

CONFUSION ABOUT DELIRIUM: A LITERATURE REVIEW AND TREATMENT PLAN

by

Niki Putzar-Davis

A Master's Project submitted to the Faculty of the

COLLEGE OF NURSING

In Partial Fulfillment of the Requirements
For the Degree of

MASTER OF SCIENCE

In the Graduate College

THE UNIVERSITY OF ARIZONA

2009

STATEMENT BY AUTHOR

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

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

SIGNED: Niki Putzar-Davis

APPROVAL BY MASTER'S PROJECT DIRECTOR

This Master's Project has been approved on the date shown below:

Kathleen C. Insel, PhD, RN
Associate Professor

Date:

ACKNOWLEDGMENTS

To my family, Glen, Lindsay and Hana Davis who have been with me every step of this journey and who make every journey more interesting and wonderful;

To my parents, Edward and Yaeko Putzar for their love and support;

To my sister, Nina Hipps and family for their prayers and home-cooked meals;

To Kathleen Insel and Virginia Le Baron for their mentoring and guidance;

To my instructors, preceptors and patients who have wisely taught me;

To friends, coworkers and strangers who have cheered me on,

I thank you all.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	3
LIST OF TABLES.....	5
ABSTRACT	6
1. CHAPTER I Introduction.....	7
<i>Issues of Delirium in Older Adults.....</i>	<i>7</i>
<i>Purpose of Report.....</i>	<i>8</i>
<i>Definition and Pathophysiology of Delirium.....</i>	<i>9</i>
<i>Significance of Delirium.....</i>	<i>12</i>
<i>Experience of Delirium.....</i>	<i>14</i>
2. CHAPTER II Assessment, Diagnosis and Treatment of Delirium.....	16
<i>Distinguishing Delirium from Dementia and Other Disorders.....</i>	<i>16</i>
<i>Consequences of Delirium.....</i>	<i>17</i>
<i>Screening, Assessment and Diagnosis of Delirium.....</i>	<i>18</i>
<i>Pharmacologic Prevention and Treatment of Delirium.....</i>	<i>30</i>
<i>Nonpharmacologic Prevention and Treatment of Delirium.....</i>	<i>35</i>
<i>Barriers in the Treatment of Delirium.....</i>	<i>40</i>
3. CHAPTER III Advanced Practice Nurse Roles and The Future	43
<i>Role of Nursing in the Care of Patients with Delirium.....</i>	<i>43</i>
<i>The Future.....</i>	<i>45</i>
<i>The Delirium Algorithm and Conclusion.....</i>	<i>48</i>
REFERENCES.....	51

LIST OF TABLES

Table 1: DSM-IV Text Revision Diagnostic Criteria for Delirium.....	23
Table 2: The Mini-Mental State Exam	24
Table 3: The Short Portable Mental Status Questionnaire.....	25
Table 4: The Confusion Assessment Method Instrument.....	27
Table 5: The Confusion Assessment Method Diagnostic Algorithm.....	28
Table 6: DELIRIUMS Mnemonic	29
Table 7: Nonpharmacological Interventions of Delirium	38
Table 8: The The Delirium Algorithm.....	49

ABSTRACT

The experience of delirium among hospitalized elderly patients is associated with diminished short and long-term quality of life and the consequences of delirium significantly contribute to the cost of health care. A comprehensive review of the literature in the recognition and diagnosis of delirium, current medications and guidelines for the prevention, care and treatment of delirium are presented. Guidelines on the detection and management of delirium are provided. The guidelines are literature based and can be used to inform caregivers of older adults in all settings. A specific focus of this report was to examine the impact of pharmacologic and non-pharmacologic treatments for hospitalized elders with delirium particularly in preventing or minimizing the effects of delirium among adults age 65 years and older. Staff nurses and advanced practice nurses are important caregivers, especially to the expanding elderly population of the Baby Boom generation. It is important that advanced practice nurses participate in advancing knowledge and research in delirium, and be informed, compassionate and astute providers to elders with delirium.

CHAPTER I

Introduction

Issues of Delirium in Older Adults

For more than 2000 years, healers have known the hallmark of delirium to be the abrupt onset of confusion but seemingly little could be done to cure it. While some changes in memory and cognition are expected as one ages, confusion is never a normal part of aging. Yet, confusion is regularly seen in hospitalized older adults and is associated with acute illness and dementia. Acute confusion delirium is considered a medical urgency and must be distinguished from dementia quickly so that proper treatment can be initiated. Regrettably, delirium is a common occurrence in acute care settings, and when detected, delirium must be thoroughly evaluated for accurate diagnosis and treatment of the underlying cause. Misdiagnosis of delirium can have dire consequences such as prolonging illness, and lead to disability or death. It is important that the underlying reason for the delirium be identified. Precipitating causes of confusion such as infection, hypoglycemia or medication reactions need to be promptly addressed. The prevalence of delirium in the general population is only about 1-2%, which increases with age to 14% in elders over 85 years old. The rate of delirium in hospitalized elders dramatically increases to 14-56% of new admissions and general wards; 70-87% in the intensive care units (Inouye, 2006).

Advanced age, dementia and medical illness are some of the predisposing risks of delirium, which in turn is associated with poor health outcomes, reduced quality of life and increased end of life costs. According to the U.S. Bureau of the Census 2000, approximately 35 million people are 65 years and older (United States Bureau, 2002). The experience of delirium in an increasingly aged population will have devastating effects as evidence shows that delirium

may not be as transient as once believed. Delirium may have longer lasting or permanent impact on cognition, which may diminish one's ability to work or live independently (Landro, 2007). Heart disease, stroke and obesity continue to garner much attention in health care and health policy, delirium will certainly become of increasing concern as the oldest of 78.2 million from the Baby Boom generation just turned 60 years old in 2006. This generation can expect to live more than 77 years and must anticipate long term health needs in order to meet the Centers for Disease Control and Prevention (CDC) Health Protection Goals: Criteria and Objectives for Older Adults to "Live Better, Longer" which includes promoting independence, preventing chronic and infectious diseases and improving behaviors that promote health (Centers for Disease, 2009).

Purpose of Report

The purpose of this report is to review the literature regarding delirium and to investigate the impact of pharmacologic and non-pharmacologic therapies of delirium in hospitalized elders. The review includes the possible prevention of delirium and current delirium treatment protocols for hospitalized older adults. A review of the literature regarding the assessment, diagnosis and treatment of delirium in the elderly will be used in the formation of a guide for potential use in hospitals. The report will accomplish this via keyword searches (delirium, aging and delirium, delirium preventions, delirium treatment protocols, pharmacologic therapy/delirium, nonpharmacologic therapy/delirium) from online professional journals, online professional website publications, and via Pub Med, an online database of the U.S. National Library of Medicine.

Definition and Pathophysiology of Delirium

The definition of delirium has evolved over the years to include terms such as “off track” to “acute confusional disorder”. Delirium, which is often under identified and undetected, those close to the patient are often the first to notice its onset by slight changes in behavior or speech. Family are often helpful in filling in health history and information gaps. Delirium has been difficult to define especially because of its variety of causes and variety of terms used such as ICU psychosis and metabolic encephalopathy (Hales, 2008). Unfortunately, delirium is not defined by a single clinical presentation but encompasses several critical features including acute onset, usually hours or days; a disturbance in consciousness, usually, but not always confusion, and a disorder of attention or the inability to focus attention (American Psychiatric Association, 2000). Clinically, delirium has other characteristics in addition to the above, including: intermittent symptoms such as confusion and lucid periods; disorganized, incoherent or rambling speech; decreased awareness of the environment; disorientation or memory deficits; hallucinations; agitation or lethargy; paranoia, anxiety or irritability (Inouye, 2006).

The pathology of delirium cannot be attributed to a single cause but is likely due to insults to or changes within the brain of a susceptible person. In vulnerable persons such as the elderly, those with dementia or other cognitive impairment, certain medications, infection, mild trauma or even sleep deprivation may precipitate delirium. Current research regarding the pathophysiology of delirium has its focus on three main areas: impaired neurotransmission, inflammatory process and chronic stress. Acetylcholine is an important neurotransmitter of the peripheral nervous system, coordinating skeletal, smooth and cardiac muscle movement. In the

central nervous system, acetylcholine is thought to be important in learning, memory and mood. Declining oxygen metabolism associated with aging combined with mild hypoxia appears to significantly inhibit acetylcholine synthesis. A decreased volume of acetylcholine in older adults seems to have some association with increased incidence of delirium, which may also explain why so many anticholinergic medications frequently appear to contribute to the development of delirium (Maldonado, 2008). One study evaluated the effects of specific anticholinergic medications in hospitalized older adults and found increased severity of delirium with increased exposure to anticholinergic medications taken the previous day. Other studies did not appear to show associations between anticholinergic medications and delirium, which could be attributed to low exposure to anticholinergic medications. While the current study measured number of anticholinergic medication exposures, the older studies measured proportions of patients exposed to anticholinergic medications, which may underestimate the anticholinergic medication and delirium association (Han, 2001).

Another proposed pathway to delirium development is a systemic inflammatory response initiated by surgical trauma via tissue injury, blood loss, leukocyte adhesion to endothelial cells and the subsequent release of free radicals. This cascading response to surgical trauma may contribute to perivascular edema and endothelial injury, which impairs acetylcholine synthesis and release (Hala, 2007).

