ASSESSMENT OF SCHOOL NURSE-PROVIDER COMMUNICATION OF CHANGES IN STUDENT CONDITION

by

Luke Huffaker

A DNP Project Submitted to the Faculty of the

COLLEGE OF NURSING

In Partial Fulfillment of the Requirements

For the Degree of

DOCTOR OF NURSING PRACTICE

In the Graduate College

THE UNIVERSITY OF ARIZONA

2 0 1 8

THE UNIVERSITY OF ARIZONA
GRADUATE COLLEGE

As members of the DNP Project Committee, we certify that we have read the DNP project prepared by Luke Huffaker entitled "Assessment of School Nurse-Provider Communication of Changes in Student Condition" and recommend that it be accepted as fulfilling the DNP project requirement for the Degree of Doctor of Nursing Practice.

Jane M Carrington — Date: December 22, 2017
Jane M. Carrington, PhD, RN, FAAN

Gloanna Peek — Date: December 22, 2017
Gloanna Peek, PhD, RN, CPNP

Sara Edmund — Date: December 22, 2017
Sara J. Edmund, DNP, RN, FNP-C, PMHNP-BC

Final approval and acceptance of this DNP project is contingent upon the candidate's submission of the final copies of the DNP project to the Graduate College.

I hereby certify that I have read this DNP project prepared under my direction and recommend that it be accepted as fulfilling the DNP project requirement.

Jane M Carrington — Date: December 22, 2017
DNP Project Chair: Jane M. Carrington, PhD, RN, FAAN

STATEMENT BY AUTHOR

This DNP Project has been submitted in partial fulfillment of requirements for an advanced degree at The University of Arizona and is deposited in the University Library to be made available to borrowers under rules of the Library.

Brief quotations from this DNP Project are allowable without special permission, provided that accurate acknowledgment of source is made. Requests for permission for extended quotation from or reproduction of this manuscript in whole or in part may be granted by the head of the major department or the Dean of the Graduate College when in his or her judgment the proposed use of the material is in the interests of scholarship. In all other instances, however, permission must be obtained from the author.

SIGNED: __Luke Huffaker_____

ACKNOWLEDGMENTS

I would like to extend a personal thanks to my family, friends, mentors, committee members and most importantly, God. Without the constant support and prayer from family, especially Alaina Hill, Greg Huffaker, Katie Huffaker, Ann Hillig and MaryLou Huffkaer, I would not be where I am today. I am also unable to thank Dr. Jane Carrington enough for her constant support and guidance through the duration of my graduate education. Dr. Carrington pushed me to achieve goals that I thought were impossible and provided constant guidance throughout the duration of my academic journey. I would also like to send a personal and sincere thank you to my committee members Dr. Sara Edmund and Dr. Gloanna Peek for their insight regarding this project. Without the support of everyone listed above, I would not have been able to achieve my educational and professional goals. Thank you.

DEDICATION

I would like to dedicate this work to my parents, Katie and Greg Huffaker. You have set a standard that I will happily strive to achieve as I continue my walk in life. Cheers to the both of you for always continuing through adversity with faith, kindness, love, courage, and strength. You have laid the foundation in which I have built my life and I will always strive to be a light in the world of others as you have done for me.

TABLE OF CONTENTS

TABLE OF CONTENTS – *Continued*

TABLE OF CONTENTS – *Continued*

LIST OF FIGURES

ABSTRACT

The landscape of the United States public school system was greatly improved upon with the creation of The Individuals with Disabilities Education Act of 2004 (IDEA 2004). This act established a standard that allowed all school aged children living with chronic illnesses to integrate into public school systems. This mandate currently impacts over 12 million children living with chronic illness including and not limited to asthma, seizure disorders, developmental delay, cystic fibrosis, traumatic brain injuries, anxiety and cancer. IDEA 2004 extended healthcare into public school systems and as a result, increased the average acuity of students that school nurses (SNs) care for. It is estimated that 15% of school-aged children miss 11 or more school days per year because of illness or injury demonstrating evidence of increased student acuity and a need to provide more appropriate care for these students in order to increase their time spent in the academic setting. Adequate SN and primary care provider (PCP) communication is essential to reduce absenteeism for this population and to ensure that students are safe during their time spent away from home and healthcare clinics. From this quality improvement project, more is understood pertaining to the communication patterns between SNs and PCPs and recommendations are provided in order to increase effective SN and PCP communication.

INTRODUCTION

Background

The Individuals with Disabilities Education Act of 2004 (IDEA 2004) resulted in great changes in our healthcare and education system, benefiting children across the United States. IDEA 2004 was created to ensure the opportunity of public education for all children, putting emphasis on those who suffer from disability. This promoted the integration of all children into public school systems, especially those who may have been excluded in the past due to healthcare related barriers (APA, 2017). Over 12 million children who live with chronic illness require additional care in the public school setting (Michigan Medicine, 2012). These children live with a wide range of health conditions such as diabetes, cerebral palsy, cystic fibrosis, seizure disorders, asthma, congenital heart problems, cancer, severe allergies, mental delay, social anxieties, learning disorders and autoimmune disorders. Unfortunately, 15% of students experience a high rate of absenteeism, threatening their developmental and academic success (AHRQ, 2013). This high absenteeism rate is due in part from the complex healthcare needs experienced by these children who have chronic health conditions. Efforts to address the complex needs of children with chronic health conditions have resulted in added stress upon the public school system and especially the school nurse (SN).

School Nurse-Provider Communication

The safety and academic success of children included under IDEA 2004 rely on optimal SN and primary care provider (PCP) communication. For this reason, communication patterns between SNs and PCPs are of particular interest for this project. The SN functions as the health expert within the public school system and coordinates with PCPs regarding the healthcare needs

of students. IDEA 2004 has revealed the need for effective SN to PCP communication and a need for adequate interdisciplinary teamwork between these two groups. Despite this need, SNs have perceived many barriers that have hindered this communication. Prior research has shown that SNs have felt that they were not included as members of the healthcare team when trying to coordinate care with providers (Guilday, 2014). Furthermore, SNs often have a challenging time communicating with primary providers making it difficult to optimally care for students or adhere to treatment plans made by providers (Nadeau & Toronto, 2015). One recent study showed that around 73% of SNs experienced breakdowns in communication between themselves and providers when trying to care for students with concussions (Wing, Amanullah, & Jacobs, 2015). All of these examples promote the idea that SNs are often unable to communicate with providers at an optimal level, thus placing students at risk for adverse outcomes relating to safety and academic wellbeing.

The Electronic Health Record

SN to PCP communication is further challenged by the lack of technology used in public school systems compared to other healthcare arenas. It is estimated that nearly 25% of SNs within public schools do not have access to electronic health records (EHRs) (NASN, 2014). This is troublesome due to the fact that EHRs act as a means of collecting, sharing and storing health information. These systems are typically connected to larger systems that facilitate communication within a healthcare team. Additionally, most research exploring the usability of the EHR has been focused on acute care settings (Gephart & Carrington, 2015; Gephart, Bristol, Dye, Finley, & Carrington, 2016). This exemplifies a lack of research concerning EHR use in public schools and promotes the idea that this aspect of healthcare needs to be better understood.

In addition to this, it is evident that many school EHR systems do not have the ability to adhere to some of the most-simple tasks relating to meaningful use of the EHR that other healthcare arenas are expected to adhere to. EHR systems should have the capability of electronically exchanging important clinical information among members of the healthcare team (Blumenthal & Tavenner, 2010). Despite this fact, the author was unable to find significant amounts information within the literature stating that SNs had the ability to do this.

The meaningful use of EHRs in the school settings could vastly change the landscape of our healthcare system benefiting students, SNs and providers alike. Giving SNs access to school based EHR systems that are as sophisticated as the EHRs seen in other healthcare arenas could help SNs stay current with continually changing treatment plans relating to their medically complex students. PCPs could greatly benefit from being able to review medication administration and response while students are under the care of the SN (Johnson & Bergren, 2011). Despite these great opportunities to enhance the lives of chronically ill school aged children, the meaningful use of public school EHR systems is outdated compared to other standards of EHR use within the United States healthcare system. This also raises question as to why public schools are not expected to have the same meaningful use standards as other healthcare arenas regarding EHR use and safety.

Problem Statement and Significance

Based on the above, it is evident that communication pathways are often non-existent or greatly diminished between SNs and PCPs, thus threatening the safety and academic success of students who live with chronic health conditions. It is important that SNs have access to recent health treatment plans that are created by PCPs in order to provide the best possible care for their

students. Furthermore, SNs have the ability to provide a wealth of information to PCPs given that that children spend a large amount of time within the school setting (Guilday, 2014). SNs must have the ability to send and receive important information concerning changes in student health status to the PCP in an efficient and secure way. This is important not only for chronically ill children, but all children attending school. Creating quality communication pathways between PCPs and SNs will extend the reach of PCPs into the school setting and result in improved outcomes for students. If communication issues between SNs and PCPs continue to go unchanged, student safety and learning potential will all be at risk.

Local Problem

This quality improvement (QI) project took place in a school district located in an urban southwestern area of Arizona. This district had around 5,200 students actively enrolled during the time of the project and the median household income was roughly $80,000. This district was made up of eight school facilities, one pre-kindergarten, four elementary (grades K-5), two middle schools (grades 6-8), and one high school (grades 9-12).

