

5-2013

# Implementation of a Wellness Curriculum

Donna Heimer Lupien  
*St. Catherine University*

Follow this and additional works at: [http://sophia.stkate.edu/dnp\\_projects](http://sophia.stkate.edu/dnp_projects)

---

## Recommended Citation

Lupien, Donna Heimer, "Implementation of a Wellness Curriculum" (2013). *Doctor of Nursing Practice Systems Change Projects*. Paper 37.

This Systems Change Project is brought to you for free and open access by the Nursing at SOPHIA. It has been accepted for inclusion in Doctor of Nursing Practice Systems Change Projects by an authorized administrator of SOPHIA. For more information, please contact [ejasch@stkate.edu](mailto:ejasch@stkate.edu).

Implementation of a Wellness Curriculum

Systems Change Project  
Submitted in Partial Fulfillment  
of the Requirements for the Degree of  
Doctor of Nursing Practice

St. Catherine University  
St. Paul, Minnesota

Donna Heimer Lupien

May 2013

IMPLEMENTATION OF A WELLNESS CURRICULUM

ST. CATHERINE UNIVERSITY  
ST. PAUL, MINNESOTA

This is to certify that I have examined this  
Doctor of Nursing Practice systems change project  
written by

Donna Heimer Lupien

and have found that it is complete and satisfactory in all respects,  
and that any and all revisions required by  
the final examining committee have been made.



---

Name of Faculty Project Advisor

May 16, 2013

---

Date

DEPARTMENT OF NURSING

# IMPLEMENTATION OF A WELLNESS CURRICULUM

Copyright Donna Heimer Lupien 2013  
All Rights Reserved

# IMPLEMENTATION OF A WELLNESS CURRICULUM

## **Acknowledgements**

I am sincerely grateful to Dr. Alice Swan, my advisor, for providing me guidance and support throughout this project. I want to thank Dr. Matthew Byrne and Dr. Larry Dahlen for their feedback and willing assistance. I especially want to thank my husband, Fred, who values education more than anyone I know. Thanks for the never ending encouragement and strength.

# IMPLEMENTATION OF A WELLNESS CURRICULUM

## **Executive Summary**

Graduate nurse anesthesia school is extremely challenging and includes long hours of study and clinical performance. A multitude of stressors can impair the ability of students to think, learn and be successful in school. A literature review was conducted to study the threats to anesthesia students' wellness. This review yielded evidence based knowledge that guided a systems change project to implement a wellness curriculum. The curriculum included three components. The first was to provide three wellness classes that included the topics of sleep, stress and substance abuse, and fitness and nutrition. The second was to create an environment more supportive of healthy lifestyles. The final component was to provide the students access to a healthy lifestyle questionnaire that revealed individual strengths and weaknesses. The purpose of the project was to increase the wellness knowledge of 35 first-year graduate nurse anesthesia students to enhance their ability to be successful in anesthesia school. The central question for the project was: In graduate nurse anesthesia students, how does implementation of a self-care wellness curriculum affect wellness knowledge? The results of the pre-test and post-test scores for the wellness classes follow. The sleep post-test mean score demonstrated a 50.3 percentage point gain over the pre-test mean score. The stress and substance abuse post-test mean score demonstrated a 59.4 percentage point gain over the pre-test mean score. The fitness and nutrition post-test mean score demonstrated a 44.3 percentage point gain over the pre-test score. Finally, the overall mean post-test score demonstrated a 51.3 percentage point gain over the pre-test mean score. The gain scores for all four tests were statistically significant at  $p < .001$ . These results indicate that a self-care wellness curriculum significantly affected graduate anesthesia student knowledge. Wellness content should be integrated into the curriculum for nurse anesthesia students.

# IMPLEMENTATION OF A WELLNESS CURRICULUM

## Table of Contents

Title Page .....	i
Advisor Approval.....	ii
Notice of Copyright.....	iii
Acknowledgements.....	iv
Executive Summary.....	v
Table of Contents.....	vi
Table of Tables.....	viii
Table of Figures.....	ix
Chapter One.....	1
Background and Significance.....	1
Wellness.....	2
Problem.....	2
Congruence with Organization.....	3
Social Justice.....	5
Summary.....	6
Chapter Two.....	7
Theoretical Framework.....	7
Ethics.....	11
Literature Review and Synthesis.....	12
Healthy Lifestyle Guideline.....	21
Systematic Review.....	24
Level of Evidence and Quality.....	27
Integrative Review.....	29
Recommendations.....	30
Summary.....	31
Chapter Three.....	32
Project Design and Methodology.....	32
Implementation Plan.....	36
Summary.....	39
Chapter Four.....	40
Data Analysis.....	40
Results of Wellness Classes.....	43
Evaluation.....	46

# IMPLEMENTATION OF A WELLNESS CURRICULUM

Healthy Lifestyle Questionnaire.....	48
Summary.....	48
Chapter Five.....	50
Discussion.....	50
Recommendations.....	56
Summary.....	58
References.....	59
Appendix A.....	63
Appendix B.....	66
Appendix C.....	67
Appendix D.....	70
Appendix E.....	71
Appendix F.....	72
Appendix G.....	73
Appendix H.....	74
Appendix I.....	75

# IMPLEMENTATION OF A WELLNESS CURRICULUM

## Table of Tables

<b><u>Table</u></b>	<b><u>Title</u></b>	<b><u>Page</u></b>
1	Anesthesia Cohort Attrition Rates.....	5
2	Sleep Test Scores.....	43
3	Stress/Substance Abuse Test Scores.....	44
4	Fitness/Nutrition Test Scores.....	45
5	Overall (Combined) Test Scores.....	46
6	Mean Test Scores.....	47
7	TestWell Standard Edition Scores.....	48

# IMPLEMENTATION OF A WELLNESS CURRICULUM

## Table of Figures

<b><u>Figure</u></b>	<b><u>Title</u></b>	<b><u>Page</u></b>
1	Age of Anesthesia Students.....	40
2	Daily Commute to Graduate School.....	41
3	Children of Anesthesia Students.....	41
4	State from Which Anesthesia Students Applied.....	42
5	Sleep Test Score Comparisons.....	43
6	Stress/Substance Abuse Test Score Comparisons.....	44
7	Fitness/Nutrition Test Score Comparisons.....	45
8	Overall (Combined) Test Score Comparisons.....	46

## **Chapter One**

Graduate nurse anesthesia school is extremely challenging and includes grueling hours of study and clinical performance. In light of these demands, the Council on Accreditation of Nurse Anesthesia Educational Programs (COA, 2011a) mandated that all schools incorporate a wellness program into their curriculum effective January 1, 2013. Suggested content included the importance of wellness, healthy lifestyles, stress coping mechanisms and chemical dependency (COA, 2011b). In addition to this COA requirement, there were an abundance of reasons for implementation of a wellness curriculum in a graduate program of nurse anesthesia.

### **Background and Significance**

Nurse anesthesia students endure frequent long-term stressors and must undergo numerous changes from their previous lifestyles. The anesthesia program is 30 months of intense full-time study which includes a didactic phase of 11 months, followed by a clinical phase of 19 months. Students must maintain a delicate balance of school, personal time and family. The majority of the students must change their residence once or twice during the program to attend class or clinical rotations. The total school costs to attend the Graduate Program in Nurse Anesthesia are \$56,000. This total does not include expenses for housing or food. Because students must quit their previous jobs to attend anesthesia school, their financial situation drastically changes. Due to time constraints, students often take on unhealthy eating habits and may sleep and exercise less.

The multitude of stressors can have profound effects on the ability of students to be successful. Their capacity to think, learn and accomplish tasks can be compromised. Impairment could also affect patient safety. Student registered nurse anesthetists (SRNAs) are often left alone to provide highly potent anesthetics to vulnerable patients under anesthesia. It is

desirable that students maintain healthy lifestyles and strive to achieve wellness. In this way, they are better equipped to manage the constant stresses of anesthesia graduate school and provide safe care to their patients.

### **Wellness**

A definition of wellness is necessary to recognize and appreciate its extensive scope. The National Wellness Institute (n.d.) conveys that “Wellness is a conscious, self-directed and evolving process of achieving full potential. Wellness is multi-dimensional and holistic, encompassing lifestyle, mental and spiritual well-being, and the environment.” It is important to note that the definition is much broader than defining wellness as the absence of disease. Furthermore, the individual is leading the way on a continuous path of possibilities.

### **Problem**

A wellness initiative is fundamental in addressing the variety of stressors that graduate nurse anesthesia students face in an intense 30 month program of study. A review of the literature was conducted to study the threats to student wellness. The review yielded evidence based knowledge that was used to design a systems change project to implement a wellness curriculum. The goal was to develop and enhance the attributes and lifestyles of anesthesia students to be successful and to enhance their capacity to reach their full potential. The central question for the project was: In a graduate anesthesia program, how does implementation of a self-care wellness curriculum affect wellness knowledge of graduate anesthesia students? Project objectives included three major components. The first was to provide three wellness classes that included the topics of sleep, stress and substance abuse, and fitness and nutrition. The second was to create an environment more supportive of healthy lifestyles. Finally, students were provided free access to a healthy lifestyle questionnaire that revealed individual strengths

and weaknesses. The long-term goal of the project was to aid student retention in anesthesia school.

Based on the project objectives, evaluation of the wellness curriculum included the two outcome objectives: by March 2013, the investigator would demonstrate that the anesthesia class mean scores for each of the three wellness post-tests increased by 30 percentage points from the baseline pre-test scores; and by March 2013, the anesthesia class participating in the wellness curriculum would have less than a 9% attrition rate which required that at least 32 of the 35 students remained in anesthesia school.

### **Congruence with Organization**

The values and goals of the college were congruent with implementation of a wellness curriculum in the anesthesia program. The college is a coeducational academic institution immersed in Christian values and traditions where emphasis is placed on the growth of individuals as human beings with knowledge, skills and inherent values. The mission statement articulates that students will be prepared for the current world of work and life-long learning. The wellness program enhances students' abilities to grasp knowledge and perform clinical skills. The students are preparing for life-long learning on the road to reaching their full potential in wellness, in addition to, anesthesia practice.

Cameron and Quinn (1999) illustrated the values and beliefs of an organization using quadrants of four cultures within the competing values framework. The four cultures are collaborate, create, control and compete (as cited in Tharp, 2009). Organizational position within a quadrant is based on two dimensions of values. The first is flexibility and dynamism versus stability and control. The second is internal focus and unity versus external focus and rivalry. The Organizational Culture Assessment Instrument (OCAI) of Cameron and Quinn

(2000) was used to examine the values of the anesthesia program. It was imperative to understand the culture present within the organization to enhance implementation of the wellness project.

The OCAI results revealed an anesthesia program with a collaborative, clan culture which valued unity, flexibility and dynamism with an internal focus. The open and friendly environment similar to an extended family was conducive to a system change. The group believed in teamwork and consensus; thus, assistance was available when needed. The leaders facilitated the process and exhibited a strong commitment to students and the investigator. Faculty held an interest in finding new ways to address student stressors. New study skills classes had recently been implemented and the prospect of a wellness curriculum in the upcoming year was well received as another student-focused initiative in the collaborative clan culture.

The wellness curriculum was congruent with the organization's strategic plan in attempting to address anesthesia student attrition rates. Dosch, Jarvis and Schlosser (2008) reported a 9% attrition rate for the national nurse anesthesia cohort graduating in 2005. It was determined that this rate from the most recent cohort data would be useful to correlate with investigator data. The COA (2012) reported an estimated mean of 3% of students that left anesthesia programs in the last year. However, the COA (2012) data calculates attrition rates as the percent of students that left an anesthesia program in the last year, not as a total per cohort. The anesthesia program of interest had a history of very low attrition rates to include many years in which all students starting the program successfully graduated. However, the attrition rates had been rising. The increased attrition rates could be related to the following factors. Three of the current five anesthesia faculty members were new. Also, the standards for progression in the

anesthesia program were strengthened and more clearly defined. Finally, students were being dismissed for non-academic reasons. Table 1 illustrates the yearly attrition trends. The goal was that a wellness curriculum would assist in keeping the anesthesia program attrition rates less than the national average of 9%.

Table 1

*Anesthesia Cohort Attrition Rates*

Graduation Year <sup>a</sup>	Students Enrolled	Students Graduated	Attrition Rate
2003	39	39	0%
2004	36	36	0%
2005	37	37	0%
2007	34	34	0%
2008	39	37	5%
2009	40	40	0%
2010	41	41	0%
2011	38	37	3%
2012	39	37	5%
2013	37	32	14%

<sup>a</sup>The anesthesia program was lengthened in 2006; therefore, no students graduated.

### **Social Justice**

The systems change project applied the principles of social justice. According to the Catechism of the Catholic Church (1994), “Social justice can be obtained only in respecting the transcendent dignity of man” (p. 521). In promoting wellness, the self-worth and value of each individual as a unique person with unlimited potential to achieve is validated. The common good of the entire anesthesia class would also be promoted. The Catechism of the Catholic Church (1994) emphasized that the common good is “the sum total of social conditions which allow people, either as groups or as individuals, to reach their fulfillment more fully and more

easily” (p. 517). The proposed program created an environment that promoted not only individual wellness, but wellness of the entire group through educational preventative measures.

### **Summary**

The purpose of the systems change project was to review the literature for threats to anesthesia student wellness and use that information to implement an evidenced based wellness curriculum. The goal was to enrich students’ capacity to be successful in anesthesia school and for the students to advance on the continuum of achieving their full potential. The project was congruent with organizational and anesthesia program goals. The system change was based on respecting the dignity and uniqueness of each graduate nurse anesthesia student. The wellness curriculum began as a systems change project for a doctor of nursing practice student. However, the curriculum will continue to be taught in future nurse anesthesia classes.

## Chapter Two

### Theoretical Framework

Theoretical sources were used to support and guide the process toward successful completion. Two theories guided the wellness curriculum system change. The first was Betty Neuman's (2002) Systems Model (as cited in Aylward, 2010). The second was the Transtheoretical Model (Prochaska, Redding, & Evers, 2008). These theories are discussed, along with the ethical considerations that underscore the project. A review of the literature for threats to student wellness ensues thereafter.

#### Betty Neuman's Systems Model

Neuman (2002) emphasized the wholeness of the individual [client] with a wellness orientation toward stability. There is dynamic movement of energy back and forth as the client strives for optimal health (as cited in Aylward, 2010). Aylward (2010) described the four major elements of nursing included in Neuman's model: client, environment, health and nursing.