Finally, chronic stress activates the sympathetic nervous system and increases levels of serum cortisol, which from the results of a few small studies, may be associated with delirium

development. This hypothesis suggests that high dose steroid treatment may reduce the risk of delirium in anticipation of surgical or medical stress (Marcantonio, 2006).

Significance of Delirium

One of the significant aspects of delirium is its impact on the aged, an expanding and medically frail population. The effect of delirium on elders is great by many measures including increased length of hospitalizations, additional staff required for the care of delirious patients, additional treatment and therapy secondary to iatrogenic events or injury, loss of independence, long-term care costs as well as the emotional cost to patients and their families. The U.S. population of older adults, 65 to 75 years old, and the very old, those over the age 75 years, are the fastest growing segments of the U.S. population. By 2029, the old and very old age groups will comprise almost 20% of the total U.S. population (Centers for Disease, 2007). Interestingly, per capita spending for health care has remained steady since 1987 in spite of the increasing age shift of the nation. The greatest impact on health care spending will come from the volume of new Medicare enrollees from the Baby Boom generation. Elders 65-85 years of age, spent approximately \$14,797 per person (\$25,691 per person over 85 years) on health care in 2004, compared to \$2,650 per child and \$4,511 per working-age adult (ages 19-64 years) in 2004 (Hartman, 2008). The elderly will spend much of these health care dollars on hospitalizations and nursing home care. Decreasing any complication related to acute illness and maintaining independence of older adults is, in part, critical in controlling health care costs. Although, some debate exists whether delirium increases hospital length of stay, a recent study of hospitalized elders found that patients who were not delirious on admission, but who developed delirium in hospital had longer hospitalizations than those patients who were admitted with known delirium or had no delirious event. While the number of cases of incident delirium was small, delirious

elders stayed approximately 8 days longer after delirium diagnosis than those with prevalent or no delirium (McCusker, 2003). The additional health care costs related to delirium are close to \$7 billion dollars per year according to 2004 Medicare estimates (Inouye, 2006).

The short and long-term outcomes for the patient experiencing delirium are not reassuring. Several studies show that the death rate at the time of hospital discharge to be 14.5-37% higher than patients discharged without a delirium event (Siddiqi, 2006). The mortality rate remains similarly high, up to 40% one year after the delirium episode. (Inouye, 2006) A review of studies regarding increased length of hospitalization and rate of institutionalization post hospitalization in patients with delirium was mixed, although the highest quality study found significant relationships between the development of delirium and post acute care institutionalization (Siddiqi, 2006). While delirium is traditionally defined as being transient, as many as 60% of patients who experienced delirium continued to have lasting effects on cognition and physical function for 6 to 12 months after hospital discharge. It is important to note that the low detection rate of delirium by health care providers likely underestimates the impact of delirium on outcome studies.

Experience of Delirium

The clinical features of delirium are the clouding of consciousness and impaired attention. However, experiences of hallucinations, delusions and disorientation during delirium can be very distressing for the patient, family and professional caregivers. Though many patients who lived through delirium could not recall their experiences, those who remembered, often described feelings of fear, anxiety and panic. They described being in a dream-like state, having dramatic hallucinations and misinterpretations of real events. The “day and night” metaphor and opposite experiences were regularly occurring themes from delirium. The patient felt the delirium experience was like moving from light into darkness, real to unreal, being in a dream but also being awake (Dupplis, 2007).

Another study recorded and transcribed interviews of patients who experienced delirium in order to better understand the acute confusion state. While some patients were unaware of the confusion, others knew that they “weren’t right” or had a sensation of “fuzziness”. The delirium experience evoked many negative emotions such as fear, anger, annoyance, disbelief and embarrassment about behaviors while confused. Paranoia and loss of trust in hospital staff was also reported (McCurren, 2003).

Breitbart and colleagues (Breitbart, 2002) attempted to quantify the delirium experience of cancer patients, their families and nurses using a number of measures such as the Memorial Delirium Assessment Scale (MDAS) (Breitbart, 1997), Karnofsky Performance Status Scale (KPS) (Karnofsky, 1948) and the Delirium Experience Questionnaire (DEQ) instrument (Breitbart, 2002). Those patients classified with severe delirium had the lowest rate of recall,

while those with moderate to mild delirium recalled 55-100% of their delirium experience.

About 66% of patients with hyperactive type delirium recalled their experience, while 43% of patients with hypoactive type delirium recalled their delirium episode. Interestingly, the study found that families rated their distress level as great or greater than the patient who experienced delirium. Highly agitated patient behavior and delirium due to brain metastases contributed the most to high family distress level. Nurses caring for the delirious patient rated their distress level nearly as high as patient distress levels, partially attributed to the added work and stress of caring for highly agitated patients (Breitbart, 2002).

CHAPTER II

Assessment, Diagnosis and Treatment of Delirium

Distinguishing Delirium from Dementia and Other Disorders

In the acute care setting, elderly patients may present with confusion, little history regarding the onset and duration of confusion and scant medication history to assist the health care provider in the differential diagnosis, which may include differentiating delirium from dementia. In some cases, discerning delirium from dementia may require specific diagnostic criteria and tools to make accurate determination of the pathological process. The diagnosis of dementia is specific to the type of dementia such as Alzheimer type (the most common type), vascular type, and frontotemporal lobe type (also known as Pick's dementia). For example, plaque deposits and neurofibrillary tangles throughout the brain, impairing cognition and memory, occur with the diagnosis of Alzheimer's dementia. Cognitive and behavioral changes as well as with brain imaging, will aid the clinician in definitive diagnosis. The DSM-IV diagnostic criteria for Alzheimer type dementia describe the gradual onset of cognitive, behavioral and language changes, which can include memory loss, aphasia and apraxia (American Psychiatric Association, 2000). Definitive diagnosis will help guide the treatment plan for the 6-10% of older adults over age 65 years, and 30% of elders over age 85 years who are expected to have dementia in the U.S. Dementia is generally considered a chronic and progressive disorder, but early treatment may help to delay the progression of symptoms. Like dementia, delirium shares symptoms of confusion, changes in cognition and memory. However, delirium is characterized by a sudden and usually reversible impairment. Specifically, inattention and clouding of

consciousness characterized delirium. Unfortunately, a variety of reasons such as infection, medication side effects, alcohol intoxication or metabolic imbalance may precipitate delirium. Proper identification of the underlying cause is the cornerstone of treatment. In addition to the clinical and physical exams, the family can provide valuable information during the assessment of cognitive status of the patient, such as baseline information, onset and symptoms of current illness or delirium.

Delirium is categorized into three subgroups: hyperactive, hypoactive and mixed delirium. The most recognizable type of delirium is the hyperactive form also referred as “excited” delirium, characterized by agitated and combative behaviors. Hypoactive delirium, sometimes, called “quiet” delirium is difficult to identify and often missed as the symptoms are mistaken for depression, lethargy or unresponsiveness. Mixed or “waxing and waning” type delirium is the most common type, which includes features of both hyperactive and hypoactive delirium types.

Consequences of Delirium

Injuries from falls, pressure ulcers, malnutrition, incontinence and exacerbation of dementia are a few of the comorbidities associated with delirium. Sleep-wake disturbances, aspiration, use of physical and chemical restraints as well as under-treatment of pain can occur as consequences of delirium. The acute care setting would seem to many an especially safe environment. In fact, the unfamiliar setting, weakness due to illness, impaired balance and gait due to medications, combined with the confusion of delirium, create dangerous situations for the elderly (Kannus, 2006). Falls are common among older adults and the reason for many

emergency room visits, and 4% of hospital admissions; in turn 2-27% of older adults will have a fall during their hospitalization (Lord, 2007). Patients with hyperactive delirium are more likely to have falls, which may be attributed to psychomotor disturbance, agitation and subsequent sedative use. On the other hand, patients with hypoactive type delirium are more likely to develop pressure ulcers and other hospital-acquired infections related to decreased mobilization (O'Keefe, 1999). Hospital acquired fecal impaction or incontinence as well as urinary incontinence increased in patients with hip fractures and delirium, which may be related to dependence on others for toileting needs, use of physical restraints or polypharmacy side effects (Palmer, 2002) (Hogan, 1997).

Screening, Assessment and Diagnosis of Delirium

Although the signs of hyperactive delirium are often easier to identify than hypoactive or mixed delirium, it is still commonly overlooked or misdiagnosed especially when patients have concurrent dementia or psychiatric illness. Health care providers are certainly familiar with agitated behaviors and hallucinations such as unaided getting out of bed, pulling at lines and tubes, disrobing, calling out, picking at objects in the air and wandering and searching behaviors. The abrupt onset of unusual behaviors or hallucinations should alert the care provider into action and treatment of delirium. The characteristics of hypoactive delirium may be subtle and difficult to assess because the patient may seem sedated, sleepy, withdrawn, which may be dismissed by the provider as disinterest or depression. The health care provider may not even detect the patient's high level of confusion or disorientation if the patient minimizes conversation, avoids eye contact or appears too depressed or tired to converse. Nurses have stated that delirium

makes “liars” out of them because at one moment the patient may be irrational and violent, and at another moment the same patient appears calm and cooperative. This may illustrate mixed delirium or the fluctuating nature of all delirium subtypes, with the patient experiencing a range in levels of consciousness and disorientation, which only adds to the difficulty of accurate diagnosis. Clinicians must diagnose delirium based on observed clinical features and symptoms, since no diagnostic tests exist to confirm it. Providers may not witness the disturbed behaviors of delirious patients because of its fluctuating nature and because delirium appears to worsen at night. The cycle of disturbed nighttime sleep further contributes to altered diurnal sleep-wake cycles commonly seen in delirious patients, and the provider may find the delirious patient asleep during daytime rounds (Maldonado, 2008) (Alagiakrishnan, 2007). Health care providers must therefore take time to query the hospital staff and family about changes in mentation, orientation and consciousness in order to make timely diagnoses and initiate interventions in the treatment of delirium. Nurses are the front-line caregivers of hospitalized patients; therefore it is imperative that they receive adequate education and support in the recognition, reporting and care of delirious elders.

