Decreasing the Incidence of Postoperative Delirium in the High Risk Elderly Population: A Plan for Translating Best Practice Guidelines Into Anesthesia Practice

Meredith Gomes
University of Southern Mississippi

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DECREASING THE INCIDENCE OF POSTOPERATIVE DELIRIUM IN THE HIGH RISK ELDERLY POPULATION: A PLAN FOR TRANSLATING BEST PRACTICE GUIDELINES INTO ANESTHESIA PRACTICE

by

Meredith Mildred Gomes

Abstract of a Capstone Project
Submitted to the Graduate School
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Nursing Practice

December 2015
ABSTRACT

DECREASING THE INCIDENCE OF POSTOPERATIVE DELIRIUM IN THE HIGH RISK ELDERLY POPULATION: A PLAN FOR TRANSLATING BEST PRACTICE GUIDELINES INTO ANESTHESIA PRACTICE

by Meredith Mildred Gomes

December 2015

Postoperative delirium is a potentially life-threatening change in cognition that occurs approximately 24 to 72 hours after surgery and is a frequent complication affecting the elderly population. The development of this postoperative complication has been found to increase mortality and morbidity, prolong hospital stays, and has also been associated with a steady decline in cognition. With the number of individuals 65 years or older predicted to increase over the next two decades and the incidence of postoperative delirium potentially affecting over 50% of postsurgical elderly patients, preventive anesthetic methods must be investigated. In early 2015, the American Geriatric Society published postoperative delirium guidelines that could potentially decrease this postoperative complication. With the aid of the Stetler model of research utilization and John Kotter’s 8-stage process for leading change, an implementation plan was developed to assist with successfully translating the guidelines into practice and diminish the occurrence of postoperative delirium.
DECREASING THE INCIDENCE OF POSTOPERATIVE DELIRIUM IN
THE HIGH RISK ELDERLY POPULATION: A PLAN FOR TRANSLATING
BEST PRACTICE GUIDELINES INTO ANESTHESIA PRACTICE

by

Meredith Mildred Gomes

A Capstone Project
Submitted to the Graduate School and the Department of Advanced Practice
at The University of Southern Mississippi in Partial Fulfillment of the Requirements
for the Degree of Doctor of Nursing Practice

Approved:

__________________________________________
Dr. Karen Rich, Committee Chair
Associate Professor, Systems Leadership and Health Outcomes

__________________________________________
Dr. Vickie Stuart, Committee Member
Assistant Clinical Professor, Advanced Practice

__________________________________________
Dr. Cathy Hughes, Committee Member
Assistant Clinical Professor, Collaborative Nursing Practice

__________________________________________
Dr. Karen S. Coats
Dean of the Graduate School

December 2015
DEDICATION

I would like to thank my parents, Bruce and Arlene Gomes, for their love, support, and understanding while I completed this capstone project and my Doctorate in Nursing Practice. I would also like to especially thank my husband, Brett Shoemaker, for his constant encouragement, love, and, above all, his patience during this endeavor.

This capstone project is dedicated to my father, Bruce Gomes, who has instilled in me the determination and passion to achieve my goals. His guidance and reassurance never faltered, and words cannot express my appreciation. This project is also dedicated to my husband, Brett, who enabled me to overcome many challenges and accomplish this dream, for which I am forever grateful.
ACKNOWLEDGMENTS

I would like to first express my sincerest appreciation to my capstone chair, Dr. Rich. Her knowledge, guidance, and support throughout this process enabled me to successfully complete this project and allowed me to truly understand the impact I can make in healthcare. Also, I would like to thank my committee members, Dr. Stuart and Dr. Hughes, for their direction and encouragement. I could not have done this without my committee, and I am tremendously grateful.
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<tr>
<td>AACN</td>
<td>American Association of Colleges of Nursing</td>
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<td>AGS</td>
<td>American Geriatrics Society Expert Panel on Postoperative Delirium in Older Adults</td>
</tr>
<tr>
<td>BIS</td>
<td>Bispectral Index</td>
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<td>CAM</td>
<td>Confusion Assessment Method</td>
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<tr>
<td>DNP</td>
<td>Doctor of Nursing Practice</td>
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<td>EMR</td>
<td>Electronic Medical Record</td>
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<td>EBP</td>
<td>Evidence Based Practice</td>
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<td>ICDSC</td>
<td>Intensive Care Delirium Screening Checklist</td>
</tr>
<tr>
<td>MAC</td>
<td>Minimal Alveolar Concentration</td>
</tr>
<tr>
<td>NCCMT</td>
<td>National Collaborating Centre for Methods and Tools</td>
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CHAPTER I

INTRODUCTION

Background of the Problem

Postoperative delirium, a devastating cognitive complication that occurs 24 to 72 hours after surgery, affects approximately 10% of elderly patients; however, this percentage escalates to 30-65% after surgeries such as hip fracture repair and emergency surgery (Strøm, Rasmussen, & Sieber, 2014). Fluctuations of consciousness, signs of inattention, and disorganized thinking are the typical clinical characteristics of the postsurgical delirium patient (Rudolph & Marcantonio, 2011). Individuals who develop this complication are found to have lengthier ICU stays, longer total hospital stays, higher hospital costs, increased institutionalization after discharge, and increased mortality (Robinson et al., 2009). The prevalence of postoperative delirium and the poor outcomes associated with this complication are becoming increasingly important as the elderly population grows.

Approximately one third of inpatient surgical procedures are performed on patients 65 years old or greater; therefore, it is critical for healthcare professionals to tailor a plan of care specific for patients who are at risk for postoperative delirium (Hall, DeFrances, Williams, Golosinskiy, & Schwartzman, 2010). In 2015, the American Geriatrics Society (AGS) Expert Panel on Postoperative Delirium in Older Adults published a best practice statement to guide healthcare professionals in decreasing the prevalence of postoperative delirium. These recommendations encompass preventive and treatment methods within the preoperative, intraoperative, and postoperative phases of care. A brief summary of the best practice guidelines for postoperative delirium

...
prevention include the following: healthcare professionals should complete a preoperative and postoperative assessment of delirium risk factors; healthcare professionals providing care to postoperative patients should be trained in recognizing signs and symptoms of postoperative delirium; anesthesia providers may need to use an electroencephalographic monitor with older patients to reduce postoperative delirium; prescribers should avoid medications that induce delirium such as anticholinergics, corticosteroids, meperidine, and hypnotics; regional anesthesia should be considered for postoperative pain management; leaders in healthcare should implement educational programs concerning postoperative delirium and the patients at risk; antipsychotic or benzodiazepines should not be prescribed to the elderly patient who is not at risk for causing personal harm or harm to others; and finally if antipsychotics or benzodiazepines are needed, the lowest effective dose should be prescribed and only for a short duration (Hand, 2014).

Significance of Project

The number of individuals who are 65 years or older is approximately 41.4 million, and the number of Americans who will reach 65 over the next two decades has been predicted to increase by 33 % (Administration on Aging, 2012). In addition to the predicted growth of the elderly population, these individuals require surgery approximately four times more often than other populations, and it is estimated that their need for surgery will further increase by the year 2020 (Bettelli, 2010).

The long term effects of postoperative delirium consists of a decline in activities of daily living, a decline in the ability to walk, a higher rate of death, and an increase in nursing home placement (Robertson & Robertson, 2006). In addition to poor outcomes
these afflicted patients endure, the economic impact is substantial. Leslie, Marcantonio, Zhang, Summers, and Inouya (2008) explained that average cost of caring for an individual with delirium is approximately two and half times the cost of a patient without delirium, and the total costs that are attributable to this cognitive disorder range from $16,303 to $64,421 per patient. Therefore, with delirium potentially imposing a $152 billion cost upon the healthcare system annually, this disorder is not only devastating to a patient’s wellbeing but financially as well.

Postoperative delirium is a complication that will undoubtedly increase in prevalence among the elderly population. The AGS (2015) best practice guidelines were developed to provide a solution for this rapidly growing postoperative complication. These recently published guidelines can have a positive impact on preventing postoperative delirium and need to be translated into practice. Since the guidelines were published in February 2015, they are not currently being utilized by healthcare providers.

The validation of the postoperative delirium prevention guidelines established by the AGS lead to the development of an implementation plan aimed towards anesthesia providers. With the aid of the Stetler model of research utilization (Stetler, 2001) and John Kotter’s 8-step process for leading change (Kotter, 1996/2012) this plan can expedite the successful translation of research into practice. With the assistance of this implementation plan, providers can discover methods that diminish the occurrence of postoperative delirium.

Statement of the Purpose and Project Objectives

The purpose of this capstone project is to increase anesthesia and other health care providers’ awareness of the recent publication of the AGS (2015) postoperative delirium
The project objectives are to:

1. Use the Stetler model of research utilization (Stetler, 2001) to validate the postoperative delirium in older adults best practice guidelines (AGS, 2015) and
2. Use the Stetler model of research utilization (Stetler, 2001) and Kotter’s (1996/2012) 8-stage process for leading change to develop an effective program to translate the postoperative delirium in older adults best practice guidelines (AGS, 2015) into anesthesia practice.

Outcomes

The intended outcomes of this project are to:

1. Widely translate the postoperative delirium in older adults best practice guidelines (AGS, 2015) into anesthesia practice and
2. Decrease postoperative delirium among the elderly population.

Review of Related Literature

In early 2015, the AGS published best practice guidelines for healthcare professionals to consider to prevent postoperative delirium when providing preoperative, intraoperative, and postoperative care to elderly patients. A 23-member expert panel reviewed 6,504 articles pertaining to postoperative delirium. The timing of these guidelines is critical because more than one-third of individuals 65 years or older are having inpatient surgeries. The guidelines underwent an extensive peer review and were structured as recommended by the Institute of Medicine (AGS, 2015). In their
publication, the AGS’s (2015) guidelines are outlined according to nine best practices. These nine practices are the focus of this review of literature, which serves as a utilization-focused critique and synopsis of the evidence supporting the guidelines as per Stetler’s (2001) model.

*Postoperative Delirium Risk Factors*

The recommendations began with identifying patients at risk for postoperative delirium. The guidelines utilized systematic reviews and other original studies to form a table, which summarized commonly found risk factors. AGS also obtained data from a clinical guideline created by the National Institute of Health and Care Excellence, which identified these factors for postoperative delirium development as “age greater than 65, chronic cognitive decline or dementia, poor vision or hearing, severe illness, and the presence of infection” (AGS, 2015, pp. 137-138).

Dasgupta and Dumbrell (2006) performed a systematic review of the literature to find the individual risk factors and the overall incidence of postoperative delirium in the noncardiac surgical patient. The authors included studies that contained original data on preoperative risk factors, patients greater than 18 years old and undergoing noncardiac surgery, at least 10 cases of delirium; a control group consisting of patients unaffected with delirium, and those where the calculated incidence of delirium was determined with the aid of the Diagnostic and Statistical Manual of Mental Disorders. Dasgupta and Dumbrell discovered that cognitive impairment, visual impairment, increased age, and functional dependence were the prevalent risk factors associated with postoperative delirium development across the studies. Although psychotropic drug use, depression, the presence of comorbidities, and institutional residence was not noted across the
studies, the authors observed that these factors also contributed to the risk of delirium development after surgery. The completion of the review revealed that the incidence of delirium varied from 5.1% to 52.2%. The review also showed that certain procedures, such as hip fracture repair and aortic surgery, have a higher incidence of postoperative delirium development. Despite the pathophysiology behind this postsurgical complication being an enigma, Dasgupta and Dumbrell’s (2006) systematic review elucidated common preoperative risk factors that can assist in guiding practitioners in identifying those patients in danger of this complication.

Although Dasgupta and Dumbrell (2006) did not specify if dementia was a risk factor for postoperative delirium, in a study involving 425 patients, Lee et al. (2011) found the incidence of postoperative delirium for individuals undergoing hip fracture repair with “probable dementia” was 54% and 26% for patients without preoperative dementia (p. 2309). Lee et al. further described that “...age, male gender, lower BMI, higher number of medical comorbidities, and duration of surgery longer than two hours...” were significant risk factors that contributed to the development of this postsurgical complication for patients without dementia (p. 2310). The importance of this study emphasizes the significance of a preoperative assessment of delirium risk factors, which includes dementia.

**Delirium Diagnosis**

The second recommendation in the AGS (2015) guidelines referenced the importance of properly training health care professionals to recognize, assess, and document the signs and symptoms of delirium. The guidelines further explain the significance of preoperative cognitive testing in order to determine a patient’s baseline
mental status prior to elective surgery, and it was suggested that a formal delirium
diagnosis tool, such as the Confusion Assessment Method (CAM), be utilized by
competent healthcare providers when determining if a patient has delirium. Ely et al.
(2001) performed a prospective cohort study in which 293 daily-paired evaluations were
completed using the CAM. Ely et al. demonstrated that the CAM for the intensive care
unit was accurate and easy to use taking approximately two minutes. Learning how to
use this assessment method requires little training. Furthermore, this assessment method
even facilitates the identification of delirium in the mechanically ventilated patient.