Within this school district, the superintendent of schools oversaw the district governing board. Each school had one principle and one vice principle that were tasked with coordinating the daily operations of each school. During the time of this project, this district had four full time SNs who cared for all enrolled students. In addition to the SNs practicing within this district, there were six health office assistants that also cared for students. Of the four practicing SNs in this district, one with a bachelor's degree in nursing acted as the district health coordinator and was tasked with overseeing all health related matters within the district. This lead SN ensured that all student health needs were addressed and that each school had adequate SN coverage

during the school day. In order to ensure that each school had coverage, the SNs were expected to provide care for multiple schools within the district at once. For example, one SN was in charge of four different schools and would travel between schools depending on the student's healthcare needs during that particular day. In another instance, one SN was in charge of two schools that neighbored each other and would travel between these schools as needed. When the SN was not within the health office, either a health assistant or office secretary would assume the care of health related needs until the SN could return. As a substitute nurse in this district, the author had cared for children with the following conditions: asthma, severe allergies, anxiety, developmental delay, depression, migraines, concussions, and other congenital defects that required close monitoring and tube feedings. Based on the literature, this makes this school a fair representation of other school districts within the United States.

Though SNs share most of the same day-to-day tasks across the nation as other SN colleagues, there is a great variance as to how SNs communicate with important stakeholders in regards to student health status. In this school district, SNs communicated with other stakeholders using verbal and electronic communication consisting of face-to-face interactions, phone calls, faxing and email. Often times, information from the SN or PCP was relayed through the guardians of students. The typical day-to-day tasks that SNs completed in this district included; ensuring that all immunizations among students were up to date, administering ordered medications, discussing healthcare plans with guardians and students, administering breathing treatments and administering tube feedings. SNs in this district also took vital signs, monitored glucose levels of students with diabetes, discussed healthcare plans with PCPs and educated children on a wide range of topics such as hygiene, diet, sanitation and safety. SNs in this district

also completed many other tasks relating to emergency response for students while they attended school and cared for acutely ill children who presented to the health office on campus with common ailments such as stomach pain, headaches and allergy symptoms. The SNs in this district often cared for multiple children throughout the day who experienced changes in health status that required communication between the SN and other important stakeholders such as guardians and providers. These changes in health status greatly varied from small abrasions to sudden seizures or cardiac related events that required immediate emergency personal response. Furthermore, the SNs in this district often had multiple students that they cared for in their health office at once, thus requiring quick and easy access to health related information.

Purpose and Stakeholders

The purpose of this quality improvement project was to perform a communication system analysis of information sharing patterns between public schools and providers. This project helped provide a foundation for continuing work towards addressing the issues that emerged within this school district. By completing this communication system analysis, more was understood about this important aspect of healthcare that often goes overlooked. The main stakeholders in this area of work are typically SNs, PCPs, students, their guardians, and other office staff including health aids, secretaries and principles. This project helped provide information about the current state of verbal and electronic communication techniques between some of these stakeholders with focus on communication between the SN and PCP.

Study Question

This project was guided by the following question: What is the current process of verbal and electronic communication used between SNs and PCPs for students with chronic illness who

experience a sudden change in their health while being educated in an urban southwest Arizona School district?

THEORETICAL FRAMEWORK

Applying theory into practice enhances clinical decision-making, critical reasoning and problem solving (Reed & Shearer, 2011). By using theory, nurses have an improved ability to conceptualize nursing practice in a systematic way that allows for the better understanding of complex clinical phenomenon existing within healthcare. The application of theory systematically guides quality improvement projects and strategies in order to improve nursing and healthcare thus resulting in improved patient outcomes (Grol, Bosh, Hulscher, Eccles & Wensing, 2007). The theory chosen to guide quality improvement projects should reflect the advanced practice nurse's personal nursing practice and beliefs, help explain the phenomenon of interest and have the ability to support excellent nursing practice (Moran & Burson, 2017).

The Effective Nurse-to-Nurse Communication Framework

For this DNP project, an adaptation of The Effective Nurse-to-Nurse Communication Framework developed by Dr. Carrington was used. This framework encompasses themes from human factors research methods, Symbolic Interaction Theory, Information Theory, Gerbner's Communication Model, and Clinical Events (Carrington, 2012). Each of these themes will be described below.

Symbolic Interaction Theory

Symbolic Interaction Theory assists researchers in better understanding the user of a communication system. This framework can further be broken down into "mind," "self," and "society." The concept of mind suggests that meanings are modified through an interpretive

process as encountered by an individual (Blumer, 1969). In other words, the concept of mind helps explain how an individual interprets their environment (Carrington, 2012). The concept of self helps describe how a particular individual defines himself/herself. This is influenced by factors such as internal pressures, social positions and group affiliations. The concept of society discusses how individuals are influenced by his/her peers through social interactions (Blumer, 1969; Carrington, 2012).

Information Theory

Information theory consists of three different elements, which are the sender, device and receiver. The sender constructs a message that is then sent using the device. This message is then received through use of the device where it can be processed. Other components of Information Theory include entropy (the measure of uncertainty that a message can contain), redundancy (lengthy information that is often received from multiple entries within a documentation system), noise (the possibility for a message to reach a receiver in a state that is difficult for the receiver to understand or for the message to not arrive at all) and probability (the likelihood of specific message being created and its specific subject matter) (Shannon, 1967; Carrington, 2012).

Gerbner's Communication Model

In Gerbner's communication model, information exchange between healthcare professionals begins with an event. This event requires the responder to witness the event and then communicate its happenings to a receiver. The receiver then obtains the message sent to them by the responder and acts on this information in order to continue care for a patient (Gerbner, 1956; Carrington, 2012).

Clinical Events

Clinical Events (CEs) stimulate communication between nurses and are defined as a sudden and unexpected change in patient condition. If not effectively communicated, a CE can become life threatening (Carrington, 2012). CEs are manifested by pain, bleeding, fever, change in output, change in level of consciousness and change in respiratory status (Carrington, 2012).

Application of the Framework

This project used an adaptation of The Effective Nurse-to-Nurse Communication Framework. Effective communication in the public school setting requires multidirectional communication between SNs, PCPs, students and guardians. Communication is ultimately shared in two main directions, information that is sent from the SN to the PCP or information that is sent from the PCP to the SN. For this reason, both the SN and PCP can act as the sender in this adapted framework. Consequently, both the SN and PCP can act as the receiver in this framework as well. The device used in this framework can be composed of electronic and verbal communication pathways. Electronic pathways include email, fax, and school/office EHR systems. Verbal pathways include phone conversations, face-to-face conversations, written notes between stakeholders and information relayed between healthcare professionals through guardians. Communication between stakeholders is usually preceded by a clinical event. For example, if a student were to have a severe asthma attack while at school, the SN would then be prompted to inform the PCP of the attack in order to alter the student's asthma treatment. Inversely, if a student were to see their PCP after experiencing a clinical event such as fever, the PCP would then be prompted to contact the SN with information regarding treatment of the student during school hours. Unfortunately, the communication of said CEs does not always

occur as described in the two examples above. This could be due to a number of reasons and has not been studied in detail to the author's understanding. The entirety of this communication between SNs, providers, parents and students exists within the constructs of Symbolic Interaction Theory where communication systems are influenced by concepts of mind, self and society. This adapted framework can be seen in Figure 1. Notice that the responder can be either the SN or the PCP in this framework. Information is then relayed through means of verbal or electronic communication to the receiver who can also be the SN or the provider. From this information the receiver creates needed changes in treatment, which then results in an outcome experienced by the student.

The following figure is adapted from The Effective Nurse-to-Nurse Communication Framework (Huffaker, n.d.).

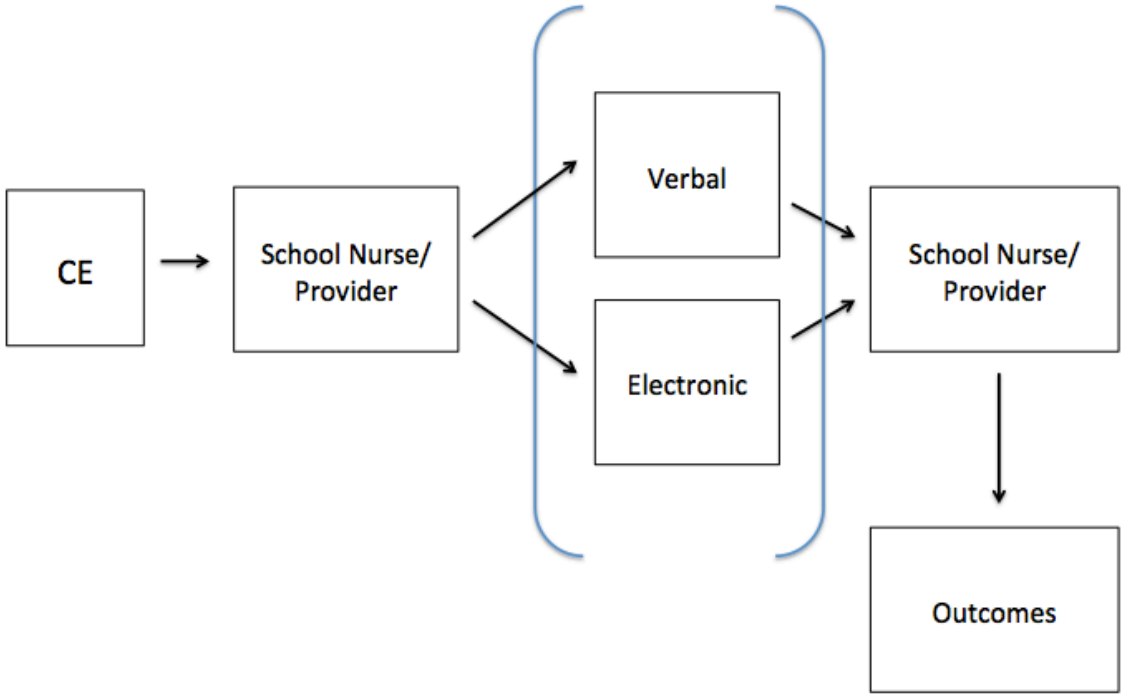

FIGURE 1. Adaptation of The Effective Nurse-to-Nurse Communication Framework.