Delirium superimposed on dementia or psychiatric illness presents a significant barrier to the prompt diagnosis of delirium. Some caregivers and staff may fail to report delirium, attributing confusion to advancing dementia. Others attribute confusion, as expected consequences during hospitalization, therefore do not communicate these changes to providers. In a study of nurses trained to recognize dementia alone, delirium alone and delirium (hypoactive and hyperactive) superimposed on dementia, more than 80% could identify dementia

alone, only 41% could identify hypoactive delirium alone and only 21% could identify hypoactive delirium superimposed on dementia. (Fick, 2007) Extremely erratic behaviors or the expression of hallucinations may be mistaken for psychosis or schizophrenia in the delirious patient. One study found that nearly half of delirious patients were referred for psychiatric evaluation for depression especially if the patient had a previous psychiatric diagnosis (Maldonado, 2008). The provider's assessment of delirium via orientation questions of person, place and time detected confusion only 2% of the time. This demonstrates that simple, unstructured and non-standardized assessments may fail to accurately assess the patient's mental status.

In the acute care setting, health care providers may need indicators to direct attention to an elder patient at risk of delirium, which would be helpful in the prevention of delirium or in early intervention of delirium. Predicting illness such as delirium may be particularly useful in prolonging elder quality of life, decreasing morbidity and mortality, and reducing hospital length of stay. A study of a predictive model of delirium development in elders, found that four of fourteen risk factors significantly correlated with the development of delirium, which are a history of chronic cognitive impairment, severe illness, elevated serum urea and abnormal serum sodium (O'Keeffe, 1996). Of the cognitive impairments, dementia predicted delirium in hospitalized elders most often perhaps because of the brain's underlying vulnerability to illness. The clinical judgment of experienced physicians on illness severity was found to be more accurate than "physiologic" scores such as the Acute Physiology and Chronic Health Evaluation (APACHE) scale. Elevated blood urea levels as well as abnormal serum sodium levels, possibly

due to dehydration or infection were found to be independent predictors of delirium in the elderly. Inouye et al (1993) found similar results in their predictive model with the addition of visual impairment instead of serum sodium level as a predictive factor. The authors caution against making correlations between predictors and outcomes; nevertheless, such models are important for further research in minimizing the impact of delirium on hospitalized elders.

Nurses or caregivers with little training, education or experience with delirious elders may mistake it for psychosis, dementia or depression and may even use these terms interchangeably. Perhaps the many lay terms describing delirium such as “sundowner’s syndrome”, “confusion”, “acute brain dysfunction”, “metabolic encephalopathy” and “ICU psychosis” contributes to the lack of nursing understanding of the disorder, the lack of reporting to providers and delays in the initiation of appropriate treatment. Since the diagnosis of delirium is made clinically and no diagnostic tests exist, the health care provider must rely on health history, physical and neurological exams, laboratory information and imaging studies to help make a determination of delirium and to rule out dementia or other types brain injuries. Unfortunately, physicians and residents accurately recognized delirium and documented delirium 20% of the time even when 84% of their ICU had delirium; nurses correctly recognized and documented delirium about 50% of the time (Maldonado, 2008). Sadly, when delirium is under-recognized, misdiagnosed or goes undiagnosed, it delays implementation of proper care and treatment. When one considers the average duration of delirium is 6 to 14 days, it may seem like prison sentence to those suffering from it. (Manson, 1997) Many excellent tools exist in the screening, diagnosing and severity rating of delirium. The American Psychiatric Association’s

Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV TR) is considered the diagnostic “gold standard” and is primarily used by psychiatric clinicians and researchers. It is a classification system of mental disorders used to describe diagnostic criteria, information and features of disorders, as well as a diagnostic coding system for record keeping and reimbursement needs (American Psychiatric Association, 2000). Table 1 illustrates the current diagnostic criteria for delirium.

Table 1:

DSM-IV Text Revision Diagnostic Criteria for Delirium

-
- A. Disturbance of consciousness (i.e., reduced clarity of awareness of the environment) with reduced ability to focus, sustain, or shift attention.
- B. A change in cognition (such as memory deficit, disorientation, language disturbance) or the development of a perceptual disturbance that is not better accounted for by a preexisting, established, or evoking dementia.
- C. The disturbance develops over a short period of time (usually hours to days) and tends to fluctuate during the course of the day.
- D. Where the delirium is due to a general medical condition- there is evidence from the history, physical examination, or laboratory findings that the disturbance is caused by the direct physiological consequences of a general medical condition
 Where the delirium is due to substance intoxication- there is evidence from the history, physical examination, or laboratory findings of either 1 or 2:
1. The symptoms in criteria (a) and (b) developed during substance intoxication
 2. Medication use- etiologically related to the disturbance
- Where the delirium is due to substance withdrawal- there is evidence from the history, physical examination, or laboratory findings that the symptoms in criteria (a) and (b) developed during or shortly after the withdrawal syndrome
- Where delirium is due to multiple etiologies- there is evidence from the history, physical examination, or laboratory findings that the delirium has more than one etiology (for example, more than one etiological general medical condition, a general medical condition plus substance intoxication, or medication side effects)
- E. Delirium not otherwise specified- this category should be used to diagnose a
-

delirium that does not meet criteria for any of the specific types of delirium described. Examples include a clinical presentation of delirium that is suspected to be due to a general medical condition or substance used but for which there is insufficient evidence to establish a specific etiology, or where delirium is due to causes not listed (for example, sensory deprivation)

Other diagnostic tools include the Confusion Assessment Method (CAM) (Inouye, 1990), the Delirium Rating Scale (DRS) (Trzepacz, 1988), and the Cognitive Test for Delirium (Hart, 1996). The clinician should also assess cognitive functioning with tools such as the Mini-Mental State Exam (MMSE) (Folstein, 1983) or the Short Portable Mental Status Questionnaire (SPMSQ) (Pfeiffer, 1975) to establish or reassess the patient's baseline perception, thinking and memory (learning) function. The MMSE is a frequently used screening tool used to measure cognitive impairment. The questions assess orientation, short-term memory, attention, recall and language. The maximum score is 30, with "normal" ranging from 24-30; mild cognitive impairment, 20-23; moderate cognitive impairment, 10-19; and severe cognitive impairment, 0-9. Table 2 is an example of the MMSE.

Table 2:

The Mini-Mental State Exam

Patient _____ Examiner _____
 _____ Date _____

Maximum Score _____

Orientation

5 () What is the (year) (season) (date) (day) (month)?

5 () Where are we (state) (country) (town) (hospital) (floor)?

Registration

3 () Name 3 objects: 1 second to say each. Then ask the patient all 3 after you have said them. Give 1 point for each correct answer. Then repeat them until he/she learns all 3. Count trials and record.

Trials _____

Attention and Calculation

5 () Serial 7's. 1 point for each correct answer. Stop after 5 answers. Alternatively spell "world" backward.

Recall

3 () Ask for the 3 objects repeated above. Give 1 point for each correct answer.

Language

2 () Name a pencil and watch.

1 () Repeat the following "No ifs, ands, or buts"

3 () Follow a 3-stage command:
 "Take a paper in your hand, fold it in half, and put it on the floor."

1 () Read and obey the following: CLOSE YOUR EYES

1 () Write a sentence.

1 () Copy the design shown.
 (Two interlocking pentagons)

_____ Total Score

ASSESS level of consciousness along a continuum _____

Alert Drowsy Stupor Coma

(Folstein, 1975)

The SPMSQ is another rapid screening tool for cognitive deficits primarily in community elders, using ten questions to test short- and long-term memory, orientation, knowledge of current events and ability to perform mathematical tasks. One limitation of cognitive

measurement tools is the effect of education on performance. Table 3 illustrates the SPMSQ tool and scoring ranges. This tool and others are screening tools and are not diagnostic instruments.

Table 2:

The Short Portable Mental Status Questionnaire

**THE SHORT PORTABLE MENTAL STATUS QUESTIONNAIRE
(SPMSQ)**

1. What are the date, month, and year?
2. What is the day of the week?
3. What is the name of this place?
4. What is your phone number?
5. How old are you?
6. When were you born?
7. Who is the current president?
8. Who was the president before him?
9. What was your mother's maiden name?
10. Can you count backward from 20 by 3's?

SCORING: *

0-2 errors: normal mental functioning

3-4 errors: mild cognitive impairment

5-7 errors: moderate cognitive impairment

8 or more errors: severe cognitive impairment

*One more error is allowed in the scoring if a patient has had a grade school education or less.

*One less error is allowed if the patient has had education beyond the high school level.

(Pfeiffer, 1975)

More recent studies suggest that through neurological examination, some patients with delirium may demonstrate primitive reflexes such as rooting reflex, grasp reflex or Babinski sign, indicating some frontal cortex disease, but diagnostic or prognostic usefulness is still under investigation (Maldonado, 2008).