In 2015, Kratz, Heinrich, Schlauß, and Diefenbacher demonstrated the importance
of having trained healthcare staff and preoperative cognitive testing. The study involved
a sample of 239 patients residing on two surgical wards. Evaluations were completed on
125 patients for the prevalence of postoperative delirium over 6 months. Thereafter, 114
patients participated in an intervention phase for 10 months. Of these participants, 61
received an intervention. The intervention was specified as preoperative screening to
derive a patient’s delirium risk, which was determined by an attention deficit, pre-
existing cognitive deficits, and the length of surgery. Once the delirium risk was
established, a trained nurse set postoperative goals, such as cognition support, a
structured daily schedule, early mobilization, and improved nutrition. The study found a
postoperative delirium prevalence of 20.8% when no intervention took place and 4.9%
prevalence when an intervention occurred.

Delirium Screening

The third recommendation by the AGS (2015) is performing postoperative
screenings of elderly patients daily by trained health care teams. Todd, Barry,
Hoppough, and McConnell (2015) completed a pilot study, which focused on the utilization of the CAM tool. The study was completed over a 3 month time period and involved 33 patients who were 65 years or older. The final outcome demonstrated an 18% delirium detection rate, a 22% reduction in length of hospital stay, a 13% improvement in discharge disposition, and a 15% increase in patient satisfaction. With this study, Todd et al. demonstrated the benefits of delirium detection and the successful use of the CAM tool.

The CAM method, a recommended assessment method by the AGS (2015) guidelines, has been found to be an exceptional diagnostic tool. Gusmao-Flores, Salluh, Chalhub, and Quarantini (2012) completed a systematic review and meta-analysis comparing the Confusion Assessment Method-Intensive Care Unit (CAM-ICU) and the Intensive Care Delirium Screening Checklist (ICDSC). Nine studies involving over 969 patients found the CAM-ICU tool to have a sensitivity of 80% and a pooled specificity of 95.5%. Four studies involving 361 patients found the ICDSC to have a sensitivity of 74% and a pooled specificity of 81.9%. Gusmao-Flores et al. concluded that both the CAM-ICU and ICDSC are effective tools for the diagnosis of delirium in critically ill patients.

*Intraoperative Measures to Prevent Delirium*

The fourth recommendation highlights anesthesia providers may consider the use of a processed electroencephalographic monitor, so that adequate depth of anesthesia and drug dosages can be determined. The authors of the AGS (2015) guidelines found several randomized controlled trials demonstrating that the Bispectral index (BIS) monitor decreased the incidence of postoperative delirium.
Seiber et al. (2010), explained that modification of anesthetic technique could modify the risk of postoperative delirium and hypothesized “…that minimizing sedation depth during spinal anesthesia for hip fracture repair in elderly patients could decrease the occurrence of postoperative delirium” (p. 19). Seiber et al. obtained a convenience sample of patients admitted for hip fracture service from John Hopkins Bayview Medical Center. With the aid of the BIS monitor, patients were randomly selected to receive either deep sedation or light sedation during their procedure. The BIS level for the deep sedation group was maintained at approximately 50 and the light sedation group was maintained at approximately 80. With the utilization of the CAM and Mini-Mental State Examination (MMSE), the incidence of delirium was obtained. The researchers found that the prevalence of delirium could be decreased up to 50% when light sedation is utilized in the elderly patient undergoing hip fracture repair under spinal anesthesia and propofol sedation.

Chan, Cheng, Lee, and Gin, (2013) also found that the occurrence of postoperative delirium decreased when light sedation is used. In their study, a sample of 921 patients was randomized, which resulted in BIS guided anesthesia being provided to 50.2% of patients involved. The remaining 49.8% received routine care during their surgical procedure. The results of this study demonstrated BIS guided anesthesia not only reduced the propofol use by 21% and volatile gas by 30%, but decreased the incidence of postoperative delirium as well. In comparison with the BIS range in the study performed by Sieber et al. (2010), Chan et al. (2013) used a lower BIS, which ranged between 40 and 60. Despite this, an approximately 10% decrease in delirium development was noted.
Similar to the studies completed by Sieber et al. (2010) and Chan et al. (2013), Radtke et al. (2013) also found that with the aid of the BIS monitor the incidence of postoperative delirium can be reduced. This study included a sample of 1,115 patients in which the depth of anesthesia was monitored. Delirium assessment was achieved with the aid of the Diagnostic and Statistical Manual of Mental Disorders (DSM IV). The delirium incidence in the control group was found to be 21.4% and the delirium occurrence in the patients guided with BIS was found to be 16.7% (Radtke et al., 2013). Although this does not appear to be a significant decrease, Radtke et al. (2013) found that BIS levels less than 20 did have a significant correlation with the incidence of postoperative delirium. The researchers further explain that unnecessary increases in anesthesia levels could possibly have neurotoxic effects; therefore, “neuromonitoring may lead to a less ‘roller-coaster’-like anesthesia” (Radtke et al., 2013, p. 104). Although BIS monitoring does not completely prevent the development of postoperative delirium, the reduction in its incidence is important with the steadily increasing elderly population.

Another aspect to consider when reviewing the BIS monitor is the possible influence on mortality rates. Bellelli et al. (2014) demonstrated the association between postoperative delirium (POD) development and mortality within a 6-month period. The researchers performed a prospective cohort study in which 199 individuals with a mean age of 84 underwent hip fracture surgery. Postoperative delirium was assessed daily using the CAM algorithm. It was discovered that mortality increases as the duration of POD increases. Although this study’s findings were significant, the small sample size may inhibit the generalizability to other settings. However, of the 57 (28.1%) individuals who developed this postoperative complication, 35 (17.6%) died.
In a study completed by Monk, Saini, Weldon, and Sigl (2005), mortality and the BIS monitor were analyzed. The researchers performed a study involving 880 subjects undergoing noncardiac surgery, in which patient comorbidity, cumulative deep hypnotic time defined by a BIS less than 45, and intraoperative systolic hypotension were found to be significant independent predictors of mortality. Monk et al. (2005) found that a 24.4% increase in mortality occurred per hour of time the BIS was less than 45. These results further emphasize that deep anesthesia may be a potential contributor to poor patient outcomes.

However Kertai et al. (2011) found that cumulative BIS values below 40 or 45 is not injurious to patients in a study involving 1473 patients of the age 57.9 ± 14.7 when undergoing noncardiac surgery. Interestingly, a study completed by Brown, Azman, Gottschalk, Mears, and Sieber (2014) also found no differences in mortality when examining BIS monitor values alone but found lighter sedation to be beneficial when comorbidities are present. Brown et al. randomized a sample of 114 patients undergoing hip fracture repair under spinal anesthesia to receive light or deep sedation during the procedure. A BIS monitor level of approximately 80 or greater was defined as light sedation, and deep sedation was determined to be a BIS level of approximately 50. The study concluded that mortality was equivalent across the sedation groups; however, when lighter sedation was utilized in patients with serious comorbidities, one-year mortality was reduced. The researchers discovered that the mortality rate among patients with hazardous comorbidities was 22.2% with lighter sedation and 43.6% with deep sedation.

Additionally, Lindholm et al. (2009) assessed 4087 patients to confirm the correlation between deep anesthesia and death. The authors did find an association
between a BIS level less than 45 and two-year mortality; however, it was concluded a randomized study would be necessary to demonstrate the causal impact.

Utilization of the BIS monitor has the potential to assist with anesthetic management by allowing anesthesia providers to monitor the amount of anesthetic administered. Ellerkmann et al. (2006) performed a literature review analyzing the correlation between mean titrated BIS values and the potential reduction in anesthetic drug consumption. After analyzing 14 studies involving 2582 patients, the researchers designated a standard clinical group with a BIS value of 43.6 ± 3.2 and a BIS-titrated group with a BIS value of 49.9 ± 5.4. The results of this study found that for every BIS point difference between the two groups a reduction of hypnotic drug use of approximately 5% occurred.

In addition to the findings of Ellerkmann et al. (2006) Punjasawadwong, Phongchiewboon, and Bunchungmongkol (2013) concluded that anesthesia guided by BIS kept within a recommended range improves anesthetic delivery and postoperative recovery from moderately deep anesthesia. After reviewing 36 studies, these authors found that BIS-guided anesthesia lessened propofol requirements by 1.32 mg/kg/hr in 672 participants and decreased the minimal alveolar concentration (MAC) for desflurane, sevoflurane, and isoflurane by 0.65 in 985 participants.

Although studies have demonstrated that a decrease in anesthetic consumption can occur by utilizing the BIS monitor, it is important to determine the effects this monitor has on cost. In a meta-analysis involving 11 randomized controlled trials Liu (2004), compared the cost of the BIS and the money that is potentially saved due to a reduction in anesthetics. Liu found that the BIS monitor reduced the amount of
anesthetic delivered, decreased the risk of postoperative nausea and vomiting, and lessened the duration in the recovery room. However these benefits did not decrease time in ambulatory surgery; therefore, the cost of the BIS electrode exceeds any cost saving. Liu concluded that the cost of the BIS would be approximately $5.55 per patient.

Despite the additional costs of the BIS found in the analysis completed by Lui (2004), the review only involved ambulatory surgery centers and did not address postoperative delirium. Leslie et al. (2008) completed a study involving 841 individuals regarding the economic impact that delirium has on health care. The researchers found that the total costs attributable to delirium range from $16,303 to $64,421 per patient, which could potentially equate to $158 billion each year.

*Medications as Risk Factors for Postoperative Delirium*

The fifth recommendation made by the AGS (2015) advises health care providers to avoid anticholinergic medications, sedative-hypnotics, and meperidine since these medications were found to drastically increase the risk of postoperative delirium. In a systematic review completed by Fong, Sands, and Leung (2006), 821 articles were retrieved in order to identify the role of postoperative analgesics in delirium. Specifically, the focus of the review was opioid and postoperative analgesic modalities. The authors excluded studies neglecting the assessment of delirium and studies not comparing opioids were also excluded. The remaining ten articles were validated and organized based on level of evidence. Interestingly, meperidine was found to be consistently associated with an increase in risk of delirium development in the elderly patient. The review also revealed that intravenous versus epidural analgesia did not influence the occurrence of delirium.
Another medication that has been linked to postoperative delirium is anticholinergics. In a study completed by Han et al. (2001), which involved 278 inpatients 65 years and older, anticholinergic exposure was specifically associated with an increase in severity of delirium in the elderly patient.

Pharmacologic Prevention of Postoperative Delirium

The AGS (2015) explained, in the sixth recommendation, that insufficient analgesia contributes to postoperative delirium and further emphasized the importance of pain control with the utilization of nonopioid alternatives. It has been found that regional anesthesia may be beneficial in preventing postoperative delirium. Kinjo et al. (2012) performed a study that involved 85 patients and concluded that a lower incidence of this complication can be achieved when a femoral nerve block was utilized during total knee replacement surgery. The authors found a 25% incidence of postoperative delirium in the group that had regional anesthesia versus a 61% incidence in the group that endured surgery without regional anesthesia.

Mouzopoulos et al. (2009) performed a study that utilized regional anesthesia as a method to decrease postoperative delirium in hip surgery patients. The researchers in this study randomized 207 patients and found a 15% incidence of delirium in patients that did not receive the fascia iliaca compartment block (FICB) versus the 10% occurrence in patients that received the block. Interestingly, this study did not reveal a significant decrease in the occurrence of delirium among high-risk patients; however, the researchers found a substantial decrease among patients who were considered an intermediate risk.
Nonpharmacologic Prevention and Treatment of Postoperative Delirium

The seventh recommendation in the AGS (2015) guidelines explains that education is an important aspect of prevention and treatment of delirium. The guidelines elaborate that education content should be “...focused on recognition of delirium, screening tools, outcomes, risk factors, and nonpharmacologic and pharmacologic approaches for prevention and management” (p. 142).

Preoperatively, it has been demonstrated that adequate hydration, balancing electrolytes, avoidance of benzodiazepines or medications that have anticholinergic side effects, and pain management may reduce an individual’s risk (Sanders, Pandharipande, Davidson, Ma, & Maze, 2011). It also has been found that creating an environment conducive for sleep and creating a relaxing environment for moderate to high-risk patients can prevent the occurrence of delirium (Rudolph & Marcantonio, 2011).

Medical Evaluation of Postoperative Delirium

The eighth recommendation made by the AGS (2015) explains the importance of healthcare providers completing a medical evaluation of patients diagnosed with postoperative delirium. The guidelines state that identifying underlying contributing factors and ordering appropriate diagnostic tests can improve an individual’s outcome and appropriate management of delirium can occur.

In a systematic literature review, Inouye, Westendorp, and Saczynski (2014) found that delirium has several highly hypothesized contributing mechanisms. These contributing factors are metabolic derangements, electrolyte disorders, inflammation, genetic factors, and biological aspects (hypoxia, hypercortisolism, impaired glucose oxidation) that can interfere with neurotransmitters. Inouye, Westendorp, and Saczynski
explained the importance of a medical evaluation when a patient demonstrates delirium, since elderly patients may not demonstrate the typical signs and symptoms of hypoxia, low glucose, or myocardial infarction.

**Pharmacologic Treatment of Postoperative Delirium**

The ninth recommendation of the AGS (2015) describes the best pharmacologic method in treating an individual with postoperative delirium. It is emphasized that benzodiazepines should not be used in non-agitated delirious patients or for some agitated delirious patients. These medications are recommended only if an agitated patient is at risk for self-injury or injury to others. If a benzodiazepine is prescribed, the lowest dose should be used and only for a short duration. The authors found no benefits in the prophylactic use of these medications or routine use in treating delirium.