**Client.** The client is the focus and is placed at the center of multiple concentric circles. Each circle includes the five client variables: physiological, psychological, sociocultural, developmental and spiritual. The outermost concentric circle is the flexible line of defense which acts as a shield to prevent stressors from attacking the client system. Lack of sleep is an example of a stressor that could make the flexible line of defense weaker and move in closer. Inside the flexible line of defense is the normal line of defense which is the standard state of client health. Inside the normal line of defense are multiple lines of resistance. The degree to which an individual shows signs and symptoms of disease will depend on the ability of the lines of resistance to protect the client. An example of attempts to protect the client would be the body's mobilization of white blood cells to fight off infection.

**Environment.** The environment is the second element of Neuman's model. Three types of environments are described: the internal, external and the created environments. Collectively, these environments are the influences that envelop the client system and influence health or illness. The internal environment consists of intrapersonal factors that are contained inside the client system. Examples of these include age, physical mobility, coping mechanisms and hope. The external environment includes interpersonal factors as well as extrapersonal factors. Interpersonal factors include the bonds and support systems of friends and family. Extrapersonal factors may include a job or available cash funds. Lastly, the created environment encompasses all of the other environments, system variables and energy to help the client move toward system stability and health.

**Health.** The third element of Neuman's model is health which is at the opposite end of the spectrum of illness. When the client system has the resources and energy to defend against environmental stressors, then it is stable and well. If the client system cannot defend against stressors, then the concentric circles are broken and the client becomes ill.

**Nursing.** Nursing is the final element of Neuman's Systems Model. Nurses collaborate with the individual to help maintain a stable system by assessing for potential effects of environmental stressors. The focus is primary prevention by identifying and reducing client risk factors and encounters with stressors.

### **Application of Neuman's System Model to Project**

Neuman's Systems Model exemplifies the importance of a wellness curriculum. Students come to a nurse anesthesia program with their own backgrounds and makeups which are influenced by their life experiences. They are unique and whole individuals with their own energy levels and available resources. The normal line of defense that surrounds them is

currently stable and they are relatively healthy as they embark on their graduate school journey. The flexible line of defense is strong and expanded outward. The students state that they are ready to face the challenges ahead. As anesthesia school begins, so do the internal and external environmental stressors. Intrapersonal strain includes loss of sleep and unhealthy eating habits which may affect body function. Positive attitudes wane and previous coping patterns may become ineffective. Interpersonal stressors mount because of the demanding amount of time necessary for studying. Students have less time for relationships with spouses, children and friends. Extrapersonal stressors include the loss of the stability of employment and decreased finances. These environmental stressors push the flexible line of defense of the client inward.

The stability of the normal line of defense may be hampered and it is at risk of being broken. If the student does not have sufficient energy and resources, the line will be crossed and the health and wellness of the individual is at stake. Hopefully the lines of resistance have the ability to fend off the stressors and return the student to a full state of stability. As a nurse and faculty member of a college, there is a role to take as a collaborator with the students. A primary prevention educational program can be put into effect to assist each student to build and maintain strong lines of defense. Current information and tools can be shared that aid them in resisting the negative effects of the numerous environmental stressors they experience during anesthesia school. The goal was to maintain the highest level of wellness possible.

### **Transtheoretical Model**

The wellness curriculum included healthy lifestyle education and encouraged students to make changes in behavior toward higher levels of wellness. Researchers Prochaska, Redding, and Evers (2008) have offered the Transtheoretical Model (TTM) to describe behavior change that develops over time through the following six stages: precontemplation, contemplation,

preparation, action, maintenance and termination. The wellness program targeted the first three of these stages. Prochaska et al. (2008) also described 10 processes of change which are strategies to support progression through the six stages.

**Stages one and two.** Precontemplation and contemplation stages include no intent to change or intent to change behavior within six months respectively. Individuals at these levels may be uninformed of the full consequences of their behavior and avoid information related to high-risk activities. The first process of change is consciousness raising; thus, a wellness curriculum intended to affect students with increased awareness and knowledge. A second process of change is dramatic relief which initially increases emotions due to unhealthy habits. The anxiety is later relieved when actions are taken to alter the habits. The wellness curriculum addressed dramatic relief through individual health risk feedback and substance abuse story telling.

**Stage three.** The preparation stage of TTM involves individuals who intend to take action within the ensuing 30 days. They have a plan of action in place, such as joining a health club or seeking professional help. Self-reevaluation is the process of change that takes place at this stage. Students in the wellness curriculum were encouraged to clarify their values, seek healthy role models and use imagery techniques to see themselves in new situations. In addition to the 10 processes of change, Prochaska et al. (2008) discussed decisional balance as a construct of the Transtheoretical Model.

**Decisional balance.** Decisional balance reflects the individual balancing of the pros and cons of changing behavior. The cons outweigh the pros in early stages of change; however, the pros surpass the cons in the middle stages of change. This weighing of pros and cons is an important concept in relation to the wellness curriculum. Evidence based classes and data were

presented to students to demonstrate increased support for the benefits of changing behavior and improving individual lifestyles.

### **Ethics**

The Code of Ethics of the American Nurses Association (ANA; 2001) provided fundamental support for the systems change project. Provision 1 necessitates that the nurse practice with “respect for the inherent dignity, worth and uniqueness of every individual” (p. 11). Provision 8.2 states that nurses should recognize processes that support ill health and should be “fosters [of] healthy life styles” (p. 29). As graduate program faculty, it was important to recognize the inherent vulnerability of students in an intense training program. Students may begin the program relatively healthy with positive feelings of self-worth. However, the barrage of school requirements and situational changes can quickly cause modifications in lifestyle that lead to decreased levels of physical and mental health. The wellness curriculum attempted to assist students to recognize and minimize known stressors. Students were encouraged to set achievable goals that promoted their individual advancement along a healthy lifestyle continuum.

Provision 3.6 of the ANA Code of Ethics (2001) discusses the impaired provider. Emphasis is placed on protecting the safety of the patient, as well as, appropriate care of the impaired health care provider. The wellness curriculum included a range of information on this sensitive topic. Student anesthetists were made aware of their individual risks. They also learned the potential profile and signs of substance abusers. The goal was that the students would address impaired provider issues with sensitivity, but also understand the necessity of protecting the public and the nurse anesthesia profession.

### **Literature Review and Synthesis**

A search was conducted for peer-reviewed research articles involving possible threats to the wellness of graduate nurse anesthesia students. The Cumulative Index to Nursing and Allied Health Literature (CINAHL) was queried initially; however, the search was expanded to include PubMed and ScienceDirect due to the low relevance of articles obtained. Keywords used for searching included *graduate students, school stress, wellness, education and drug abuse*. The Medical Subject Headings (MeSH) of *education nursing graduate, nurse anesthetists, life change events, health promotion, health education and drug users* were also used. *Limiters* included *English only, all adult, human only, scholarly journals, and published in the last 5 yrs*. In order to retrieve research about a specific population, inclusion criteria required only SRNAs or Certified Registered Nurse Anesthetists (CRNAs) and full text to enable study analysis. Exclusion criteria were anesthesiologists and all other students. However, due to the low number of relevant articles available, the search was expanded to studies published in the last 10 years and anesthesiologist research which also included SRNA or CRNA data. The final selection of eight research articles was analyzed and is summarized in an evidence table (see Appendix A for study characteristics).

### **Research Themes**

Because student wellness is multidimensional, three themes emerged among the group of eight articles reviewed. The themes were student progression and retention, stress and coping, and substance abuse. A literature analysis was conducted through the use of these themes.

### **Student Progression and Retention**

Four studies examined student progression and retention. Three of the studies (Dosch, Jarvis, & Schlosser, 2008; Hulse et al., 2007; Waugaman & Aron, 2003) had similar purposes.

The researchers tried to identify factors contributing to student attrition to gain information and develop solutions. The fourth study (Burns, 2011) explored whether academic progression could be predicted by preadmission criteria. All four studies were relevant to the clinical question. Finding causes of attrition rates could permit future students to remain in school and move toward achieving their full potential.

The investigators used two different research designs to examine factors contributing to attrition. Three researchers used correlational designs; whereas, Waugaman and Aron (2003) used a cross-sectional prospective quasi-experimental design. The research designs did not provide strong evidence, but three studies (Dosch et al., 2008; Hulse et al., 2007; Waugaman & Aron, 2003) included sample sizes of at least 55% of the population. Each study looked at different variables. The use of different variables was a weakness as the studies cannot be combined to provide a pattern or strong evidence for the research question.

All four studies were specific to SRNAs which matched the population for the clinical question. Hulse et al. (2007) used a convenience sample of 42 students in the US Army Graduate Program in Anesthesia Nursing. The three year longitudinal study involved attrition of subjects to 38 for the first follow-up assessment and to 26 for the final assessment. Investigators did not discuss reasons for loss of subjects, but the attrition was a threat to validity. Two investigators (Burns, 2011; Dosch et al., 2008) surveyed program directors for data on 914 and 1,499 SRNAs. Waugaman and Aron (2003) sent questionnaires to SRNAs which resulted in data on 1,119 students. None of the studies reported a power analysis to justify sample size. Burns (2011) and Waugaman and Aron included specific sample characteristics. Burns stated that 55.5% of subjects were female. Waugaman and Aron stated that the proportion of female subjects (60.2%) mirrored the gender distribution of CRNAs in the United States.

All investigators reported institutional review board (IRB) approval for their studies. IRB approval was particularly important as students are considered a vulnerable population. Two studies (Burns, 2011; Hulse et al., 2007) explicitly stated that confidentiality would be preserved. Hulse et al. (2007) stated that completion of the survey implied consent.

Only the cross-sectional prospective quasi-experimental study by Waugaman and Aron (2003) involved an intervention or discussed an extraneous variable. The intervention was time. Students were divided into six month time periods based on how far they were in anesthesia school. Data showed a decrease in student enrollment in the 12-18 month time period. There was concern that this time frame may have contributed to sampling variation. Questionnaires were mailed in the spring when fewer students were in the 12-18 month time period. Waugaman and Aron (2003) believed that the findings were not the result of sampling variation because, in addition to attrition rate, students were the least positively oriented to commitment to nurse anesthesia during that time frame.

The outcome measures for two articles (Dosch et al., 2008; Hulse et al., 2007) could be compared as the first was attrition rate and the second was graduation rate. The outcome measures for the other two articles were different and not easily compared. Burns (2011) looked at current grade point average (GPA), while Waugaman and Aron (2003) examined specific time periods of attrition. Only Hulse et al (2007) attempted to follow study participants. Students were followed for three years until they graduated from nurse anesthesia school.

Although four investigators studied attrition, each used different independent variables. The only independent variable that was similar was the graduate record exam (GRE) in which one study used the total value; whereas, another researcher used the individual verbal and quantitative scores. Other variables studied include admission criteria, director experience,

program size and length, locus of control, anxiety and scales of socialization. All four studies used different instruments to collect data. Hulse et al. (2007) and Waugaman and Aron (2003) used tools with established validity and reliability. The tools for Hulse et al. (2007) were the Rotter Locus of Control Scale, State-Trait Anxiety Inventory and the Watson-Glaser Critical Thinking Appraisal. The tool for Waugaman and Aron (2003) was the Student Nurse Anesthetist Experience Questionnaire. The other two investigators (Burns, 2011; Dosch et al., 2008) created new survey tools which were reviewed by experts providing face validity, but had no established validity or reliability.

The three correlational studies (Burns, 2011; Dosch et al., 2008; Hulse et al., 2007) used a variety of statistical techniques including Pearson's correlation, Chi-square, multiple linear regression and logistic regression. The quasi-experimental study (Waugaman & Aron, 2003) utilized analysis of variance (ANOVA). Investigators in all four studies (Burns, 2011; Dosch et al., 2008; Hulse et al., 2007; Waugaman & Aron, 2003) specifically identified the statistical tests applied. All statistics were appropriate for the variables that were analyzed. Probability values were given when applicable and all investigators considered  $p \leq 0.05$  to be statistically significant.

There were statistically significant results in each of the four attrition studies. According to Burns (2011), the preadmission criteria of GPA, science GPA and GRE were significantly correlated with academic progression. Furthermore, critical care experience was inversely correlated with academic progression. Dosch et al. (2008) demonstrated that a longer program length was associated with a higher attrition rate. Hulse et al. (2007) showed that external locus of control and lower anxiety levels were significant predictors of SRNA graduation. According to Waugaman and Aron (2003), there was significance for multiple socialization scales by length

of enrollment. At 12-18 months, SRNAs demonstrated a bureaucratic view, the least commitment to nurse anesthesia and an enrollment drop. At greater than 30 months, SRNAs were holistic and most committed to nurse anesthesia.

Considered collectively, there was no clear overlap in the results of the four studies. More research was needed to replicate previous studies and consolidate the evidence. Wellness could be a latent variable that played a role in many of the study results; however, more research was needed to identify trends and patterns.

### **Stress and Coping**

Two reviewed articles addressed stress and coping. The purpose of the Chipas and McKenna (2011) study was to determine the current level of stress, coping mechanisms and physical manifestations in SRNAs and CRNAs. Biddle and Aker (2011) wanted to quantify the sleep habits of CRNAs in order to foster awareness of patient safety concerns.

The stress and coping studies were descriptive and low on the hierarchy of evidence; however, they had large sample sizes. A clear pattern of evidence could not be established. Nevertheless, the authors were asking very important questions related to wellness. Combined study results provided a picture of current SRNA and CRNA stress, sleep and medication use. A weakness was that the studies involved self-reporting on sensitive issues which could affect accurate responses.

The sample size of the Chipas and McKenna (2011) study was 7,537 SRNAs and CRNAs and that of Biddle and Aker (2011) was 1,284 CRNAs. However, neither study used power analysis to justify the sample size. Biddle and Aker used a stratified random sampling of 10% of CRNAs located in seven regions. Sixty-one percent of the sample was female and the majority was between 30-59 years of age. The investigators did not state whether this sample was

representative of the population. Chipas and McKenna (2011) study respondents were American Association of Nurse Anesthetists (AANA) members (85%) and SRNAs (15%). The AANA (2013) reports that 92% of all nurse anesthetists in the United States are members. Of the AANA study members, 60% were female whereas 70% of the study SRNAs were female. Ethnicity was primarily white, at 90% for all. Chipas and McKenna stated that the demographics of the AANA members responding were similar to that of the total AANA membership. The demographics of the study participants matched the graduate anesthesia students in being primarily white and female. However, the nurse anesthesia students are younger with most being between 26-35 years of age.

Study subjects were protected as both articles had approval of the IRB and Biddle and Aker (2011) explicitly discussed their process design to ensure anonymity. Subjects were not exposed to interventions and there were no obvious extraneous variables.

The outcome measures between the studies were quite different and not easily compared. Chipas and McKenna (2011) scored stress on a Likert scale and obtained data from physical stress questions. Biddle and Aker (2011) collected outcomes from sleep-related questions. Both studies used percentages of respondents reporting in their statistical analysis.