SYNTHESIS OF EVIDENCE

PubMed, Chochrane Library and Embase search engines were used to explore current information that exists around communication pathways between SNs and providers. The following search terms were used: school electronic health record, EHR, electronic school health record, SN provider communication, SN communication, school health and school based EHR. No relevant articles were found using the Embase search engine and one relevant article was found using Chochrane Library. Most articles were identified using the MeSH function within PubMed. When completing the initial search limiting all articles to within five years, 17 potential resources were made available, three of which were useful. After these three articles were discovered, the 'similar articles' function was used in PubMed to find the remaining sources.

Findings

After completing this search, it was concluded that little research has been done that specifically studied communication pathways between SNs and primary care providers (Volkman & Hillemeier, 2008). Having stated this, there was a wealth of information that discussed the importance of strong communication pathways in the healthcare setting. Furthermore, there has been significant research into the EHR and its potential benefits and shortcomings. The evidence that was discovered during this search process is discussed in further detail and is categorized into themes that relate to this topic.

Communication Pathways

A multitude of researchers and healthcare professionals agree that there is a strong need for effective communication pathways to exist between healthcare providers in order for safe and efficient care to be carried out for patients. These communication pathways should include

various stakeholders that relate to this subject such as SNs, PCPs, patients and their families (Cowell, 2013; AADE, 2012; Johnson, Bergren, & Westbrook, 2012, Guilday, 2014; Foley, Dunbar, & Clancy, 2014).

In addition to the information discovered during this synthesis of evidence pertaining to general communication in healthcare, one pertinent qualitative study was identified that focused on information exchange in the school setting. Through the use of focus groups, this study found that there was often no uniform procedure in which schools exchanged health information with primary care providers. This lead to the loss of important information that was needed to properly care for children while they attended school (Egginton et al., 2012).

Teamwork and Interdisciplinary Teams

SNs should be viewed as valuable members of the healthcare team and assist students with day-to-day health needs within the school setting. This is in part due to the fact that students spend significant amounts of time in the school setting underneath the care of SNs (Bruzzese et al., 2006; Anderson, 2013). Despite the obvious ability for SNs to greatly assist with student care and health management, many SNs feel as though they are not utilized to the best of their abilities. Furthermore, some SNs feel as though they are not recognized as part of the healthcare team (Guilday, 2014). SNs perceived that they did not have the needed information to care for children with chronic health conditions due to the fact that they were not informed about the changes in treatment plans created by PCPs (Guilday, 2014; Svavarsdottir et al., 2012). In addition to this, reaching primary care providers was difficult for SNs and very time consuming (Svavarsdottir et al., 2012; Radis, Updegrove, Somsel, & Crowley, 2016). Communication was further hindered by the need for parental consent in order for the SN to speak with the child's

PCPs (Liberatos et al, 2013). These barriers greatly diminished the SN's ability to provide optimal care for students who suffered from chronic health conditions.

Need for a National Standardized Dataset

A multitude of authors in this field believe that it would be beneficial for a national standardized dataset to be available that would host health data gained by SNs. It is thought that this dataset would increase interdisciplinary communication and care coordination while also improving research abilities relating to this population. This dataset would be created through the use of EHR systems within the school setting. Furthermore, it is believed that a dataset such as the one discussed above would allow quality research to be conducted that encompassed current health trends throughout all geographical areas of the United States (Johnson, Bergren, & Westbrook, 2012; Patrick et al., 2014; Gapinski & Sheetz, 2014).

Chronic Conditions and Students

The number of students with chronic health conditions has been steadily increasing. This brings health related needs into the classroom, which results in implications for learning. In 2002 to 2008 the percentage of children in special education programs or with chronic or acute health problems increased by around 60%. Some sources state that around 18% of children that are younger than the age of 18 currently have at least one special health care need (National Center for Education Statistics, 2011). SNs and primary care providers are seeking support in order to provide quality care that encompasses the complex care requirements needed for these students while they attend school (Anderson, 2013). These complex needs and chronic health conditions put these children at a significant health risk and could have damaging impacts for these students academically.

School Electronic Health Records

Various position statements have been made discussing the importance of school based EHR systems. These position statements have discussed the benefits of their use, which include better patient outcomes and increased communication between stakeholders (NASN, 2014; Hiltz et al., 2014; Guilday, 2014). Despite this, little research has been conducted in regards to school EHRs. Much of the research that has been conducted relating to this topic has been done in acute care settings (Gephart & Carrington, 2015; Gephart, Bristol, Dye, Finley, & Carrington, 2016). Furthermore, a lack of ability for SNs to access student's EHRs also has a negative impact on primary care offices due to the fact that SNs tend to overwhelm primary care offices with requests relating to student health information (Radis et al., 2016). Generally speaking, SNs often face many barriers when trying to obtain students' health related information.

Gaps in Knowledge

After completing this synthesis of evidence, it was very clear that there is a lack of information pertaining to current communication pathways between SNs and PCPs. In addition to this, little information regarding the strengths and weaknesses of school EHRs is available. This exemplifies the idea that more work needs to be done in this area of healthcare in order to create better health and academic outcomes for school aged children. No articles were found that discussed the perceptions of students or their guardians in relation to the exchange of health related information. This quality improvement project was conducted in order to fill some of these gaps relating to SN-PCP communication within the public school setting.

METHODS

This project used an adapted content analysis and semi-structured interview questions to conduct a system analysis of the current state of SN to PCP communication. The purpose of this quality improvement project was to perform a communication system analysis of information sharing patterns between public schools and providers. This project was guided by the following question: What is the current process of verbal and electronic communication used between SNs and PCPs for students with chronic illness who experience a sudden change in their health while being educated in an urban southwest Arizona School district? To accomplish this QI project, the following plan was completed.

Project Plan and Recruitment Process

The author first contacted the Assistant Superintended and Special Services Director of the school district in which this projected was conducted. From this, the author submitted a formal application that discussed the purposes, benefits, risks and methods regarding this work. After the Assistant Superintended and Special Services Director reviewed and approved the project application, a site authority letter was issued by the district that agreed to the terms that had been discussed in the application (See Appendix A for an example of this site authority letter). After approval was granted from the school district, the author then submitted a Determination of Human Research form through The University of Arizona Institutional Review Board. This project was determined to be non-human research and the author was given permission to proceed with this project from The University of Arizona Institutional Review Board (See Appendix B for an example of this Determination of Human Research form). The author then contacted the head SN of the district via email and informed her that the project had

been approved and that data collection could commence immediately. The author created an email that contained a brief synopsis of the purposes, benefits, risks and methods that related to the project. This email was first sent to the head SN in order to gain her approval and to further inform her about the project. After the head SN had reviewed the email she forwarded its contents to the SNs practicing within the district. (Please see Appendix C for an example of this email.) After each participant agreed to enroll in the study, the author contacted each participant via telephone in order to answer any questions that the participants had regarding the project. After all questions had been answered at an individual level the time and location in which each interview would take place was agreed upon. Simultaneously, local primary care offices were contacted with the use of a flyer that contained information regarding the project. (Please see an example of this recruitment flyer in Appendix D.) These primary care office locations were identified using a Google Maps search, with the search terms "pediatricians" and "pediatric." The author traveled via personal car to each primary care office and presented the flyer seen in Appendix D to each location. While the author was at each PCP location, a brief explanation of the project was given to the secretary who was then asked to give flyer to either the provider/s or practice manager.

Setting and Data Collection

This project was conducted in a school district located in southern Arizona. During the data collection phase of this project, the district was home to over 5,200 students and was made up of eight different school facilities. One of these facilities was a pre-kindergarten school, four of these facilities were elementary schools (grades K-5), two of these facilities were middle schools (grades 6-8) and one of these facilities was a high school (grades 9-12). Four full time

SNs worked in this district and had the responsibility of caring for all enrolled students. These SNs had the help of six health assistants that also worked in the district. These health assistants either worked directly alongside the SNs or by themselves depending on the students' needs at each school and depending on the SNs' availability on a day-to-day basis. Student needs changed daily and often required the SNs to rotate between schools as needed.

The author conducted face-to-face interviews with project participants at the locations in which each participant was employed. (See Appendix E for interview questions.) Each interview was held of the convenience of the participant. Before interviewing each participant, the author reminded them that they could stop participating in the project at any time without consequence. They were also informed that there was no right or wrong answer to the interview questions being asked to them. Each participant was also reminded to avoid discussing any personal or identifiable information about themselves, students, or other colleagues during each interview. Before conducting each interview, the participant first signed a consent form in order to participate in the study. (Please see Appendix D for an example of the consent form that was used.) Each interview consisted of semi-structured questions that were digitally recorded. During the interview process, the author took hand written notes that included simple observations and thoughts relating to each interview in order to capture information that was not well captured through these recordings. Each interview lasted approximately 25-30 minutes. During each interview, the digital recording needed to be stopped multiple times in order for the SN to see students as they presented to the health office with health related needs. No PCPs agreed to participate in this project; therefore, all interviews were done with SNs at the schools in which they worked.

Participants

Intended participants included SNs and PCPs that had been actively working in their current position for no less than six months. It was the author's goal to have at least three SNs and three PCPs participate in the project. All SNs practicing in the school district were contacted and invited to participate in the project. From these SNs, three had been working in their current position long enough to be eligible for participation. No PCPs agreed to participate in this project. From the four SNs practicing in this district, three SNs were eligible to partake in the interview process. All three of the eligible SNs enrolled in this project.