Deiner and Silverstein (2009) indicated that the dopamine antagonist, haloperidol, has been shown to assist with decreasing the duration and severity of delirium but has no effect when used prophylactically. However, Rudolph and Marcantonio (2011) reported that treatment with haloperidol simply converts delirium from a hyperactive subtype into a hypoactive type and worsens the patient’s prognosis. Although haloperidol may assist with preventing patient from injuring themselves or staff, this pharmacologic treatment may have a negative effect on patient outcomes; therefore, prevention needs to be a priority for these patients.

Razak and Yung (2015) completed a systematic review of the literature examining 10 studies in which the incidence, risk factors, and preventive strategies for postoperative delirium in patients undergoing total joint arthroplasty were evaluated. The
authors discovered Lorazepam to be the treatment of choice for patients with delirium since this medication has a rapid onset and is considered to be safe.

Theoretical Framework

As medical science and knowledge increases, it is imperative to translate evidence into practice so that patients receive health care that is founded upon the most recent and superlative scientific knowledge (Institute of Medicine, 2001). However for the implementation of evidence to take place, a transition to a new method of practice must occur, which often meets with resistance. According to McConnell (2010), “The principal cause of most resistances to change is the disturbance to the status quo (...) especially if the disturbances or direction for change lead into unfamiliar territory” (as cited in White, 2012, p. 49).

In addition to employee resistance, there are other barriers that must be considered when implementing a new practice method. Solomons and Spross (2010) further elaborated on organizational barriers that encompass translating evidence into practice as the following: the organization’s goals were not being aligned with the mission, lack of time for health care providers to read research, successful use of research was not rewarded, employees did not have enough time in training to gain competency in their new practice method, and lack of awareness of research. Consequently, when implementing evidence into practice, the amount of time for successful translation increases because of these barriers. According to the Agency of Healthcare Research and Quality (AHRQ, 2001), it was estimated that it could take approximately two decades for research to become part of routine practice. Therefore, in order to cement change within
an organization and expedite the translation of evidence into practice, John Kotter’s (1996/2012) 8-stage process for creating change is a beneficial aspect.

In 1995 John Kotter published an article for the *Harvard Business Review* entitled “Leading Change: Why Transformation Efforts Fail.” Kotter explained the article was “...based on [his] analysis of dozens of initiatives over the prior fifteen years to produce significant useful change in organizations, via restructuring, reengineering, restrategizing, acquisitions, downsizing, quality programs, and cultural renewal” (p. xi). In his 1996 book, republished with a new preface in 2012, Kotter built upon his original principles and provided a detailed explanation of what allows change to be successful and what causes change efforts to fail. Kotter’s 8-stage process for leading change has assisted many transformation efforts in health care, such as the implementation of the Situation, Background, Assessment, and Recommendation (SBAR) communication process. Kotter’s (1996/2012, p.23) 8-stage process is shown in Figure 1.
The AGS (2015) issued recommendations for anesthesia providers, nurses, and physicians to decrease postoperative delirium among elderly patients. A program that includes the principles of Kotter’s (1996/2012) 8-stage process for leading change may
motivate employees of healthcare facilities to make the transition of incorporating the AGS’s (2015) postoperative delirium guidelines and address the barriers encountered when implementing a new method of care for the elderly population.

The first stage of Kotter’s (1996/2012) process of creating change begins with “establishing a sense of urgency” (p. 23). Campbell (2008) described several methods to assist in developing a sense of urgency; for instance, creating a video presentation. When implementing the use of electronic medical records (EMRs), a video can be created showing a devastated parent whose child died due to a medical error that could have been prevented if an EMR was used instead of a paper chart (Campbell, 2008). Another example that can be considered when creating this urgency is to allow staff members to visit a facility that has successfully implemented EMRs and interact with colleagues. To create a sense of urgency for the utilization of the AGS (2015) postoperative delirium guidelines, a graphic video or illustration showing a patient suffering the effects of postoperative delirium can be presented to staff.

The next stage consists of “creating the guiding coalition” (Kotter, 1996/2012, p. 23). Kotter (1996/2012) presented several qualities that this team must encompass and are described as the following: the individuals must have relevant knowledge, have the ability to establish credibility among peers, have leadership skills, have the ability to motivate individuals, and have the aptitude for developing and communicating a vision. The third stage is “developing a vision and strategy” (p. 23). Kotter (1996/2012) emphasized the importance of developing a vision and what makes a vision effective. Kotter described the vision as one that is clear, is less than one page, and takes less than one minute to communicate. He further explained that a vision should be moving; a
vision should create a bold strategy and should move ahead quickly. Additionally, Kotter (1996/2012) stressed one must not assume that logical plans and budgets are enough, financial and analytical visions should not be relied upon, and visions should not be about decreasing costs. Therefore, when selecting a guiding team for the implementation of the AGS (2015) postoperative delirium guidelines, the team members must be proficient in their knowledge about this type of delirium in order for them to properly motivate coworkers and to be a credible resource. Also, when developing a vision statement for the guidelines, it is important not to include the financial benefits, but to keep the focus on the patient and the positive postsurgical results that can occur.

The fourth stage begins with “communicating the change vision” (Kotter, 1996/2012, p. 23). Kotter and Cohen (2002) explained that the guiding team should be able to “…address anxieties, accept anger, and evoke faith in the vision” (p. 5). The authors expounded that another effective strategy for communicating the necessity of change is achieved with a question-and-answer session provided by the guiding team; however, the answers must be provided with certainty and without defensiveness. Another technique the guiding team can use to assist with communication is matching words and deeds to emphasize belief in the vision. When executing this step implementing the AGS (2015) guidelines, the guiding team must not only verbally endorse the use of the postoperative delirium guidelines but also tailor their anesthetic plan according to the guideline’s recommendations. This method will reinforce the vision when coworkers witness the guiding team implementing and following the guidelines. During stage five, the change is introduced and people are encouraged to take action. This stage encompasses keeping managers and supervisors positive regarding the
vision. Kotter and Cohen explained that if a supervisor were reluctant to embrace the transition or change in practice, the staff would ultimately give up on the vision. Stage six is “generating short-term wins” (Kotter, 1996/2012, p. 23). This step is accomplished by focusing on tasks where results can be attained. These wins are described as the following: (a) providing feedback to leaders regarding the validity of their visions, (b) giving those working to achieve the vision positive reinforcement, (c) building confidence in the change effort, attracting those who are not entirely enthusiastic, and (d) taking influence away from skeptics (Kotter & Cohen 2002).

Stage seven of Kotter’s (1996/2012) process of creating change is “consolidating gains and producing more change” (p. 23). Once “short-term wins” have occurred, it is imperative to keep momentum and urgency going and negative feelings to a minimum (Kotter, 1996/2012, p. 23). The final stage is to make the change stick by making the change part of the organization’s culture. Kotter and Cohen (2002) explained that culture is values shared by a group and, “its a set of common feelings about what is of value and how we should act” (p. 8). This phase can be realized by providing the AGS guidelines to new employees in orientation and emphasizing its use when providing care to the elderly population.

The successful utilization of Kotter’s (1996/2012) process within health care facilities has been demonstrated in several studies. In a study performed by Beckett and Kipnis (2009), the structured communication tool Situation, Background, Assessment, and Recommendation (SBAR) were successfully implemented in a 291-bed community hospital in Arizona with the application of Kotter’s theory. Another successful use of this theory was demonstrated by Knazik and Baker (2011). With the utilization of this
theory, a Michigan hospital’s emergency department (ED) staff reduced admission time by 83%, the length of stay in the ED by 48%, and individuals who left without being seen for their problem decreased by 91%.

Kotter’s (1996/2012) theory of change is used as the framework in this capstone project to assist with the successful implementation of the AGS (2015) guidelines and to prevent post-operative delirium among high-risk elders. Kotter’s 8-stage process for leading change may have an increased role within hospitals and other medical facilities with health care shifting to an outcome based payment system. The success of hospitals will be determined by the health and outcomes of their patients. Therefore, with Americans living longer and the elderly population increasing, implementation of the guidelines will not only benefit the healthcare facility but also can potentially become a vital part of improving the older adult’s surgical outcome.
CHAPTER II
METHODOLOGY

Design

This capstone project is essentially designed as a quality improvement project. A program was developed and prepared for implementation for the purpose of improving the quality of care for a population of elderly patients. There are no cultural exclusions with this program. Evaluation methodology was included in the program design so that when the program is implemented within any organization, the success of the program can be appropriately evaluated.

Target Population

The target population is the elderly, and for this quality improvement program, the elderly is defined as an individual who is 65 years old or greater. The application of this program is intended for anesthesia providers and anesthesia managers.

Setting

The program was presented to anesthesia providers and anesthesia managers who work in the perioperative area of a local hospital in Hattiesburg, MS.

Detailed Procedures

In this section the implementation plan and the development of the plan is discussed. To facilitate the clear flow of information, the procedure of research utilization for implementation is addressed prior to the plan development. The utilization of an evidence based practice (EBP) model in this implementation plan was vital because “...EBP is a problem-solving approach to clinical care that incorporates the conscientious use of current best evidence from well-designed studies, a clinician’s expertise, and
patient values and preferences” (Fineout-Overholt, Melnyk, & Schultz, 2005, p. 335).

The Stetler model of evidence-based practice was the guide for the development of this plan since it provides a set of criteria that outlines the feasibility of applying studies when addressing a problem that is in need of a solution (National Collaborating Centre for Methods and Tools [NCCMT], 2011). Additionally, John Kotter’s theory of change is another important implementation instrument due to the theory’s ability to promote lasting change. With application of both the Stetler model and John Kotter’s theory of change, this implementation plan guides healthcare facilities aspiring to improve the elderly population postsurgical outcome by integrating the AGS (2015) guidelines into practice.

The development of this plan began with the Stetler evidence based practice model. Stetler (2001) described the model with five phases as follows: preparation, validation, comparative evaluation/decision making, translation/application and evaluation. According to NCCMT (2011), each phase is designed to “facilitate critical thinking about the practical application of research findings; result in the use of evidence in the context of daily practice; and mitigate some of the human errors made in decision making” (p. 2). Figure 2 provides a summary of the five phases of the model.
Figure 2. Stetler model of evidence-based practice. Adapted from “Updating the Stetler model of research utilization to facilitate evidence-based practice,” by C. B. Stetler, 2001. Nursing Outlook, 6, p. 276. Copyright 2001 by Mobsy, Inc., used with permission
In phase one of the Stetler model, “preparation,” evidence is consulted for a potential resolution when a problem is identified (p. 275). In accordance with this phase, after identification of poor elderly patient outcomes associated with postoperative delirium, the literature was consulted to determine if any credible studies revealed possible solutions. In addition to the existence of a substantial amount of studies addressing postoperative delirium, a review of literature uncovered the AGS (2015) guidelines. These guidelines and other vital studies revealed amelioration of this postoperative complication could be obtained; therefore, phase two of the Stetler model was addressed.

In phase two of the Stetler model, which is termed “validation,” the evidence is assessed for “…credibility, applicability, and operational details” (NCCMT, 2011, p. 2). A significant amount of evidence utilized in the AGS (2015) guidelines creation has already been determined to be credible by the expert panel. However, a hierarchy of evidence was determined with an extensive literature review in which studies were evaluated for credibility and correspondence with the recommendations provided by AGS. After the completion of evidence validation, concentration on phase three of the Stetler model began.

In phase three, “comparative evaluation/decision making,” the feasibility of applying the results from the validated sources is determined (Stetler, 2001, p. 275). In this phase, according to Stetler (2001), the user must make four choices based upon the evaluation of evidence, which are the following: choose to implement the research, consider using the research and gather additional information prior to implementation, delay implementation of the research until further evidence is available, or reject the
research. After determining the validity of the evidence and completing a literature review, it was concluded that implementing the guidelines is both necessary and feasible.

In phase four, “translation/application,” the implementation process is explained (Stetler, 2001, p. 275). John Kotter’s theory of change was a feature in this phase. Kotter’s (1996/2012) 8-stage process, which promotes lasting change, assisted with the formulation of a plan. The implementation plan is an eleven-step process and serves as a guide for health care managers and anesthesia providers to use when promoting the use of the AGS guidelines.

In phase five, “evaluation,” the expected outcomes are clarified, and an evaluation process is identified (Stetler, 2001, p. 275). In this capstone project, the identified method of evaluating the outcome of the guidelines implementation is accomplished with the Confusion Assessment Method (CAM) algorithm, which is based on the Diagnostic and Statistical Manual of Mental Disorders (DSM)-IIIR criteria (American Psychiatric Association, 1987). This is an easy four-step method that can assist with screening patients for delirium (Laurila, Pitkala, Strandberg, & Tilvis 2002).

Ethics

There were no human subjects or personal healthcare information required for the completion of this capstone project. Institutional Review Board (IRB) exemption was obtained from The University of Southern Mississippi.