The study findings related to stress and coping revealed the following: Chipas and McKenna (2011) demonstrated that the average daily stress level of a SRNA and CRNA were 7.2/10 and 4.3/10 respectively. The percentages of SRNAs and CRNAs who sought help for their stress were 27 and 31% respectively. Nineteen percent of both SRNAs and CRNAs reported taking prescription medications for stress. Biddle and Aker (2011) reported that 77% of CRNAs stated that they were sleepy during the work day with 68% waking up excessively tired. Twenty-four percent conveyed that they used sleep medications.

### **Substance Abuse**

The purpose of examining the final two studies was to look at prevalence and outcomes of substance abuse among attending anesthesiologists, residents and SRNAs. Wilson et al. (2008) examined inhalational abuse, while Wischmeyer et al. (2007) studied propofol abuse. These studies were consistent with the clinical question in that abuse could be the result of poor levels of wellness.

The research design of the substance abuse studies was descriptive. Both studies were poorly designed and actually had three authors in common. The investigators in Wilson et al. (2008) did not specify a time period to reference when respondents answered questions about previous known abusers. Therefore, the true incidence of abuse is unknown. The investigators in both studies queried anesthesiologist academic chairpersons to report on anesthesiologist attendings, residents and SRNAs. However, most SRNAs are not trained at the same hospitals as residents due to conflicts of case access. The investigators reported on the SRNAs as if they had a representative sample of the population, even though they did not survey any of the SRNA only sites or query of SRNA faculty. Both study investigators sent out initial surveys with follow-up surveys. Then they used personal emails and telephone calls to secure the desired response rate. This approach causes investigator bias. The Wischmeyer et al. (2007) study continued the survey study for over a year until they received a response from all chairpersons. Additional abuse cases from early respondents could have been missed. Power analysis of sample size was not reported.

Many extraneous variables were present throughout the studies. They included unknown reference time for answering questions, length of time to collect data, investigator bias and

unrepresentative sample. Although some extraneous variables were mentioned by the authors, they were not controlled for in the studies. They were mentioned as limitations of the research.

IRB approval was obtained for both studies and confidentiality of subjects was maintained by reporting data in aggregate. However, constant inquiring of subjects when they have previously not responded hinders subjects' individual right of autonomy.

Many variables related to anesthetic abuse were included on surveys. However, investigators created their own tools which had no established validity or reliability, nor was expert opinion used to improve the surveys. Comparisons could be made between the two articles on anesthetic abuse with measures of mortality and return to practice rates. Outcomes were measured as percentages for statistical analysis in both studies.

For the study findings, the term *anesthetist* was used to describe an inclusive group of anesthesiologist attendings, residents and SRNAs in academic medical centers. The study findings showed mortality rates for anesthetists found abusing inhalational and propofol anesthetics were 26 and 28% respectively. Of inhalational abusers, 22% were able to return to anesthesia practice. Only 12% of propofol abusers returned to practice. Anesthetists abused propofol at a rate of 0.1% which was an increase from previous statistics that showed 0.02%. Twenty-two percent of academic anesthesia departments reported at least one case of abuse of inhalational agents.

### **Synthesis of Student Wellness Literature**

Student registered nurse anesthetists must be on a continuous path of physical, mental and spiritual health to enhance their ability to move forward and achieve their goals. Otherwise, they risk numerous threats to their wellness, success and even life itself. It is well-known that graduate nurse anesthesia school is very challenging and involves grueling hours of study and

clinical. However, there is not an over-abundance of research to support this specific population in their endeavors. Studies have not been replicated or consolidated to provide a higher level of evidence because the available research involves the study of very different variables and outcomes that cannot be combined easily. What the researchers demonstrated was the vastness of the student wellness issue. The evidence supported the concept that the wellness of graduate nurse anesthesia students was multifactorial. In order for SRNAs to be more successful in school they need to come with prior academic success and strive to keep their anxiety and stress as low as possible. Students need to be socialized and supported especially during the 12-18 month time period in school when they are at most risk for attrition from the program. Mortality from anesthetic abuse is between 26 to 28%. Therefore, it is likely that a student abusing anesthesia drugs would be found dead before it is discovered that they have a problem. Education of students and family needs to occur so that the early warning signs of abuse may be seen. If a student does fall to anesthetic abuse, the possibility of them returning to anesthesia practice is very low. SRNAs and CRNAs play a crucial role in the anesthesia care and safety of patients. With 77% of CRNAs reporting that they are sleepy during work and 24% stating that they used sleep medications, there is definitely a cause for concern. Mandates are in place to limit the number of hours a nurse anesthesia student or resident can work in a week. However, CRNAs or anesthesiologists do not have any constraints on the number of practice hours or sleep which has been a topic of recent discussion and debate within the AANA. The AANA recently solicited feedback regarding sleep and fatigue in order to update a practice advisory. Overall, the research evidence supported the clinical question and demonstrated the need for a wellness curriculum in graduate nurse anesthesia schools. More research is necessary to strengthen the current evidence. However, the research reviewed provided a better focus for this systems change

project. Stress, sleep, coping and substance abuse were incorporated into the anesthesia curriculum design. The topics were presented in a way that related to the daily lives and safety of the students and their patients.

### **Healthy Lifestyles Guideline**

The National Guidelines Clearinghouse, the Registered Nurses Association of Ontario Best Practice Guidelines and the Institute for Clinical Systems Improvement (ICSI) were searched for content relevant to student wellness. The searches were conducted by organization, category and subject. The organizations queried were the American Nurses Association and the American Society of Anesthesiologists. Categories explored included preventive and health maintenance. Subject terms were *attrition, stress, substance abuse and wellness*. The addition of *AND students* to each of the previous search terms helped to narrow the results. The most appropriate guideline found, *Healthy Lifestyles* (ICSI, 2011) was described and critiqued.

### **Guideline Assessment**

The quality of the Healthy Lifestyles guideline was assessed through use of the Appraisal of Guidelines for Research & Evaluation II (AGREE II; 2009) instrument. The evaluation results are shown in a table (see Appendix B for AGREE II scores). In the overall assessment, the guideline was rated as six out of seven demonstrating very high quality and was recommended for use. The guideline was very well written, organized and routinely updated. The intended users, target population, objectives and health questions were specifically described. A diverse professional group developed the guideline with full input from patients through a patient advisory council. Key recommendations were clearly presented with flow charts, algorithms and a summary table; moreover, multiple tools were included for provider use. Facilitators and barriers of implementation were presented with suggested strategies to overcome

the barriers. The weaknesses of the guideline were in the domains of rigour of development and editorial independence. No specific electronic databases, search time frames, or inclusion and exclusion criteria were described. No external review of the guideline was performed. Sources of funding and potential conflicts of interest were listed, but resulting influences were not discussed or denied.

### **Guideline Findings**

The healthy lifestyles guideline was for use with adults age 18 and older and included objectives of increased health screening, individual goal setting and the increased availability of community resources. Multiple content areas within the guideline appropriate for graduate student nurse anesthetists were explored. The authors of the guideline stated that individuals are motivated toward healthy lifestyles through community, social and environmental support. The support included changes in the physical environment; such as, the provision of walking trails and parks. Creating access to places for physical activity, including worksites, has shown strong evidence of support. Point-of service prompts near elevators to encourage use of the stairs were useful. There was considerable evidence to support changes in the nutritional environment of universities and places of work. Food choices were positively affected through food availability, access, and point-of-purchase nutritional information. Recommendations for changes in the social environment included educational campaigns to change public opinion, attitudes and social norms. Faith-based organizations were often an important part of the social network providing support for healthy lifestyles and delivering a voice in public policy development. As an implementation strategy to support changes in lifestyles, the healthy lifestyles work group suggested placing educational materials such as posters, pamphlets and videos throughout

facilities. Access to community resources should be available by providing web sites and support group materials.

**Primary care provider.** The healthy lifestyles guideline specified that when a primary care provider gave a strong individualized message to a patient, it was helpful with long-term behavior change. This individualized message was especially helpful when combined with educational material, follow-up and referral. Health care systems enhanced patient support through follow-up phone calls from office personnel, letters signed by the provider and awareness of patient participation in specific health programs during office visits.

**Brief interventions.** In the process of individual change toward a healthy lifestyle, brief interventions were effective. The brief intervention involved sharing screening results and providing individual feedback on health risks and consequences. Health care advice was given and the patient committed to measurable short and long-term goals. Patient encouragement and follow-up support or counseling was provided. Multiple health behaviors should be addressed at the same time because combined interventions showed the greatest results.

**Health assessments.** Standardized surveys that measure health status, behavior, skills and attitudes are labeled health assessments. An example was provided in the guidelines; however, there were many variations available. The surveys can be administered in an array of settings. Health assessments have shown to be effective when combined with prompt feedback, education and suggestions for change on identified risk factors. Health assessments are best when results are discussed with health care providers or counselors. If performed consistently, health assessments have shown strong evidence in improving the following health behaviors in populations of workers: decreasing tobacco and harmful alcohol use; reducing blood pressure,

cholesterol and dietary fat; and improving physical activity and reducing the number of sick days.

**Four lifestyle behaviors.** The healthy lifestyles guideline discussed four specific lifestyle behaviors: adequate physical activity, a diet emphasizing fruits and vegetables, abstinence from tobacco/tobacco smoke and avoidance of harmful drinking. Collectively, these four behaviors were correlated with at least 10 years of increased life expectancy. Adopting these behaviors at any age significantly lowered an individual's total mortality rate. A few specifics of each of the four lifestyle behaviors were discussed. Any improvement in physical activity, even ten minutes a day was beneficial. However, a healthy goal would be moderate intensity exercise for 30 minutes a day, five days a week. Strength training two or more non-consecutive days a week was also important. For healthy nutrition, individuals should avoid oversized portions and make half of their plate fruits and vegetables. Drinking water instead of sugary drinks was important, as well as, switching to low-fat/fat-free milk and decreasing sodium intake. If someone quit smoking, their health was significantly improved.

Pharmacotherapy and telephone quit lines were moderately effective in helping individuals to stop smoking. Alcohol has harmful effects on a fetus; therefore, females should not drink during pregnancy. Screening and brief interventions for substance abuse increased compliance with treatment. The four lifestyle behaviors discussed could be improved by a fifth element, practicing positive thinking. Promotion of positive emotions increased reports of happiness and showed short-term advantages to well-being.

### **Systematic Review**

A search was conducted for systematic review research articles involving threats to the wellness of graduate nurse anesthesia students. The Cochrane Library, PubMed, CINAHL and

Sigma Theta Tau International were queried. Search terms included *nurses, students, providers, wellness, stress, attrition, substance abuse, education, doctoral program* and *reviews*. *Limiters* included *English only, all adult, human only* and *published in 2000 to 2012*. Three systematic reviews were found; but only one specifically related to the wellness of nurses. The other two reviews were excluded because one pertained to medical education stress and the other one reviewed the specific tools available to assess students for school admission.

### **Systematic Critique**

The relevant systematic review obtained was a qualitative integrative review entitled *Doctoral Persistence and Doctoral Program Completion among Nurses* (Cohen, 2011). It was critiqued using the University of Oxford (2005) Systematic Review Appraisal Sheet (see Appendix C for nominal results). The main question (PICO) of the systematic review was clearly stated. The author wanted to know the following: In doctoral nursing students, how does doctoral persistence and the challenges faced affect doctoral student retention and reverse the nursing shortage? It is unlikely that the author missed relevant studies because articles were reviewed from four different disciplines by searching five major databases. The author examined the reference lists of pertinent articles and included doctoral dissertations, papers presented and an unpublished manuscript. The search strategy was described in detail with key words; however, specific MESH terms were not stated. Abstracts were reviewed for relevance, full text articles examined and a final 24 research studies were pertinent for the systematic review. Most exclusion and inclusion criteria were clearly stated and appropriate. Exclusion criteria included articles written prior to 1985 and articles that did not pertain to doctoral study. Articles were limited to the English language, although the University of Oxford (2005) appraisal states that English language should not be used for exclusion. The author included

nursing articles that defined doctoral persistence, explored the doctoral experience or suggested ways to improve doctoral graduation rates. The major criteria not stated was what type of studies were included or excluded for the review. In reviewing the reference list, it appeared that the articles included were single qualitative studies. The author did not describe any method of quality or criteria used to demonstrate that individual studies were sufficiently valid. There was no mention of any qualitative measures, such as, data saturation, triangulation, audit, or credibility. However, there was demonstration that the results were similar from study to study. The author listed four themes with examples of each in a table. These themes are discussed further.

### **Systematic Findings**

According to Cohen (2011), a review of the literature resulted in the emergence of four themes that provided a view of the doctoral nursing student. Cohen hoped that the information would help prepare prospective students, as well as, remind faculty of the burdens that students face. The goal was to increase doctoral student retention, increase the availability of doctorally prepared nursing faculty and ultimately reverse the nursing shortage. The Cohen (2011) study related to graduate student nurse anesthetists as the anesthesia program will soon transition from a master's degree to a doctor of nursing practice degree. The four doctoral nursing student themes were *periods of transition, parenthood and outside demands, delays and faculty-student relationships and positive aspects*.

The first theme was periods of transition. It is difficult for students to be back in a classroom after many years away. Women reported poor communication from the people they thought would be the most supportive. Students reported anxiety, sleep disturbance, depression

and weight gain. The build-up of stress over time caused health problems that resulted in student attrition.

The second theme was parenthood and outside demands. Parents often struggled with role conflict trying to balance school, work and family. The parent felt guilty about neglecting any one of the roles and was unable to fully relax. Financial difficulties were often a concern.

The third theme was delays and faculty-student relationships. Students became discouraged if faculty did not respond to student requests for meetings or advice. Student momentum was lost when there were long wait periods for feedback or necessary approvals. Conflict arose with differences in work expectations between the student and faculty member.

The fourth theme was positive aspects. Focusing on the positive aspects of obtaining a doctoral degree helped the student persevere through difficult times. Students reported improved critical thinking, writing skills and research abilities. They developed resilience to obstacles and pride in accomplishments. Students also reported the development of life-long friendships.

The four themes shared a common element which was persistence. It was persistence which drove student behavior. It was persistence which allowed a student to endure and surpass any of the obstacles on the path to the doctoral degree. Persistence was a predictor of program retention and completion.