Most importantly, the maintenance of a high degree of suspicion and alertness of delirium especially in high-risk patients and the use of validated measurement instruments in delirium detection will be helpful to diagnose and treat delirium promptly (Maldonado, 2008). The Confusion Assessment Method (CAM) instrument is a commonly used and easy to implement, reliable tool for delirium detection especially for the non-psychiatric trained clinician. CAM training materials are brief and readily available. The interviewer should also be prepared to do a brief cognitive assessment such as the MMSE in conjunction with the CAM (Inouye, 1991). The CAM instrument consists of 10 yes/no or brief answer questions and a four-feature diagnostic algorithm. The diagnosis of delirium using CAM requires the presence of features 1 and 2, and feature 3 or 4. Table 4 and Table 5 are examples of the Confusion Assessment Method Instrument and Diagnostic Algorithm.

Table 3:

The Confusion Assessment Method Instrument

The Confusion Assessment Method Instrument:

- 1. [Acute Onset]** Is there evidence of an acute change in mental status from the patient's baseline?
 - 2A. [Inattention]** Did the patient have difficulty focusing attention, for example, being easily distractible, or having difficulty keeping track of what was being said?
 - 2B. (If present or abnormal)** Did this behavior fluctuate during the interview, that is, tend to come and go or increase and decrease in severity?
 - 3. [Disorganized thinking]** 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?
 - 4. [Altered level of consciousness]** Overall, how would you rate this patient's level of consciousness? (Alert [normal]; Vigilant [hyperalert, overly sensitive to environmental stimuli, startled very easily], Lethargic [drowsy, easily aroused]; Stupor [difficult to arouse]; Coma; [unarousable]; Uncertain)
-

-
- 5. [Disorientation]** Was the patient disoriented at any time during the interview, such as thinking that he or she was somewhere other than the hospital, using the wrong bed, or misjudging the time of day?
- 6. [Memory impairment]** Did the patient demonstrate any memory problems during the interview, such as inability to remember events in the hospital or difficulty remembering instructions?
- 7. [Perceptual disturbances]** Did the patient have any evidence of perceptual disturbances, for example, hallucinations, illusions or misinterpretations (such as thinking something was moving when it was not)?
- 8A. [Psychomotor agitation]** At any time during the interview did the patient have an unusually increased level of motor activity such as restlessness, picking at bedclothes, tapping fingers or making frequent sudden changes of position?
- 8B. [Psychomotor retardation]** At any time during the interview did the patient have an unusually decreased level of motor activity such as sluggishness, staring into space, staying in one position for a long time or moving very slowly?
- 9. [Altered sleep-wake cycle]** Did the patient have evidence of disturbance of the sleep-wake cycle, such as excessive daytime sleepiness with insomnia at night?

(Inouye, 1990)

Table 4:

The Confusion Assessment Method Diagnostic Algorithm

Feature 1: Acute Onset and Fluctuating Course

This feature is usually obtained from a family member or nurse and is shown by positive responses to the following questions: Is there evidence of an acute change in mental status from the patient's baseline? Did the (abnormal) behavior fluctuate during the day, that is, tend to come and go, or increase and decrease in severity?

Feature 2: Inattention

This feature is shown by a positive response to the following question: Did the patient have difficulty focusing attention, for example, being easily distractible, or having difficulty keeping track of what was being said?

Feature 3: Disorganized thinking

This feature is shown by a positive response to the following question: 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?

Feature 4: Altered Level of consciousness

This feature is shown by any answer other than "alert" to the following question: Overall, how would you rate this patient's level of consciousness? (alert [normal]),

vigilant [hyperalert], lethargic [drowsy, easily aroused], stupor [difficult to arouse], or coma [unarousable])

The diagnosis of delirium by CAM requires the presence of features 1 and 2 and either 3 or 4.

(Inouye, 1990)

Mnemonics are useful memory tools for reviewing physical and psychosocial systems in the assessment, diagnostic and treatment process. Following the diagnosis of delirium, the clinician must develop a treatment plan to identify the reasons for the patient's change in mental status. "DELIRIUMS" is a simple mnemonic that care providers may use in forming the differential diagnosis list and guide the plan of care for patients with delirium. Each letter of the mnemonic stands for a physiologic condition or disorder, or other contributing factor, which may be one or more causes of delirium. For example, "D" in "DELIRIUMS" stands for "Drugs, drugs, drugs" which emphatically represents that medications and polypharmacy are frequently the cause of delirium. (Delirium Mnemonics, 2003) The basic delirium workup should include a complete blood count (CBC), electrolytes, glucose level, renal and liver function tests, thyroid functions test, urinalysis, pulse oximetry and chest x-ray.

Table 5:

DELIRIUMS Mnemonic

D	Drugs, drugs, drugs
E	Eyes, ears (poor vision and hearing are significant risk factors)
L	Low O ₂ states (MI, ARDS, PE, CHF, COPD)
I	Infection
R	Retention (urine or stool), Restraints
I	Ictal
U	Underhydration/Undernutrition
M	Metabolic
S	Subdural, Sleep deprivation

ICU Delirium and Cognitive Impairment Study Group: Vanderbilt University Medical Center (Brain Dysfunction in, 2003/2008)

Pharmacologic Prevention and Treatment of Delirium

Frequently, medical and nursing staff administer anticholinergics (antihistamines and anxiolytics), benzodiazepines and opioids for their usually sedating side effects in an effort to calm agitated, delirious patients. Unfortunately, these medications can precipitate or worsen delirium. Therefore, such agents should be avoided except in delirium caused by alcohol, barbiturate or benzodiazepine withdrawal. Older adults in the U.S. regularly take an average of 2-6 prescription medications and 1-3 over-the-counter medications or supplements (Larsen, 1999). Many of the medications that the elderly take for preexisting conditions (heart disease,

hypertension and diabetes), such as furosemide, digoxin, hydrochlorothiazide, insulin, warfarin, metoprolol, diltiazem and ranitidine, may potentiate adverse anticholinergic side effects.

Anticholinergics can have peripheral and central nervous system side effects that health care providers and caregivers must be alert for. Peripheral anticholinergic side effects include decreased salivation, decreased bronchial secretions, decreased sweating, increased pupil size, increased heart rate, difficulty urinating and decreased gastrointestinal motility. Central anticholinergic side effects may present as impaired concentration, confusion, attention deficits and memory impairment. Anticholinergic side effects can be managed by dose reduction of the known offending medication, often times an antipsychotic, tricyclic antidepressant or antihistamines. If continuation of the antipsychotic is desired in the treatment of delirium, the clinician may reduce or eliminate other medications with known anticholinergic side effects. Of course, one may also prescribe a different antipsychotic with fewer anticholinergic side effects. Providers caring for hospitalized elders must be particularly alert for anticholinergic delirium, which is a medical emergency. Patients may have symptoms of hot, dry skin; dry mucous membranes, dilated pupils, absent bowel sounds and tachycardia (Lieberman, 2004). Occasionally, emergent treatment of anticholinergic toxicity for severe tachycardia, hypertension, respiratory depression, psychosis or extreme agitated delirium may be treated with physostigmine salicylate, which inhibits acetylcholinesterase in the hydrolysis of acetylcholine (Burns, 2008).

Use of pharmacologic treatments for delirious patients can be helpful but should never be substituted for the complete discovery process and treatment of the underlying cause of acute

confusion. Although the U.S. Food and Drug Administration (FDA) has not approved specific drugs for the treatment of delirium, a few medications are regularly used. Particularly for the agitated delirious patient, certain medications may be helpful in reducing the severity and duration of delirium symptoms. The most widely studied and commonly used medication, haloperidol, is a first generation antipsychotic, which is administered orally, intramuscularly (IM) or intravenously (IV) with suggested dose ranges from 2-20 mg per day, up to a maximum of 100 mg per day. Although, the FDA does not approve IV haloperidol, it is commonly used “off-label” in clinical practice (US Food and Drug Administration, 2007). Its mechanism of action is thought to occur by inhibiting dopamine transmission in the brain, which in turn affects basal metabolism, wakefulness and vasomotor tone (DiPiro, 1993/2005). One concern with the use of haloperidol has been the increased risk of extrapyramidal symptoms (EPS) such as akathisia, dystonia, pseudoparkinsonism and dyskinesia, which manifest as atypical involuntary muscle movements. Other concerns are that haloperidol may cause the prolongation of the QT interval or Torsade de Pointes as seen on electrocardiogram (EKG). In a comprehensive review of the literature, Maldonado found that IV haloperidol to be the agent of choice for agitated, delirious patients particularly when used as part of a delirium management protocol with few EPS and cardiac arrhythmia complications. The American College of Critical Care Medicine and the Society of Critical Care Medicine also found IV haloperidol to be preferred and safe to use in critically ill patients. Recommended precautions prior to haloperidol initiation include baseline EKG with QT interval measurement, serum magnesium and potassium levels and

appropriate correction of levels, and cautious monitoring and use of other medications, which may increase the QT interval (Maldonado, 2008).