Project Evaluation

The project was evaluated by capstone committee members prior to a final defense.
Assumptions

This capstone project was predicated on the assumption that healthcare providers and hospital administrators view postoperative delirium as a significant issue that needs to be addressed. It was assumed that they would be motivated to implement the guidelines in order to improve elderly patients’ postsurgical outcomes. Specifically, it was assumed anesthesia and nurse providers have concerns with the incidence of postoperative delirium and would consider tailoring patient care plans based upon the AGS (2015) guidelines. It was also assumed that Kotter’s 8-stage process of leading change and Stetler’s (2001) model of research utilization could promote the success of the project. Finally, prior to validating the AGS (2015) guidelines it was assumed credible evidence was employed from the literature to create the postoperative delirium guidelines.

Resource Requirements

There were not many resources needed to complete this capstone project. Resources required were the University of Southern Mississippi library, the Internet, books, and a computer.

Doctor of Nursing Practice Essentials

In comparison with the Doctor of Philosophy degree (PhD), which focuses on the utilization of philosophy and generation of original research, the Doctor of Nursing Practice degree (DNP) concentrates on preparing the nursing graduate for a practice that is based upon evidence from credible research. According to the American Association of Colleges of Nursing (AACN) both doctoral nursing programs “share rigorous and demanding expectations: a scholarly approach to the discipline, and a commitment to the
advancement of the profession. Both are terminal degrees in the discipline” (2006, p. 3). The DNP essentials encompass the competencies that are obtained while pursuing the DNP degree.

**Essential One**

Essential one describes the scientific underpinning of nursing, which includes human biology, physiology and psychology, and nursing science. Nursing science contains concepts such as nursing theories, which assist in guiding nursing practice (Chism, 2013). This capstone project focused upon the implementation of the AGS (2015) guidelines, which have utilized over 6,000 scientific studies to formulate recommendations to prevent postoperative delirium. With Stetler’s EBP model and John Kotter’s theory of change providing the framework for this project, a new practice approach based upon science and evidence utilized in the AGS (2015) guidelines could occur.

**Essential Two**

Essential two elaborates on the importance of identifying issues within organizations and being a facilitator of change (Chism, 2013). With the elderly population projected to increase in the United States, there is a potential for an increase of postoperative delirium occurrence. This capstone project demonstrates the utilization of essential two with the development of an implementation plan that was designed as a quality improvement project.

**Essential Three**

Essential three involves the translation of research into practice (Chism, 2013). By incorporating the Stetler model and John Kotter’s theory of change into an
implementation plan the solutions presented in the literature, specifically the AGS (2015) guidelines were translated into plan, which can be utilized in the practice of anesthesia.

*Essential Four*

Essential four focuses on the use of information technology in order to improve patient outcomes (Chism, 2013). This capstone utilized essential four through the process of completing a literature review. With the aid of technology, utilizing databases and locating relevant peer reviewed journals, a thorough literature review was completed in order to discover a potential solution for postoperative delirium in the elderly patient.

*Essential Five*

Essential five accentuates the importance of healthcare policy and its influence on the delivery of health care (Chism, 2013). With this completed capstone project, dissemination of the results may influence policies of a local Mississippi hospital and improve the perioperative care provided to the elderly patient can occur.

*Essential Six*

Essential six depicts the importance of collaboration among nurses and other disciplines (Chism, 2013). Similarly to essential five, the dissemination of the results of this capstone encouraged communication among healthcare professionals regarding the care provided to elderly patients.

*Essential Seven*

Essential seven emphasizes prevention of illness, reduction of risk, and the improvement of population health (Chism, 2013). Postoperative delirium results in poor patient outcomes and is a potentially life-threatening change in cognition. This capstone project emphasized the prevention of postoperative delirium by translating the AGS
(2015) guidelines and into an implementation plan that can be easily utilized by anesthesia providers. With this program, healthcare facilities now have the necessary tools for successful implementation of these recommendations. With the guidelines successfully being employed, the incidence of postoperative delirium will decrease, related postoperative complications will decrease, and the quality of life elderly patients experience postoperatively will improve.

*Essential Eight*

Essential eight stresses the importance of mastering one particular area in the practice of nursing (Chism, 2013). This capstone project addressed this essential by emphasizing the anesthetic and perioperative care of elderly patients. By evaluating the evidence found in the literature and applying it to practice, a proficiency in anesthesia techniques specific to the elderly population were discovered and mastered.
CHAPTER II

RESULTS

In the following section, the implementation plan and the operational details are explained. The AGS (2015) guidelines addressed many operative phases of care the elderly patient encounters; however, this particular plan is targeted towards anesthesia staff. John Kotter’s (1996/2012) 8-stage process of creating major change was integrated into this plan and served as a guide with the goal of promoting a lasting change in anesthesia practice (1996/2012, p. 23). Additionally, this plan provides the opportunity for expansion of AGS (2015) guideline utilization to other phases of care. There are eleven steps in this plan and they are summarized in Table 1.

Table 1

AGS (2015) Implementation Plan Summary

<table>
<thead>
<tr>
<th>Step</th>
<th>Process</th>
<th>Estimated timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>One- Familiarization with AGS (2015) guidelines as it relates to anesthesia staff.</td>
<td>The American Geriatric Society 2015 guidelines are located via: <a href="http://www.journalacs.org/article/S1072-7515(14)01793-1/pdf">http://www.journalacs.org/article/S1072-7515(14)01793-1/pdf</a></td>
<td>1 week</td>
</tr>
<tr>
<td>Two- Determine postoperative delirium occurrence at your facility.</td>
<td>The occurrence rate can be determined with the Confusion Assessment Method (CAM). See Figure 3.</td>
<td>Incidence rate should be determined over 13 – 26 weeks.</td>
</tr>
<tr>
<td>Three- Address complacency.</td>
<td>Establish a sense of urgency by bombarding employees with diagrams or images relating to postoperative delirium. See Figure 4-6.</td>
<td>2 weeks and continuous thereafter.</td>
</tr>
<tr>
<td>Four- Create a guiding coalition team.</td>
<td>The team should have the following attributes: believe the application of the AGS (2015) guidelines is necessary, have credibility among staff, have both leadership and management skills, and finally the group must trust each other. Avoid individuals who have large egos, are untrustworthy and/or unenthusiastic.</td>
<td>1 to 2 weeks</td>
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Table 1 (continued).

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<th>Step</th>
<th>Process</th>
<th>Estimated timeline</th>
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<tr>
<td>Five-</td>
<td>The vision statement 1) clarifies the direction for change, 2) facilitates the change in practice by motivating action, and 3) aligns the anesthesia team. An effective vision statement should be easy to communicate; appeal to long-term interests of the anesthesia team, patients, and other stakeholders; convey what the future will look like after the guidelines have been implemented; and it should also be realistic, clear, and feasible (Kotter, 1996/2012).</td>
<td>4 to 8 weeks</td>
</tr>
<tr>
<td>Six -</td>
<td>This simple and clear phrase summarizes the vision statement. For example, “Our anesthetic is specifically tailored for the aging mind.” The use of metaphors can also be a creative way to communicate the vision statement such as “The way we pass our gas allows grandma to come home with both her mind and hip intact!”</td>
<td>1 to 2 weeks</td>
</tr>
<tr>
<td>Seven-</td>
<td>AGS (2015) anesthesia concerns:</td>
<td>Implementation process begins after the successful development and communication of vision statement.</td>
</tr>
<tr>
<td>Implement (AGS 2015) guidelines.</td>
<td>- Identify patients at risk. (See AGS guidelines for complete list)</td>
<td></td>
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<tr>
<td></td>
<td>- Consider using processed electroencephalographic monitors to determine anesthetic depth during intravenous sedation or general anesthesia of elderly patients.</td>
<td></td>
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<tr>
<td></td>
<td>- Avoid medications that potentially induce postoperative delirium such as, diphenhydramine, meperidine, and benzodiazepines. (See AGS guidelines for comprehensive list)</td>
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<td></td>
<td>- Consider providing regional anesthesia preoperatively and/or postoperatively to assist with pain control.</td>
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<td></td>
<td>- Enhance postoperative pain control, preferably with nonopioids.</td>
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<th>Step</th>
<th>Process</th>
<th>Estimated timeline</th>
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<tr>
<td>Eight-</td>
<td>Watch out for barriers and address accordingly.</td>
<td>On going throughout the implementation process.</td>
</tr>
<tr>
<td></td>
<td>Typical barriers are: An anesthesia team member’s lack of knowledge and skills or a supervisor’s discouragement.</td>
<td></td>
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<td>Nine-</td>
<td>Establish “short-term wins” (Kotter, 1996/2012, p. 23).</td>
<td>Incidence rate is determined throughout the implementation process.</td>
</tr>
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<td></td>
<td>After consistent implementation of the guidelines, compare the original incidence rate of postoperative delirium to the current incidence rate. The occurrence rate can be determined with the Confusion Assessment Method (CAM) see Figure 4.</td>
<td></td>
</tr>
<tr>
<td>Ten-</td>
<td>Motivate other departments to become involved with the AGS (2015) guidelines.</td>
<td>4 weeks</td>
</tr>
<tr>
<td></td>
<td>Once a decreased incidence of postoperative delirium occurs, use this win, to involve other managerial and administrative departments of the facility. Disclose the approximate costs of postoperative delirium and the potential financial savings, which can occur with the use of the AGS guidelines.</td>
<td></td>
</tr>
<tr>
<td>Eleven-</td>
<td>Cement the use of the AGS (2015) guidelines within daily anesthesia practice.</td>
<td>1 year</td>
</tr>
<tr>
<td></td>
<td>The guiding coalition should continue sharing the vision statement, provide consistent support to individuals who routinely use the guidelines and instruct individuals who are new to utilizing the guidelines. Furthermore the facility’s postoperative delirium occurrence rate should be evaluated every six months to continually provide wins and determine the successful use of the AGS guidelines.</td>
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The first step in this plan simply begins with familiarizing oneself with the AGS (2015) postoperative delirium guidelines. The second step, determining the incidence of postoperative delirium at your facility, is accomplished with the confusion assessment
The CAM algorithm is a recognized method of evaluating the incidence of postoperative delirium. The CAM algorithm, which is based on the American Psychiatric Association (1987) Diagnostic and Statistical Manual of Mental Disorders (DSM)-IIIR criteria, was demonstrated to be a sensitive and a precise system when determining the presence of postoperative delirium (Gusmao-Flores, Salluh, Chalhub, & Quarantini, 2012). This is an easy four-step method that can assist with screening patients for delirium (Laurila, Pitkala, Strandberg, & Tilvis, 2002). The four features of the CAM algorithm are a “…combination of feature 1 (acute onset and fluctuating course), feature 2 (inattention), and either Feature 3 (disorganized thinking) or Feature 4 (abnormal level of consciousness)” (Rudolph & Marcantonio, 2011, p. 1211).

Determining a baseline percentage with the CAM in step two is essential and will enable the efficacy of the guidelines to be determined; in addition to, providing a “short-term win”, which is explained further in step nine (Kotter, 1996/2012, p. 23). Both the accurate evaluation of postoperative delirium occurrence and the creation of wins are vital aspects of this implementation plan and are dependent upon the assessment of postoperative delirium occurrence rate. Step two and step nine will either require the assistance of the healthcare facilities’ nurses to utilize the CAM with their daily patient assessments or a daily follow-up of the postsurgical elderly patient by anesthesia providers. Use of the form in Figure 3 allows for incidence of postoperative delirium to be determined.
Part 1

1. ACUTE ONSET AND FLUCTUATING COURSE:
   a. Is there evidence of an acute change in mental status from the patient’s baseline? NO YES
   b. Did the (abnormal) behavior fluctuate during the day, that is, tend to come and go, or increase and decrease in severity? NO YES

2. INATTENTION:
   a. Did the patient have difficulty focusing attention, for example, being easily distractible or having difficult keeping track of what was being said? NO YES

Part 2

3. DISORGANIZED THINKING:
   a. Was the patient’s thinking disorganized or incoherent, such as rambling or irrelevant conversation, unclear or illogical flow of ideas, or unpredictable switching from subject to subject? NO YES

4. ALTERED LEVEL OF CONSCIOUSNESS:
   a. Overall, how would you rate the patient’s level of consciousness? Circle your choice.

   Alert (normal)
   Vigilant (hyperalert) Lethargic (drowsy, easily to aroused)
   Stupor (difficult to arouse) Coma (unarousable)

RN Signature: __________________________ Date: __________ Time: __________

The diagnosis of delirium by CAM requires the presence of positive answers in 1 and 2 and either 3 or 4. For example, yes in 1, 2, 3 = + diagnosis of delirium. Please note a check next to alert does not count as a positive answer, only a check next to the other four levels of consciousnesses. A positive test requires physician notification.

Figure 3. Is a Confusion Assessment Method (CAM) form, which can be utilized by anesthesia providers or nurses to determine the postoperative delirium occurrence rate. From “Delirium detection and improved management in older patients hospitalized for hip fracture,” by S. K. Todd, J. Hoppough, J.S. Barry, and E. McConnell, 2015, International Journal of Orthopaedic and Trauma Nursing, p. 5. Copyright 2015 by Elsevier Ltd., used with permission.
The third step for this plan addresses complacency, which ultimately inhibits cooperation when attempting to implement a change in practice. As per John Kotter’s (1996/2012) “eight-stage process of creating major change;” a sense of urgency will rectify this obstacle (p. 23). Achieving urgency with anesthesia providers is created by making the crises of postoperative delirium apparent. According to Kotter (1996/2012), “visible crises can be enormously helpful in catching people’s attention and pushing up urgency levels” (p. 47). In order to achieve “visible crises”, a discussion of postoperative delirium within a dedicated conference should occur in order for anesthesia and essential staff to converse and learn important facts (Kotter, 1996/2012, p. 47). After the fundamental data has been provided, it is crucial to bombard employees with diagrams or images, which allows the issue of postoperative delirium to remain visible.