### **Level of Evidence and Quality**

The previously discussed research studies and guideline were each assessed for level of evidence and quality (see Appendix A for study characteristics). The assessment tools are displayed (see Appendix D for evidence hierarchy levels and Appendix E for evidence quality). The two highest rated studies were the healthy lifestyle guideline (ICSI, 2011) at a level Ia high and Waugaman and Aron (2003) at Iib high. The healthy lifestyle guideline (ICSI, 2011) was

developed by a review of published meta-analyses and systematic reviews and received very high scores when appraised with AGREE II. Therefore, the healthy lifestyle guideline could be implemented with confidence. The study by Waugaman and Aron (2003) was quasi-experimental, utilized a valid and reliable tool with a sample size of 55% of the population that mirrored the gender of U.S. CRNAs. Waugaman and Aron (2003) provided good support for student attrition at 12-18 months of school when students were least committed to anesthesia. The three correlational studies (Burns, 2011; Dosch et al., 2008; Hulse et al., 2007) were all rated level IV moderate. This level puts them at a middle range of level and quality of evidence. Each used appropriate statistical tests and generally had good sample sizes from the population. Hulse et al (2007) used an established survey tool, while (Burns, 2011; Dosch et al., 2008) used tools with face validity. More research was needed to replicate these correlational studies (Burns, 2011; Dosch et al., 2008; Hulse et al., 2007) to increase the strength of evidence. Currently, high pre-admission scores and lower anxiety are significant for success in anesthesia school, while longer program length and more critical care experience are significant for attrition. The integrative review (Cohen, 2011) was rated as level V moderate. The author did not describe any criteria to show that individual studies were valid; therefore, the quality of the study could not be rated high. The evidence obtained was useful due to the volume of articles with repeated themes. The studies by Biddle and Aker (2011) and Chipas and McKenna (2011) were both rated level VI moderate. Although low on the hierarchy, both studies had large sample sizes and surveys with face validity. The final two studies (Wilson et al., 2008; Wischmeyer et al., 2007) were rated level VI low. Both had significant flaws in design and methods. Extraneous variables were not accounted for and new survey tools were used. Interestingly though, mortality rates and rehabilitation to practice rates were similar between the two studies. It is difficult to state the

comprehensive strength of the evidence when different variables or outcomes were measured in most of the studies discussed. More research is necessary to help strengthen the current evidence.

### **Integrative Review**

The following integrative review combined eight primary research articles; one systematic review and a national practice guideline (see Appendix A for study characteristics). The evidence suggested that the wellness of graduate nurse anesthesia students was multifactorial. Available research involved the study of many different variables with significant outcomes that may be combined into general themes. However, replication of studies would be necessary to increase quantitative data on individual variables. The evidence supported the clinical question and demonstrated the need for a wellness curriculum in graduate nurse anesthesia schools to increase wellness knowledge. The knowledge is needed to assist students to reach their full potential and be healthy and successful in their academic endeavors. In order for SRNAs to be more successful in school, they need to come with prior academic success. Students must be supported and socialized during vulnerable periods of transition. Vulnerable periods include coming back to the classroom after many years away and during the 12-18 month time period when students are at most risk for attrition. Students should understand that persistence is a predictor of program completion. It is persistence that will allow students to endure and surpass obstacles on their path to a degree. SRNAs should obtain adequate sleep and strive to keep their anxiety and stress as low as possible. The build-up of stress over time has been shown to cause health problems that resulted in student attrition. Focusing on the positive aspects of school helps the student persevere through difficult times. Positive aspects could include improved critical thinking, pride in accomplishments or the development of life-long

friendships. Practicing positive thinking increased reports of happiness and has shown short-term advantages to well-being. Four healthy lifestyle behaviors were collectively correlated with at least 10 years of increased life expectancy. The four behaviors were physical activity, healthy diet, abstinence from tobacco and avoidance of harmful drinking. Substance abuse in anesthesia can have detrimental effects with mortality rates from anesthetic abuse close to 30% and the possibility of returning to successful practice very low. Individuals were motivated toward healthy lifestyles through community, social and environmental support. Support includes information and educational materials being readily available and seen throughout facilities. It is important that areas for physical activity are provided and easily accessible. Finally, health assessment surveys are a first step, but should be supplemented with prompt feedback, education and suggestions for change.

### **Recommendations**

Based on the integrative review of the literature, four recommendations evolved that support graduate nurse anesthesia students. The first recommendation was: Create an environment that is supportive of healthy lifestyles. A healthy environment includes a walking trail, information about local gyms and educational posters and pamphlets throughout the facility. The recommendation was supported by the Healthy Lifestyles Guideline of ICSI (2011) which reported that individuals are motivated toward health through environmental support with availability of educational materials. The second recommendation was: Offer students a health assessment survey that gives individualized feedback on lifestyle strengths and weaknesses. The ICSI Healthy Lifestyles Guideline reports strong evidence that regular health assessments improve health behaviors. The health assessment recommendation also addresses student wellness issues discussed throughout the research articles. These include anxiety (Hulse et al.,

2007), stress (Chipas and McKenna, 2011), and sleep (Biddle and Aker, 2011). The third recommendation was: Provide classroom education on four lifestyle behaviors: physical activity, diet, tobacco and alcohol abuse. These behaviors were correlated with over 10 years of increased life expectancy (ICSI, 2011). Education in early identification of anesthetic abuse was included to help combat a high-risk behavior (Wilson et al., 2008; Wischmeyer et al., 2007). The fourth recommendation was: Provide education on the benefits of practicing positive thinking and the need for student persistence to graduate. The ICSI reports increased happiness and well-being by practicing positive thinking. Cohen (2011) showed that focusing on the positive aspects of school and persistence helped the student persevere through difficult times and ultimately graduate. Hopefully, implementation of the evidence based recommendations above will increase student knowledge and enhance their capacity to strive for success and grow towards their full potential.

### **Summary**

The theoretical and ethical foundations for the systems change project were discussed. This included Betty Neuman's Systems Model, The Transtheoretical Model and the ANA Code of Ethics. A review of the literature revealed multiple variables enmeshed in the wellness of anesthesia students. Research themes emerged including student progression and retention, stress and coping, substance abuse, and persistence. The healthy lifestyle guideline provided high quality recommendations that were incorporated into the wellness curriculum of the systems change project.

### **Chapter Three**

#### **Project Design and Methodology**

The purpose of the wellness curriculum was to increase the wellness knowledge of 35 first-year graduate nurse anesthesia students to enhance their ability to be successful in anesthesia school. It was hypothesized that a non-experimental study with pre-test and post-test design would demonstrate at least an increase of 30 percentage points in mean test scores. Wellness curriculum data were analyzed using paired *t*-tests and percentages with the Excel data analysis toolkit. The wellness curriculum was the intervention which included three major components: wellness classes, a supportive environment and healthy lifestyle questionnaire.

#### **Wellness Classes**

The first component of the wellness curriculum was to provide three wellness classes. With the support of the site mentor and program director, three two-hour blocks of time were incorporated into the anesthesia student's schedule. The time slots were distributed over a three month time-frame. The first class covered the topic of sleep. The second class integrated stress and substance abuse. The final class included fitness and nutrition. The classes presented were evidence based and tailored to the issues and concerns of graduate nurse anesthesia students. Each of the three sessions began with a pre-test assessment with 10 items. Then a lecture was presented and followed by a post-test of the same 10 items. Due to the new COA (2011a) standards, student participation in the pass/fail wellness classes was mandatory. Students were required to receive an overall score of 85% which is the standard passing rate of the graduate nurse anesthesia program. The major components of the curriculum for each of the three wellness classes follow.

**Sleep.**

1. National Transportation Safety Board Data
2. Combating drowsy driving
3. Wake time equivalence to blood alcohol levels
4. Anesthesia sleep and vigilance study
5. Sleep requirements
6. Stages of sleep and student relevance
7. Naps
8. Sleep deficit
9. Circadian rhythms
10. Hormones
11. Hindrances to sleep
12. Polysomnography
13. Sleep disorders
14. Aging
15. Environment

**Stress and substance abuse.**

1. U.S. health statistics
2. Wellness definition
3. National wellness factors
4. Individual wellness factors
5. Student stressors
6. Coping with stress
7. Anesthesia school attrition
8. Anesthetic drug abuse incidence
9. Mortality of abuse
10. Profile of substance abusers
11. Signs of substance abuse
12. Experiences with substance abusers
13. Prevention plan
14. Treatment assistance and return to practice rates
15. *Wearing Masks* video (Rainbow Productions)

**Fitness and nutrition.**

1. Positive thinking
2. Genetics
3. Benefits of exercise
4. Time goals
5. Hot and cold weather
6. Running surfaces
7. Exercise shoes and clothes
8. Treadmills, ellipticals and balance equipment

9. High intensity training
10. Lactate threshold and oxygen uptake
11. Aerobic exercise
12. Strength training
13. Static and dynamic stretching, warm-up
14. Injuries
15. Fruits, vegetables and protein portions
16. Curbing hunger
17. Weight loss
18. Fats and fried foods
19. Grading of meats
20. Cholesterol

### **Environment**

The second component of the wellness project was to create an environment more supportive of healthy lifestyles. This was primarily accomplished through the use of wall posters with healthy reminders and gym literature placed in the student lounge/study area. A mileage map of the walk around the building and parking lot was also posted. Seven sets of hand weights and two sets of hand grips were provided for student use.

### **Healthy Lifestyle Questionnaire**

The final part of the project was to provide the students free access to an on-line lifestyle questionnaire within the first month of their anesthesia program. Students were informed that participation in the lifestyle survey was voluntary and that completion of the on-line questionnaire implied consent. Institutional Review Board (IRB) approval had been obtained for a written information consent form that was provided to each student to read before making any decisions about participation. The National Wellness Institute (NWI; 2004) assisted the investigator to provide the TestWell Standard Edition which is a 100 item assessment of wellness. The test results provided students with self-awareness of their current state of health by revealing personalized strengths and weaknesses. The primary purpose of the questionnaire was to assist the individual students in their quest for wellness. However, demographics and

aggregated results were collected to aid in the development of future wellness classes. A more in-depth discussion of the tool follows.

The National Wellness Institute (1976) co-founder, Dr. Bill Hettler, developed the Six Dimensions of Wellness Model which includes occupational, physical, social, intellectual, spiritual and emotional areas. The NWI (2004) TestWell wellness inventory is based upon these inter-related dimensions that combine to give balance in individual's lives. The questionnaire contains the ensuing 10 sections: physical fitness and nutrition, medical self-care, safety, environmental wellness, social awareness, emotional awareness and sexuality, emotional management, intellectual wellness, occupational wellness, and spirituality and values. Individual items are scored on a Likert scale ranging from 1 (almost never) to 5 (almost always). Although the questionnaire is 100 items, it takes only about 20 minutes to complete. Students immediately received their on-line score for each section, as well as, a total wellness score. By recording their confidential personal identification number, students could also view their results at a later date.

Owen (1999) sought to test the reliability and validity of the TestWell for use with graduate students. The reliability was demonstrated with a Cronbach's coefficient alpha of .92. The validity was determined with a Pearson product moment correlation coefficient calculated between the total score and each of the 10 sub-sections. All results were shown to be statistically significant at the .001 alpha level. Jones and Frazier (1994) calculated a Cronbach coefficient alpha of .84 for the TestWell when they used the tool with wellness professionals (as cited in Owen, 1999).

## **Implementation Plan**

### **Timeline**

To initiate the systems change project, the investigator met with the academic advisor, site mentor and anesthesia program director in the fall of 2011. The project was discussed at an anesthesia faculty committee. There was full support of the wellness curriculum from all mentors and stakeholders in the project. A primary consideration was the question of when would be the best time to implement the wellness classes. Initially it was thought that all three classes would be presented during the new students' orientation week or shortly thereafter. This plan made sense as we wanted the students to have the information as they began their graduate school journey. However, the academic advisor discussed trying to incorporate wellness throughout the curriculum. With this in mind, the plan evolved into presenting the wellness classes over a longer three month time frame. With one class per month, the students were able to absorb and contemplate on the information easier than if they had received all of the information in a short time frame. The opportunity to take the individual lifestyle questionnaire was presented to the students within the first month of their program which was before any of the wellness classes began.

In the spring of 2012, the investigator conducted a review of the literature and delivered a preliminary public presentation. By early fall of 2012, Institutional Review Board (IRB) approval had been obtained from both St. Catherine University and the college of the anesthesia program. Project implementation and data collection began fall of 2012 with data analysis in winter 2013.

**Resources**

In order to implement a system change project, it was necessary to evaluate resources available versus resources needed. The resources available for the wellness curriculum were identified with a total cost of \$853 (see Appendix F for resources available for program). The facilities resources listed are fixed expenses of the college; however, the resources are utilized for the wellness curriculum. The equipment listed is shown with estimated depreciation costs.

The resources needed for the wellness curriculum were also determined with a total cost of \$15,444 (see Appendix G for resources needed for program). The main cost was the investigator salary of \$13,750 for 275 hours. The time allotted includes investigator literature review, reading and class development. Additional professionals necessary included a statistician and a test administrator for the TestWell wellness inventory (National Wellness Institute, 2004). The individual wellness assessments were donated with use of the university name. Wellness equipment was essential to help create a healthy school atmosphere. Finally, supplies were needed that directly related to implementation of the program; such as, printer paper and score sheets. The combined costs of the available and needed resources for the program were \$16,297.

**Budget**

The combined costs of the resources for the system change program were presented in a budget (see Appendix H for program budget). Note that due to rounding of numbers, the budget displays a total cost of \$16,298 instead of \$16,297. The investigator total time investment was 275 hours over a three month time period (roughly October through December). The first revenue item is 'college to anesthesia program'. This money was originally received through student tuition and fees and then allotted to the anesthesia program. Only college revenue that

was associated with the wellness curriculum is listed. The second revenue item is ‘donated time/money’. Most of the revenue for the wellness program is within this category and includes the investigator’s salary, investigator vehicle costs, statistician, test administrator, lifestyle assessments, books and weight equipment. There are five categories of expenses with most being distributed over the course of three months as a wellness class is presented each month. Total expenses of \$16,298 equal the total revenue from the college and donations.

### **Return on Investment**

The wellness classes were designed to assist students to achieve healthier lifestyles that would enable them to think and learn at optimal levels leading to continued school progression and graduation. Improved student retention helps maintain college revenue. The benefit of income retained was calculated by the semester that student attrition occurs (see Appendix I for return on investment for one student). For example: if the wellness curriculum prevents one student from leaving the anesthesia program during the first semester, the college would benefit \$11,916 in retained student tuition. Based on the benefits displayed and the costs of the wellness curriculum, a return on investment (ROI) analysis can be done. Stone, Smith, and Frick (2010) demonstrated that ROI is calculated as benefits minus costs which is then divided by costs and finally, multiplied by 100%. In order to calculate ROI for the wellness project, it must first be determined how many students are retained. There are many reasons that a student may leave the program. To be conservative, it was assumed that one student is retained in anesthesia school due to the wellness program. ROI was calculated for each semester of anesthesia school (see Appendix I for return on investment for one student). If a student is retained in the first semester, the ROI is negative at -27%. The project would be unacceptable because the costs are greater than the benefits. If a student is retained in the second through the eighth semesters;

however, the ROI turns to positive numbers and the benefits are greater than the costs. The benefits greatly outweigh the costs in the sixth through eighth semesters as the ROIs are greater than 200% making the project an exceptionally good investment. The vision was that a wellness curriculum early in the anesthesia program would provide the students with the necessary tools to remain in school many semesters and ultimately graduate.