Recently, health providers are trying newer atypical, second-generation antipsychotic (SGA) medications such as clozapine, olanzapine, quetiapine, risperidone, ziprasidone and sertindole in order to avoid the EPS side effects of typical antipsychotics. Much of the information about the use of SGAs in delirium comes from small studies, and the evidence appears to be mixed regarding their improved effectiveness relative to haloperidol. Clozapine had significantly fewer EPS side effects than haloperidol but quetiapine, risperidone, ziprasidone and sertindole had no or inconclusive evidence of improved efficacy or decreased EPS side effects. Risperidone and olanzapine were similarly efficacious in the treatment of delirium as haloperidol and all three medications were effective in decreasing the duration and degree of delirium over placebo. Unfortunately, some SGAs have also been found to cause or worsen delirium due to their anticholinergic effects, and have other undesirable side effects such as weight gain, dyslipidemia, diabetes and hypertension. Health care workers must carefully consider and monitor the use of either typical or atypical antipsychotics. However, their use does not appear to increase the risk of mortality that physical restraints and polypharmacy have in patients with delirium (Maldonado, 2008).

In a review of studies regarding the safety and efficacy of antipsychotics in the treatment of delirium, the authors found that typical and atypical antipsychotic drugs appeared to have similar therapeutic value. The authors noted that questions related to the validity of the studies, including concomitant use of low dose lorazepam, subjective assessment of sleep quality, and

poor randomization and mixed populations of the sample groups of delirious patients (ICU patients, AIDS patients and general hospital patients) confounded the results. Interestingly, none of the studies compared the use of antipsychotics to non-pharmacologic interventions alone or in combination with study medications. With such a scarcity of valid and reliable evidence, one cannot make any definitive conclusions about the benefits of pharmacotherapeutics over non-pharmacologic therapies versus no treatment at all (Lacasse, 2006).

Several non-antipsychotic medications with mechanisms of action at cholinergic and serotonin receptor sites (as opposed to dopamine and muscarinic receptor sites in atypical antipsychotics) show some promise in the treatment of delirium. In one study, patients who became agitated and delirious after coronary artery bypass graft surgery, received ondansetron (Zofran) 8 mg IV. Eighty percent of the treated patients returned to non-agitated state in a short period of time without any reported adverse side effects (Bayindir, 2001). Trazadone appears to have a pharmacologic effect on serotonin antagonism at receptors that impact slow-wave sleep cycles, which may improve disturbed diurnal sleep patterns frequently seen in delirious patients (Okamoto, 1999).

Nonpharmacologic Prevention and Treatment of Delirium

Interestingly, the pharmacologic treatment options did not conclusively out perform non-pharmacologic treatments in patients with delirium. Many of the non-pharmacologic treatments appear surprisingly simple and easy to implement but are overlooked as therapeutic interventions in delirium. Much of the literature refers to nonpharmacologic interventions as both preventive and curative, and should be included in every plan of care to optimize comfort and provide

accurate, orienting sensory information. For example, it is important that patients have glasses and hearing devices with them during hospitalizations. Many of the nonpharmacologic therapies would be beneficial for every hospitalized elder regardless of diagnosis. Interventions such as ambulation or physical therapy are necessary to prevent deconditioning; adequate fluid and nutrition to prevent malnutrition and dehydration; encouragement of family/friend participation in care to prevent patient isolation and depression. Other therapies in delirium prevention and treatment include elimination of unnecessary medications, prevention of constipation and urinary retention in addition to promoting adequate sleep and removing indwelling lines such as urinary catheters, IVs, arterial lines and nasogastric tubes as soon as possible. Physical and chemical restraints should be avoided, however, they may be necessary for the maintenance of life-saving devices (endotracheal tubes), or if the patient is a danger to himself or others. Patients in physical or chemical restraints must be closely monitored and restraint use should be evaluated for discontinuations regularly and frequently. With many hospitals adopting open-hours visiting policies, family and close friends should be encouraged to stay at the bedside to foster familiarity and accurate orientation. Family may not be able to stay with patients at all times or the patient may be too agitated for family to care for, thus sitters are regularly utilized to stay at the bedside of delirious patients. Sitters are usually certified nurse assistants (CNAs) who typically provide one-to-one patient care for the delirious patient, as an alternative to physical and chemical restraints. They generally assist with the activities of daily living (ADL) such as toileting, feeding and turning as well as companionship. Unfortunately, sitters are expensive, are not always available and do not perform consistently in preventing medical line displacement or

falls. One hospital in Seattle looked for evidence-based alternatives to sitter use and found that scheduled toileting strategies and limited use of multiple drugs, particularly benzodiazepines, as well as the use of bed/chair alarms and nonskid slippers, significantly decreased the number of patients falls, use of restraints and use of sitters (Sweeney, 2008).

A few studies have investigated nonpharmacologic delirium prevention modalities, which shows that the use of multicomponent therapies, when used consistently, has beneficial results over usual or standard care practices. Inouye's ongoing work in delirium has investigated the possibility of delirium prevention. One such study used six nonpharmacologic interventions on 422 at risk for delirium development patients; all were 70 years or older. All patients received three of the interventions; orientation (names of care team members and daily schedule at least once a day), therapeutic activities (cognitively stimulating activities 3 times a day such as discussion of current events, reminiscence activities, word game or art activities), and mobility (ambulation, range-of-motion and minimal use of immobilizing devices such as bladder catheters and physical restraints). Some patients received the other three interventions; nonpharmacologic sleep aid (warm drink, back massage, noise reduction strategies), hearing or vision aid (provide or repair of visual or hearing aids, adaptive equipment and reinforcement of aid use), and volume repletion (encouragement of oral fluid intake). The study later excluded the last three interventions because only a portion of the sample received those interventions and they did not show significant impact on delirium outcomes. Nevertheless, the results demonstrated that higher adherence to the interventions resulted in lower incidence of delirium. Table 7 describes

a list of nonpharmacological interventions of delirium that may be incorporated in any care setting.

Table 6:

Nonpharmacological Interventions of Delirium

Minimize the use of immobilizing catheters, intravenous lines, and physical restraints
Avoid immobility, early mobilization
Monitor nutrition
Provide visual and hearing aids
Monitor closely for dehydration
Control pain
Monitor fluid-electrolyte balance
Monitor bowel and bladder functioning
Review medications
Reorient communications with the patient
Place an orientation board, clock, or familiar objects (i.e., family photographs) in patient rooms
Encourage cognitively stimulating activities such as word puzzles
Facilitate sleep hygiene measures, including relaxation music or tapes at bedtime, warm drinks, and gentle massage
Minimize noise and interventions at bedtime, e.g., by rescheduling medication times
(Breitbart, 2008)

Guidelines and Programs

Health care protocols and best practice guidelines are evidence-based models to standardize patient care or health care processes. Guidelines are tools to help providers and patients in decision-making about the most appropriate care for the desired outcomes. The National Guideline Clearinghouse (NGC), a branch of the Agency for Healthcare Research and Quality (AHRQ), U.S. Department of Health and Human Services, publishes evidenced-based

clinical practice guidelines, and recently released updated delirium guidelines, “Delirium: prevention, early recognition, and treatment” (Agency for Healthcare Research, 2008). The authors developed a nursing practice protocol with the goal to reduce the incidence of delirium in hospitalized older adults. It includes the major components of the nursing process of assessment, diagnosing, planning, implementing and evaluation. The healthcare provider must assess the risk factors and features of delirium through cognitive testing, medication review, pain assessment, laboratory exam, environmental stimuli and mobility deficits. Implementation of prevention and treatment measures include treating and correcting physiologic disturbances, and initially appropriate pharmacologic and nonpharmacologic therapies. Evaluation of outcomes can be measured in terms of the patient such as absence of delirium or cognitive status returned to baseline; in terms of the health care provider by improved detection and treatment of delirium or improved usage of protocols; and in terms of the institution by decreased length of stays, cost-savings and improved patient and staff satisfaction (Tullmann, 2008).

Hospital Elder Life Program (HELP) is a multi-component delirium prevention program developed by Inouye, which strives to improve hospital care of older adults through nine core interventions. The program individualizes the interventions to match the needs of each elder throughout the hospital stay in hopes to maintain cognitive and physical functioning, maximize independence, assist elders/families with transition from hospital to home and prevent unplanned hospital readmissions. A geriatric interdisciplinary team, trained staff and volunteers administer the interventions as well as track the patient outcomes. The HELP program offers training manuals, video clips of the interventions and other advice about starting and maintaining a

program. The program reports success in reducing the incidence of delirium, decreasing the duration and number of episodes of delirium as well as improved cost savings of hospital services (Inouye, 2007). The interventions include daily visitors for communication and social support, daily exercise, hearing and vision equipment use and repair, feeding assistance and geriatric education for staff.

Other programs such as the Nurses Improving Care for Healthsystem Elders (NICHE) and the Delirium Abatement Program (DAP) aim to improve the quality of elder care by preventing delirium or by minimizing the effects of delirium. Such programs utilize geriatric resource nurses to direct the care particular to older adults such skin integrity, immobility, nutrition and pain. Expert geriatric resource nurses and advanced practice nurse also facilitate functional recovery and discharge planning so that older adult patients can return home safely (Fletcher, 2007) (Bergmann, 2005).