Significant evidence to consider when creating urgency is the following: data on the elderly population; the incidence of postoperative delirium; the effects this complication has on the patient; the consequences of development; and finally the financial cost. Figures 4 and 5 provide a summary of the projected elderly population growth and the incidence of postoperative delirium after various surgical procedures. These diagrams would be a beneficial attribute when creating a “visible crises.” The information presented in these figures exemplifies the necessity of the AGS (2015) guidelines and the high frequency of this postoperative complication.
Figure 4. This figure depicts the population of individuals 65 years old or greater in the United States from the year 2000 to 2050. The area in blue represents the total elderly population in millions. The area in red illustrates the percentage of the total United States population in which the elderly represent. The green shows the percent change in elderly population between decades. Adapted from “65+ in the United States: 2010,” by L.A. West, S. Cole, D. Goodkind, and W. He, (2014), Current Population Reports, p. 5. Copyright 2014 by the US Census Bureau.

Figure 5. Illustrates the ranges of postoperative delirium for specific surgeries. The area in blue represents the lowest recorded range and the area in red represents the highest recorded range of postoperative delirium. Adapted from “Postoperative delirium: acute change with long-term implications,” by J. L. Rudolph and E. R. Marcantonio, 2011, Anesthesia and Analgesia, 5, p. 1203. Copyright 2011 by the National Institute of Health.
Additionally, it is imperative to provide information on postoperative delirium from the patients’ perspective in order for anesthesia providers to understand the emotional turmoil these patients could potentially encounter. Partridge, Martin, Harari, & Dhesi, (2012) highlighted the psychological and emotional aspects of this postoperative complication, which can also be a vital part of creating urgency. The patients who have endured postoperative delirium reported having hallucinations and delusions. A prime example of the mental stress that is encountered by afflicted individuals can be summarized with this patient quote: “the nursing staff were going to kill me and sell my body parts overseas” (Magarey & McCutcheon, 2005, p. 351). Furthermore, the typical emotions these patients experience are fear, anger, insecurity, and hopelessness. Utilizing an image that contains a powerful quote, which summarizes an attribute of postoperative delirium, or providing an image that demonstrates examples of other emotions these patients typically encounter, will further assist in providing a visual crisis. Figure 6 is provided as an example of a potential visual demonstration of a postoperative delirium patient’s experience. Another powerful aspect of evidence to disclose with essential anesthesia staff is the outcomes associated with postoperative delirium. This complication is associated with a hospital mortality rate as high as 17%, longer intensive care and hospital stays, and higher rates of discharge to a nursing home (Rudolph & Marcantonio, 2011).
“The nursing staff were going to kill me and sell my body parts overseas...”

The Delirious Experience

Figure 6. This illustration, the delirious experience, is an example of a potential visual, which can promote urgency. The quote is adapted from “Fishing with the dead—Recall of memories from the ICU,” by J. M. Magarey and H. H. McCutcheon, 2005, Intensive and Critical Care Nursing, 6, p. 351. The experiences of the postoperative delirium patient are adapted from “The delirium experience: what is the effect on patients, relatives and staff and what can be done to modify this?” By J. S. Partridge, F. C. Martin, D. Harari, and J. K. Dhesi, 2013, International journal of geriatric psychiatry, 8, p. 806.

Furthermore an additional motivating aspect to assist with combating complacency is the economic impact postoperative delirium has upon the healthcare industry. The total costs attributable to delirium range from $16,303 to 64,421 per patient, which could potentially result in $158 billion each year. Although cost may not
be a strong motivating factor for some anesthesia personnel, this information may be vital when attempting to recruit additional personnel, which will be discussed in step ten.

Step four of this implementation plan comprises of forming a “guiding coalition” (Kotter, 1996/2012, p. 23). When choosing members of this team, according to Kotter, there are certain attributes these individuals should have which are the following: believe the application of the AGS (2015) guidelines is necessary, have credibility among staff, and have both leadership and management skills (1996/2012). Kotter also advises individuals who have large egos, are unenthusiastic, or an individual who can damage trust within the coalition should be not be invited to participate in the team. Once a team is decided upon, it is imperative the team has trust amongst them and shares a common goal. If trust among the chosen coalition group is in question, Kotter recommends the coalition group participate in off-site activities that will assist in forming trust among group members.

Once the guiding coalition team has been developed, and urgency for the amelioration of postoperative delirium is high, development of an effective vision statement can take place, which is step five in this process. Kotter warns, “creating an effective vision” may take months and several drafts; however, determining this statement is not simply the responsibility of the guiding coalition team but anesthesia personnel who desire to be involved may participate as well (1996/2012, p. 84). The vision statement allows for the following: 1) clarification of the direction for change, 2) facilitation of the change in practice by motivating action, and 3) alignment of the anesthesia team (Kotter, 1996/2012). Kotter advises an effective vision statement should contain the following attributes: easy to communicate; appeal to long-term interests of the
anesthesia team, patients, and other stakeholders; convey what the future will look like after the guidelines have been implemented; and it should also be realistic, clear, and feasible.

Step six of this implementation plan, communication of this vision statement, is initiated once the development of the vision statement has been completed. Kotter explains, when “communicating the change in vision,” the coalition must be prepared to answer questions and listen to opinions of other anesthesia cohorts to ensure the anesthesia team is in agreement with the vision and to also decrease potential resistance (Kotter, 1996/2012, p. 23). Due to the complexity of accurately communicating the vision statement in its entirety, Kotter recommends a simple and clear phrase that summarizes the vision statement should be developed. For example, our anesthetic is specifically tailored for the aging mind. The use of metaphors in this summary vision statement can also be a creative way to assist with communicating the vision and also allows for simplicity. For example, the way we pass our gas allows grandma to come home with both her mind and hip intact! After a simple vision message is decided upon it is imperative for the coalition team to repeat the message whenever possible when communicating the vision (Kotter, 1996/2012). This can be achieved in simple conversation and/or in meetings.

Step seven, involves the utilization of the guidelines in anesthesia practice. In this step, it is important that the guiding coalition team practice the vision they are communicating. If the guiding team does not routinely use the guidelines then other members of the anesthesia team will question the credibility of the vision and the guiding coalition team.
Step eight encompasses the barriers discussed in John Kotter’s 8-stage process for leading change. After other members of the anesthesia team understand the vision and are readily utilizing the guidelines, it is important for the guiding coalition to be aware of barriers (Kotter, 1996/2012). These barriers could range from an anesthesia team member’s lack of knowledge and skills or a supervisor’s discouragement. In order to prevent disengagement of a team member from the vision related to a deficiency of knowledge, it is imperative to familiarize and educate them with the aspects of the AGS (2015) guidelines that are applicable to anesthesia. If a supervisor demonstrates reluctance to participate in the utilization of the guidelines, they could unknowingly cause an impediment of the successful participation of other anesthesia team members. Therefore, it is vital to address their hesitancy and have an honest discussion with this individual and not avoid this crucial conversation (Kotter, 1996/2012).

After the AGS (2015) guidelines are used routinely, step nine may be initiated. According to Kotter it is vital to establish “short-term wins” (1996/2012, p. 23). This type of win can be achieved by comparing the incidence of postoperative delirium prior to the guidelines implementation to the current postoperative delirium incidence rate. The CAM will be utilized again and can assist in determining the postoperative delirium occurrence rate as previously discussed. Having this data is vital to the successful continuation of the program because it provides visual results, decreases the number of resistors, and demonstrates the guidelines are working and worth the effort (Kotter, 1996/2012). Furthermore, while these “short-term wins” are being conveyed, the guiding coalition should continue communicating the vision in order to maintain the urgency of postoperative delirium (Kotter, 1996/2012, p. 23).
Once “short-term wins” are established, step ten can take place (Kotter, 1996/2012, p. 23). The guiding coalition utilizes these victories as momentum to expand the project and produce more change while maintaining the urgency of preventing postoperative delirium (Kotter, 1996/2012). As stated earlier, in this stage disclosing the financial aspects postoperative delirium imposes upon a healthcare facility and patients can potentiate support from management and administrative systems outside the anesthesia department. According to the AGS (2015) guidelines, a potential intraoperative measure anesthesia providers can consider is the use of an electroencephalographic monitor in order to measure anesthetic depth of the elderly patient. The cost of a bispectral index monitor, according to Medtronic and Covidien, ranges from $4,000 to $6,000 and the sensors are approximately $18-22 each (J. Reynolds, personnel communication, August 17, 2015). With the lowest approximate cost postoperative delirium imposes on the patient being $16,000, acquiring this monitor may be financially advantageous for the healthcare facility.

The final step of this implementation plan is explained by John Kotter’s change theory as “anchoring new approaches in the culture” (1996/2012, p. 23). This step involves cementing the use of the AGS (2015) guidelines within daily anesthesia practice. This is only accomplished when it becomes part of the culture. Establishing the guidelines within anesthesia culture is an important stage because “culture refers to the norms of behavior and shared values among a group of people” (Kotter, 1999/2012, p. 156). Therefore, when the concern for postoperative delirium development becomes part of the culture within an anesthesia group this behavior will continue and be taught to new members resulting in a change in practice that lasts. In order to be successful in
instituting the guidelines within anesthesia culture the guiding coalition should continue sharing the vision statement, they should provide consistent support to individuals who are routinely using the guidelines and they should instruct individuals who are new to utilizing the guidelines. Furthermore, the facility’s postoperative delirium occurrence rate should be evaluated every six months to continually provide “short-term wins” and determine the successful use of the AGS (2015) guidelines (Kotter, 1996/2012, p. 23). With a decrease in postoperative delirium occurrence, further solidification of the guidelines within the anesthesia method of practice will occur.
CHAPTER IV
SUMMARY

Limitations
The limitation of this implementation plan involving the AGS (2015) guidelines is the limited time available to execute the plan.

Not having successfully placed this plan into action, there are unknown variables to consider, such as willing participation by anesthesia provider, managers, or registered nurses.

Implications for Anesthesia Practice
The implications for nursing practice is focused on proper identification of the patients at risk for postoperative delirium, anesthesia techniques that can decrease risks for postoperative delirium development, and the use of the assessments methods that accurately identify patients who develop postoperative delirium.

Implications for Research
Prior to applying the AGS (2015) guidelines implementation plan, in order to determine anesthesia providers’ knowledge of postoperative delirium and enable the discovery of a potential coalition team, a survey should be completed. To truly evaluate the effectiveness of this plan in decreasing the occurrence of postoperative delirium in the elderly population, a pilot study should be completed in which the plan is successfully utilized and the incidence of this postoperative complication evaluated.

Implications for Education
As the elderly population grows and becomes a greater percent of the hospitalized and surgical patient population, education concerning the care for these individuals will
need to increase. Education regarding the use of AGS (2015) guidelines, CAM algorithm or other delirium assessment tools needs to become routine.

Benefits
The benefits of successfully implementing these guidelines into practice are decreased postoperative delirium in the elderly patient, decreased associated costs, improved recognition of postoperative delirium, and an improvement of elderly patient outcomes.

Challenges
The challenges of this project were developing a plan that provides both instructions to individuals and creates a lasting change in practice.

