|----------------|-----------------|---|-------|--------|-----------------|-------|
| | | Paired Differences | | | | t | df | Sig. (2-tailed) | |
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | | | | Upper |
| Pair 1 | PRT10 - POT10 | -.200 | .495 | .070 | -.341 | -.059 | -2.858 | 49 | .006 |
| Pair 2 | PRT11 - POT11 | .020 | .473 | .067 | -.115 | .155 | .299 | 49 | .766 |
| Pair 3 | PRT12 - POT12 | -.700 | .505 | .071 | -.844 | -.556 | -9.800 | 49 | .000 |
| Pair 4 | PRT13 - POT13 | .040 | .402 | .057 | -.074 | .154 | .704 | 49 | .485 |
| Pair 5 | PRT14 - POT14 | .080 | .566 | .080 | -.081 | .241 | 1.000 | 49 | .322 |
| Pair 6 | PRT15 - POT15 | -.060 | .314 | .044 | -.149 | .029 | -1.353 | 49 | .182 |
| Pair 7 | PRT16 - POT16 | -.520 | .646 | .091 | -.704 | -.336 | -5.687 | 49 | .000 |
| Pair 8 | PRT17 - POT17 | -.100 | .303 | .043 | -.186 | -.014 | -2.333 | 49 | .024 |
| Pair 9 | PRT18 - POT18 | -.040 | .699 | .099 | -.239 | .159 | -.405 | 49 | .687 |
| Pair 10 | PRT19 - POT19 | -.060 | .373 | .053 | -.166 | .046 | -1.137 | 49 | .261 |

Appendix G

One Way ANOVA Questions 2, 3, 4 and 5

Question 3

| ANOVA | | | | | | |
|-------|----------------|----------------|----|-------------|-------|------|
| | | Sum of Squares | df | Mean Square | F | Sig. |
| PRT7 | Between Groups | 11.064 | 2 | 5.532 | .916 | .406 |
| | Within Groups | 350.378 | 58 | 6.041 | | |
| | Total | 361.443 | 60 | | | |
| PRT8 | Between Groups | 8.088 | 2 | 4.044 | .647 | .527 |
| | Within Groups | 362.470 | 58 | 6.249 | | |
| | Total | 370.557 | 60 | | | |
| PRT9 | Between Groups | 1.231 | 2 | .616 | .484 | .619 |
| | Within Groups | 73.752 | 58 | 1.272 | | |
| | Total | 74.984 | 60 | | | |
| PRT10 | Between Groups | .062 | 2 | .031 | .143 | .867 |
| | Within Groups | 12.626 | 58 | .218 | | |
| | Total | 12.689 | 60 | | | |
| PRT11 | Between Groups | .247 | 2 | .124 | .559 | .575 |
| | Within Groups | 12.835 | 58 | .221 | | |
| | Total | 13.082 | 60 | | | |
| PRT12 | Between Groups | .113 | 2 | .057 | .345 | .710 |
| | Within Groups | 9.526 | 58 | .164 | | |
| | Total | 9.639 | 60 | | | |
| PRT13 | Between Groups | .033 | 2 | .017 | .261 | .771 |
| | Within Groups | 3.704 | 58 | .064 | | |
| | Total | 3.738 | 60 | | | |
| PRT14 | Between Groups | .303 | 2 | .152 | .886 | .418 |
| | Within Groups | 9.926 | 58 | .171 | | |
| | Total | 10.230 | 60 | | | |
| PRT15 | Between Groups | .086 | 2 | .043 | .553 | .579 |
| | Within Groups | 4.504 | 58 | .078 | | |
| | Total | 4.590 | 60 | | | |
| PRT16 | Between Groups | .562 | 2 | .281 | 1.345 | .269 |
| | Within Groups | 12.126 | 58 | .209 | | |
| | Total | 12.689 | 60 | | | |
| PRT17 | Between Groups | .038 | 2 | .019 | .242 | .786 |
| | Within Groups | 4.552 | 58 | .078 | | |
| | Total | 4.590 | 60 | | | |
| PRT18 | Between Groups | .168 | 2 | .084 | .322 | .726 |
| | Within Groups | 15.078 | 58 | .260 | | |
| | Total | 15.246 | 60 | | | |
| PRT19 | Between Groups | .158 | 2 | .079 | .871 | .424 |
| | Within Groups | 5.252 | 58 | .091 | | |
| | Total | 5.410 | 60 | | | |