Barriers in the Treatment of Delirium

One wonders why after two thousands years, so many elders still suffer the consequences of delirium. As in the old days, it is perhaps barriers to adequate and proper care that is to blame. Some barriers in the treatment of delirium may include lack of knowledge about the pathophysiology and assessment of delirium, lack of knowledge in the treatment of delirium and lack of hospital protocols for delirium. Older adults are at risk from the toxic effects of medications, which has enormous costs in terms of their health and safety as well as health care costs. The Beers Criteria is a list of 48 medications to avoid in older adults, because of potential adverse reactions, and is a helpful tool in guiding the prescribing practice of those taking care of

the elderly. While many hospital staff, physicians and residents ignore the Beers list of medications, federal government regulations limit the use of these medications in nursing home settings. (Fick, 2003) (Geriatrics, 2006) Few studies have investigated the issues of barriers to care but one study identified barriers to appropriate prescribing in hospitalized elders who are clearly vulnerable to the risks of polypharmacy. Sedating medications, especially, can have significant adverse side effects, which can precipitate falls, aspiration, delirium and over-sedation that lead to serious injury. Computerized pharmacy alerts have helped improve safe prescribing behavior, maintain clinical standards of care and offer alternatives to prescribed medications. In this same study, when physicians ordered diphenhydramine (Benadryl) or diazepam (Valium), a computer alert appeared, with a reminder of the patient's advanced age, offered nonpharmacologic alternatives such as warm milk or tea, suggested safer medication alternatives such as lorazepam (Ativan) or trazodone, as well as a "back out" option if the physician wished to continue or discontinue the original medication choice. Online links to medical and pharmacologic information may also provide quick access to supporting data and improve trust in the computer suggestions (Agostini, 2008).

While scarce evidence exists regarding the benefit of such guidelines on patient outcomes, it is important to continue research, collect data and develop programs and therapies to improve patient care. It is also important to consult multidisciplinary experts to discuss differing opinions, clarify recommendations and discover areas for further investigation. Some institutions have utilized protocols or best practice guidelines, like the HELP program with cooperation from geriatricians, geriatric nurse specialists, staff and administrators, yet it has been

difficult to overcome barriers such as the retention of effective geriatric clinical leaders, integrating with existing geriatric programs and institution financial support. These challenges highlight the difficulty of translating research evidence into clinical practice and that further investigation into effective program implementation and organizational change are warranted (Bradley, 2004).

CHAPTER III

Advanced Practice Nurse Roles and The Future

Role of Nursing in the Care of Patients with Delirium

The growing shortage of primary care physicians is of national concern especially, as the expanding population of aging Baby Boomers need more medical services. The need for more providers creates opportunities for many advanced practice nurses (APNs) to fill these roles in all practice settings. The role of advanced practice nurses is multifaceted; they are clinicians, educators, administrative leaders, researchers, and health care policy-makers. Clinical advanced practice nurses, most with graduate level education, national accreditation and prescriptive authority are prepared to provide competent and cost-effective care in acute care and long-term care settings. They are and will be invaluable in implementing standardized care practices, which Joint Commission on Accreditation of Healthcare Organizations (JCAHO), Centers for Medicare & Medicaid Services (CMS) and, state health departments monitor as patient advocates and as part of service compensation. Hospitals, nursing homes and providers are under increasing pressure from the federal government to improve quality of care and improve patient outcomes as conditions of payment and for institutional accreditation. Quality indicators exist for many specific disease states, so that patients receive standard tests, treatments and medications. Williamson's principle of "maximum achievable benefit," states that when a "diagnosis is frequent, the deficiencies in care are common and serious, and the deficiencies are correctable," meaning that a little attention will impart great good (Graham, 1995). Health care advocates often use this criteria for selecting diagnoses for protocol or guideline implementation;

for example the “American College of Cardiology (ACC)/American Heart Association (AHA) guideline for the management of patients with ST-elevation myocardial infarction,” which many hospitals and providers follow when caring for heart attack victims. CMS has developed a Nursing Home Quality Indicator (NHQI) called the Post Acute Care Quality Measures, which includes delirium, pain and pressure ulcers as signs of patient quality of care. Most hospital-discharged patients in nursing homes are considered short-stay patients and the expectation is that they will return home without the previously stated nursing home complications. Since the detrimental impact of delirium on morbidity and mortality rates is known, it is imperative that providers, including APNs, find and treat the cause of delirium. This is necessary to restore health and quality of life, as well as compliance with quality care standards (US Department of, 2008). While delirium is not currently a quality measure in the acute care setting, other quality measures frequently associated with delirium are. CMS health advocates prepare to add the following to the list of quality of care measures: prevalence of falls, falls with injury and, death or serious injury related to restraints and bedrails (Department of Health, 2009). It can be difficult for physicians and residents to treat delirium with the urgency it deserves because of busy practice schedules and medical staff shortages. Rules implemented by the Accreditation Council for Graduate Medical Education limits practice hours of medical residents, to reduce fatigue related mistakes, improve patient safety as well as the health and education of residents (Accreditation, 2002). Hospitals that once relied on medical resident coverage may increasingly utilize APNs, especially as more Acute Care Nurse Practitioners (ACNPs) come into practice. Fewer physicians and large numbers of older adults are not an ideal formula for improving the

health of the elderly. As partners of the interdisciplinary health care team, APNs will bring high level nursing knowledge, expertise and experience to the care of older adults.

The Future

In Francis's (1999) editorial, "Three Millennia of Delirium Research: Moving Beyond Echoes of the Past," he emphatically states that experts have studied this ancient problem yet delirium is as common and destructive as ever. He suggests that the scientific community's obsession with methodological rigor may be stifling creative ideas and innovation in delirium research. Francis makes three suggestions that may promote the discovery of solutions to problems such as delirium, including recommendations are that one must make health professionals aware of the problem of delirium; secondly, the public must be aware of the problem in order to gain funding support; and finally, we must be open to unique observations in the scientific process that may advance our understanding of delirium.

The following are novel ideas for the problem of delirium. Saint Louis University Hospital has a four-bed area, where elders with delirium (or at very high risk of developing delirium) are closely cared for without the use of restraints and minimal use of sedating medications. The "Delirium Room" is part of the hospital's Acute Care for the Elderly (ACE) program, which focuses on the care of older adults to maintain as much physical function and independence at discharge as possible. Highly trained nurses caring for delirious patients constantly monitor them to prevent problems from worsening such as agitation, and treat reversible causes of delirium early. The use of Delirium Rooms may also help care providers focus on the specific needs of the delirious patient, thereby making it less likely to miss

diagnosing underlying cause of delirium. Specialty areas are like classrooms for nurses and physicians to learn about the condition of delirium and the patients suffering from delirium. The results from the Delirium Room study found that patient hospital length of stay (LOS) was nearly equal to the expected diagnostic related groups (DRG) length of stay, which is significantly fewer days compared to patients receiving standard care (Flaherty, 2003).

Another unique suggestion for the care of delirious elders is the use of “delirium doulas,” which are highly trained, lay caregivers providing the patient physical and emotional comfort, offering family support and advocating for the patient during the delirious state. Physical and emotional comfort measures include offering cool compresses, handholding, repositioning, assistance with fluid and nutrition intake, verbal reassurance, and companionship, offering encouragement and being a familiar presence. Delirium doulas would advocate for the patient by promoting delirium guideline adherence such as keeping lights dimmed, minimizing noise, cleaning glasses or assisting with ambulation. Delirium doulas do not make health care decisions for the patient but are present as support team members. How doulas would be reimbursed, using volunteers as doulas and training issues are concerns with the delirium doulas concept (Balas, 2004).

Finally, a recent study proposes an “old-fashioned” innovation for an age-old problem that may help prevent delirium in older adults among other benefits. The concept is “Hospital at Home,” which provides acute care services to low and moderate risk patients at home as a substitute to acute care or emergency room hospitalization. Providers must be able and willing to offer complex services such as oxygen, intravenous drugs, portable imaging as well as have

the skills and confidence to treat very ill patients away from traditional settings. The study supports the idea that selected patients can receive hospital quality care with fewer complications such as hospital-acquired infections, use of chemical or physical restraints and delirium. A hospital in Buffalo, New York implemented the Hospital at Home model successfully using nurse practitioners in addition to physician providers. In the past home health agencies have had a more leisurely approach to patient care but now must have astute nurses and staff to meet the needs of acutely ill patients (Leff, 2005). The study also reports added benefits such as increased patient satisfaction, decreased pressure for inpatient beds and cost savings for hospitals and third-party payers (Leff, 2005) (The John A. Hartford, 2009).