The stakeholders being focused on in this project included SNs and PCPs. Students and their guardians were intentionally excluded at this time for a number of reasons. One, little research has been conducted in this area of work and the author wanted to better understand the perceptions of health professionals within this setting before including students and their guardians. Two, The Effective Nurse-to-Nurse Communication Framework discusses the exchange of information between two healthcare professionals. For this reason, the author believed that it was fitting to adhere to this model and include only SNs and PCPs at this time. Three, because children are considered a vulnerable population group, the author wanted to better understand this area of work before including them. The author would like to make note that future QI projects related to this topic of interest will include students and their parents. The author understands that these two stakeholder groups play an important role in the exchange of health data and is interested in better understanding their significance in future work.

Timeline and Project Budget

There was no compensation for participants of this project. Furthermore, the author already had the equipment needed to conduct all aspects of this project. For these reasons no significant amount of money was invested into this work.

The author defended this project proposal in September of 2017. Approval to conduct this project was given by the school district in November of 2017. The University of Arizona Institutional Review Board granted the author permission to conduct this project in November of 2017. Data was then collected, transcribed and annotated in late November and early December of 2017.

Tools for Data Collection

A digital recorder and micro SD card were used for recording interviews. Data was then transferred from the micro SD card to the author's computer. Microsoft word was the platform used for transcribing data. This data was then printed and annotated upon by hand. All data was de-identified at the point of transcription and no sensitive health information was saved onto the computer of the author. A simple notepad and pen was used for note taking during each interview. After data annotation had occurred and meaningful themes were identified, all data was destroyed by means of shredding. The personal car of the author was used as means of transportation for dropping informational flyers off at each PCP location and for traveling to the locations of each interview.

Data Analysis

An adapted content analysis was used to seek commonalities and create categories of common themes from the transcribed data and hand-written notes created by the interview

process. This approach to data analysis is appropriate for QI projects because it assists in better understanding phenomenon within practice. One advantage of this method of analysis, like traditional content analysis, is that information is gained directly from the study participants, rather than imposing preconceived categories or perspectives (Hsieh & Shannon, 2005). Each interview transcription was read word-by-word and themes were identified and categorized into meaningful groups. During this time, notes about the text were made regarding initial impressions, thoughts and analysis of data. From this data themes emerged and were grouped accordingly. Some of these groups were then broken down into subgroups. Relevant research findings are addressed further in the discussion section of this work. From the information gained in this QI project, the author made recommendations that will increase effective communication between stakeholders and reduce absenteeism for children with chronic health conditions who experience a change in health status. These recommendations are located within the discussion section of this paper.

Ethical Considerations

Ethical knowledge helps provide QI leaders with insight into areas that should and should not be studied. Furthermore, ethical knowledge requires QI leaders to have the ability to examine what is acceptable and desirable in different healthcare related situations (Moran & Burson, 2017). When conducting research, it is vital for ethics to be considered while creating the proposal and during the implementation of any QI project. Because of this, it is the duty of the Doctor of Nursing Practice (DNP) student to conduct themselves and their QI project at the highest possible ethical level in order to protect participants from harm and to ensure quality outcomes. During this project, the author strived to keep these fundamental notions concerning

ethics in mind. Three main ethical principles that should be focused on when creating the proposal of a DNP project are respect for persons, beneficence and justice. The author will discuss how these principles relate to this DNP project.

Respect for Persons

To ensure respect for persons during this project, the author informed all stakeholders about the research in which they were participating. The author also informed participants of the potential risks and benefits of participating in this project. In this case, there were no expected risks for participating in the QI project. Furthermore, there were no expected risks for the school district or PCPs that were asked to participate in this project. The author ensured that participants were aware that they could discontinue being in the project at any moment without consequence.

Beneficence

In order to meet the principle of beneficence during the conduction of this QI project, the author respected the decisions made by participants and had the welfare of the participant in mind during all phases of this work. Furthermore, the author did not place participants in any potential harm. Lastly, the author strived to ensure that no data could be used to harm the employment status of the person being interviewed.

Justice

It was unlikely that the principle of justice would be put at risk during this quality improvement project. No conceivable harm or discomfort was placed on participants. For this reason, there was no burden to be distributed among participants. The author would like to note that a vulnerable population, school aged children, was intentionally excluded while conducting this QI project

RESULTS

Here the author presents the results of the quality improvement project that sought to perform a communication system analysis of information sharing patterns between SNs and PCPs. This quality improvement project was guided by the question: What is the current process of verbal and electronic communication used between SNs and PCPs for students with chronic illness who experience a sudden change in their health while being educated in an urban southwest Arizona School district? The project was conducted as described in the methods section using semi-structured interviews and data was organized by demographics of the participating SNs and PCPs

Demographics

Three of the four practicing SNs in this school district were eligible to participate in this quality improvement project. The SN that was not eligible to participate had been practicing in her current position for less than six months and was therefore unable to partake in the interview process. All three of the eligible SNs agreed to participate in the interview process. Of these three SNs, two had their bachelors in nursing. The other SN participant had gained her school nurse certificate after having first been trained outside of the United States. No PCP agreed to partake in this project and the author was not contacted by any PCP location regarding questions about the project details. The average amount of time spent practicing as a SN among project participants was 12.3 years and the average amount of time spent practicing in this district was 9.8 years. These SN participants routinely care for a wide range of students ranging from preschoolers to 12th graders.

Data Collection Process

Each interview lasted approximately 25-30 minutes which longer that what the author had expected. Hand written notes were taken each time the author perceived something that would be hard to distinguish in the digitally recoding interviews. Overall, very few hand written notes were taken during each interview and most of the information gained was from the content discussed during the digitally recorded interviews. The notes that were taken during each interview were due to frequent interruptions during the recordings. Notable information regarding SN-PCP communication has been categorized into the following groups and sub-groups and is discussed in greater detail below.

School Nurse-to-Provider Communication Pathways

Information existing within this group can be broken down further into two sub-groups; "Guarding Gatekeepers" and "Availability of Information." In this school district most student-related health information was transferred between the SN and PCP using fax, email, or written notes. Additionally, communication between SNs and PCPs occurs over telephone and face-to-face conversations within this district. In general, information that is exchanged between SNs and PCPs originates with the PCP and is then relayed to the SN using the pathways discussed above. Each SN placed emphasis on the reality that guardians often act as an information sharing hubs that regulate the exchange of health data between SNs and PCPs. No SN discussed that there was a specific protocol that was followed when exchanging health information between stakeholders. Rather, much of the information that was relayed between SNs and PCPs was regulated by what the student's guardians deemed important or what they wanted to share between healthcare professionals.

Guardian Gatekeepers

One SN that participated in this project discussed that the guardians of students have the ability to regulate the information that is exchanged between SNs and PCPs. This is possible for a number of reasons. One, in order for the SN to access information directly from PCP offices, the guardian must first give permission for their child's health data to be shared with other healthcare providers. This is true weather that data is originating with the PCP or the SN. Two, the school electronic health record (EHR) used in this district does not have the ability to communicate with EHR systems that are external to that of the EHR system used in this district. As a result, the guardians within this school district have the ability to regulate the amount and type of information that is shared among SNs and PCPs. One SN discussed that guardians in this area are affluent and enjoy being in control of their children's health. Two of the SNs discussed the idea that guardians sometimes un-intentionally fail to report important health related information to the SN that originates with the PCP due to their lack of healthcare experience or expertise. Two of the SNs discussed that guardians sometimes intentionally withhold information that is intended to be shared between the SN and PCP. One SN gave the example that some guardians intentionally fail to inform the SN regarding the start of medications if they as the guardian do not want to take the time to fill out the proper paperwork needed to have their child take a medication while at school.

Availability of Information

Despite the fact that guardians sometimes act as gatekeepers that regulate information transfer between SNs and PCPs, two of the three SNs reported that it is typically not difficult to obtain student health information created by PCPs. The other SN stated that information

exchange is mainly dependent on the provider as to how willing they are to share information with SNs. This willingness can be affected by the PCP forgetting to ask the guardian to allow the sharing of health information, or by the PCP not understanding that sharing health related information with the SN is important. Two of three participants discussed that the PCP rarely requested information from them as the SN. One SN discussed that this was due to the reality that children with chronic health conditions often have technological devices that they use for managing their health status. One example that a SN gave was that students with diabetes have access to continuous glucose monitoring machines which have the ability record keep and digitally store blood sugar levels without the need for SNs to obtain this health related data in order to relay it to the PCP. Furthermore, all the participating SNs discussed that they often have to create personal treatment plans for students with chronic health conditions due to the fact that there are not already treatment plans put in place by the PCP.

These treatment plans are often created using information given to the students by their PCP along with information from national guidelines. Sources used by these SNs to supplement information given to them by PCPs include content from the American Diabetes Association and the National Epilepsy Foundation. One SN discussed that some providers are reluctant to sign treatment plans that are created by the SNs for students with chronic conditions. This particular SN discussed that this sometimes occurs with treatment plans that are created for students with seizure disorders. This SN discussed that she has requested for treatment plans to be signed by the student's neurologist only for them to be denied. This SN believes that PCPs or neurologists are hesitant to sign treatment plans because they do not want to assume responsibility for the

students while they are at school and when they are under the care of a different healthcare professional.

High Acuity Health Conditions

Two out of the three SNs participants discussed that they care for students with a wide range of complex health needs such as seizure disorders, psychological conditions, asthma, diabetes, allergies and conditions that require the management of tube feedings. One SN discussed that students sometimes struggle with their chronic health conditions to the point that they miss a considerable amount of time in school or that they have to enroll in home school due to the worsening of health related complications. Additionally, this SN discussed the idea that there have been instances where the PCP was unaware of the student's declining health condition while they were enrolled in school. This was due to guardians of students who would fail to take their child to their PCP office. This is further complicated by the SN often not having the ability to contact the PCP about the student's worsening condition due to the fact that the parents had not signed a student health information release form.