Conclusions
With the elderly population projected to increase in the near future, it is imperative that anesthesia providers consider the utilization of evidence provided by the American Geriatrics Society (2015) to ameliorate the poor outcomes associated with postoperative delirium. The aim of this project is to increase anesthesia providers’ awareness of the AGS (2015) guidelines and to efficiently translate this new knowledge into practice. By utilizing the Stetler’s evidence-based practice model and John Kotter’s theory of change, this implementation plan was devised to be employed by healthcare facilities wishing to decrease this postoperative complication.
## APPENDIX A

### LITERATURE REVIEW TABLE

**Postoperative Delirium Risk Factors**

<table>
<thead>
<tr>
<th>Citation</th>
<th>Purpose</th>
<th>Study Type</th>
<th>Sample</th>
<th>Data Collection/Measurements Used</th>
<th>Level of Evidence</th>
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<th>Strengths and Weaknesses</th>
<th>Appraisal: Worth to Practice</th>
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<tr>
<td>Dasgupta, &amp; Dumbrell, 2006, Preoperative Risk Assessment for Delirium After Noncardiac Surgery: A Systematic Review.</td>
<td>To identify preoperative risk factors associated with delirium following noncardiac surgery.</td>
<td>Systematic Review</td>
<td>A total of 2,737 abstracts and titles were reviewed of which 25 articles meet the inclusion criteria required.</td>
<td>Data was obtained from articles located on databases such as CINAHL, Cochrane, and PsychInfo.</td>
<td>Level 1- Evidence from a systematic review of appropriate randomized controlled trials.</td>
<td>Cognitive impairment, visual impairment, increased age, and functional dependence were found to be associated with delirium across the reviewed studies. The range of delirium was found to be 5.1% to 52.2%, with greater rates found after hip fracture repair and aortic surgeries.</td>
<td>Strengths: The studies used for this review meet strict inclusion and exclusion criteria. Weaknesses: Each study was unique and can introduce heterogeneity, which can be the result of random error and factors, such as different study methodologies, different surgical procedures, and different populations.</td>
<td>Postoperative delirium is an increasing concern and more research is needed to decrease its occurrence. This article addressed preoperative risk factors for delirium that were associated with noncardiac surgery.</td>
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<td>Lee, Mears, Rosenberg, Leoutsakos, Gottschalk, &amp; Sieber. (2011). Predisposing factors for postoperative delirium after hip fracture repair in individuals with and without dementia.</td>
<td>To determine if the preoperative dementia is a risk for postoperative delirium in patients exposed to hip fracture repair surgery.</td>
<td>Quantitative</td>
<td>425 non-delirious, acute hip fracture patients admitted for hip fracture repair service.</td>
<td>Every patient involved in the study was assessed for delirium by a specialty nurse with the aid of the Confusion Assessment Method (CAM) before study registration and from the second postoperative day until they were discharged from the hospital.</td>
<td>Level IV – Cohort study.</td>
<td>The incidence of delirium was higher in the “Probable Dementia Group” (54% vs. 26%;) than in the “No Dementia Group.” Male gender, BMI, summation of medical comorbidities, and surgery greater than two hours were independent associations with post-operative delirium. In the “probable dementia” group, only the delay in time from emergency room to surgery was linked to delirium.</td>
<td>Strengths - Similar results found when compared with previous systematic reviews, regardless of pre-operative dementia presence, no difference in delirium occurrence was found between patients who underwent general anesthesia versus those who had a spinal. Weaknesses - Assessment of preoperative dementia did not occur with certainty. To avoid obstruction of surgical intervention some misclassifications may have occurred.</td>
<td>Based on this article’s findings, identification of high-risk patients for post-operative delirium could result in more referrals to geriatricians and improve the progress of delirium prevention techniques.</td>
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<td>Ely, Inouye, Bernard, Gordon, Francis, May,... &amp; Dittus, 2001. Delirium in mechanically ventilated patients: validity and reliability of the confusion assessment method for the intensive care unit.</td>
<td>To validate the Confusion Assessment Method (CAM) for ICU patients who are mechanically ventilated and to simultaneously find the rate of delirium.</td>
<td>Quantitative Cohort Study</td>
<td>111 mechanically ventilated patients were involved in this study.</td>
<td>471 evaluations were completed. The CAM-ICU was compared to a reference standard for diagnosing delirium.</td>
<td>Level IV – Cohort study.</td>
<td>CAM-ICU had a sensitivity of 100% - 93% with specificities of 98%–100% The CAM-ICU was completed with a mean of 2 minutes, which demonstrates it could easily become part of a nurses' routine assessment.</td>
<td>Strengths: The large number of patient evaluations and delirium experts were utilized for a reference. Weakness: Inclusion of patients with suspected dementia in a subgroup analysis to authenticate performance of the CAM-ICU in patients with dementia.</td>
<td>The CAM-ICU assessment method is easy and accurate for nurses to use.</td>
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<td>Kratze, Heinrich, Schlauß, &amp; Diefenbacher, 2015. Preventing postoperative delirium.</td>
<td>To find the incidence of postoperative delirium in a general surgical ward, the preoperative predictive factors of delirium, and whether a geriatric psychiatric specialist nurse has the ability to reduce the incidence of postoperative delirium with non-pharmacological interventions.</td>
<td>Quantitative Cohort Study</td>
<td>320 patients of whom 65 had the intervention applied to their plan of care.</td>
<td>A systematic assessment of the frequency of postoperative delirium in patients over 70 on two surgical wards took place. The first six months of the study, the number of patients with postoperative delirium was determined. Then the next ten months a trained nurse carried out an intervention.</td>
<td>Level IV – Cohort study.</td>
<td>The frequency of postoperative delirium in elderly patients with cognitive deficits can be decreased with trained nurses, postoperative supervision, and cognitive stimulation.</td>
<td>Strengths: This study demonstrates the benefits of nonpharmacologic interventions. Weakness: This was not a randomized study. Also a low number of patients were involved and the patients in the intervention group had greater initial physical and functional impairment.</td>
<td>This study demonstrates that having trained nursing staff who understand delirium risk factors and the knowledge of tools for delirium prophylaxis can result in the improvement of patient outcomes.</td>
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## Delirium Screening

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<tr>
<td>Todd, Barry, Hoppough, &amp; McConnell, (2015). Delirium detection and improved management in older patients hospitalized for hip fracture.</td>
<td>The purpose of this study was to test the practicality and efficacy of utilizing the CAM routinely.</td>
<td>Pilot study</td>
<td>33 elderly patients were involved in this study.</td>
<td>The pilot study utilized a pre and post design in order to evaluate the efficacy of the delirium detection procedures and clinical procedures used by the nurses.</td>
<td>Level III - Pre-test – post-test or historic/retrospective without control group study.</td>
<td>Delirium was detected in 18% of patients, length of stay was reduced by 22%, discharge disposition improved by 13%, and satisfaction scores increased by 15%.</td>
<td><strong>Strengths:</strong> CAM was found to have a 94% accuracy of completion and was completed 86.7% of the time. <strong>Weakness:</strong> Small sample size and non-controlled design. Also comorbidities were not matched and cognitive function not assessed.</td>
<td>This pilot study demonstrated that implementing CAM promotes early detection and improved treatment of delirium.</td>
</tr>
<tr>
<td>Gusmão-Flores, D., Figueira Salluh, Chalhub, &amp; Quarantini. (2012). The confusion assessment method for the intensive care unit (CAM-ICU) and intensive care delirium screening checklist (ICDSC) for the diagnosis of delirium: a systematic review and meta-analysis of clinical studies.</td>
<td>The purpose of this review was to evaluate previously published studies that provided data on the CAM-ICU and the ICDSC for the diagnosis of delirium in the critically ill and determine the CAM-ICU and ICDSC accuracy.</td>
<td>Systematic review with meta-analysis</td>
<td>969 patients were evaluated within nine studies in which CAM-ICU was used. 391 patients were evaluated within four studies in which ICDSC was used.</td>
<td>Systematic database search utilizing MEDLINE, SciELO, CINAHL, and EMBASE.</td>
<td>Level I - Evidence from a systematic review with meta-analysis.</td>
<td>The CAM-ICU was found to have a specificity of 95.5% and a sensitivity of 80%. The ICDSC was found to have a specificity of 81.9% and a sensitivity of 74%.</td>
<td><strong>Strengths:</strong> The summary receiver operating characteristic (SROC) curve, which allows for the determination of a diagnostic test performance, was used in this study. <strong>Weakness:</strong> Although children were excluded in this analysis, an age range of the patients evaluated was not included.</td>
<td>CAM-ICU and ICDSC are screening tools that are beneficial when diagnosing delirium in critically ill patients.</td>
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## Intraoperative Measures to Prevent Delirium

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<td>Sieber, Zakriya, Gottschalk, Blute, Lee, Rosenberg, &amp; Mears. (2010).</td>
<td>To decrease the prevalence of postoperative delirium after hip fracture repair in the elderly by limiting intraoperative sedation depth after a spinal.</td>
<td>Quantitative randomized controlled trial</td>
<td>The sample included 114 patients 65 years or older having spinal anesthesia and propofol sedation.</td>
<td>Delirium assessments began on postoperative day two by using the Confusion Assessment Method (CAM) and Mini-Mental State Examination (MMSE).</td>
<td>Level II - Single randomized controlled trial.</td>
<td>When using spinal anesthesia and light propofol sedation for the elderly patient, the incidence of delirium can be decreased up to 50%.</td>
<td>Strengths: The study was a double blind randomized control trial. Weakness: A convenience sample was used. Also there was restricted generalizability of the results to patients with moderate dementia.</td>
<td>This article reports findings that the current rate of postoperative delirium is as high as 62% after a hip fracture repair. With the elderly population steadily increasing, applying the findings of this study could result in decreasing this complication.</td>
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<td>Chan, Cheng, Lee, Gin, &amp; CODA Trial Group. (2013).</td>
<td>To determine whether BIS-guided anesthesia decreases the incidence of postoperative delirium and postoperative cognitive disorder in the elderly undergoing major surgery.</td>
<td>Quantitative randomized controlled trial</td>
<td>A total of 921 elderly patients enduring noncardiac surgery were included in the study.</td>
<td>Cognitive function was measured within a week before surgery and again at one week postoperatively. Then again at three months after surgery. The Chinese version of the cognitive failure questionnaire was utilized to identify the possible individual issues with perception, memory, and motor function.</td>
<td>Level II - Single randomized controlled trial.</td>
<td>The BIS group had fewer patients’ develop postoperative delirium when compared to the group that had routine care. Patients in the BIS group also had a smaller occurrence of postoperative cognitive disorder at 3 months.</td>
<td>Strengths: The occurrence of postoperative delirium was comparable with other studies. Weaknesses: Universal neuropsychology assessments do not exist therefore a linear comparison of the neuropsychology assessment that was utilized in this study and assessments used with other studies cannot occur.</td>
<td>BIS guided anesthesia can reduce the development of postoperative delirium after major noncardiac surgery by 15.6%. The amount of propofol used also decreased by 21%. Therefore, costs, complications related to delirium, and medication costs can decrease.</td>
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<tr>
<td>Radtke, Franck, Lendner, Krüger, Wernecke, &amp; Spies. (2013).</td>
<td>To assess whether BIS-guided anesthesia decreases the frequency of postoperative delirium in elderly patients.</td>
<td>Quantitative randomized controlled trial</td>
<td>A total of 1,155 elderly patients greater than 60 years old participated in the study.</td>
<td>Delirium was assessed both morning and night according to the Diagnostic and Statistical Manual of Mental Disorders (DSM IV) from the first to the seventh postsurgical day.</td>
<td>Level II - Single randomized controlled trial.</td>
<td>Patients guided with BIS had a lower delirium occurrence. The postoperative delirium rate was 16.7% in the group of patients having the intervention and 21.4% in the control group.</td>
<td>Strengths: Delirium assessment was performed by instructed medical personnel. The observers were uninformed of the treatment group. Weaknesses: Of the BIS blinded group, 141 patients were unblinded during the procedure.</td>
<td>Intraoperative monitoring of sedation level can decrease the incidence of delirium. With patients who are thought to be at higher risk for delirium a reducing low BIS values can improve patient outcomes.</td>
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<td>Bellelli, Mazzola, Morandi, Bruni, Carnevali, Corsi, &amp; Annoni. (2014).</td>
<td>To evaluate the relationship between the duration of postoperative delirium and 6-month mortality in elderly adults after hip fracture surgery.</td>
<td>Quantitative cohort study</td>
<td>199 individuals with a mean age of 84.3 ± 6.4 participated in the study.</td>
<td>Confusion Assessment method (CAM) was used to assess delirium. Multivariable Cox regression models were used to evaluate the association between postoperative delirium and 6-month mortality after surgery.</td>
<td>Level IV - Evidence from a cohort study.</td>
<td>Duration of postoperative delirium is a significant predictive factor for 6-month mortality.</td>
<td>Strengths: Use of CAM and accurate assessment of delirium development. Weakness: Small sample size, drugs such as neuroleptics were not assessed, presence of delirium preoperatively was not assessed, and delirium was not assessed post discharge.</td>
<td>This study demonstrates the efforts needed to lessen the frequency of postoperative delirium.</td>
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<tr>
<td>Monk, Saini, Weldon, &amp; Sigl (2005). Anesthetic management and one-year mortality after noncardiac surgery.</td>
<td>To find if postoperative mortality within the first year is associated with demographic, preoperative, clinical, surgical, or intraoperative variables.</td>
<td>Quantitative Cohort study</td>
<td>Analysis of 880 patients took place.</td>
<td>Cox proportional hazards modeling was utilized to find time to death or survival to 1 yr.</td>
<td>Level IV - Evidence obtained from well-designed cohort study.</td>
<td>Increasing the deep hypnotic time and intraoperative hypotension were predictors of increased mortality.</td>
<td>Strengths: Large sample size Weaknesses: There was a potential for unclear factors in patient selection, which may have resulted in random error. Also, anesthetic dose was not evaluated.</td>
<td>Anesthetic management has the potential to impact the long-term outcomes.</td>
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<tr>
<td>Kertai, Palanca, Pal, Burnside, Zhang, Sadiq, Finkel, Avidan, &amp; B-Unaware Study Group. (2011) Bispectral index monitoring, duration of bispectral index below 45, patient risk factors, and intermediate-term mortality after noncardiac surgery in the B-Unaware Trial.</td>
<td>To find if BIS values less than 40 or 45, cumulative anesthetic dose, comorbidities, and intraoperative events are associated with higher postoperative mortality.</td>
<td>Quantitative Randomized controlled trial</td>
<td>1,473 aged at least 18 years participated in the study.</td>
<td>Patients were randomly assigned to a BIS-guided protocol or an end-tidal anesthetic-agent concentration - guided protocol. Practitioners in both groups could view end-tidal anesthetic-agent concentration. BIS groups had an audible alarm for values &gt;60, and &lt;40. In the end-tidal anesthetic-agent concentration group an alarm went off for values &lt;0.7 MAC or &gt;1.3 MAC</td>
<td>Level II- Single randomized controlled trial.</td>
<td>A total of 358 patients died during a follow up of 3.2 ± 1.1 yr. There were statistically significant associations among various perioperative risk factors, including malignancy and intermediate term mortality. BIS-monitored patients did not have lower mortality. Cumulative duration of BIS values less than 45 was not associated with mortality.</td>
<td>Strengths: Randomized controlled trial Weakness: This study was not limited to the elderly patient. Due to multimodal anesthesia, determining the impact of anesthetic dose on mortality was difficult.</td>
<td>BIS values below 40-45, or a cumulative inhalational anesthetic dose was not harmful to patients.</td>
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<td>Brown, Azman, Gottschalk, Mears, &amp; Sieber, F. E. (2014). Sedation depth during spinal anesthesia and survival in elderly patients undergoing hip fracture repair.</td>
<td>To confirm that low BIS values are linked with higher mortality</td>
<td>Quantitative randomized controlled trial</td>
<td>114 patients greater than 65 years old participated in the study.</td>
<td>Between 2005 and 2008 randomization of patients having surgical repair of a hip fracture under spinal anesthesia received either a light or deep sedation.</td>
<td>Level II: Evidence obtained from randomized controlled trial.</td>
<td>The results support the hypothesis that light sedation may decrease mortality.</td>
<td>Strengths: Randomization of patients occurred. Weakness: Only planned surgeries with spinal anesthesia were included. So results are not generalizable to emergency surgery.</td>
<td>A lighter sedation during hip fracture repair under spinal anesthesia may decrease mortality in elderly patients with higher comorbidity scores.</td>
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<td>Punjasawadwong, Phongchiewboon, &amp; Bunchung-mongkol. (2014). Bispectral index for improving anaesthetic delivery and postoperative recovery.</td>
<td>This review focused on whether the incorporation of BIS into routine practice for management of anesthesia can decrease the following: risk of intraoperative awareness, consumption of anesthetic agents, recovery time, and total anesthesia cost.</td>
<td>Systematic review</td>
<td>The authors included 36 randomized controlled trials.</td>
<td>In this updated article, the authors searched the Cochrane Central Register of Controlled Trials, MEDLINE, EMBASE and other relevant references.</td>
<td>Level I- Evidence from a systematic review with pertinent randomized controlled trials.</td>
<td>BIS can be useful in directing anesthetic dosing, decrease the risk of intraoperative awareness in the high risk, and improve both delivery and recovery from anesthesia.</td>
<td>Strengths: Systematic Review Weaknesses: Anesthesia providers partaking in the study were not blinded, which could result in this study being bias.</td>
<td>BIS-guided anesthesia can lessen the risk of intraoperative awareness; anesthesia guided by BIS within a recommended range improves delivery and postoperative recovery from deep anesthesia.</td>
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<tr>
<td>Ellerkmann, R., K., Kreuer, S., Wilhelm, W., Röpcke, H., Hoefft, A., &amp; Bruhn, J. (2006). Reduction in anesthetic drug consumption is correlated with mean titrated intraoperative bispectral index value</td>
<td>To investigate the association between decreasing anesthetic drug administration and average BIS values.</td>
<td>Literature review</td>
<td>The search returned 14 randomized controlled trials encompassing 16 individual investigations and 2,582 subjects.</td>
<td>The National Library of Medicine’s MEDLINE database was used in the search.</td>
<td>Level I- Evidence from a systematic review of randomized controlled trials.</td>
<td>The average titrated BIS value was shown to be large aspect for hypnotic drug administration.</td>
<td>Strengths: Review of literature consisting of randomized controlled trials Weaknesses: Findings for the BIS cannot be easily transferred to other electroencephalogram’s because the parameter values cannot be translated equally.</td>
<td>The utilization of the BIS monitor can decrease the amount of hypnotic drugs used.</td>
</tr>
<tr>
<td>Lindholm, Träff, Granath, Greenwald, Ekbom, Lennmarken, &amp; Sandin, (2009). Mortality within 2 years after surgery in relation to low intraoperative bispectral index values and preexisting malignant disease.</td>
<td>To confirm or disprove that anesthesia with a BIS &lt;45 is a risk factor for death within 1 and 2 years after surgery and to evaluate the influence of malignancy, which was the principal cause of mortality in the preceding study.</td>
<td>Quantitative controlled trials without randomization</td>
<td>4,087 patients were assessed.</td>
<td>The analysis was performed in three steps. In the first step nonsurvivors were compared to survivors with intraoperative BIS values. In a second step, the association between a BIS less than 45 and mortality within 2 years with regard malignancy. Finally, the initial analysis was repeated and preexisting malignancy included.</td>
<td>Level III- Evidence data obtained from controlled trials without randomization, quasi-experimental</td>
<td>There was a relation between a BIS less than 45 and 2 year mortality.</td>
<td>Strengths: The sample size of 4,087 Weakness: Not a randomized controlled study. When preexisting malignancy status among the covariant was repeated with a COX regression, the link between a 2-yr mortality and a BIS less than 45 was no longer substantial. The average BIS during surgery in the whole cohort was 37.</td>
<td>A BIS less than 45 may have an effect on the elderly patient mortality rate.</td>
</tr>
</tbody>
</table>
**Intraoperative Measures to Prevent Delirium Continued**