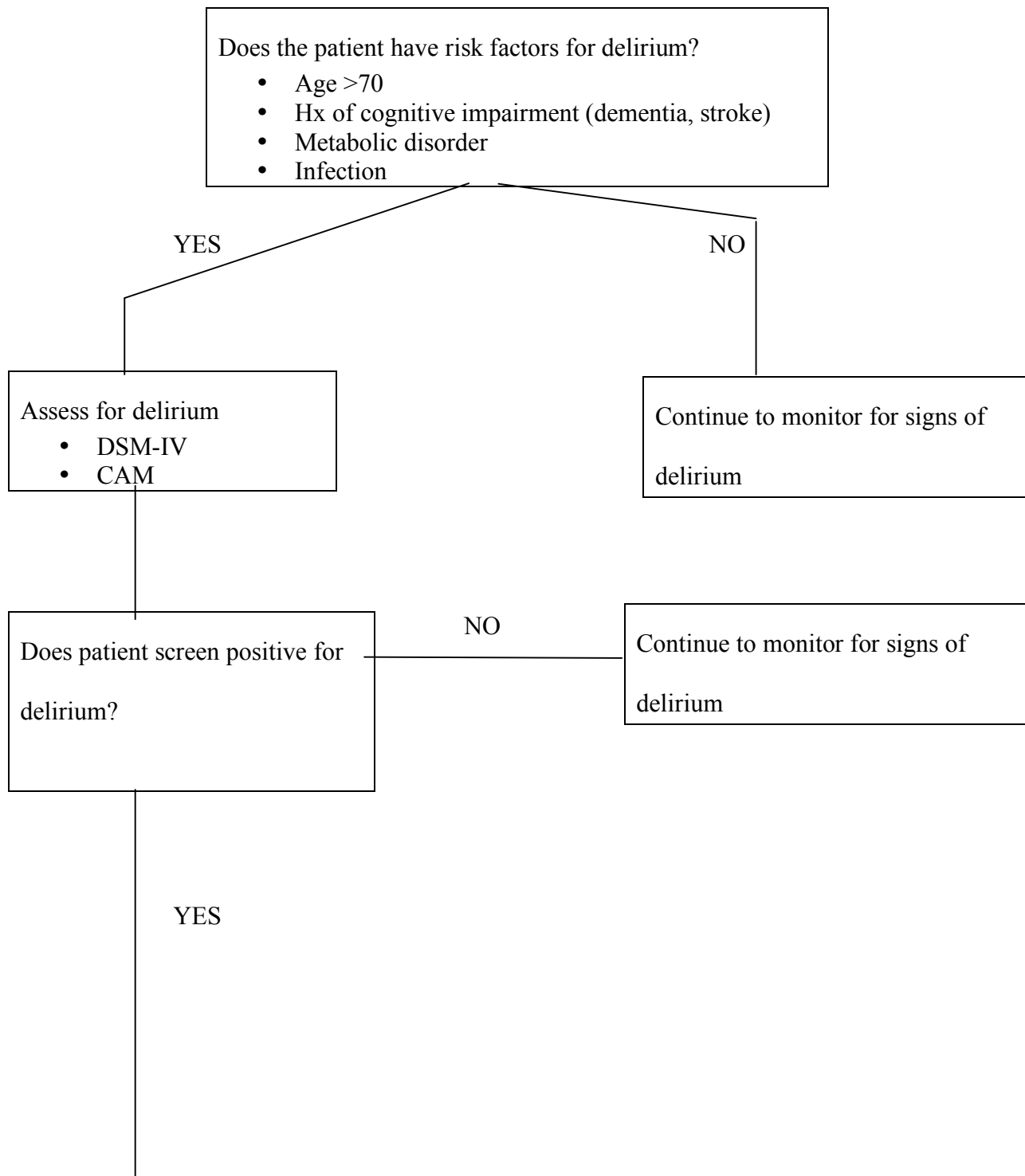
The Delirium Algorithm and Conclusion

The comprehensive literature review and writing of this paper has helped this author develop an algorithm for preventing and treating delirium. While this author did not contribute new or original information to the study of delirium, it is important to continue educating oneself, share information with coworkers and colleagues, and revisit problems in order to stimulate ideas and solutions. In part, the purpose of this report is the development of a delirium guideline to help, particularly nurses, in the care of delirious elders. The Delirium Algorithm will serve in that purpose as well as summary and conclusion to the information gained from reading, investigating and reflecting upon the condition of delirium. Table 8 illustrates the Delirium Algorithm. It will also be a goal to encourage the optimal health of hospitalized older adults by implementing or promoting guidelines or programs in all care settings to prevent or

minimize the effects of delirium. Through the discovery and learning process of this project, it is my hope that I may have some positive impact on the health of older adults especially in the acute care setting

Table 8:

The Delirium Algorithm



- Notify attending physician or nurse practitioner per orders or protocol
- CBC
- CMP
- Glucose
- Calcium
- UA with C&S
- CXR
- O2 saturation
- For hyperactive type delirium:
- Ondansetron (Zofran) 4-8 mg IV q 4-12 hrs. prn delirium
- Haloperidol (Haldol) 0.5-5 mg IV q 6 hrs. prn delirium
- Lorazepam (Ativan) 0.5-2 mg IV q 8 hrs. prn anxiety
- Physical restraints (if pt. is a danger to self, others or for maintenance of medical therapy)

For all patients:

- Medication review: DC unnecessary medication as ordered
- Provide structure/routine of activities
- Encourage family, friends to visit
- Provide orienting material (clock, calendar, open curtain during daytime)
- Encourage hydration & nutrition
- Mobilize patient
- Bowel and urinary management

Avoid:

- Benzodiazepines (diazepam, chlordiazepoxide, alprazolam, temazepam, triazolam)
- Anticholinergic drugs (chlopheniramine, diphenhydramine, promethazine, carisprodol)
- Demerol

REFERENCES

- 100,000 Lives Campaign*. (2004). Retrieved April 5, 2009, from Institute for Healthcare Improvement Web site: <http://www.ihl.org/IHI/Programs/Campaign>
- Accreditation Council for Graduate Medical Education. (2002). *Resident Supervision, Duty Hours, and Work Environment*. USA: Author. Retrieved April 6, 2009, from Accreditation Council for Graduate Medical Education Web site: http://www.acgme.org/acWebsite/resInfo/ri_OSHAresp.asp
- Agency for Healthcare Research, & Quality. (2008). *Delirium: prevention, early recognition, and treatment* (In: Evidence-based geriatric nursing protocols for best practice). National Guideline Clearinghouse.
- Agostini, J. V. (2001). Prevention of Delirium in Older Hospitalized Patients. In *Making Health Care Safer: A Critical Analysis of Patient Safety Practices* (43rd ed.). Retrieved January 15, 2009, from U.S. Department of Health & Human Services Web site: <http://www.ahrq.gov/clinic/ptsafety/chap28.htm>
- Agostini, J. V. (2008). Improving Sedative-Hypnotic Prescribing in Older Hospitalized Patients: Provider-Perceived Benefits and Barriers of a Computer-based Reminder. *Journal of General Internal Medicine*, 23(1), 32-36.
- Alagiakrishnan, K. (2007). *Delirium*. Retrieved March 20, 2009, from eMedicine from WebMD; psychiatry; emergency Web site: <http://emedicine.medscape.com/article/288890-overview>

- American Psychiatric Association. (1999, May). *Practice Guideline for the Treatment of Patients with Delirium* (APA Practice Guidelines). Trzepacz, P., Breitbart, W., Franklin, J., Levenson, J., Martini, D.R., Wang, P.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.
- Balas, M. C. (2004). Delirium Doulas: An Innovative Approach to Enhance Care for Critically Ill Older Adults. *Critical Care Nurse*, 24, 36-46.
- Basics of Geriatric Care: Demographics*. (2005). Retrieved January 19, 2009, from The Merck Manual of Geriatrics Web site: <http://www.merck.com/mkgr/mmg/sec1/ch2/ch2b.jsp>
- Bayindir, O. et al. (2001). Ondansetron hydrochloride for the treatment of delirium after coronary artery surgery. *The Journal of Thoracic and Cardiovascular Surgery*, 121(1), 176-177.
- Bergmann, M. A. (2005). A Model for Management of Delirious Post-acute Care Patients. *Journal of the American Geriatrics Society*, 53(10), 1817-1825.
- Bradley, E. H. (2004). Translating research into Clinical Practice: Making Change Happen. *Journal of the American Geriatric Society*, 52, 1875-1882.
- Brain Dysfunction in Critically Ill Patients*. (2008). . (Original work published 2003) Retrieved April 2, 2009, from ICU Delirium and Cognitive Impairment Study Group Web site: <http://www.icudelirium.org/delirium/index.html>
- Breitbart, W. (1997). The Memorial Delirium Assessment Scale. *Journal of Pain and Symptom Management*, 13(3), 128-137.

- Breitbart, W. (2002). The Delirium Experience: Delirium Recall and Delirium-Related Distress in Hospitalized Patients with Cancer, Their Spouses/Caregivers, and Their Nurses. *Psychosomatics*, 43, 183-194.
- Breitbart, W. (2002). The Delirium Experience: Delirium Recall and Delirium-Related Distress in Hospitalized Patients With Cancer, Their Spouses/Caregivers, and Their Nurses. *Psychosomatics*, 43(3), 183-194.
- Breitbart, W. (2008). Agitation and Delirium at the End of Life. *The Journal of the American Medical Association*, 300(24), 2898-2910.
- Burns, A. (2004). Delirium. *Journal of Neurology, Neurosurgery & Psychiatry*, 75, 362-367.
- Burns, J. J. (2008). Toxicity, Anticholinergic: Treatment & Medication. *Emedicine*, 1. Retrieved March 22, 2009, from eMedicine from WebMD; Toxicity, Anticholinergic: Treatment & Medication Web site: <http://emedicine.medscape.com/article/812644-treatment>
- Canadian Coalition for Seniors' Mental Health. (2006). In Hogan (Ed.), *National Guidelines for Seniors' Mental Health: The Assessment and Treatment of Delirium*. Toronto, Canada: Canadian Government Printing Office.
- Centers for Disease Control and Prevention. (2009). *Healthy People in Every Stage of Life* [Data file]. Available from <http://www.cdc.gov/osi/goals/people/people50andup.html>
- Centers for Disease Control, & Prevention. (2007). In A. B. Bernstein (Ed.), *Health, United States, 2007 with Chartbook on Trends in the Health of Americans* (DHHS Publication No. 2007-1232). Washington, DC: U.S. Government Printing Office.