Question 4

| ANOVA | | | | | | |
|-------|----------------|----------------|----|-------------|-------|------|
| | | Sum of Squares | df | Mean Square | F | Sig. |
| PRT7 | Between Groups | 155.478 | 24 | 6.478 | 1.132 | .361 |
| | Within Groups | 205.964 | 36 | 5.721 | | |
| | Total | 361.443 | 60 | | | |
| PRT8 | Between Groups | 163.716 | 24 | 6.821 | 1.187 | .314 |
| | Within Groups | 206.842 | 36 | 5.746 | | |
| | Total | 370.557 | 60 | | | |
| PRT9 | Between Groups | 32.492 | 24 | 1.354 | 1.147 | .348 |
| | Within Groups | 42.492 | 36 | 1.180 | | |
| | Total | 74.984 | 60 | | | |
| PRT10 | Between Groups | 5.858 | 24 | .244 | 1.286 | .242 |
| | Within Groups | 6.831 | 36 | .190 | | |
| | Total | 12.689 | 60 | | | |
| PRT11 | Between Groups | 4.103 | 24 | .171 | .686 | .833 |
| | Within Groups | 8.979 | 36 | .249 | | |
| | Total | 13.082 | 60 | | | |
| PRT12 | Between Groups | 3.673 | 24 | .153 | .923 | .574 |
| | Within Groups | 5.967 | 36 | .166 | | |
| | Total | 9.639 | 60 | | | |
| PRT13 | Between Groups | 1.881 | 24 | .078 | 1.519 | .125 |
| | Within Groups | 1.857 | 36 | .052 | | |
| | Total | 3.738 | 60 | | | |
| PRT14 | Between Groups | 4.664 | 24 | .194 | 1.257 | .262 |
| | Within Groups | 5.565 | 36 | .155 | | |
| | Total | 10.230 | 60 | | | |
| PRT15 | Between Groups | 2.423 | 24 | .101 | 1.678 | .078 |
| | Within Groups | 2.167 | 36 | .060 | | |
| | Total | 4.590 | 60 | | | |
| PRT16 | Between Groups | 4.840 | 24 | .202 | .925 | .572 |
| | Within Groups | 7.849 | 36 | .218 | | |
| | Total | 12.689 | 60 | | | |
| PRT17 | Between Groups | 3.290 | 24 | .137 | 3.796 | .000 |
| | Within Groups | 1.300 | 36 | .036 | | |
| | Total | 4.590 | 60 | | | |
| PRT18 | Between Groups | 5.082 | 24 | .212 | .750 | .768 |
| | Within Groups | 10.164 | 36 | .282 | | |
| | Total | 15.246 | 60 | | | |
| PRT19 | Between Groups | 3.493 | 24 | .146 | 2.734 | .003 |
| | Within Groups | 1.917 | 36 | .053 | | |
| | Total | 5.410 | 60 | | | |

| ANOVA | | | | | | |
|-------|----------------|----------------|----|-------------|-------|------|
| | | Sum of Squares | df | Mean Square | F | Sig. |
| PRT7 | Between Groups | 165.895 | 21 | 7.900 | 1.576 | .108 |
| | Within Groups | 195.548 | 39 | 5.014 | | |
| | Total | 361.443 | 60 | | | |
| PRT8 | Between Groups | 170.412 | 21 | 8.115 | 1.581 | .106 |
| | Within Groups | 200.145 | 39 | 5.132 | | |
| | Total | 370.557 | 60 | | | |
| PRT9 | Between Groups | 33.493 | 21 | 1.595 | 1.499 | .135 |
| | Within Groups | 41.490 | 39 | 1.064 | | |
| | Total | 74.984 | 60 | | | |
| PRT10 | Between Groups | 5.708 | 21 | .272 | 1.518 | .127 |
| | Within Groups | 6.981 | 39 | .179 | | |
| | Total | 12.689 | 60 | | | |
| PRT11 | Between Groups | 4.625 | 21 | .220 | 1.016 | .469 |
| | Within Groups | 8.457 | 39 | .217 | | |
| | Total | 13.082 | 60 | | | |
| PRT12 | Between Groups | 3.382 | 21 | .161 | 1.004 | .481 |
| | Within Groups | 6.257 | 39 | .160 | | |
| | Total | 9.639 | 60 | | | |
| PRT13 | Between Groups | .788 | 21 | .038 | .496 | .956 |
| | Within Groups | 2.950 | 39 | .076 | | |
| | Total | 3.738 | 60 | | | |
| PRT14 | Between Groups | 3.639 | 21 | .173 | 1.025 | .459 |
| | Within Groups | 6.590 | 39 | .169 | | |
| | Total | 10.230 | 60 | | | |
| PRT15 | Between Groups | 1.023 | 21 | .049 | .533 | .937 |
| | Within Groups | 3.567 | 39 | .091 | | |
| | Total | 4.590 | 60 | | | |
| PRT16 | Between Groups | 3.591 | 21 | .171 | .733 | .774 |
| | Within Groups | 9.098 | 39 | .233 | | |
| | Total | 12.689 | 60 | | | |
| PRT17 | Between Groups | 2.083 | 21 | .099 | 1.543 | .119 |
| | Within Groups | 2.507 | 39 | .064 | | |
| | Total | 4.590 | 60 | | | |
| PRT18 | Between Groups | 5.732 | 21 | .273 | 1.119 | .370 |
| | Within Groups | 9.514 | 39 | .244 | | |
| | Total | 15.246 | 60 | | | |
| PRT19 | Between Groups | 1.843 | 21 | .088 | .960 | .527 |
| | Within Groups | 3.567 | 39 | .091 | | |
| | Total | 5.410 | 60 | | | |