### **Ethical Considerations**

Pozgar (2013) wrote that the ethical principle of beneficence includes “helping others” (p. 9). The investigator believes a wellness curriculum is designed to help anesthesia students on their path to reaching their full potential. In this context, the investigator may want to push students toward lifestyle changes that the students are not ready to undertake. The investigator should provide information and support, but needs to allow the students their individual right of autonomy. According to Pozgar (2013), autonomy is allowing an individual to render their own decisions. Students also had the right to decide if they wanted to take the lifestyle questionnaire which involved answering some questions that may have been sensitive in nature. Any information provided needed to be safeguarded with students’ privacy and confidentiality protected. The Code of Ethics of the ANA (2001) includes privacy and confidentiality in Provisions 3.1 and 3.2 respectively.

### **Summary**

The wellness curriculum project consisted of three parts: evidence based wellness classes, creating a healthy environment and providing students access to a lifestyle inventory. The resources available and needed were identified and budgeted. The return on investment demonstrated that the project was a good investment in aiding student success. Ethical principles were considered during project development and implementation.

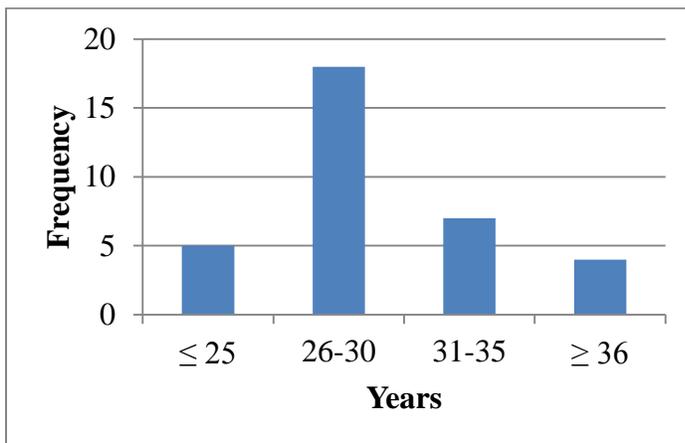
## Chapter Four

### Data Analysis

The students involved in the wellness curriculum were the anesthesia program's graduating class of 2015. The class began with 35 graduate nurse anesthesia students. All 35 participated in the three mandatory wellness classes. Pre-test and post-test data are presented from the individual and combined test results. Thirty-four students (97%) chose to complete the voluntary TestWell Standard Edition wellness inventory (NWI, 2004). Demographic data are presented that were obtained from the questionnaire as well as aggregate student lifestyle information.

#### Demographics

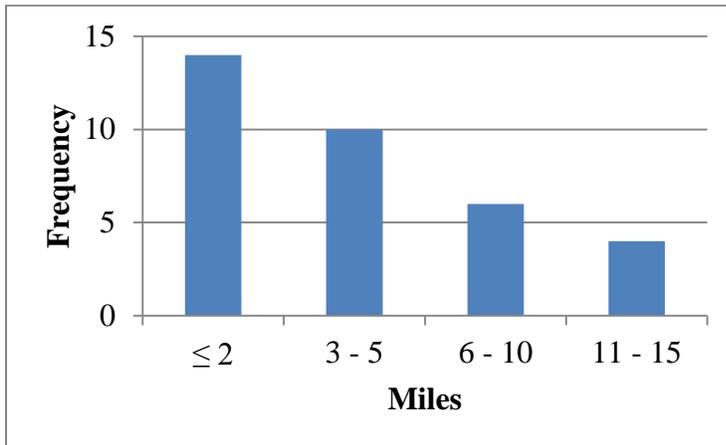
Of the 34 students surveyed, 9 (26%) were males and 25 (74%) were females. The marital status was 18 (53%) single and 16 (47%) married. Figure 1 displays the age distribution of the anesthesia students. Eighteen (53%) of students were between the ages of 26 and 30.



*n*=34

Figure 1. Age of Anesthesia Students

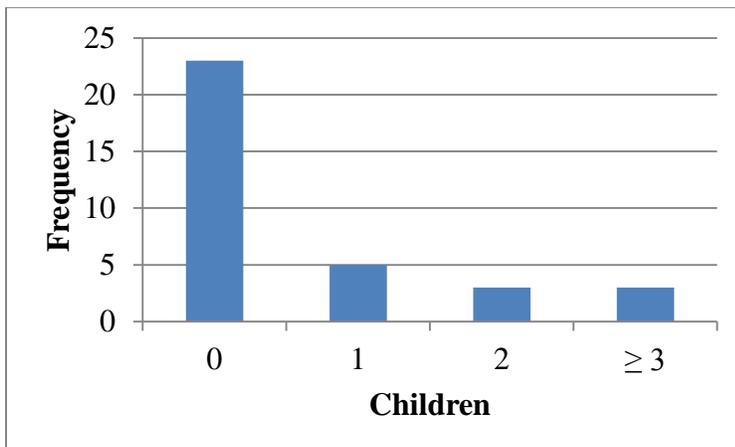
The daily commute to attend anesthesia graduate school is shown in Figure 2. Twenty-four (71%) students commute five miles or less. No students reported a daily commute greater than 15 miles.



$n=34$

Figure 2. Daily Commute to Graduate School

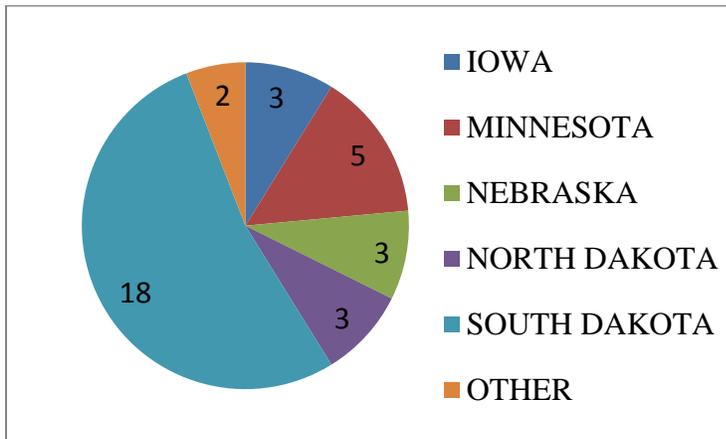
The number of children the anesthesia students have is depicted in Figure 3. Twenty-three (68%) of students do not have any children. On the opposite end of the spectrum, three (9%) of students have three or more children.



$n=34$

Figure 3. Children of Anesthesia Students

The survey asked the students the following question: From which state did you apply for anesthesia school? The results are displayed in Figure 4. Eighteen (53%) applied from South Dakota and 16 (47%) of students applied to the anesthesia school from a different state than South Dakota.



*n*=34

Figure 4. State from Which Anesthesia Students Applied

**Results of Wellness Classes**

Three wellness classes were presented to the nurse anesthesia graduate students: sleep, stress and substance abuse, and fitness and nutrition. The outcomes of the 10 item pre-test and post-test for each module, as well as, the combined results are presented with descriptive statistics and figures.

**Sleep**

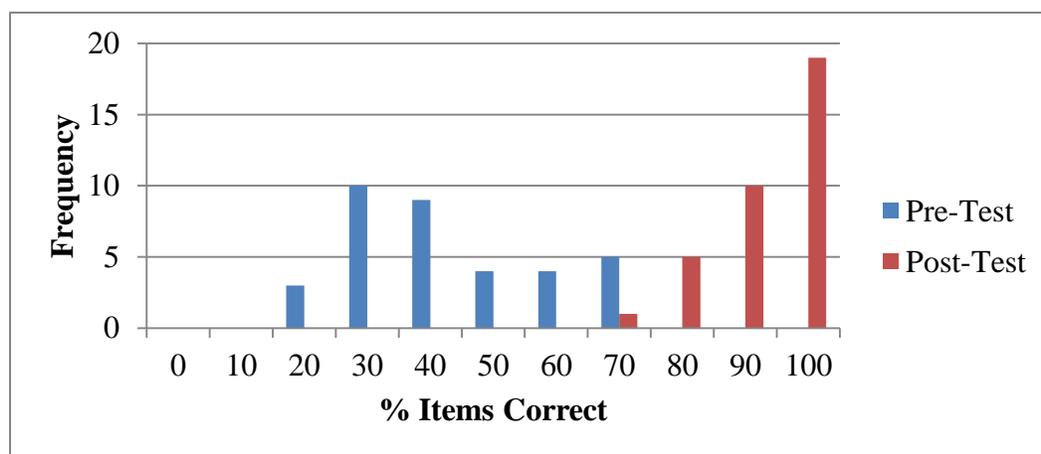
The first wellness class presented was on sleep. The pre-test mean score was 4.3 with a range of 2 through 7. The post-test mean score was 9.3 with a range of 7 through 10. The mean gain score was 5. The summary data are displayed in Table 2. A visual illustration of the change in test score distributions is presented in Figure 5.

Table 2

*Sleep Test Scores*

	Mean	Median	Std Dev	Min.	Max.	Skew	Kurtosis
Pre-Test	4.31	4	1.57	2	7	0.46	-0.90
Post-Test	9.34	10	0.84	7	10	-1.06	0.28
Gain	5.03	5	1.71	1	8	-0.31	-0.42

n=35



n=35

Figure 5. Sleep Test Score Comparisons

**Stress and Substance Abuse**

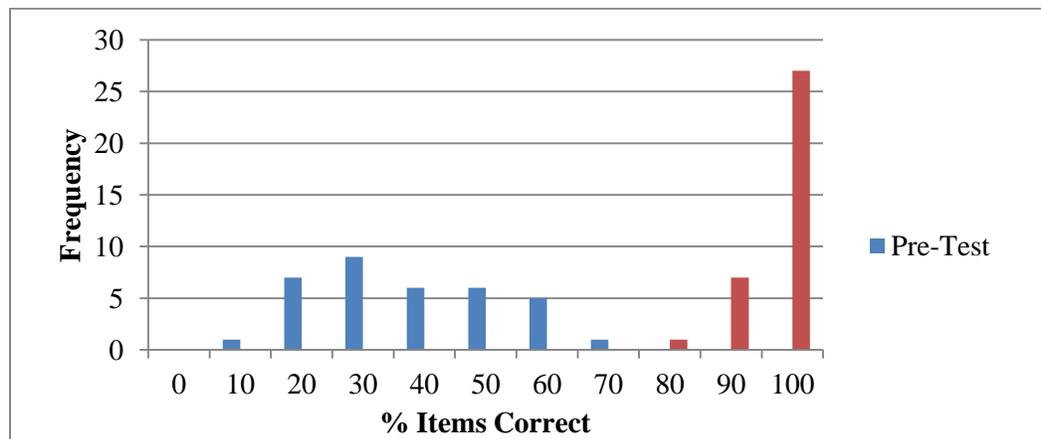
The second wellness class offered was on stress and substance abuse. The pre-test mean score was 3.8 with a range of 1 through 7. The post-test mean score was 9.7 with a range of 8 through 10. The mean gain score was 5.9. The summary data are displayed in Table 3. A visual illustration of the change in test score distributions is presented in Figure 6.

Table 3

*Stress/Substance Abuse Test Scores*

	Mean	Median	Std Dev	Min.	Max.	Skew	Kurtosis
Pre-Test	3.80	4	1.53	1	7	0.25	-0.90
Post-Test	9.74	10	0.51	8	10	-1.86	2.89
Gain	5.94	6	1.49	3	8	-0.29	-0.86

n=35



n=35

Figure 6. Stress/Substance Abuse Test Score Comparisons

**Fitness and Nutrition**

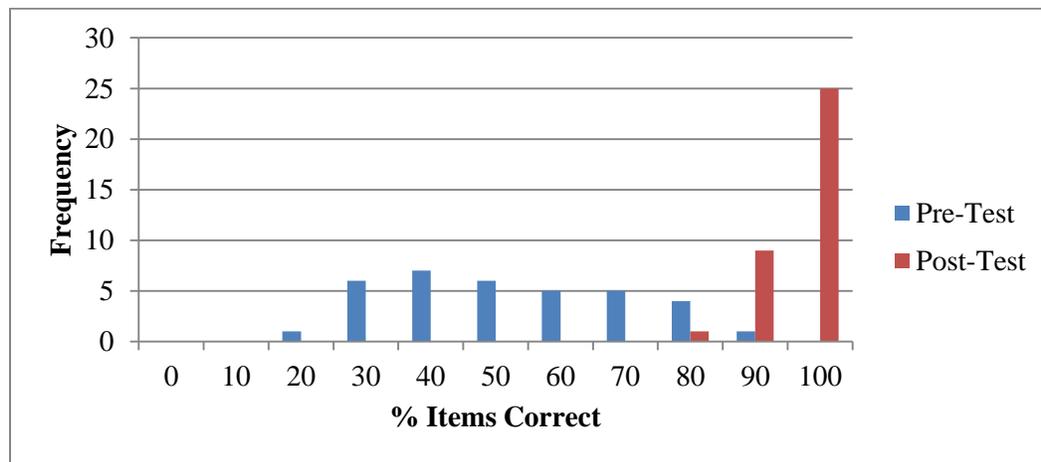
The third and final wellness class presented was on fitness and nutrition. The pre-test mean score was 5.3 with a range of 2 through 9. The post-test mean score was 9.7 with a range of 8 through 10. The mean gain score was 4.4. The summary data are displayed in Table 4. A visual illustration of the change in test score distributions is presented in Figure 7.