School Resources and Time Constraints

One SN discussed how time constraints could be a leading contributor to failed communication between themselves and PCPs. This SN discussed how it is difficult to find the time to speak with PCPs about students when she is also tasked with caring for children at multiple school locations. Two of the participating SNs discussed they that they often have to travel between multiple schools during the day to care for students. This is required from the SNs because the school district has had a difficult time hiring new SNs to fill available positions. This is mainly a result of poor monetary compensation that is offered to the newly hired SNs. Because

the there is such a shortage of SNs, resources tend to be spread thin at each school. Because of this, health office assistants and office staff members are required to aid the SNs with their patient loads during times they are practicing outside of the health office at other school locations. One SN discussed that this presents a problem for a number of reasons, the biggest being that health assistants working in the district have very little formal education relating to healthcare related practices. As a result, some of the health assistants have a difficult time adhering to treatment plans created by PCPs and have given incorrect medication dosages because of their lack of formal training.

School Electronic Health Record

Each SN participant discussed the strengths and weakness relating to the school EHR system available in their district. Each participant had positive perceptions relating the use of an EHR system in a public school setting. This group can further be broken down in the two sub-groups as discussed below.

School electronic health record strengths. The SNs agree that using the school EHR is important to their practice as a SN. Furthermore, the SNs agree that the school EHR that they use does an adequate job at helping them perform health related tasks that they are required to complete as a SN. The SN participants agree that using the school EHR improves their practice abilities as a SN. All three SNs also discussed that their school EHR system allows them to quickly access health related data if needed regarding student's previous health office visits. From the student data within the EHR system, the SNs are able to print reports regarding specific health related information. For example, two of SN discussed that they find their school EHR helpful because it allows them to easily access information regarding specific students and their

health related trends. The SNs uses their EHR system in order to better understand how often students report to the health office which allows the SNs to make appropriate interventions for students whether that it involves informing guardians about the overuse of the health office or by helping the SN come to the conclusion that a particular student needs to visit their PCP for CEs relating to unmanaged chronic health conditions.

School electronic health record weaknesses. Though the EHR is relatively well liked among the SNs, all participants within this project discussed that the EHR system does not provide an area in which they can easily document medication administration. Though a function does exist within the EHR system that allows the SNs to report medication administration, the SNs discussed that that their district information technology (IT) department had not given them access to this section of the EHR. As a result, all of the participants discussed that they have to double chart their medications administration by stating that a medication was given in an EHR health office visit note and in a paper medication administration log.

The SNs also felt that the district IT department unintentionally created barriers that hindered the optimal use of the school district EHR system. One SN discussed that there used to be an employee in the IT department that was very good at trouble shooting problems relating to the EHR. Unfortunately, this person was never replaced by another employee that could adequately fulfill her role as the EHR expert. This resulted in questions not being answered relating to EHR concerns or needs. Each participant also agreed that their school EHR did not have the ability to communicate with external EHRs. Furthermore, the SNs discussed that they typically did not have access to other providers' EHRs. One study participant did discuss that a concussion specialist in town would send web address that provided access to treatment plans,

assessments and exam notes for students who attended their clinic if the guardians had first signed a health information release form that gave access to the SN to review student health data. This SN was excited that she was able to see the provider's notes and thought that this system of information exchange between herself and the specialist was productive and a good example of how communication should occur between the SN and PCPs.

School Nurse Beliefs

The SNs agreed that communication between themselves and PCPs was important to their practice as SNs. One SN explained that "*communication with PCPs is like gold.*" One of the participants believed that there were no major issues regarding communication between SNs and PCPs within her district. The other two participants acknowledged that communication problems did exist between SNs and PCPs and that gaining access to treatment plans for students with chronic health conditions is sometimes difficult and appears to be specific to each student's PCP or guardians.

Additionally, perceptions as to whether or not the SNs felt as though they were a part of the healthcare team were widely variable. One of the participants explicitly stated that she did not feel like she was part the healthcare team while another participant stated that she did feel as though she was part of the healthcare team. The remaining participant stated that her feelings as to whether or not she was part of the healthcare team greatly relied on the provider that she was communicating with at any given time. When discussing ways in which communication with the PCP could be improved upon, two of the study participants stated they thought it would be beneficial to have a function in which the SNs were able to meet the PCPs in person. One of the participants eluded that this may increase camaraderie between the two groups whereas the other

thought it would be a good opportunity to inform the PCPs that the SN needs information regarding changes in treatment plans each time a significant change occurs regarding the health status of a student. Lastly, none of the study participants believed it would be beneficial for a school EHR system to be created that would allow for the exchange and aggregation of health related data on a national level or between other EHR systems. One SN stated that she is unsure of what benefit a school EHR such as the one described would have. This same SN also stated that she thought it was "*weird*" for data to be able to be shared across EHR platforms or across state lines. The other two SNs discussed that they think it is more fitting for the health department to inform them of disease trends instead of using an EHR system to help them with this.

Clinical Events

CEs are manifested by pain, bleeding, fever, change in output, change in level of consciousness and change in respiratory status (Carrington, 2012). When the SNs were asked if they would be able to directly contact the PCP if a student were having a CE while at school, two of the SNs discussed that they would most likely not call the PCP in an emergency situation. These SNs discussed that if a patient were experiencing a CE, SNs would most likely call 911 or the guardian of the student before contacting the PCP. If the student were experiencing a CE that was not an emergency, one SN stressed they would inform the student's guardians regarding the change in condition. All three SNs stressed that communication regarding treatment plans and changes in condition typically went through the guardians of students unless they had previously received a student health information release form. One of the SNs discussed that she typically only feels obligated to directly contact a student's PCP if the student has no guardians and lives

in a group home. Lastly, all three SNs used three ring binders that housed every student's health history form. This form is filled out by the guardians of students before each school year. This form contains information relating to student health conditions, prescribed medications and guardian contact information. In other words, each SN still relies on paper charting as a supplement to the EHR for obtaining student health information during times where information is needed quickly as exemplified by CEs.

Quality Improvement Question

The question guiding this quality improvement project was 'What is the current process of verbal and electronic communication used between SNs and PCPs for students with chronic illness who experience a sudden change in their health while being educated in an urban southwest Arizona School district?' This question can now be answered as follows.

In this school district verbal and electronic communication pathways between SNs and PCPs occurs through the use of many information sharing channels. These channels include face-to-face communication, telephone conversations, email and fax. Furthermore, the guardians of students are often tasked with exchanging information between healthcare professionals. In this district the SNs stressed that most communication between SNs and PCPs in done through the guardians. In one instance, one of the SNs discussed that she had access to a patient portal that had been made available by a concussion specialist regarding student health information. This was the only example given by the SNs that discussed an ability to retrieve information from an EHR system other than their own. Most of the communication that occurs between the SN and PCP originates with the PCP. This can be attributed to a number of reasons. One, if a CE occurs while at school the SNs typically contact emergency personal or the guardians of students rather

than the PCP. Two, some healthcare related technology is being used for data collection which sometimes omits the need for the PCP to contact the SN directly regarding the health status of students. Regardless of the matter, communication patterns vary greatly from instance to instance depending on the actions of the guardians and depending on the specific PCP being communicated with. Lastly, the guardians often act as gatekeepers that regulate the exchanging of information between SNs and PCPs. Because the EHR system in this district is unable to communicate with outside EHR systems, it typically acts as a data collection device rather than a data collection and communication device.

DISCUSSION

With the creation of IDEA 2004, the landscape of our healthcare and education system greatly changed. As a result, healthcare borders were extended into the public school system. IDEA 2004 greatly improved the lives of millions of school-aged students by integrating children with chronic health conditions into the public school system in ways that had not been possible in the past. These students who are now able to participate in the public school system suffer from a number of chronic health conditions including seizure disorders, diabetes, congenital birth defects, psychological problems, social problems, asthma, severe allergies, and cancer. Though the integration of students with complex chronic health conditions into public schools was beneficial in many ways, it did result in extra stress and burden that is now placed on SNs and the districts in which they practice. The academic success and overall wellbeing of children with chronic health conditions attending public schools depends on the ability for SNs to adequately care for children and their healthcare needs. In order to properly care for these students, efficient communication is required between SNs and PCPs. Traditionally, very little

research has been conducted in regards to communication patterns between SNs and PCPs. Through completing this project, more is now understood regarding verbal and electronic communication pathways between SNs and PCPs for students with chronic health conditions. Through gaining this information, students will hopefully have the ability to receive safer care while attending school which will decrease the time they spend away from the academic setting due to improperly managed health conditions.

Communication Pathways

It is well accepted by healthcare professionals that effective communication pathways need to exist between healthcare professionals in order for patients to experience optimal healthcare results (Cowell, 2013; AADE, 2012; Johnson, Bergren, & Westbrook, 2012, Guilday, 2014; Foley, Dunbar, & Clancy, 2014). This project helped confirm that healthcare professionals believe that strong communication pathways are needed to properly care for patients, or in the case students with chronic health conditions. Every participant in this project agreed that strong communication pathways are needed to exist between themselves and other healthcare providers in order to provide safe care for students. Even though this was an expected finding, this is significant in that it further confirms the idea that adequate communication is needed in the public school setting in order to care for students and their chronic healthcare needs. Furthermore, through conducting this project it was discovered that there was no set procedure in which information was shared between SNs and PCPs within in this school district. This was an expected finding and is consistent with research that has been done in this area of healthcare. Because there is no set method for exchanging health related data between SNs and PCPs, guardians have the ability to be selective as to what they share between SNs and PCPs. This can

make it difficult for SNs to care for children with chronic health conditions, especially if they experience a CE while attending school and need access to current treatment plans. Furthermore, the exchange of health related information is hindered by the fact that SNs must first receive permission from the parent in order to access health related information from the PCP. This is significant in that healthcare information is typically exchanged relatively easily among healthcare professionals in other settings.