<table>
<thead>
<tr>
<th>Citation</th>
<th>Purpose</th>
<th>Study Type</th>
<th>Sample</th>
<th>Data Collection/Measurements Used</th>
<th>Level of Evidence</th>
<th>Key Findings</th>
<th>Strengths and Weaknesses</th>
<th>Appraisal: Worth to Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liu, S. S. (2004). Effects of Bispectral Index monitoring on ambulatory anesthesia: a meta-analysis of randomized controlled trials and a cost analysis</td>
<td>To determine if titrating general anesthesia based upon the Bispectral Index (BIS) monitoring will result in decreasing anesthetic use, reduce side effects, and result in a more efficient patient recovery.</td>
<td>Meta-analysis of Randomized Controlled Trials and a cost analysis</td>
<td>1,380 subjects from 11 trials were included.</td>
<td>The National Library of Medicine’s MEDLINE database, the American College of Physicians Journal Club, the Cochrane Central Register of Controlled Trials, the Cochrane Database of Systematic Reviews, and the Database of Abstracts of Reviews of Effects were searched.</td>
<td>Level II - Evidence obtained from at least one well-designed randomized controlled trial</td>
<td>The use of BIS decreased anesthetic consumption, reduced the risk of nausea and vomiting, and recovery room time. However, due to the cost of the BIS electrode, and time spent in the ambulatory surgery unit, there were no cost savings. BIS monitoring resulted in a total cost of approximately 5.55 US dollars per patient.</td>
<td><strong>Strengths:</strong> Several randomized controlled trials were used. <strong>Weaknesses:</strong> A single researcher completed the analysis. Utilizing the BIS monitor may not be cost effective but it can decrease anesthetic administration, reduce the risk of nausea and vomiting, and recovery room time.</td>
<td></td>
</tr>
<tr>
<td>Leslie, Marcanctonio, Zhang, Leo-Summers, &amp; Inouye (2008). One-year health care costs associated with delirium in the elderly population.</td>
<td>To determine the total one-year health care costs attributable to delirium.</td>
<td>Quantitative cohort study</td>
<td>841 patients were involved in this study.</td>
<td>Participants were of an earlier controlled clinical trial encompassing delirium prevention who were hospitalized and 70 years and older. Statistical analysis software was utilized for analyses.</td>
<td>Level IV - Evidence obtained from well-designed cohort study</td>
<td>The economic impact of delirium was found to be significant, competing with diabetes mellitus. <strong>Strengths:</strong> Large sample size was used. <strong>Weakness:</strong> Errors in estimating costs. Per year delirium is responsible for over $60,000 in extra health care costs per patient. Estimating that delirium affects an estimated 20 percent of 11.8 million hospitalized persons 65 years and older, the attributable costs are $43 billion to $152 billion.</td>
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## Medications As Risk Factors for Postoperative Delirium

<table>
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<th>Citation</th>
<th>Purpose</th>
<th>Study Type</th>
<th>Sample</th>
<th>Data Collection/Measurements Used</th>
<th>Level of Evidence</th>
<th>Key Findings</th>
<th>Strengths and Weaknesses</th>
<th>Appraisal: Worth to Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fong, H. K., Sands, L. P., &amp; Leung, J. M. (2006). The role of postoperative analgesia in delirium and cognitive decline in elderly patients: a systematic review.</td>
<td>To compare the effect of both intravenous and epidural postoperative pain management techniques and opioid analgesics on the elderly postsurgical cognitive status.</td>
<td>Systematic review</td>
<td>Of the 821 searched articles, six meet inclusion criteria.</td>
<td>The review comprised of a search from PubMed database of the National Library of Medicine and CINAHL. The studies utilized were from clinical trials and observational (cohort and case-control). The review then classified each study by level of evidence.</td>
<td>Level II—Systematic review of a combination of randomized controlled trials, cohort studies, quasi-experimental and non-experimental.</td>
<td>The review demonstrated there is lack of data which links the opioids; morphine, fentanyl, or hydromorphone, with increase risk of delirium. However the review did show meperidine increased the risk of delirium in elderly postsurgical patients. Additionally the review found pain managed with intravenous or epidurals does not affect cognitive function differently.</td>
<td><strong>Strengths:</strong> Systematic review of literature <strong>Weakness:</strong> The studies used in the review were found to use different assessment methods when diagnosing postoperative delirium.</td>
<td>Meperidine should be avoided in the elderly patient at risk for postoperative delirium.</td>
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</table>
## Pharmacologic Prevention of Postoperative Delirium

<table>
<thead>
<tr>
<th>Citation</th>
<th>Purpose</th>
<th>Study Type</th>
<th>Sample</th>
<th>Data Collection/Measurements Used</th>
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<th>Key Findings</th>
<th>Strengths and Weaknesses</th>
<th>Appraisal: Worth to Practice</th>
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<tbody>
<tr>
<td>Kinjo, S., Lim, E., Sands, L. P., Bozic, K. J., &amp; Leung, J. M. (2012). Does using a femoral nerve block for total knee replacement decrease postoperative delirium?</td>
<td>To compare the frequency of postoperative delirium between patients who had a femoral nerve block for postoperative pain management and those who did not.</td>
<td>Quantitative prospective cohort study</td>
<td>The sample included 85 patients, 65 years old or greater randomized into two groups.</td>
<td>In patients who underwent total knee replacement a baseline cognitive function was assessed preoperatively. The Confusion Assessment Method was used postoperatively. Delirium was compared in two postoperative groups: femoral nerve block versus the control. Pain levels and opioid use were also compared.</td>
<td>Level IV- Evidence from cohort studies</td>
<td>The incidence of postoperative delirium was reduced with the addition of a femoral nerve block for postoperative pain management. The block also decreased intraoperative opioid use; however this reduction did not extend beyond the operative phase.</td>
<td>Strengths: Use of the CAM and accurate assessment of delirium. Weakness: There was no control for anesthesia and postoperative pain management methods.</td>
<td>Incorporating femoral nerve block to assist with pain management can reduce delirium. This block can also reduce the amount of intraoperative opioids given.</td>
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</table>
### Pharmacologic Prevention of Postoperative Delirium Continued

<table>
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<th>Level of Evidence</th>
<th>Key Findings</th>
<th>Strengths and Weaknesses</th>
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<tr>
<td>Mouzopoulos, G., Vasiliadis, G., Lasanianos, N., Nikolaras, G., Morakis, E., &amp; Kaminaris, M. (2009). Fascia iliaca block prophylaxis for hip fracture patients at risk for delirium: a randomized placebo-controlled study.</td>
<td>To determine the efficiency of a fascia iliaca compartment block for postoperative delirium prevention in patients enduring hip surgery who are considered at an intermediate or high risk.</td>
<td>Quantitative Randomized Controlled Trial</td>
<td>The sample included 207 patients 70 years old or greater randomized to receive a fascia iliaca compartment block or be in the placebo group.</td>
<td>Patients considered to be at intermediate or high risk for developing delirium were randomly appointed to receive the fascia iliaca compartment block or placebo.</td>
<td>Level II Evidence randomized controlled trial</td>
<td>No significant difference was found in patients considered to be at high-risk. However, the block did have an impact on delirium occurrence in patients considered to be at an intermediate-risk.</td>
<td>Strengths: Randomized controlled trial. Weakness: The impact of certain drugs was not evaluated.</td>
<td>Practitioners should consider using this block if the patient is at an intermediate risk for developing postoperative delirium.</td>
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### Nonpharmacologic Prevention and Treatment of Postoperative Delirium