Table 4

*Fitness/Nutrition Test Scores*

	Mean	Median	Std Dev	Min.	Max.	Skew	Kurtosis
Pre-Test	5.26	5	1.84	2	9	0.23	-0.95
Post-Test	9.69	10	0.53	8	10	-1.45	1.31
Gain	4.43	5	1.80	1	8	-0.08	-0.78

n=35



n=35

Figure 7. Fitness/Nutrition Test Score Comparisons

**Overall Classes**

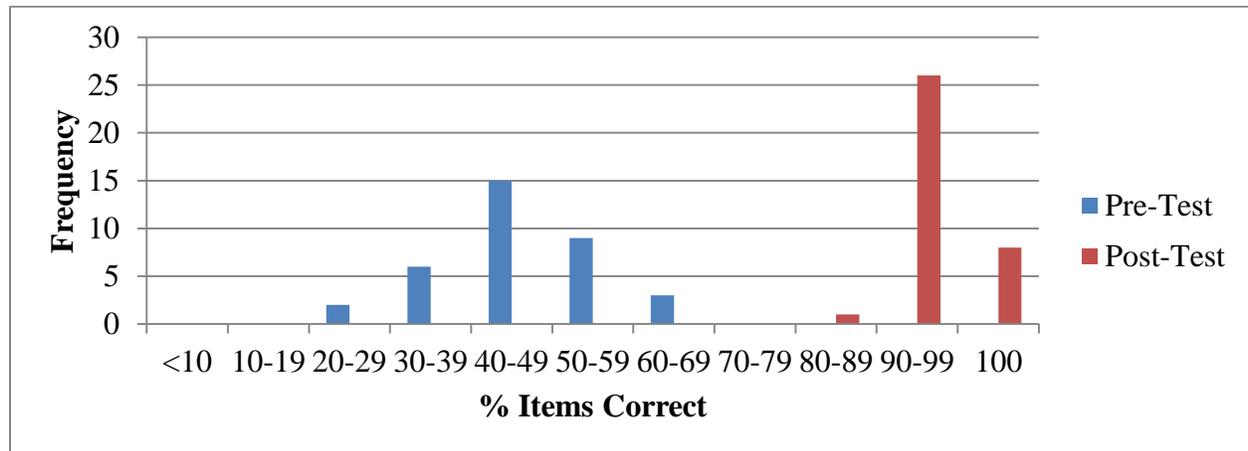
The three wellness tests were combined for total scores. The pre-test mean score was 13.4 with a range of 7 through 19. The post-test mean score was 28.8 with a range of 26 through 30. The mean gain score was 15.4. The summary data are displayed in Table 5. A visual illustration of the change in total test score distributions is presented in Figure 8.

Table 5

*Overall (Combined) Test Scores*

	Mean	Median	Std Dev	Min.	Max.	Skew	Kurtosis
Pre-Test	13.37	14	2.78	7	19	-0.23	-0.01
Post-Test	28.77	29	1.00	26	30	-0.81	0.51
Gain	15.40	15	2.76	9	22	0.32	0.58

n=35



n=35

Figure 8. Overall (Combined) Test Score Comparisons

**Evaluation**

An outcome objective of the systems change project was to demonstrate that the anesthesia class mean scores for each of the three wellness post-tests increased 30 percentage points from the baseline pre-test scores. Attainment of this objective was examined using paired *t*-tests. The paired *t*-test is based on three assumptions. The first assumption was that the data pairs were collected independently. The second was an interval/ratio level dependent variable

which was the score. These two assumptions were met by the test design. The final assumption was that the dependent variable (gain score) had a normal distribution. This was tested by examining the skew and kurtosis of the gain scores. To be considered sufficiently normal, both the skew and the kurtosis must be between -1 and +1. The assumption was met as both the individual classes and the overall gain scores fell within this parameter as seen in each of the Tables 2 through 5.

The results of four paired *t*-tests are summarized in Table 6. In each case, the null hypothesis ( $H_0$ ) was a gain less than 30 percentage points. The alternate hypothesis ( $H_1$ ) was a gain greater than or equal to 30 percentage points. The gain score was statistically significant in all four tests with  $p < .001$ .

Table 6

*Mean Test Scores*

Content Area	Pre-Test (% Correct)	Post-Test (% Correct)	Gain %	Gain > 30% (of Total %)	<i>t</i> ( <i>df</i> = 34)
Sleep	43.1	93.4	50.3	94.3	7.03*
Stress/Sub Abuse	38.0	97.4	59.4	100	11.65*
Fitness/Nutrition	52.6	96.8	44.3	77.1	4.69*
Overall	44.7	96.0	51.3	100	13.73*

\* $p < .001$ , 1-tailed

A second outcome objective of the systems change project was the anesthesia class participating in the wellness curriculum would have less than a 9% attrition rate which required that at least 32 of the 35 students remain in anesthesia school. Although this is a long-term goal extending beyond the length of the project, currently there is 0% attrition as all 35 nurse anesthesia graduate students remain enrolled. The confounding variables that the investigator could not control were an anesthesia faculty with three of the five being new members and strengthening of the academic progression standards.

### Healthy Lifestyle Questionnaire

The aggregate student results of the TestWell wellness inventory are presented in Table 7. The 10 wellness content areas are shown in rank order from lowest to highest scores. The possible range of scores for a student in each section was from 20 to 100. The mean student score was the lowest in the physical fitness and nutrition category with a mean of 60.3 and a range of 28 through 92. The mean student score was the highest in safety with a mean of 88.6 and a range of 70 through 100. The three content areas with the lowest mean scores were physical fitness and nutrition, environmental wellness and intellectual wellness. The minimum scores in each of these sections were 28, 32 and 36 respectively. The minimum scores listed are far below the minimums in the other wellness content areas with the next lowest minimum of 50.

Table 7

#### *TestWell Standard Edition Scores*

	Mean	Median	Std Dev	Minimum	Maximum
Physical Fitness and Nutrition	60.29	59	13.40	28	92
Environmental Wellness	66.12	65	14.88	32	98
Intellectual Wellness	69.59	71	11.80	36	96
Medical Self-Care	71.35	70	11.07	50	98
Spirituality and Values	72.94	71	10.54	56	100
Social Awareness	73.12	75	12.51	52	96
Emotional Management	74.47	74	10.03	50	90
Occupational Wellness	81.29	82	8.90	62	100
Emotional Awareness/Sexuality	83.71	84	10.03	50	100
Safety	88.59	90	8.11	70	100
TOTAL Score	741.47	745	62.88	606	858

$n = 34$

### Summary

The demographics of students in a graduate nurse anesthesia program have been described. All students participated in taking the three wellness classes of sleep, stress and substance abuse, and fitness and nutrition. Tables and figures portrayed the statistical results of

changes from student pre-test to post-test scores. The results were significant for each of the classes, as well as, the combined score results with a  $p < .001$ . A healthy lifestyle questionnaire was taken by beginning nurse anesthesia students. The results were presented in 10 content areas with the class scoring highest in safety and lowest in the physical fitness and nutrition category.

## **Chapter Five**

### **Discussion**

The data analysis presented will be discussed to understand the results and appreciate the possible implications of the study. Suggested changes for future wellness programs are offered as well as recommendations for further research. The theories validated by the wellness curriculum and the role of the doctor of nursing practice nurse educator are also described.

### **Demographics**

The demographic characteristics of the anesthesia students provided some useful insights into the stressors they may encounter. Although most students are 30 years old or less, 11 (32%) of the anesthesia students are 31 years old or older. Many of these older students have not been in a classroom for a number of years. Cohen (2011) reported that it is difficult for students to return to the classroom after many years away. All students have a daily commute of 15 miles or less with 24 (71%) students commuting five miles or less. These data revealed that students were not spending excessive amounts of time traveling to school. Twenty-three (68%) students did not have the additional demands of child-rearing; however, six (18%) students had two or more children. Cohen (2011) reported that the student-parent often feels guilty about neglecting any one of their multiple roles and was unable to fully relax. Sixteen (47%) students applied to the anesthesia school from out-of-state. Although 18 students applied from South Dakota, it is highly unlikely that all of them lived in the same town where the school is located. Therefore, the percentage of students that had to relocate in order to attend anesthesia school is greater than the 47% out-of-state students. Moving involves major life changes and is often very stressful. Given that 16 (47%) students are married, a move involves the added stress of a spouse changing jobs or possibly taking on a different family role.

**Sleep**

Sleep is a crucial health topic considering that one-third of our lives is spent carrying it out. This equates to 25 total years of sleep for males and 27 years for females based on life expectancies of 76 and 81 respectively (Centers for Disease Control and Prevention, 2011). As emphasized by Maas (1998), sleep is essential to memory storage and retention. Sleep promotes the growth of neural connections to hold memories and aids in the transfer of short-term memory into long-term memory. If one's sleep is disrupted or deprived of rapid eye movement stages, remembering information learned recently will be difficult. Therefore, it is fundamental for anesthesia students to have quality sleep in order to think, learn and accomplish new tasks to the best of their abilities. The results of the sleep pre-test demonstrated that the anesthesia students were lacking in sleep knowledge. Without a solid foundation of knowledge to build upon, students cannot even begin to practice healthy sleeping habits. The results of the pre-test are not surprising when viewed in comparison to the sleep habits of CRNAs. Biddle and Aker (2011) reported that 77% of CRNAs were sleepy during the work day, 68% wake up excessively tired and 24% use sleep medications. Given these data, it is probable that the professional counterparts of the SRNAs also have some knowledge deficits regarding healthy sleep. The student post-test scores indicated that a self-care wellness curriculum could significantly ( $p < .001$ ) affect student sleep knowledge.

**Stress and Substance Abuse**

Of the three wellness tests, the stress and substance abuse results demonstrated the lowest pre-test score (mean 3.8), the highest post-test score (mean 9.7) and the greatest gain (mean 5.9). The low scores on the pre-test could be anticipated as 50% of the questions were specific to the career path of a CRNA, including their time as students. Chipas and McKenna (2011) revealed

that SRNAs reported their average daily stress level at 7.2 out of 10 compared to 4.3 for CRNAs. Consequently, it is important to address the topic of stress early in the anesthesia program. The stakes are high for those who succumb to anesthetic substance abuse. After years of study and clinical preparation, anesthesiologists may be unable to return to practice or may be found dead. The fact that anesthesiologists are often discovered deceased before co-workers or families recognize that a problem exists suggests a noteworthy lack of education regarding the extent of the problem and its warning signs. Rehabilitation to practice has success rates of 12% to 22%, while mortality rates are 26% to 28% (Wilson et al., 2008; Wischmeyer et al., 2007). These risks include student registered nurse anesthesiologists, once again emphasizing the need to address the subject matter early in an anesthesia program. Students need an understanding of the problem in order to think about a prevention plan, seek help or recognize the signs in classmates. The pre-test demonstrated a definite student knowledge deficit with considerable score improvements gained ( $p < .001$ ) after the investigator lecture and discussion.

### **Fitness and Nutrition**

Because the students are all registered nurses, it is not surprising that the fitness and nutrition scores revealed the highest pre-test knowledge of the three wellness topics. It is interesting to note though that this category had the widest range of pre-test scores from 2 through 9. Moreover, a relatively even distribution of scores at each level of correct answers was present. Like the other wellness topics, there was still room for education to enhance student awareness and knowledge. The post-test scores once again demonstrated that students' knowledge could be improved ( $p < .001$ ) through a wellness lecture.

**Overall**

When combining the results of the three wellness class pre-test and post-tests, the impact results of a wellness curriculum can be seen more clearly. With a total pre-test mean of 13.4 and post-test mean of 28.8, the scores more than doubled. The graphic depiction of these data in Figure 8 is remarkable to view and also statistically significant with  $p < .001$ .

**Healthy Lifestyle Questionnaire**

The anesthesia students scored the lowest in the physical fitness and nutrition category of the TestWell wellness inventory. The low score may seem unusual considering the students had the highest pre-test knowledge in the physical fitness and nutrition category. However, the TestWell wellness inventory was about actual behavior, not knowledge. Students have a knowledge deficit as well as room for improvement in their fitness and nutrition behaviors. A large portion of the wellness curriculum was devoted to fitness and nutrition; therefore, it is hoped that the students will make some progress in this area on their continuum to wellness. The second lowest score was in environmental wellness which is a topic not covered in the wellness curriculum. Environmental wellness may not play much of a role in the everyday stresses of an anesthesia student. However, due to its low rank order, some environmental content should be considered for next year's wellness classes. With the highest score in safety, it is hoped that these established behavior patterns will continue to protect the students during their stressful school endeavors. The high scores in emotional awareness and emotional management indicated that students had excellent strength and control to assist in handling the everyday dynamics of school. The occupational wellness scores were quite high. Nevertheless, this area may be an area of considerable stress during graduate school. The students come to the anesthesia program highly recommended from their supervisors with critical thinking and skills in complex nursing

roles. In anesthesia school, they essentially start all over again in a different environment. The SRNAs are at the bottom of a hierarchy striving to achieve a level of knowledge and competence in a new role.

### **Insights**

Implementation of a wellness curriculum was a fulfilling endeavor. The investigator is excited about continuing and improving the program. Observations from implementation are discussed that may affect future programs.

**Reflections on first wellness curriculum.** The investigator was pleased with the level of anesthesia student engagement in the wellness curriculum. Students demonstrated a desire to be active on their individual roads to wellness as 34 of 35 students choose to participate in the individual lifestyle assessment. Students were attentive to the classroom lectures and interactive in the learning process through questions. The investigator believes the process was enhanced with content material that was tailored to the graduate nurse anesthesia student. The first class was on sleep which is a health topic that is often not addressed in academic settings. It is easier to be attentive in class when the information presented is new and also if the information is perceived as having personal implications. The stress and substance abuse content held student interest as they learned about their new risks upon entering the field of anesthesia. After presenting the third class, the investigator realized that the timing of classes was quite important if maximum benefits were to be achieved. Instead of giving a fitness and nutrition class toward the end of December around holiday time, the investigator thought it would be wise to move it to the first day of class in January. The thought was that a fitness and nutrition class would fit well with the common practice of making a New Year's resolution to lose weight, exercise or eat healthier. However, the investigator did not realize the implications of two other factors. First,

the students were coming off of vacation time. The investigator believed the students would arrive fresh and rejuvenated from their time away. Instead, the students seemed exhausted from traveling and the holidays. The students were not back into a school routine yet. Secondly, the students attended their first week of clinical before their vacation time started. Thus, the students arrived back at school excited and talkative about their new anesthesia experiences. A January class would have been fine as long as it was not during the students' first week back at school. Previous classes were given on Wednesdays which also worked better than on a Monday.

**Expectations and grading.** The investigator also learned that student testing standards, specifically a definition of pass and fail needed to be clearly stated. There were no expectations of student preparation before the start of classes. The investigator wanted the students to listen and absorb the lecture material which would allow them to answer the same questions they had just seen on a pre-test. The investigator told the students multiple times that the wellness classes were pass/fail; nevertheless, that the students had to pass the curriculum. However, the definition of pass was unclear. The graduate college requirement to pass graded classes was 85% which is a grade of B. Some students did not initially understand that the word 'pass' meant that they had to meet this same standard.

**Revisions for next wellness curriculum.** Improvements could be made to the wellness classes regarding content or teaching methods. More nutrition information could be added, to include reading and understanding product nutrition labels. Emphasis was placed on anesthetic substance abuse; however, more time could be devoted to the effects of alcohol and the concept of "Friends don't let friends drive drunk" from the Department of Transportation ad campaign. Classroom lecture could be enhanced with more active student participation. Groups of students

could each read a wellness article and then informally present the topic to the class for discussion. Individual reading assignments could also be assigned.