Teamwork and Interdisciplinary Teams

Our nation's children spend a large portion of their day in school, therefore, SNs should be viewed as valuable members of the healthcare team assisting students with day-to-day health needs within the school setting (Bruzzese et al., 2006; Anderson, 2013). This was confirmed through this quality improvement project. SNs often care for students with complex chronic health conditions on a day-to-day basis within their health offices. This quality improvement project provided insight into the process used by SNs when coordinating care for children with chronic conditions. In the past SNs, have often felt as though they are not included in the healthcare team (Guilday, 2014). This was evident by SNs often feeling that they were not informed of changed treatment plans for students with chronic health conditions (Guilday, 2014; Svavarsdottier et al., 2014). It was unexpected to see that the SNs in this district had mixed feelings as to whether or not they felt as though they were part of the healthcare team. This suggests that feelings regarding this topic are dependent on a multitude of factors such as the personal beliefs of the SN regarding their role, the perspective of the PCP to include the SN in the communication process, and the link between the parent or guardian and healthcare professionals.

An unexpected finding was that one of the SNs in this project believed that there were no significant issues regarding communication patterns between herself and PCPs. This finding was significant because it contradicted what other SNs in this district were experiencing. In addition to this, it contradicted what other SNs across that nation have experienced.

Another significant finding is that no PCPs agreed to participate in this quality improvement project. At this time, it is unknown as to why none of the PCPs agreed to partake in this project. It could be the result of a number of reasons such as PCP disinterest in the subject or simply that they feel they are too busy to sit for an interview with a student. Regardless of the reason, the PCPs within this district did not participate in this project which limited the authors ability to understand the PCPs perceptions and needs regarding this area of work. This presents a large issue when trying to gain a full understanding of the verbal and electronic communication patterns between SNs and PCPs.

National Standardized Data and Communication between Systems

Suggestions in the past have been made by leading SNs regarding ways to improve communication pathways between healthcare professionals who care for children attending public schools. Some of these SNs feel that it would be beneficial to have a national standardized dataset that would aggregate important information relating to healthcare trends among students. It is believed that this would increases the SN's ability to care for students with chronic health needs while also improving communication between SNs and other healthcare professionals (Johnson, Bergren & Westbrook, 2012; Patrick et al., 2014; Gapinski & Sheetz, 2014). From completing this project, it was identified that the SNs within this district do not believe that it would be beneficial to have this type of data available for their use in practice. Furthermore, the

SNs in this district did not see benefit in having an EHR system that could communicate with external EHR systems. This is significant because most healthcare arenas are moving towards improving sharing capabilities between healthcare professionals. This was an unexpected finding and suggests that SNs have become accustomed to some of the limitations they face regarding their abilities to send and receive student health information. At this point, it is unclear why this is the case. This also raises the question if healthcare professionals are using SNs and their expertise to their full potential. SNs spend a significant amount of time caring for children with complex health needs. Despite this, it seems as though PCPs are not using SNs to their full advantages. Lastly, it is worth mentioning that one SNs did express that she enjoyed having the ability to access treatment plans, assessments and exams of a specialty provider in the area. Perhaps the system that this specialty provider used could be used as a template in future efforts for increasing SN and PCP communication.

Student Acuity and Health Related Needs

Two of the three SNs interviewed in this projected discussed that they care for students that have a wide array of chronic health conditions and who are medically complex thus requiring active participation in order to achieve desired health outcomes. This was an expected finding and is consistent with the healthcare trends that are experienced by other SNs across the United States. This finding is significant in that it further promotes the idea that SNs care for complex students on a daily basis and require optimal communication pathways between themselves and the PCP. Through conducting this project, it was also confirmed that children with chronic healthcare needs are at risk for missing time spent in the academic setting. Missed time spent in school could be devastating to the academic progression and overall development

of students. This finding was expected and significant in that it provides more examples relating to how chronic health conditions can have devastating impacts on a student's well-being if left unmanaged.

School Electronic Health Records

The National Association of School Nurses along with other authors concerned with school nursing have made multiple position statements that have discussed the importance of using school EHRs in daily practice (NASN, 2014; Hiltz et al., 2014; Guilday, 2014). Despite this, seemingly little research has been done relating to how EHRs are used the school setting. Furthermore, gaps exist pertaining to the understanding of SN's perceived strengths and weakness of school based EHR systems and their ability to enhance communication. This project helped fill some of these knowledge gaps. Though it is unclear as to how many other school districts across the United States uses the same platform as the SNs in this district, it did depict some of the strengths and weakness that could be perceived by SNs using school based EHR systems while caring for children with chronic health conditions. Through conducting this project, it was discovered that the SNs in this district believed that using a school based EHR system is important and that they benefit their practice as a SN. In addition to this, it was confirmed that using a school based EHR system helped SNs access previously entered health related data. This project also confirmed that SNs often do not have access to external EHRs and that their EHR system does not have to ability to communicate with external EHR systems outside the boundaries of the school district. These findings were expected and are significant because it exemplifies that important information is gathered and entered into the school EHR by SNs but is never used by other healthcare professionals such as the PCP. SNs have the ability to

provide a wealth of information to PCPs but the information they obtain is rarely used to its fullest potential.

Recommendations for Improving Communication

From conducting this project, the author was able to better understand some of the strengths and weakness regarding communication between SNs and PCPs. This project helped identify some of the main issues that SNs experience relating to communication when providing care for children with chronic health conditions. In order to improve communication between SNs and PCPs, providers first need to understand that SNs are an important aspect of the healthcare team. Furthermore, it is important that PCPs understand that SNs require specific information for treatment plans regarding students with chronic health conditions. Two of the SNs suggested setting up a social function in which they could meet PCPs and get to know them better as professionals. The author believes that this could be beneficial and could assist PCPs in becoming more aware of the needs of the SNs. In addition to this, it is believed by the author that this could promote PCPs to use information gained by the SN in order to help guide their patient care. At this function, the PCPs could be informed about some of the healthcare forms that the SN needs to properly care for their students. In addition to this the author believes that it would be beneficial for the school district to send information to local PCPs that specifically discusses the health information that is required for each student to safely participate in daily school activities. The author hopes that this would prompt PCPs to have a discussion with guardians during wellness visits about some of the needs of the SN. Lastly, the author believes that communication and the carrying out of student treatment plans would be improved upon if more registered nurses practiced within this school district. The author is aware that this may not be

easily feasible but thinks that by hiring more SNs, students would be better cared for. By doing this, the SNs practicing in this district would hopefully have more time that they could use to communicate more efficiently with PCPs in the area.

At the national level, it would be beneficial for more research in this area to be conducted to better understand communication between SNs and PCPs. Additionally, even the though the SNs in this district did not believe that it would be beneficial to have EHRs that could communicate past their current abilities, the author believes that it would be beneficial for SNs and PCPs to have better access to each other's work. More specifically, the author believes that it would be beneficial for all healthcare professionals to have access to an EHR system that would allow all healthcare professionals to easily communicate with each other using one platform. This platform would allow the sharing of health information across all healthcare arenas such as PCP offices, school districts, community health offices and the acute hospital setting.

Theory

An adaptation of The Effective Nurse-to-Nurse Communication Framework developed by Carrington (2012) was used to help guide this project. In this adapted framework, multidirectional communication between SNs and PCPs is acknowledged. Both the nurse and the PCP act as the sender in this adapted framework. Consequently, both the nurse and PCP can act as the receiver as well. This framework adequately represented how information is exchanged between healthcare professionals using verbal and electronic communication pathways. Typically, students experience a change in condition while at school or within the community. When this change in condition requires a healthcare provider's intervention as seen with CEs, the student reports to the school health office or their PCP's office. Either the SN or PCP identifies

the current problem/s then uses verbal or electronic avenues of communication to inform the other healthcare provider regarding the change in student condition, which is then used to guide the receiver's practice. This adapted framework was appropriate to use in this DNP project and adequately depicted the exchange of heath related information between SNs and PCPs.

Project Limitations

One of the largest limitations from this work is that it failed to gather information regarding the perceptions of PCPs and how they communicate with SNs. PCPs are an important stakeholder in this area of healthcare and it would have been valuable to gain more insight into how they perceive their role. Understanding the PCPs beliefs relating to this area would have been very valuable in making recommendations on ways to improve SN and PCP communication. Because there was no PCP involvement in this project, the information gained is incomplete. Furthermore, this project lacks information regarding the perceptions of parents and students who also act as important stakeholders in this arena.

Project Strengths

Past research has been conducted that analyzes SN to PCP communication regarding specific diseases and conditions such as diabetes and asthma. This project helped fill knowledge gaps pertaining to SN to PCP communication as a whole without being confined by a specific disease or condition. Furthermore, this project helps provide information relating to an understudied area of healthcare. This will hopefully provide a base in which more research can be conducted regarding communication that is done pertaining to children with chronic health conditions enrolled the public school setting. Lastly, because 75% of the SNs in this district were

interviewed during this project, it is likely that the author was able to gain a relatively good understanding about how SNs perceived information exchange between themselves and PCPs.

Future Work

More exploration needs to be done regarding SN and PCP communication to better understand phenomenon relating to some of the topics discussed above. More specifically, nurse scientists could assist in our understanding of this SN to PCP communication and the extension of the healthcare system in public school. This would increase our understanding of communication within this setting and is essential to decrease the absenteeism rate of complex school aged children in order to foster their long-term health and success. Because this project failed to gain information from the PCP, the author also suggests a similar project, such as the one discussed above, be conducted with focus on PCPs who care for children attending public schools. Lastly, the author would like to complete a project that involves better understanding into how SNs perceive their role as healthcare professionals and why information gathered by SNs is not used in other areas of healthcare to the fullest of its potential. This could be followed with research collaborating with a nurse scientist to understand critical elements of the school based EHR to foster effective SN, PCP, student and guardian communication.