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<th>Data Collection/Measurements Used</th>
<th>Level of Evidence</th>
<th>Key Findings</th>
<th>Strengths and Weaknesses</th>
<th>Appraisal: Worth to Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sanders, R. D., Pandharipande, P. P., Davidson, A. J., Ma, D., &amp; Maze, M. (2011). Anticipating and managing postoperative delirium and cognitive decline in adults.</td>
<td>To determine if BIS values less than 40 or 45, cumulative anesthetic dose, comorbidities, and intraoperative events are uniquely related with increased intermediate-term postoperative mortality.</td>
<td>Quantitative single randomized controlled trial</td>
<td>1,473 aged at least 18 years were included in this study.</td>
<td>Patients randomly assigned to a BIS-guided protocol or an end-tidal anesthetic concentration - guided protocol.</td>
<td>Level II-single randomized controlled trial</td>
<td>358 patients died during the follow-up of 3.2 ± 1.1 years. There were links between various risk factors and malignancy; however, BIS-monitored patients did not have lower mortality when compared to the unmonitored.</td>
<td>Strengths: Randomized controlled trial. Weakness: Additional information gathered on perioperative risk factors was obtained from medical records.</td>
<td>A BIS value below a threshold 40-45 can be harmful to patients.</td>
</tr>
</tbody>
</table>
# Medical Evaluation of Postoperative Delirium

<table>
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<tr>
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<th>Study Type</th>
<th>Sample</th>
<th>Data Collection/Measurements Used</th>
<th>Level of Evidence</th>
<th>Key Findings</th>
<th>Strengths and Weaknesses</th>
<th>Appraisal: Worth to Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inouye, S. K., Westendorp, R. G., &amp; Saczynski, J. S. (2014). Delirium in elderly people.</td>
<td>This review’s purpose was to provide an overview of the epidemiology, causes, pharmacological and non-pharmacological influences on postoperative delirium.</td>
<td>Review</td>
<td>35 studies were included in this review.</td>
<td>Based on a systematic literature review from 2004–2012. Articles on frequency and outcomes of delirium were selected by the following criteria: sample size of 100 or greater; prospective sampling framework; satisfaction of Strengthening the Reporting of Observational Studies in Epidemiology criteria; and use of a validated delirium instrument.</td>
<td>Level II-evidence Systematic review of a combination of randomized controlled trials, quasi-experimental and non-experimental, with or without meta-analysis.</td>
<td>Assessment for delirium in all elderly patients 65 or older; decrease psychoactive drug use; use non-pharmacological approaches to manage patient anxiousness, sleep disturbances, or agitation; only use pharmacological approaches when severe agitation is present; involve family in care; encourage mobility; provide patients with glasses, hearing aids and dentures; keep patients involved in their care.</td>
<td>Strengths: Based on a systematic literature review from the year 2004 to 2012. Articles were selected based upon a rigorous inclusion criteria. Weakness: A meta analysis was not included.</td>
<td>This article provided a summary of postoperative delirium, which can be useful in assisting developing a plan of care for the elderly patient.</td>
</tr>
<tr>
<td>Citation</td>
<td>Purpose</td>
<td>Study Type</td>
<td>Sample</td>
<td>Data Collection/Measurements Used</td>
<td>Level of Evidence</td>
<td>Key Findings</td>
<td>Strengths and Weaknesses</td>
<td>Appraisal: Worth to Practice</td>
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<tr>
<td>Deiner, &amp; Silverstein. (2009).</td>
<td>To define postoperative delirium, to discuss the cause and explore both treatment and prevention options for elderly patients undergoing non-cardiac surgery.</td>
<td>Review</td>
<td>No sample.</td>
<td>This review did not specify data collection methods.</td>
<td>Level IV - Opinion of recognized expert based on scientific evidence.</td>
<td>This study emphasizes the importance of: identifying patients who are at risk; having knowledge of common contributing perioperative factors and preventive interventions; having the ability to identify the disease forms; treating patients with severe hyperactive symptoms.</td>
<td>Strength: Cohort and randomized controlled trials were used in review. Weakness: Level IV evidence, not a systematic review, and could potentially be biased.</td>
<td>Provided information and summarizes potential preventive and treatment modalities.</td>
</tr>
<tr>
<td>Razak &amp; Yung. (2015). Postoperative Delirium in Patients Undergoing Total Joint Arthroplasty: A Systematic Review.</td>
<td>To evaluate the incidence, risk factors and preventive tactics for postoperative delirium following total joint arthroplasty.</td>
<td>Systematic review</td>
<td>10 articles meet inclusion criteria in this study.</td>
<td>An electronic search was performed in the MEDLINE database in which studies published up to June 2014 were included. Literature regarding epidemiology, causative factors, risk profiles and prevention strategies were utilized.</td>
<td>Level I- Evidence from a systematic review</td>
<td>Independent predictors of postoperative delirium were found. Postoperative delirium is not rare and is more frequent than originally suspected. Lorazepam has been the treatment of choice for patients with delirium.</td>
<td>Strengths: Systematic review of literature. Weakness: Low number of subjects in this review.</td>
<td>The current evidence has alluded to some risk factors and promising prevention and treatment possibilities. Pre-screening and risk stratification is vital in order to improve post surgical outcomes.</td>
</tr>
</tbody>
</table>
### APPENDIX B

#### DNP ESSENTIALS

<table>
<thead>
<tr>
<th>DNP Essentials</th>
<th>Capstone relation to DNP Essentials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DNP Essentials I – Scientific underpinnings for practice</strong></td>
<td>This capstone project focused upon implementing the AGS (2015) guidelines, which have utilized over 6,000 scientific studies to formulate recommendations to prevent postoperative delirium. Stetler’s EBP model and John Kotter’s theory of change provided the framework for this implementation plan, which provided a new practice approach for anesthesia providers based upon the science and evidence.</td>
</tr>
<tr>
<td><strong>DNP Essentials II – Organizational and systems leadership for quality improvement and systems thinking</strong></td>
<td>With the elderly population projected to increase in the United States, there is a potential for an increase of postoperative delirium occurrence. This capstone project demonstrates the utilization of essential two with the development of an implementation plan that was designed as a quality improvement project.</td>
</tr>
<tr>
<td><strong>DNP Essentials III – Clinical scholarship and analytical methods for evidence-based practice</strong></td>
<td>By incorporating the Stetler model and John Kotter’s theory of change into an implementation plan the solutions presented in the literature, specifically the AGS (2015) guidelines were translated into plan, which can be utilized in the practice of anesthesia.</td>
</tr>
<tr>
<td><strong>DNP Essentials IV – Information systems or technology and patient care technology for the improvement and transformation of health care</strong></td>
<td>In order to complete this capstone project databases were utilized to complete a review of the literature. Also databases were used in order to examine the evidence provided in the American Geriatrics Society Guidelines for postoperative delirium.</td>
</tr>
<tr>
<td>DNP Essentials V – Healthcare policy for advocacy in healthcare</td>
<td>With this completed capstone project, dissemination of the results may influence policies of a local Mississippi hospital and improve the perioperative care provided to the elderly patient.</td>
</tr>
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<td>-----------------------------------------------</td>
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<tr>
<td>DNP Essentials VI – Interprofessional collaboration for improving patient and population health outcomes</td>
<td>Interprofessional collaboration occurred with the dissemination of the capstone project results. Communication among healthcare professionals during this process could change the care provided to elderly patients during surgery.</td>
</tr>
<tr>
<td>DNP Essentials VII – Clinical prevention and population health for improving the nation's health</td>
<td>This capstone project emphasized the prevention of postoperative delirium by translating the AGS (2015) guidelines and into an implementation plan that can be easily utilized by anesthesia providers. With this program, healthcare facilities now have the necessary tools for successful implementation of these recommendations. With the guidelines successfully being employed, the incidence of postoperative delirium will decrease, related postoperative complications will decrease, and the quality of life elderly patients experience postoperatively will improve.</td>
</tr>
<tr>
<td>DNP Essentials VIII – Advanced nursing practice</td>
<td>This capstone project addressed this essential by emphasizing the anesthetic and perioperative care of elderly patients. By evaluating the evidence found in the literature and applying it to practice, a proficiency in anesthesia techniques specific to the elderly population were discovered and mastered.</td>
</tr>
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</table>
## APPENDIX C

### PROJECTED TIMETABLE

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<tr>
<th>Required Submissions</th>
<th>Estimated start</th>
<th>Estimated Date of completion</th>
<th>Sequential/Parallel</th>
<th>Dependent upon</th>
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<tr>
<td>Topic and Literature Search</td>
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<td>July 2015</td>
<td>Parallel</td>
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<tr>
<td>Preliminary proposal</td>
<td>Completed</td>
<td>May 2014</td>
<td>Sequential</td>
<td>Literature search</td>
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<td>Final outline</td>
<td>Completed</td>
<td>July 2014</td>
<td>Parallel</td>
<td>Literature review</td>
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<tr>
<td>CITI training</td>
<td>Completed</td>
<td>Aug. 2014</td>
<td>Parallel</td>
<td>None</td>
</tr>
<tr>
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<td>Completed</td>
<td>Aug. 2014</td>
<td>Parallel</td>
<td>None</td>
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<tr>
<td>IRB submission/approval</td>
<td>Current</td>
<td>Nov. 2014</td>
<td>Sequential</td>
<td>Proposal Completion</td>
</tr>
<tr>
<td>Project implementation</td>
<td>April 2015</td>
<td>June 2015</td>
<td>Sequential</td>
<td>IRB and proposal defense</td>
</tr>
<tr>
<td>Submit prospectus approval form to graduate degree auditor</td>
<td>June 2015</td>
<td>July 2015</td>
<td>Parallel</td>
<td>Successful completion of project</td>
</tr>
<tr>
<td>Submit contract graduate reader</td>
<td>July 2015</td>
<td>July 2015</td>
<td>Parallel</td>
<td>Approval from graduate degree auditor</td>
</tr>
<tr>
<td>Email title page to the graduate reader</td>
<td>July 2015</td>
<td>July 2015</td>
<td>Parallel</td>
<td>Contract submission</td>
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<tr>
<td>Oral defense of capstone project</td>
<td>Aug. 2015</td>
<td>Sept. 2015</td>
<td>Sequential</td>
<td>Title page submission</td>
</tr>
<tr>
<td>Submit results of oral defense to grad school</td>
<td>Sept. 2015</td>
<td>Sept. 2015</td>
<td>Sequential</td>
<td>Successful oral defense</td>
</tr>
<tr>
<td>Submit hardcopy of capstone project to graduate reader for proofing</td>
<td>Sept. 2015</td>
<td>Sept. 2015</td>
<td>Sequential</td>
<td>Oral defense result received</td>
</tr>
<tr>
<td>Final signed title pages due</td>
<td>Oct. 2015</td>
<td>Oct. 2015</td>
<td>Sequential</td>
<td>Graduate reader proofing</td>
</tr>
<tr>
<td>Submit final copies of capstone to the graduate reader</td>
<td>Nov. 2015</td>
<td>Nov. 2015</td>
<td>Sequential</td>
<td>Title pages signed</td>
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APPENDIX D

LETTER OF PERMISSION FOR FIGURE 1.

Dear Meredith,

This is approved, given you use the proper academic citation standards.

Best,
Natasha

Kotter
INTERNATIONAL
5 Burnett Street, Cambridge, Massachusetts 02138
main 617.491.4499 / fax 617.491.0855
npuim@kotterinternational.com / www.kotterinternational.com

---

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August 11, 2015 at 4:33 PM
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To whom it may concern,

My name is Meredith Gomez and I am currently seeking my Doctorate in Nursing Practice with an emphasis in Nurse Anesthesia. I am completing my capstone project involving the American Geriatric Society (AGS) Postoperative Delirium Guidelines, which were recently published in 2015. The purpose of my capstone project is to increase anesthesia and other health care provider’s awareness of the recent publication of the AGS (2015) postoperative delirium guidelines, encourage the implementation of the guidelines, and to decrease the incidence of this postoperative complication. I am contacting you to request permission for the use of John Kotter’s “eight-stage process of creating major change” diagram due to potentially seeking publication of my project. This diagram is located on page 23 within the book “Leading Change” published in 2012. If you could contact me at your earliest convenience regarding my inquiry I would appreciate it.

Respectfully,

Meredith Gomez, SRNA, BSN
**APPENDIX E**

LETTER OF PERMISSION FOR FIGURE 2.

---

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To Whom It May Concern:

The doctoral capstone project submitted to IRB by Meredith Gomes titled “Decreasing the incident of postoperative delirium in the high risk elderly population: A plan for translating best practice guidelines into anesthesia practice” has been reviewed by Patsy Anderson, DNS, RN, who is a College of Nursing representative of The University of Southern Mississippi Institutional Review Board. The project is a policy analysis that does not involve human subjects. Since the capstone project does not use human subjects, this project does not require IRB approval.

In this doctoral capstone Ms. Gomes and her advisor Dr. Karen Rich will adhere to project proper protection of organizational data. If Ms. Gomes’ project changes to include Human Subjects, she will notify her doctoral capstone advisor, and apply for IRB approval.

Sincerely,

Dr. Patsy Anderson

Patsy Anderson, DNS, RN
USM IRB Member
College of Nursing Representative
Associate Professor
Associate Dean
College of Nursing
The University of Southern Mississippi
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Bellelli, G., Mazzola, P., Morandi, A., Bruni, A., Carnevali, L., Corsi, M., ... & Annoni, G. (2014). Duration of postoperative delirium is an independent predictor of 6-

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Gusmao-Flores, D., Figueira Salluh, J. I., Chalhub, R. Á., & Quarantini, L. C. (2012). The confusion assessment method for the intensive care unit (CAM-ICU) and intensive care delirium screening checklist (ICDSC) for the diagnosis of delirium:


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