### **Recommendations**

The wellness curriculum validated the theories that guided the project from beginning to end. Neuman (2002) emphasized that the individual [client] has a wellness orientation toward stability which involves four elements: client, environment, health and nursing (as cited in Aylward, 2010). A wellness orientation toward stability was demonstrated in the student's attentiveness and willingness to examine their individual lives. The review of literature and wellness classes revealed many variables that could attack the student [client] system. The multiple concentric circles shielding the student could be pushed in or broken by lack of sleep or exercise, poor nutrition, stress or substance abuse. The student environment changed as they moved, left a job or spent available cash funds. The nurse educator focused on primary prevention when identifying and addressing student stressors in a wellness curriculum. The goal was to enhance the students' ability to be stable and healthy.

Prochaska et al. provided the Transtheoretical Model to describe behavior change that develops over time through six stages and 10 processes. The key for the wellness curriculum was to realize that students would not get to the action stage until they had gone through three other stages: precontemplation, contemplation and preparation. The wellness pre-test scores demonstrated that the students needed increased awareness and knowledge first. Evidenced based classes provided data that were intended to increase the positive benefits of changing behavior. Self-reevaluation was promoted by the results of the individual lifestyle questionnaires. The wellness curriculum provided students with a fresh start on the long continuum toward optimal health.

**Dissemination**

The project findings demonstrate a need for student wellness educational opportunities. The transferability includes any graduate program considering the high levels of stress endured by that population of students. However, beginning undergraduate students would also benefit from a solid foundation of wellness knowledge. The project was shared with anesthesia program faculty. The systems change project will be disseminated through a public presentation at St. Catherine University and electronically on St. Catherine University SOPHIA. The investigator will give the research presentation at the May 2013 annual meeting of the Upsilon Iota Chapter of Sigma Theta Tau International. The research will also be submitted for inclusion on the National Wellness Institute website.

**Doctor of Nursing Practice**

Nurse educators with a doctor of nursing practice degree should engage in strategies to assist students to be successful in school. Emphasis should be placed on increasing student knowledge of potential stressors. Wellness education should be available in nursing departments or accessible within the college curriculum. Faculty should be involved in ensuring that college campuses provide an environment supportive of healthy lifestyles. The wellness curriculum systems change project provides a foundation for future scholarship. More research is necessary to document the initial wellness knowledge deficits of graduate nurse anesthesia students. The students need to be followed long-term in order to see if they retain the knowledge presented. Researchers need to evaluate if the knowledge evolves into actual behavior changes and if student attrition rates decrease as a result of a wellness curriculum.

The future doctor of nursing practice anesthesia curriculum includes a wellness program. In the first semester of class, anesthesia students will take a one credit Proseminar. This new

course will include wellness content, along with classes to help students improve their study skills.

### **Summary**

The results and important implications of the pre-test and post-test of each of the three wellness classes were presented. The timing, testing and content of the material was discussed in order to make changes and improvements to future programs. Underlying theories of the systems change project were supported and explained. Finally, recommendations were made for future research utilizing the doctor of nursing practice nurse educator.

### References

- Agency for Healthcare Research and Quality. (2007). *Guide to clinical preventive services: Appendix A: How the U.S. preventive services task force grades its recommendations*. Retrieved from [www.ahrq.gov/clinic/pocketgd1011/gcp10app.htm](http://www.ahrq.gov/clinic/pocketgd1011/gcp10app.htm)
- American Association of Nurse Anesthetists. (2013). *President's address*. Retrieved from [www.aana.com/ceandeducation/students/Pages/President-Address.aspx](http://www.aana.com/ceandeducation/students/Pages/President-Address.aspx)
- American Nurses Association. (2001). *Code of ethics for nurses with interpretive statements*. Silver Spring, MD: Nursebooks.org.
- Appraisal of Guidelines for Research & Evaluation. (2009). *Introduction to AGREE II*. Retrieved from [www.agreetrust.org/about-agree/introduction0/](http://www.agreetrust.org/about-agree/introduction0/)
- Aylward, P. D. (2010). Betty Neuman's systems model. In M. Parker & M. Smith (Eds.), *Nursing theories & nursing practice* (3<sup>rd</sup> ed., pp. 182-201). Philadelphia, PA: F. A. Davis.
- Biddle, C., & Aker, J. (2011). The national study of sleep-related behaviors of nurse anesthetists: Personal and professional implications. *AANA Journal*, 79(4), 324-331.
- Burns, S. (2011). Predicting academic progression for student registered nurse anesthetists. *AANA Journal*, 79(3), 193-201.
- Cameron, K., & Quinn, R. (2000). OCAI: Organizational culture assessment instrument. Retrieved from <http://www.simon-cozens.org/content/ocai-o-matic>
- Catechism of the Catholic Church*. (1994). English Ed., United States Catholic Conference, Inc.- Libreria Editrice Vaticana.
- Centers for Disease Control and Prevention. (2011). *Mortality: Life expectancy at birth*. Retrieved September 5, 2012 from [www.cdc.gov/nchs/data/11.pdf#022](http://www.cdc.gov/nchs/data/hus/11.pdf#022)

- Chipas, A., & McKenna, D. (2011). Stress and burnout in nurse anesthesia. *AANA Journal*, 79(2), 122-128.
- Cohen, S. (2011). Doctoral persistence and doctoral program completion among nurses. *Nursing Forum*, 46(2), 64-70.
- Council on Accreditation of Nurse Anesthesia Educational Programs. (2011a, July). *Program director's update* (COA Issue No 58). Retrieved from <http://www.aana.com/programdirectorsupdate.aspx>
- Council on Accreditation of Nurse Anesthesia Educational Programs. (2011b, May). *Standards for accreditation of nurse anesthesia educational programs*. Retrieved from <http://www.aana.com/Accreditation.aspx?id255&linkidentifier=id&itemid=255>
- Council on Accreditation of Nurse Anesthesia Educational Programs. (2012). *Nurse anesthesia programs: Summary of 2012 annual report data*. Retrieved from <http://home.coa.us.com/Pages/default.aspx>
- Dorsch, M., Jarvis, S., & Schlosser, K. (2008). Attrition in nurse anesthesia educational programs as reported by program directors: The class of 2005. *AANA Journal*, 76(4), 277-281.
- Hulse, J., Chenowith, T., Lebedovych, L., Dickinson, P., Cavanaugh, B., & Garrett, N. (2007). Predictors of student success in the US Army graduate program in anesthesia nursing. *AANA Journal*, 75(5), 339-346.
- Institute for Clinical Systems Improvement. (2011). *Health care guideline: Healthy lifestyles*. Retrieved from [http://www.icsi.org/guidelines\\_and\\_more/gl\\_os\\_prot/preventive\\_health\\_maintenance](http://www.icsi.org/guidelines_and_more/gl_os_prot/preventive_health_maintenance)

Maas, J. B. (1998). *Power sleep: The revolutionary program that prepares your mind for peak performance*. New York, NY: Villard Books.

National Wellness Institute. (n.d.). *Defining wellness*. Retrieved November 20, 2011 from [http://www.nationalwellness.org/index.php?id\\_tier=2&id\\_c=26](http://www.nationalwellness.org/index.php?id_tier=2&id_c=26)

National Wellness Institute. (1976). *The six dimensions of wellness model by Bill Hettler*. Retrieved from [http://www.nationalwellness.org/index.php?id\\_tier=2&id\\_c=25](http://www.nationalwellness.org/index.php?id_tier=2&id_c=25)

National Wellness Institute. (2004). *TestWell*. Retrieved November 20, 2011 from [http://www.testwell.org/index.php?id=1627&id\\_tier=3430](http://www.testwell.org/index.php?id=1627&id_tier=3430)

Owen, T. R. (1999). The reliability and validity of a wellness inventory. *American Journal of Health Promotion, 13*(3), 180-182.

Polit, D., & Beck, C. (2010). *Essentials of nursing research: Appraising evidence for nursing practice* (7<sup>th</sup> ed.). Philadelphia, PA: Lippincott Williams & Wilkens.

Pozgar, G. D. (2013). *Legal and ethical issues for health professionals* (3<sup>rd</sup> ed.). Burlington, MA: Jones and Bartlett Learning.

Prochaska, J. O., Redding, C. A., & Evers, K. E. (2008). The transtheoretical model and stages of change. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior and health education: Theory, research, and practice* (4<sup>th</sup> ed., pp.97-121). San Francisco, CA: Jossey-Bass.

Stone, P. W., Smith, J. A., & Frick, K. D. (2010). Finance for nurse managers: Return on investment. *American Nurse Today, 5*(3), 30-32.

Tharp, B. M. (2009). *Four organizational culture types*. Retrieved from [http://www.academia.edu/1588713/Four\\_Organizational\\_Culture\\_Types](http://www.academia.edu/1588713/Four_Organizational_Culture_Types)

University of Oxford. (2005). *Critical appraisal*. Retrieved from University of Oxford, Australia,

Centre for Evidence Based Medicine website: [http://www.cebm.net /index .aspx?o=1157](http://www.cebm.net/index.aspx?o=1157)

Waugaman, W., & Aron, G. (2003). Vulnerable time periods for attrition during nurse anesthesia education. *AANA Journal*, 71(1), 11-14.

Wilson, J., Kiselanova, N., Stevens, Q., Lutz, R., Mandler, T., Tran, Z., & Wischmeyer, P.

(2008). A survey of inhalational anaesthetic abuse in anaesthesia training programmes.

*Anaesthesia*, 63, 616-620. doi:10.1111/j.1365-2044.2008.05444.x

Wischmeyer, P. E., Johnson, B. R., Wilson, J. E., Dingmann, C., Bachman, H. M., Roller, E.,...

Henthorn, T. K. (2007). A survey of propofol abuse in academic anesthesia programs.

*Anesthesia & Analgesia*, 105(4), 1066-1071. doi:10.1213/01ane0000270215.86253.30

## Appendix A

Table of Quantitative Study Characteristics

Study (Author, Year)	Purpose	Population/ Sample	Research Design	Intervention	Comparison	Outcome Measures/ Scales	Results	Level/Quality of Evidence <sup>a</sup>
Burns, S. 2011	Determine relationship between SRNA admission criteria and academic progression	21/108 Response 19.4%  CRNA program directors reporting on 914 SRNAs	Correlational	None	Admission GPA, SGPA, GRE & critical care experience to current GPA	Current GPA	GPA $p < 0.01$ SGPA $p < 0.001$ GRE $p < 0.001$ Critical care inverse relationship $p < 0.001$	IV Moderate
Dosch, M. Jarvis, S. Schlosser, K. 2008	Determine the SRNA attrition rate of each program for cohort graduating in 2005	62/93 Response 67%  CRNA program directors reporting on 1,499 SRNAs	Correlational	None	Program director experience, program size & program length to attrition rate	Attrition rate	Program director experience NS, program size NS, longer program $p < 0.031$	IV Moderate
Hulse, J. Chenowith, T. Lebedovych, L. Dickinson, P. Cavanaugh, B. Garrett, N. 2007	Identify cognitive and noncognitive factors that predict SRNA graduation	42/46 SRNAs convenience sample from US Army Graduate Program in Anesthesia Nursing (USAGPAN)	Longitudinal prospective correlational	None	Internal vs. external locus of control, anxiety levels, GRE verbal and quantitative, age, gender	SRNA graduation	External locus of control $p < 0.02$ , lower anxiety $p < 0.02$ ; all other variables NS	IV Moderate
Waugaman, W. Aron, G. 2003	Identify SRNAs patterns of socialization and time periods of increased risk for attrition	1,119/2008 Response 55%  All SRNAs	Cross-sectional prospective quasi-experimental	Six month time periods of enrollment in continuum of anesthesia school	8 scales of professional socialization to SRNAs 6 month periods of enrollment in school	Time periods of increased SRNA attrition	$P < 0.05$ for 12-18 months, bureaucratic view, least commitment, enrollment drop > 30 months holistic, most commitment	II b High

Study (Author, Year)	Purpose	Population/ Sample	Research Design	Intervention	Comparison	Outcome Measures/ Scales	Results	Level/Quality of Evidence <sup>a</sup>
Biddle, C. Aker, J. 2011	Quantify and describe CRNA sleep activity	1,284/3,170 Response 41%  Stratified random sample of CRNAs	Descriptive and qualitative content analysis	None	None	Survey scores, themes	77% sleepy during work day, 68% wake up excessively tired, 24 % use sleep medications	VI Moderate
Chipas, A. McKenna, D. 2011	Determine level of stress and physical manifestations in CRNAs and SRNAs	7,537/28,000 Response 26.9%  All CRNAs and SRNAs	Descriptive	None	None	Survey scores, stress level on 10 point Likert scale	SRNA/CRNA stress level 7.2/10 & 4.3/10, seek professional help 27% & 31%, take prescription meds 19% each	VI Moderate
Wilson, J. Kiselanova, N. Stevens, Q. Lutz, R. Mandler, T. Tran, Z. Wischmeyer, P. 2008	Assess prevalence and outcomes of inhalational abuse among anesthesia personnel	106/126 Response 84%  Anesthesiologist academic chairpersons reporting on anesthesia personnel	Descriptive	None	None	Anesthetists abusing inhalational agents, abuse mortality rate, rehabilitation to practice	22% of departments had at least one abuser, 26% mortality rate, 22% rehabilitation to practice	VI Low
Wischmeyer, P. Johnson, B. Wilson, J. Kingmann, C. Bachman, H. Roller, E. Tran, Z. Henthorn, T. 2007	Assess prevalence and outcomes of propofol abuse among anesthesia personnel	126/126 Response 100%  Anesthesiologist academic chairpersons reporting on anesthesia personnel	Descriptive	None	None	Anesthetists abusing propofol, abuse mortality rate, rehabilitation to practice	0.1% anesthetists abuse propofol, 28% mortality rate, 12% rehabilitation to practice	VI Low

<b>Study (Author, Year)</b>	<b>Purpose</b>	<b>Population/ Sample</b>	<b>Research Design</b>	<b>Intervention</b>	<b>Comparison</b>	<b>Outcome Measures/ Scales</b>	<b>Results</b>	<b>Level/Quality of Evidence<sup>a</sup></b>
Institute for Clinical Systems Improvement 2011	Optimize adult health	Adults 18 years and older	Guideline	N/A	N/A	Life expectancy, mortality rates	Healthy Lifestyle Guideline, 10 years increased life expectancy, decreased mortality rates	I a High
Cohen, S 2011	Address doctoral student persistence and challenges to increase student retention, faculty and nurses	24 Articles	Integrative review	None	None	Themes	Four Themes: periods of transition, parenthood and outside demands, delays and faculty-student relationships, positive aspects	V Moderate