Question 6

| ANOVA | | | | | | |
|-------|----------------|----------------|----|-------------|-------|------|
| | | Sum of Squares | df | Mean Square | F | Sig. |
| PRT7 | Between Groups | 37.749 | 2 | 18.875 | 3.382 | .041 |
| | Within Groups | 323.693 | 58 | 5.581 | | |
| | Total | 361.443 | 60 | | | |
| PRT8 | Between Groups | 30.631 | 2 | 15.315 | 2.613 | .082 |
| | Within Groups | 339.927 | 58 | 5.861 | | |
| | Total | 370.557 | 60 | | | |
| PRT9 | Between Groups | 8.017 | 2 | 4.008 | 3.472 | .038 |
| | Within Groups | 66.967 | 58 | 1.155 | | |
| | Total | 74.984 | 60 | | | |
| PRT10 | Between Groups | .582 | 2 | .291 | 1.394 | .256 |
| | Within Groups | 12.107 | 58 | .209 | | |
| | Total | 12.689 | 60 | | | |
| PRT11 | Between Groups | .242 | 2 | .121 | .546 | .582 |
| | Within Groups | 12.840 | 58 | .221 | | |
| | Total | 13.082 | 60 | | | |
| PRT12 | Between Groups | .433 | 2 | .216 | 1.363 | .264 |
| | Within Groups | 9.207 | 58 | .159 | | |
| | Total | 9.639 | 60 | | | |
| PRT13 | Between Groups | .078 | 2 | .039 | .616 | .544 |
| | Within Groups | 3.660 | 58 | .063 | | |
| | Total | 3.738 | 60 | | | |
| PRT14 | Between Groups | .030 | 2 | .015 | .084 | .920 |
| | Within Groups | 10.200 | 58 | .176 | | |
| | Total | 10.230 | 60 | | | |
| PRT15 | Between Groups | .050 | 2 | .025 | .320 | .727 |
| | Within Groups | 4.540 | 58 | .078 | | |
| | Total | 4.590 | 60 | | | |
| PRT16 | Between Groups | .582 | 2 | .291 | 1.394 | .256 |
| | Within Groups | 12.107 | 58 | .209 | | |
| | Total | 12.689 | 60 | | | |
| PRT17 | Between Groups | .097 | 2 | .048 | .625 | .539 |
| | Within Groups | 4.493 | 58 | .077 | | |
| | Total | 4.590 | 60 | | | |
| PRT18 | Between Groups | .119 | 2 | .060 | .229 | .796 |
| | Within Groups | 15.127 | 58 | .261 | | |
| | Total | 15.246 | 60 | | | |
| PRT19 | Between Groups | .610 | 2 | .305 | 3.684 | .031 |
| | Within Groups | 4.800 | 58 | .083 | | |
| | Total | 5.410 | 60 | | | |

Appendix H

Wilcoxon Signed Ranks Tests

Question 7 Wilcoxon Signed Ranks Preparedness

Hypothesis Test Summary

| | Null Hypothesis | Test | Sig. | Decision |
|---|---|---|------|-----------------------------|
| 1 | The median of differences between PRT8 and POT8 equals 0. | Related-Samples Wilcoxon Signed Rank Test | .000 | Reject the null hypothesis. |

Asymptotic significances are displayed. The significance level is .05.

Question 8 Wilcoxon Signed Ranks Confidence

Hypothesis Test Summary

| | Null Hypothesis | Test | Sig. | Decision |
|---|---|---|------|-----------------------------|
| 1 | The median of differences between PRT8 and POT8 equals 0. | Related-Samples Wilcoxon Signed Rank Test | .000 | Reject the null hypothesis. |

Asymptotic significances are displayed. The significance level is .05.