Personal Development

Through taking part in this project the author gained valuable insight into developing and completing QI projects. This information will be used to guide future work conducted by the author in professional settings. This project serves as a reminder that when conducting any type of research or quality improvement extra time should be incorporated into deadlines in order to accommodate for unforeseeable events that lengthen the amount of time projects take to

complete. Furthermore, the author believes that it would be beneficial to improve upon the process in which he took to analyze interview data in the future work. More specifically, it would be beneficial to have transcribed data validated by one or more persons other than the author in order to gain agreement regarding the phenomenon discovered through the data analysis process.

Conclusion

In conclusion, knowledge gaps regarding SN to PCP communication exist and little research has been done that specifically identifies communication patterns between SNs and PCPs regarding the overall health of students with chronic health conditions. This project used an adaptation of The Effective Nurse-to-Nurse Communication Framework in order to guide this work. This project also used an adapted content analysis and semi-structured interview questions to conduct a system analysis of the current state of SN to PCP communication. This DNP project provides information regarding an understudied area of healthcare and will help guide future studies within this healthcare arena. From the information gained through conducting this project, suggestions on how to improve communication between SNs and PCPs were made on a district and national level. More research needs to be completed that is concerned with communication between important stakeholders involved in caring for school-aged children with chronic health conditions. Through conducting more work regarding this area of healthcare, the lives of school aged children and the overall wellbeing of our nation can be immensely improved upon for future generations to come.

APPENDIX A:

SCHOOL DISTRICT SITE AUTHORITY LETTER

Catalina Foothills Unified School District #16

2101 E. River Road, Tucson, AZ 85718

(520) 209-8081 www.cfsd16.org

Special Services

November 21, 2017

Dear Dr. Carrington,

This letter is to inform you that Mr. Luke Huffaker has been approved to implement the DNP Quality Improvement Project titled, Assessment of School Nurse-Provider Communication of Changes in Student Condition, in the Catalina Foothills School District.

This project uses digitally recorded semi-structured interview questions. CFSD will allow Mr. Huffaker to conduct short 10-20 minute interviews with school nurses practicing in CFSD if they choose to be a part of this qualify improvement project. From the information gained in these interviews, Mr. Huffaker will make suggestions on how to improve communication between the school nurses of CFSD and providers in the surrounding area.

We understand that this project will involve school nurses and their participation is voluntary. Mr. Huffaker will contact the school nurses about the project. Individual school nurses will agree or deny participation in this project. We understand that we will receive a copy of the IRB-approved, stamped consent document. CFSD will receive a copy of the project results along with a document containing suggestions on how to improve communication between school nurses and providers. CFSD or its employees will receive no monetary gains from participation in this project.

Data collection (interviews) will occur in the month of November.

I will serve as the district liaison for this project. All future communication, including the results of this project, should be directed to me at ematyjasik@cfsd16.org.

Sincerely,

Erin Matyjasik, PhD, NCSP
Special Services Director
Nationally Certified School Psychologist
Catalina Foothills School District

cc: Luke Huffaker
Denise Bartlett

APPENDIX B:

DETERMINATION OF HUMAN RESEARCH FORM

Research
Office for Research & Discovery

Human Subjects
Protection Program

1618 E. Helen St.
P.O.Box 245137
Tucson, AZ 85724-5137
Tel: (520) 626-6721
http://rgw.arizona.edu/compliance/home

Date:	November 20, 2017
Principal Investigator:	Luke Huffaker
Protocol Number:	1711034365
Protocol Title:	Assessment of School Nurses-Provider Communication of Changes in Student Condition
Determination:	Human Subjects Review not Required

The project listed above does not require oversight by the University of Arizona because the project does not meet the definition of 'research' and/or 'human subject'.

- **Not Research as defined by 45 CFR 46.102(d):** As presented, the activities described above do not meet the definition of research as cited in the regulations issued by the U.S. Department of Health and Human Services which state that "research means a systematic investigation, including research development, testing and evaluation, designed to contribute to generalizable knowledge".
- **Not Human Subjects Research as defined by 45 CFR 46.102(f):** As presented, the activities described above do not meet the definition of research involving human subjects as cited in the regulations issued by the U.S. Department of Health and Human Services which state that "human subject means a living individual about whom an investigator (whether professional or student) conducting research obtains data through intervention ***or*** interaction with the individual, or identifiable private information".

Note: Modifications to projects not requiring human subjects review that change the nature of the project should be submitted to the Human Subjects Protection Program (HSPP) for a new determination (e.g. addition of research with children, specimen collection, participant observation, prospective collection of data when the study was previously retrospective in nature, and broadening the scope or nature of the research question). Please contact the HSPP to consult on whether the proposed changes need further review.

The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).

APPENDIX C:

RECRUITMENT EMAIL SENT TO DISTRICT SCHOOL NURSES

RECRUITMENT EMAIL SENT TO DISTRICT SCHOOL NURSES

Greetings School Nurses of Catalina Foothills School District,

My name is Luke Huffaker and I am conducting a quality improvement (QI) project as part of my curriculum requirements through The University of Arizona Doctorate of Nursing Practice program. This QI project will involve school nurses practicing within Catalina Foothills School District (CFSD) and primary care providers who care for students attending CFSD schools. The purpose of this QI project is to perform a communication system analysis of information sharing patterns between school nurses and providers. From the information gained in this QI project, suggestions will be made regarding ways to improve communication patterns between CFSD and surrounding provider locations.

As the primary investigator in this QI project, I am asking for CFSD nurses to participate in a face-to-face digitally recorded interview that will last approximately 10-20 minutes. These interviews will consist of semi structured interview questions pertaining to current information sharing patterns between school nurses and primary care providers. Interviews will also be conducted with local primary care offices who provide care for students enrolled in CFSD. No sensitive health information will be discussed in these interviews and all information will be de-identified. Furthermore, interviews will be held at the convenience of the school nurse if they are willing to participate. There are no foreseeable psychological, social or economic risks to the participants of this project. There are also no foreseeable risks to CFSD or any of its students or staff members. This project has been reviewed and approved by CFSD. Participation in this project is not mandatory. Furthermore, participants can withdrawal from the project at any time without consequence. There will be no monetary compensation for participating in this project.

From the information gained through these short interviews, suggestions will be made regarding ways to improve communication patterns between the school nurses of XXSD and primary care providers in the surrounding areas. This will ultimately improve communication between healthcare providers and result in improved safety and wellbeing for students. This information will be presented to CFSD via text document after completion of the QI project. Furthermore, the information gained through this QI project can be presented in person via presentation should CFSD request this. All participants are also encouraged to attend the formal presentation of this material during the final defense of this work at The University of Arizona College of Nursing. The date of the final defense of this work has not been determined at this point.

If you have any questions about this QI project or would like to participate, please contact me, Luke Huffaker, using the contact information below.

Email: huffaker@email.arizona.edu
Cell: 928-830-8358

APPENDIX D:

FLYER FOR PRIMARY CARE OFFICES

Department of Nursing at The University of Arizona

PARTICIPANTS NEEDED FOR A QUALITY IMPROVEMENT PORJECT RELATING TO COMMUNICATION BETWEEN SCHOOL NURSES AND PRIMARY CARE PROVIDERS

Title:

Assessment of School Nurse-Provider Communication of Changes in Student Condition

We are looking for volunteers to take part in a project that seeks to better understand communication between primary care providers (PCPs) and school nurses relating to students with chronic health conditions. Information gained in this study will then be used to improve communication patterns between PCPs and school nurses.

As a participant in this study, you would be asked to partake is a short recorded interview (lasting 10-20 minutes) relating to current communication patterns between yourself, the PCP, and school nurses from Catalina Foothills School District.

For more information about this project, or to volunteer,
please contact:
Luke G. Huffaker, RN, Third Year DNP Student
at
928-830-8358
Email: **huffaker@email.arizona.edu**

If you would like to participate in this project, please contact Luke Huffaker by December 15, 2017

There is no compensation for participation in this study

APPENDIX E:

INTERVIEW QUESTIONS

Questions That Will Be Asked to School Nurses:

1. What is your highest nursing degree?
2. How long have you worked as a school nurse?
3. How long have you worked as a school nurse in this district?
4. On average per school year, how many times do you care for students with chronic health conditions who experience a sudden change in condition during school hours?
5. When such a student comes to you, what is the process you take to communicate with other school nurses, parents or primary care providers?
6. How do you typically obtain treatment plans for children with chronic health conditions?
7. How often do you directly contact PCP offices?
8. Is it difficult for you to contact PCPs?
9. What information do you need to properly care for students with chronic health conditions who experience a sudden change in condition such as bleeding, change in level of consciousness, change in respiratory status, change in output, fever or pain?
10. What is the availability of the information that you need to care for these students?
11. If a clinical event (bleeding, change in output etc.) were to happen at school, do you think you would you be able to directly contact the student's PCP about important health related information if need be?
12. How often do you get directly contacted by PCP offices about treatment plans for students with chronic health conditions?
13. How is information typically exchanged between you and the PCP?
14. How is information typically exchanged between you and guardians of students with chronic health conditions?
15. How is information typically exchanged between you and students with chronic health conditions.
16. What would you recommend to increase communication between school nurses, parents, and PCPs?
17. Do you feel as though you are part of the healthcare team?
18. What are the strengths of the school EHR that you currently use?
19. What are the weakness of the school EHR that you currently use?
20. What would you recommend to improve the school EHR?
21. Is using a school EHR important to you and your practice as a nurse?
22. Do you think it would be important to have a school EHR that can communicate with other school EHRs across the nation?
23. Is your EHR system able to communicate with external EHR systems?
24. How would you improve communication between you and PCPs in regards to students with chronic health conditions?
25. What are strengths relating to communication between yourself and PCPs about children with chronic illnesses?
26. What are weaknesses relating to communication between yourself and PCPs about children with chronic illnesses?
27. Do you think communication between yourself and the PCP is important?
28. Would you like to discuss any concerns about this topic at this moment?