<sup>a</sup>See Appendix D and E for sources and information

**Appendix B**

**Table of Results for Appraisal of Guidelines for Research & Evaluation II**

Domain	Item Number	Rating Scales 1 through 7 (strongly disagree = 1, strongly agree = 7)						
		1	2	3	4	5	6	7
1. Scope and Purpose	1 Objectives							X
	2 Question							X
	3 Population							X
2. Stakeholder Involvement	4 Group							X
	5 Patient							X
	6 Users							X
3. Rigour of Development	7 Methods			X				
	8 Criteria			X				
	9 Evidence					X		
	10 Recom.						X	
	11 Risks						X	
	12 Links							X
	13 Reviewed	X						
	14 Updated							X
4. Clarity of Presentation	15 Specific							X
	16 Options							X
	17 Keys							X
5. Applicability	18 Barriers							X
	19 Advice							X
	20 Resource		X					
	21 Audit			X				
6. Editorial Independence	22 Funder				X			
	23 Interests				X			
Overall Assessment	Rating Scale 1 through 7 (lowest possible quality = 1, highest possible quality = 7)							6
	I would recommend this guideline for use.				Yes	X	Yes, with modifications	No

## Appendix C

## Results of the University of Oxford Systematic Review Appraisal Sheet

**SYSTEMATIC REVIEW: Are the results of the review valid?**

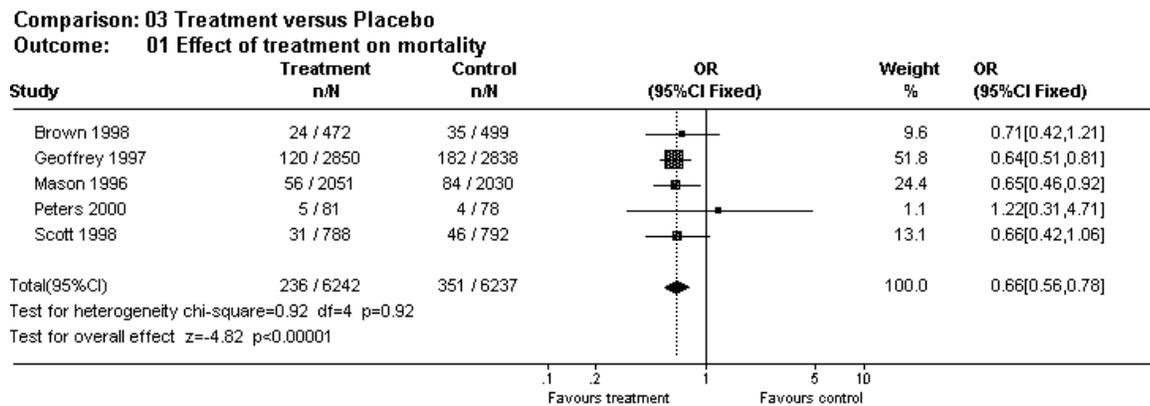
<b>What question (PICO) did the systematic review address?</b>	
What is best?	Where do I find the information?
The main question being addressed should be clearly stated. The exposure, such as a therapy or diagnostic test, and the outcome(s) of interest will often be expressed in terms of a simple relationship.	The <b>Title, Abstract</b> or <i>final paragraph of the Introduction</i> should clearly state the question. If you still cannot ascertain what the focused question is after reading these sections, search for another paper!
This paper: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/>	
Comment: The PICO question was clearly stated with a simple relationship.	
<b>F - Is it unlikely that important, relevant studies were missed?</b>	
What is best?	Where do I find the information?
The starting point for comprehensive search for all relevant studies is the major bibliographic databases (e.g., Medline, Cochrane, EMBASE, etc) but should also include a search of reference lists from relevant studies, and contact with experts, particularly to inquire about unpublished studies. The search should not be limited to English language only. The search strategy should include both MESH terms and text words.	The <b>Methods</b> section should describe the search strategy, including the terms used, in some detail. The <b>Results</b> section will outline the number of titles and abstracts reviewed, the number of full-text studies retrieved, and the number of studies excluded together with the reasons for exclusion. This information may be presented in a figure or flow chart.
This paper: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/>	
Comment: The search included five databases, reference lists, dissertations, unpublished manuscript and key words. MESH terms were not stated, English only.	
<b>A - Were the criteria used to select articles for inclusion appropriate?</b>	
What is best?	Where do I find the information?
The inclusion or exclusion of studies in a systematic review should be clearly defined a priori. The eligibility criteria used should specify the patients, interventions or exposures and outcomes of interest. In many cases the type of study design will also be a key component of the eligibility criteria.	The <b>Methods</b> section should describe in detail the inclusion and exclusion criteria. Normally, this will include the study design.

<p>This paper: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Comment: Inclusion: doctoral persistence, experience or ways to improve graduation rates. Exclusion: prior to 1985, not pertaining to doctoral study.</p>	
<p><b>A - Were the included studies sufficiently valid for the type of question asked?</b></p>	
<p>What is best?</p>	<p>Where do I find the information?</p>
<p>The article should describe how the quality of each study was assessed using predetermined quality criteria appropriate to the type of clinical question (e.g., randomization, blinding and completeness of follow-up)</p>	<p>The <b>Methods</b> section should describe the assessment of quality and the criteria used. The <b>Results</b> section should provide information on the quality of the individual studies.</p>
<p>This paper: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Comment: No methods of quality or criteria stated describing articles.</p>	
<p><b>T - Were the results similar from study to study?</b></p>	
<p>What is best?</p>	<p>Where do I find the information?</p>
<p>Ideally, the results of the different studies should be similar or homogeneous. If heterogeneity exists the authors may estimate whether the differences are significant (chi-square test). Possible reasons for the heterogeneity should be explored.</p>	<p>The <b>Results</b> section should state whether the results are heterogeneous and discuss possible reasons. The forest plot should show the results of the chi-square test for heterogeneity and if discuss reasons for heterogeneity, if present.</p>
<p>This paper: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/></p> <p>Comment: Four themes emerged from the articles reviewed.</p>	

**What were the results?** Themes: periods of transition, parenthood and outside demands, delays and faculty-student relationships, positive aspects

**How are the results presented?** In a table with four themes and examples.

A systematic review provides a summary of the data from the results of a number of individual studies. If the results of the individual studies are similar, a statistical method (called meta-analysis) is used to combine the results from the individual studies and an overall summary estimate is calculated. The meta-analysis gives weighted values to each of the individual studies according to their size. The individual results of the studies need to be expressed in a standard way, such as relative risk, odds ratio or mean difference between the groups. Results are traditionally displayed in a figure, like the one below, called a **forest plot**.



The forest plot depicted above represents a meta-analysis of 5 trials that assessed the effects of a hypothetical treatment on mortality. Individual studies are represented by a black square and a horizontal line, which corresponds to the point estimate and 95% confidence interval of the odds ratio. The size of the black square reflects the weight of the study in the meta-analysis. The solid vertical line corresponds to 'no effect' of treatment - an odds ratio of 1.0. When the confidence interval includes 1 it indicates that the result is not significant at conventional levels ( $P > 0.05$ ).

The diamond at the bottom represents the combined or pooled odds ratio of all 5 trials with its 95% confidence interval. In this case, it shows that the treatment reduces mortality by 34% (OR 0.66 95% CI 0.56 to 0.78). Notice that the diamond does not overlap the 'no effect' line (the confidence interval doesn't include 1) so we can be assured that the pooled OR is statistically significant. The test for overall effect also indicates statistical significance ( $p < 0.0001$ ).

**Exploring heterogeneity**

Heterogeneity can be assessed using the "eyeball" test or more formally with statistical tests, such as the Cochran Q test. With the "eyeball" test one looks for overlap of the confidence intervals of the trials with the summary estimate. In the example above note that the dotted line running vertically through the combined odds ratio crosses the horizontal lines of all the individual studies indicating that the studies are homogenous. Heterogeneity can also be assessed using the Cochran chi-square (Cochran Q). If Cochran Q is statistically significant there is definite heterogeneity. If Cochran Q is not statistically significant but the ratio of Cochran Q and the degrees of freedom (Q/df) is  $> 1$  there is possible heterogeneity. If Cochran Q is not statistically significant and Q/df is  $< 1$  then heterogeneity is very unlikely. In the example above Q/df is  $< 1$  ( $0.92/4 = 0.23$ ) and the p-value is not significant (0.92) indicating no heterogeneity.

**Note:** The level of significance for Cochran Q is often set at 0.1 due to the low power of the test to detect heterogeneity.

**Appendix D****Evidence Hierarchy Levels**

Level I a.	Systematic review of RCTs
Level I b.	Systematic review of nonrandomized trials
Level II a.	Single RCT
Level II b.	Single nonrandomized trial
Level III	Systematic review of correlational/observational studies
Level IV	Single correlational/observational study
Level V	Systematic review of descriptive/qualitative/physiologic studies
Level VI	Single descriptive/qualitative/physiologic study
Level VII	Opinions of authorities, expert committees

*Note.* Adapted from “*Essentials of Nursing Research: Appraising Evidence for Nursing Practice* (7<sup>th</sup> ed.),” by D. Polit and C. Beck, 2010. Philadelphia, PA: Lippincott Williams & Wilkens.

## Appendix E

### Evidence Quality

#### Levels of Certainty Regarding Net Benefit

Level of Certainty*	Description
<b>High</b>	The available evidence usually includes consistent results from well-designed, well-conducted studies in representative primary care populations. These studies assess the effects of the preventive service on health outcomes. This conclusion is therefore unlikely to be strongly affected by the results of future studies.
<b>Moderate</b>	<p>The available evidence is sufficient to determine the effects of the preventive service on health outcomes, but confidence in the estimate is constrained by such factors as:</p> <ul style="list-style-type: none"> <li>• The number, size, or quality of individual studies.</li> <li>• Inconsistency of findings across individual studies.</li> <li>• Limited generalizability of findings to routine primary care practice.</li> <li>• Lack of coherence in the chain of evidence.</li> </ul> <p>As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.</p>
<b>Low</b>	<p>The available evidence is insufficient to assess effects on health outcomes. Evidence is insufficient because of:</p> <ul style="list-style-type: none"> <li>• The limited number or size of studies.</li> <li>• Important flaws in study design or methods.</li> <li>• Inconsistency of findings across individual studies.</li> <li>• Gaps in the chain of evidence.</li> <li>• Findings not generalizable to routine primary care practice.</li> <li>• Lack of information on important health outcomes.</li> </ul> <p>More information may allow estimation of effects on health outcomes.</p>

\* The USPSTF defines certainty as "likelihood that the USPSTF assessment of the net benefit of a preventive service is correct." The net benefit is defined as benefit minus harm of the preventive service as implemented in a general, primary care population. The USPSTF assigns a certainty level based on the nature of the overall evidence available to assess the net benefit of a preventive service.

*Note.* Adapted from "Guide to Clinical Preventive Services: Appendix A: How the U.S. Preventive Services Task Force Grades its Recommendations," by Agency for Healthcare Research and Quality, 2007. Retrieved from [www.ahrq.gov/clinic/pocketgd1011/gcp10app.htm](http://www.ahrq.gov/clinic/pocketgd1011/gcp10app.htm)

**Appendix F****Resources Available for Program**

<b>Category</b>	<b>Item</b>	<b>Cost</b>
Facilities	Building office space 200 square feet. (\$150,000 yearly mortgage for 12,000 square feet)	337
	Building office utilities 200 square feet (\$14,000 yearly utilities for 12,000 square feet)	32
	Classroom rent for 6 hours x \$50/hour (35 students)	300
	Library consortium fee including electronic access (\$11,000 yearly for 106 users)	14
Equipment	Computer, software, internet	150
	Printer	10
	Scantron test scoring machine	5
	LCD projector (uses wall screen)	5
<b>Total</b>		<b>\$853</b>

**Appendix G****Resources Needed for Program**

<b>Category</b>	<b>Item</b>	<b>Cost</b>
Personnel (and linked to)	Investigator salary (275 hours x \$50/hour)	13,750
	Investigator car and gas 34 miles a day (college rate of .355/mile)	422
	Statistician (4 hours x \$50/hour)	200
	TestWell administrator (4 hours x \$50/hour)	200
	TestWell lifestyle assessment (donated with use of university name)	0
Supplies	Reference books/DVD set	235
	Printer toner black	76
	Printer paper 4 reams	40
	Scantron score sheets 210 (\$14.50 for 500 of 15 item)	6
Wellness environment	Hand weights 7 sets	215
	Dumbbell rack	53
	Hand grips 2 adjustable	32
	Rolatape 12" measuring wheel	68
	Marking paint	6
	Posters 4	141
<b>Total</b>		<b>\$15,444</b>

**Appendix H**  
**Program Budget**

	<b>October</b>	<b>November</b>	<b>December</b>	<b>TOTAL</b>
<b>REVENUE</b>				
College to anesthesia program	376	300	300	976
Donated time/money	5159	5239	4924	15322
<b>TOTAL REVENUE</b>	<b>5535</b>	<b>5539</b>	<b>5224</b>	<b>\$16,298</b>
<b>EXPENSES</b>				
<b>FACILITIES</b>				
Office space	112	112	112	336
Office utilities	11	11	11	33
Classroom rent	100	100	100	300
Library consortium	5	5	5	15
<b>PERSONNEL</b>				
Investigator salary	4583	4583	4583	13749
Investigator car/gas	141	141	141	423
Statistician			200	200
TestWell administrator	200			200
TestWell assessment	0			0
<b>EQUIPMENT</b>				
Computer, software	50	50	50	150
Printer	3	3	3	9
Scantron machine	2	2	2	6
LCD projector	2	2	2	6
<b>SUPPLIES</b>				
Reference books/DVD	235			235
Printer toner	76			76
Printer paper	13	13	13	39
Scantron sheets	2	2	2	6
<b>WELLNESS</b>				
Hand weights		215		215
Dumbbell rack		53		53
Hand grips		32		32
Rolatape wheel		68		68
Marking paint		6		6
Posters		141		141
<b>TOTAL EXPENSES</b>	<b>5535</b>	<b>5539</b>	<b>5224</b>	<b>\$16,298</b>
<b>PROFIT/LOSS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

## Appendix I

## Return on Investment for One Student

Semester of student attrition	Benefit: tuition dollars retained	Cost: wellness program	$\frac{\text{Benefits} - \text{costs}}{\text{costs}}$ [X 100%] =	Return on Investment
1	11,916	16,297	$\frac{11,916 - 16,297}{16,297}$ [X 100%] =	-27%
2	24,598		$\frac{24,598 - 16,297}{16,297}$ [X 100%] =	51%
3	35,538		$\frac{35,538 - 16,297}{16,297}$ [X 100%] =	118%
4	40,764		$\frac{40,764 - 16,297}{16,297}$ [X 100%] =	150%
5	46,130		$\frac{46,130 - 16,297}{16,297}$ [X 100%] =	183%
6	49,756		$\frac{49,756 - 16,297}{16,297}$ [X 100%] =	205%
7	53,260		$\frac{53,260 - 16,297}{16,297}$ [X 100%] =	227%
8	55,836		$\frac{55,836 - 16,297}{16,297}$ [X 100%] =	243%