Wilcoxon Signed Ranks Test for Questions 7 & 8

Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|--------------------|----|---------|---------|------|----------------|
| PRT7 | 61 | 1 | 10 | 6.33 | 2.454 |
| PRT8 | 61 | 1 | 10 | 6.61 | 2.485 |
| POT7 | 50 | 2 | 10 | 8.42 | 1.715 |
| POT8 | 50 | 2 | 10 | 8.42 | 1.785 |
| Valid N (listwise) | 50 | | | | |

Appendix I

Citi Certificate

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

• **Name:** Laura Nickerson (ID: 6164822)
 • **Institution Affiliation:** Regis University (ID: 745)
 • **Institution Email:** lnickerson@regis.edu
 • **Institution Unit:** student

• **Curriculum Group:** Human Research
 • **Course Learner Group:** Social Behavioral Research Investigators and Key Personnel
 • **Stage:** Stage 1 - Basic Course

• **Record ID:** 22312011
 • **Report Date:** 17-Jun-2017
 • **Current Score**:** 92

| REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES | MOST RECENT | SCORE |
|--|-------------|------------|
| History and Ethical Principles - SBE (ID: 490) | 19-Feb-2017 | 5/5 (100%) |
| Belmont Report and CITI Course Introduction (ID: 1127) | 19-Feb-2017 | 3/3 (100%) |
| The Federal Regulations - SBE (ID: 502) | 19-Feb-2017 | 4/5 (80%) |
| Assessing Risk - SBE (ID: 503) | 19-Feb-2017 | 4/5 (80%) |
| Informed Consent - SBE (ID: 504) | 19-Feb-2017 | 5/5 (100%) |
| Privacy and Confidentiality - SBE (ID: 505) | 19-Feb-2017 | 5/5 (100%) |
| The IRB Member Module - "What Every IRB Member Needs to Know" (ID: 816) | 19-Feb-2017 | 5/5 (100%) |
| Vulnerable Subjects - Research Involving Workers/Employees (ID: 483) | 19-Feb-2017 | 6/7 (86%) |
| Conflicts of Interest in Research Involving Human Subjects (ID: 488) | 19-Feb-2017 | 5/5 (100%) |
| Populations in Research Requiring Additional Considerations and/or Protections (ID: 16680) | 19-Feb-2017 | 4/5 (80%) |

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.
 Verify at: www.citiprogram.org/verify/7b2e6a0ebc-3d45-ea28-9a11-85ee5d30cb31-22312011

Collaborative Institutional Training Initiative (CITI Program)
 Email: support@citiprogram.org
 Phone: 888-326-2929
 Web: <http://www.citiprogram.org>

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

• **Name:** Laura Nickerson (ID: 6164822)
 • **Institution Affiliation:** Regis University (ID: 745)
 • **Institution Email:** lnickerson@regis.edu
 • **Institution Unit:** student
 • **Curriculum Group:** Human Research
 • **Course Learner Group:** Social Behavioral Research Investigators and Key Personnel
 • **Stage:** Stage 1 - Basic Course
 • **Record ID:** 22312011
 • **Completion Date:** 19-Feb-2017
 • **Expiration Date:** 19-Feb-2020
 • **Minimum Passing:** 80
 • **Reported Score*:** 93

| REQUIRED AND ELECTIVE MODULES ONLY | DATE COMPLETED | SCORE |
|--|----------------|------------|
| Belmont Report and CITI Course Introduction (ID: 1127) | 19-Feb-2017 | 3/3 (100%) |
| History and Ethical Principles - SBE (ID: 490) | 19-Feb-2017 | 5/5 (100%) |
| The Federal Regulations - SBE (ID: 502) | 19-Feb-2017 | 4/5 (80%) |
| Assessing Risk - SBE (ID: 503) | 19-Feb-2017 | 4/5 (80%) |
| Informed Consent - SBE (ID: 504) | 19-Feb-2017 | 5/5 (100%) |
| Privacy and Confidentiality - SBE (ID: 505) | 19-Feb-2017 | 5/5 (100%) |

For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.

Verify at: www.citiprogram.org/verify/7k5eacebd3645-4c26-9a11-55ee6c3bcb31-22312011

Collaborative Institutional Training Initiative (CITI Program)
 Email: support@citiprogram.org
 Phone: 888-529-5529
 Web: <https://www.citiprogram.org>