Questions Asked to the Primary Care Provider:

1. How often do you directly communicate with SNs regarding patients with chronic health conditions who experience a change in status during school?
2. How do you usually transfer student health information to SNs regarding students with chronic health conditions?
3. How often does your office get contacted by SNs?
4. If a SN were to contact you or your office staff, would they be able to obtain information about student's health information?
5. What are strengths that you can identify in relation to communication between you and SNs/health aids?
6. What are weaknesses that you can identify in relation to communication between you and SNs/health aids?
7. Do you think that communication between yourself and the school nurse is important?
8. Is your EHR system able to communicate with external EHR systems?
9. How often do you use information that is obtained from the school nurse when making treatment plans for students?
10. Do you have any suggestions for improving communication between you and SNs/health aids?
11. Would you like to discuss any concerns about this topic at the moment?

APPENDIX F:

PARTICIPANT CONSENT FORM

Assessment of School Nurse-Provider Communication of Changes in Student Condition.

Principal Investigator: Luke Huffaker, RN

The purpose of this quality improvement (QI) project is to perform a communication system analysis of information sharing patterns between Catalina Foothills School District school nurses and providers.

If you choose to take part in this project, you will be asked to partake in a digitally recorded interview consisting of questions relating to communication pathways between school nurses and primary care providers. It will take approximately 10-20 minutes to complete this interview. There are no foreseeable risks associated with participating in this project and you will receive no immediate benefit from your participation. Information gained through conducting these interviews will lay the foundation for more work to be completed in this overlooked area of nursing. In other words, the information gained through conducting these interviews will provide insight that can be used in order to improve communication patterns between school nurses of this district and primary care providers. This will ultimately improve communication between healthcare providers and result in improved safety and wellbeing for students. All interview responses are anonymous.

Participation is voluntary and refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may withdraw at any time from the project should you chose to participate. In addition, you may skip any question that you choose not to answer. By participating, you do not give up any personal legal rights you may have as a participant in this project.

For questions, concerns, or complaints about the project, you may call Mr. Luke Huffaker, RN, at 928-830-8358.

Participant Name:_____.

Participant Signature:_____. Date:_____.

Principle Investigator Signature:_____. Date:_____.

REFERENCES

Agency for Healthcare Research and Quality. (2013). *Missed school days: number of school days that children missed in the past 12 months due to illness or injury*. Retrieved from https://www.qualitymeasures.ahrq.gov/summaries/summary/47477/missed-school-days-number-of-school-days-that-children-missed-in-the-past-12-months-due-to-illness-or-injury#

American Association of Diabetes Educators. (2013). Management of children with diabetes in the school setting. *American Association of Diabetes Educators*, *40*(1), 116-121. doi:10.1177/0145721713513544

American Psychological Association. (2017). Individuals with disabilities education act (IDEA). Retrieved from http://www.apa.org/about/gr/issues/disability/idea.aspx

Anderson, L. (2013). The development and implementation of eSchoolCare: a novel health care support system for SNs. *Advances in Nursing Science*, *36*(4), 289-303. doi:10.1097/ANS.0000000000000003

Blumenthal, D. & Tavenner, M. (2010). The "meaningful use" regulation for electronic health records. *The New England Journal of Medicine*, *363*(6).

Blumer, H. (1969). *Symbolic interactionism perspective and method*. Berkley, CA: University of California Press.

Bruzzese, J., Evans, D., Wiesemann, S., Pinkett-Heller, M., Levison, M., Du, Y., … Mellins, R. (2006). Using school staff to establish a preventative network of care to improve elementary school student's control of asthma. *Journal of School Health*, *76*(6), 307-312.

Carrington, J. (2012). Development of a conceptual framework to guide a program of research exploring nurse-to-nurse communication. *Computers Informatics Nursing*, *30*(6), 293-299. doi:10.1097/NXN.0b013e31824af809

Cowell, J. (2013). Interprofessional practice and school nursing. *The Journal of School Nursing*, *29*(5). doi:10.1177/1059840513501468

Egginton, J., Textor, L., Knoebel, E., McWilliams, D., Aleman, M., & Yawn, B. (2012). Enhancing school asthma action plans: qualitative results from soothes Minnesota beacon stakeholder groups. *Journal of School Health*, *83*, 885-895.

Foley, M., Dunbar, N., & Clancy, J. (2014). Collaborative care for children: a grand rounds presentation. *The Journal of School Nursing*, *30*(4), 251-255. doi:10.1177/1059840513484364

Gapinski, M. & Sheetz, A. (2014). The evolution of school nursing data indicators in Massachusetts: recommendations for a national data set. *SAGE Journal*, *30*(5), 317-323. doi:10.1177/1059840514526888

Gephart, S., Bristol, A., Dye, J., Finley, B., & Carrington, J. (2016). Validity and reliability of a new measure of nursing experience with unintended consequences of electronic health records. *Computers, Informatics, Nursing*, *34*(10), 436-447. doi:10.1097/CIN.0000000000000285

Gephart, S., Carrington, J., & Finley, B. (2015). A systematic review of nurses' experiences with unintended consequences when using the electronic health record. *Nursing Administration Quarterly*, *39*(4), 345-356. doi:10.1097/NAQ.0000000000000119

Gerbner, G. (1956). Toward a general model of communication. In *AV Rev.* (pp. 171-195).

Grol, R., Bosch, M., Hulscher, M., Eccles, M., & Wensing, M. (2007). Planning and studying improvement in patient care: the use of theoretical perspectives. *The Milbank Quarterly*, *85*(1), 93-138. Retrieved from https://d2l.arizona.edu/content/enforced/568599-674-2171-1NURS922201/Grol%20et%20al.%202007%20Milbank%20Qrtly.pdf?_&d2lSessionVal=spOeHtrT32JhftLBKIkcffAqA&ou=568599

Guilday, P. (2014). An innovation approach to enhancing combination and improving student health. *School Nurse*, *29*(5), 242-247. doi:10.1177/1942602X14540215

Hiltz, C., Johnson, K., Lechtenberg, J., Maughan, E., & Trefry, S. (2014). SNrole in electronic school health records. *National Association of SNs*. doi:10.1177/1942602X14534391

Hsieh, H. & Shannon, S. (2005). Three approaches to qualitative content analysis. *Sage Journals*, *15*(9), 1277-1288. doi:10.1177/1049732305276687

Huffaker, L. & Carrington, J. M. (In Press). Understanding effective communication between school nurses and providers [Abstract]. *Innovations in Engagement through Research, Practice, and Education, Communicating Nursing Research Conference Proceedings.*

Johnson, K., Bergren, M., & Westbrook, L. (2012). The promise of standardized data collection: school health variables identified by states. *The Journal of School Nursing*, *28*(2), 95-107. doi:10.1177/1059840511426434

Johnson, K. & Bergren, M. (2011). Meaningful use of school health data. *The Journal of School Nursing*, *27*(102). doi:10.1177/1059840510391267

Liberatos, P., Leone, J., Craig, A. M., Frei, E. M., Fuentes, N., & Harris, I. M. (2013). Challenges of asthma management for SNs in districts with high asthma hospitalization rates. *Journal of School Health, 83*, 867-875.

Michigan Medicine. (2012). *Children with chronic conditions*. Retrieved from http://www.med.umich.edu/yourchild/topics/chronic.htm

Moran, K. & Burson, R. (2017). The phenomenon of interest. In *The doctor of nursing practice scholarly project* (2nd ed., pp. 89-115). Burlington, MA: Jones and Bartlett Learning.

Nadeau, E., & Toronto, C. (2016). Barriers to asthma management for SNs: an integrative review. *The Journal of School Nursing*, *32*(2), 86-98. doi:10.1177/1059840515621607

National Association of SNs. (2014). *SNrole in electronic school health records*. Retrieved from https://www.nasn.org/PolicyAdvocacy/PositionPapersandReports/NASNPositionStatementsFullView/tabid/462/ArticleId/641/Electronic-School-Health-Records-School-Nurse-Role-in-Adopted-January-2014

National Center for Education Statistics. (2011). Elementary and secondary education. *Institute of Education Science*, 59-164.

Patrick, K., Mendonca, L., Maughan, E., Wolfe, L., Bergren, M., Johnson, K., … Cole, M. (2014). National standardized data set for school health services. *National Association of SNs*. doi:10.1177/1942602X14544448

Radis, M., Updegromve, S., Somsel, A., & Crowley, A. (2016). Negotiating access to health information to promote students' health. *The Journal of School Nursing*, *32*(2), 81-85. doi:10.1177/1059840515615676

Reed, P. & Shearer, N. (2011). *Nursing knowledge and theory innovation*. New York, NY: Springer Publishing Company.

Shannon, C. (1967). The mathematical theory of communication. In *The mathematical theory of communication* (pp. 31-125). Chicago, IL: University of Illinois Press.

Svavarsdottir, E. K., Garwick, A. W., Anderson, L. S., Looman, W. S., Seppelt, A., & Orlygsdottir, B. (2012). The international SNasthma project: barriers related to asthma management in schools. *Journal of Advanced Nursing, 69*, 1161–1171.

Volkman, J. & Hillemeier, M. (2008). School nurse communication effectiveness with physicians and satisfaction with school health services. *The Journal of School Nursing*, *24*(5), 310-318. doi:10.1177/1059840508323199

Wing, R., Amanullah, S., & Jacobs, E. (2015). Communication is key in school nurses' preparedness for facilitating "return to learn" following concussion. *Clinical Pediatrics*, *55*(3), 228-235. doi:10.1177/0009922815592879