- Delirium Mnemonics*. (2003). Retrieved April 2, 2009, from ICU Delirium and Cognitive Impairment Study Group Web site: <http://www.icudelirium.org/delirium/delirover-mneumonics.html>
- Department of Health, & Human Services. (2009). *Quality Measures for Reporting in Fiscal Year 2009 for 2010 Update* (Quality Measures for Reporting in Fiscal Year 2009 for 2010 Update). Washington, DC: U.S. Government Printing Office. Retrieved April 5, 2009, from Centers for Medicare & Medicaid Services Web site: <http://www.cms.hhs.gov/apps/media/press/factsheet.asp?Counter=3044&intNumPerPage=10&checkDate=&checkKey=&srchType=1&numDays=3500&srchOpt=0&srchData=&srchOpt=0&srchData=&keywordType=All&chkNewsType=6&intPage=&showAll=&pYear=&year=&desc=&cboOrder=date>
- DiPiro, J. T. (Ed.). (2005). *Pharmacotherapy: A Pathophysiologic Approach* (6th ed.). New York: McGraw-Hill. (Original work published 1993)
- Duppils, G. S. (2007). Patients' experiences of being delirious. *Journal of Clinical Nursing*, *16*, 810-818.
- Elie, M. (1998). Delirium Risk Factors in Elderly Hospitalized Patients. *Journal of General Internal Medicine*, *13*(3), 204-212.
- Fick, D. M. (2003). Updating the Beers Criteria for Potentially Inappropriate Medication Use in Older Adults. *Archives of Internal Medicine*, *163*(22), 2716-2724.
- Fick, D. M. (2007). Recognizing delirium superimposed on dementia: assessing nurses' knowledge using case vignettes. *Journal of Gerontological Nursing*, *33*(2), 40-47.

- Flaherty, J. H. (2003). A Model for Managing Delirious Older Inpatients. *Journal of the American Geriatrics*, 51(7), 1031.
- Fletcher, K. (2007). Using Nurse Practitioners to Implement Best Practice Care for the Elderly During Hospitalization: The NICHE Journey at the University of Virginia Medical Center. *Critical Care Nursing Clinics of North America*, 19, 321-337.
- Folstein, M. (1975). "Mini-Mental State" a Practical Method for Grading the Cognitive State of Patients for the Clinician. *Journal of Psychiatric Research*, 12(3), 189-198.
- Folstein, M. F. (1983). The mini-mental state examination. *Archives of General Psychiatry*, 40(7), 812.
- Francis, J. (1999). Three Millennia of Delirium Research: Moving Beyond Echoes of the Past. *American Geriatrics Society*, 47(11).
- Geriatrics. (2006). *Hospitals Ignore Beers List, Use Inappropriate Medications*. Available from <http://geriatrics.modernmedicine.com/geriatrics/article/articleDetail.jsp?id=324543>
- Graham, N. O. (1995). *Quality in Health Care: Theory, Application, and Evolution* (3rd ed.). Jones & Bartlett Publishers. (Original work published 1995)
- Hala, M. (2007). Pathophysiology of postoperative delirium: Systemic inflammation as a response to surgical trauma causes diffuse microcirculatory impairment. *Medical Hypotheses*, 68(1), 194-196.
- Hales, R. E. (Ed.). (2008). *Textbook of Psychiatry* (5th ed., Vol. 1). American Psychiatric Publishing, Inc.

- Han, L. (2001). Use of Medications with Anticholinergic Effect Predicts Clinical Severity of Delirium Symptoms in Older Medical Inpatients. *Archives of Internal Medicine*, 161(8), 1099-1105.
- Hart, R. P. (1996). Validation of a cognitive test for delirium in medical ICU patients. *Psychosomatics*, 37(6), 533-546.
- Hartman, M. (2008). U.S. Health Spending By Age, Selected Years Through 2004. *Health Affairs*, 27(1), w1-w12.
- Hogan, D. B. (1997). Revisiting the O complex: urinary incontinence, delirium and polypharmacy in elderly patients. *Canadian Medical Association Journal*, 157(8), 1071-1077.
- <http://www.cdc.gov/nchs/data/hus/hus07.pdf#098>
- Inouye, S. (1990). Clarifying confusion: the confusion assessment method. *Annals of Internal Medicine*, 113(12), 941-948.
- Inouye, S. K. (1991). *The Confusion Assessment Method (CAM) Training Manual and Coding Guide*. Boston: Yale University School of Medicine.
- Inouye, S. K. (1993). A predictive model for delirium in hospitalized elderly medical patients based on admission characteristics. *Annals of Internal Medicine*, 119, 474-481.
- Inouye, S. K. (1999). Multicomponent Intervention to Prevent Delirium in Hospitalized Older Patients. *The New England Journal of Medicine*, 340(9), 669-676.
- Inouye, S. K. (2003). The Role of Adherence on the Effectiveness of Nonpharmacologic Interventions. *Archives of Internal Medicine*, 163(8), 958-964.

- Inouye, S. K. (2006). Delirium in Older Persons. *The New England Journal of Medicine*, 354(11), 1157-65.
- Inouye, S. K. (2007). Geriatric Syndromes: Clinical, Research, and Policy Implications of a Core Geriatric Concept. *Journal of the American Geriatrics Society*, 55(5), 780-791.
- Inouye, S. K. (2007). *The Hospital Elder Life Program (HELP)* (Yale University School of Medicine). New Haven, CT: Yale University School of Medicine. Retrieved April 6, 2009, from The Hospital Elder Life Program (HELP) Web site: <http://www.hospitalelderlifeprogram.org/public/help-info.php?pageid=01.03.00>
- The John A. Hartford Foundation. (2009). *Bringing acute hospital care home for older persons*. Author. Retrieved April 6, 2009, from Hospital at Home Web site: <http://www.hospitalathome.org/DGM/>
- Kalisvaart, K. J. (2005). Haloperidol prophylaxis for elderly hip-surgery patients at risk for delirium: a randomized placebo-controlled study. *Journal of the American Geriatric Society*, 53(10), 1658-1666.
- Kannus, P. (2006). Preventing falls among elderly people in the hospital environment. *The Medical Journal of Australia*, 184(8), 372-373.
- Karnofsky, D. (1948). The Use of Nitrogen Mustards in the Palliative Treatment of carcinoma. *Cancer*, 1, 634-656.
- Lacasse, H. (2006). Systematic Review of Antipsychotics for the Treatment of Hospital-Associated Delirium in Medically or Surgically Ill Patients. *The Annals of Pharmacotherapy*, 40, 1996-1973.

- Landro, L. (2007). Hospitals Combat an Insidious Complication. *The Wall Street Journal Online*, October 17, D1. [Electronic version]
- Larsen, P. D. (1999). Polypharmacy and elderly patients. *Association of Perioperative Registered Nurses*, 3.
- Leff, B. (2005). Hospital at Home: Feasibility and Outcomes of a Program To Provide Hospital-Level Care at Home for Acutely Ill Older Patients. *Annals of Internal Medicine*, 143(11), 798-808.
- Lieberman, J. A. (2004). Managing Anticholinergic Side Effects. *Primary Care Companion Journal of Clinical Psychiatry*, 6(2), 20-23.
- Lord, S. R. (2007). *Falls in Older People: Risk Factors and Strategies for Prevention* (2nd ed.). Cambridge, UK: Cambridge University Press.
- Lykens's, C. G. (1998). Diagnosis and Management of Delirium in the Elderly. *Journal of Clinical Outcomes Management*, 5(4), 51-62.
- Maldonado, J. R. (2008). Delirium in the Acute Care Setting: Characteristics, Diagnosis and Treatment. *Critical Care Clinics*, 24(4), 657-722.
- Manson, P. J. (1997). The duration of delirium in medical and postoperative patients for psychiatric consultation. *Annals of Clinical Psychiatry*, 9(4), 219-226.
- Marcantonio, E. R. (2006). Serum Biomarkers for Delirium. *Journal of Gerontology*, 61A(12), 1281-1286.
- McCurren, C. (2003). Delirium: Elders Tell Their Stories and Guide Nursing Practice. *Medsurg Nursing*, 12(5), 318-323.

- McCusker, J. (2003). Does Delirium Increase Hospital Stay? *Journal of the American Geriatrics Society*, 51(11), 1539-1546.
- Michaud, L. (2007). Delirium: Guidelines for general hospitals. *Journal of Psychosomatic Research*, 62, 371-383.
- Miller, C. A. (2008). *Nursing for Wellness in Older Adults: Theory and Practice* (5th ed.). Philadelphia: Lippincott Williams & Wilkins. (Original work published 2008)
- Naughton, B. J. (2005). A Multifactorial Intervention to Reduce Prevalence of Delirium and Shorten Hospital Length of Stay. *Journal of the American Geriatrics Society*, 53, 18-23.
- Okamoto, Y. (1999). Trazodone in the treatment of delirium. *Journal of Clinical Psychopharmacology*, 19(3), 280-282.
- O'Keefe, S. T. (1999). Clinical significance of delirium subtypes in older people. *Age and Ageing*, 28, 115-119.
- O'Keefe, S. T. (1996). Predicting Delirium in Elderly Patients: Development and Validation of a Risk-stratification Model. *Age and Ageing*, 25, 317-321.
- Palmer, M. H. (2002). Risk Factors for Hospital-Acquired Incontinence in Elderly Female Hip Fracture Patients. *Journal of Gerontology: Medical Sciences*, 57A(10), M672-M677.
- Pfeiffer, E. (1975). A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. *Journal of American Geriatrics Society*, 23, 433-441.
- Robinson, S. (2008). Aging and Delirium: Too Much or Too Little Pain Medication? *Pain Management Nursing*, 9(2), 66-72.

- Siddiqi, N. (2006). Occurrence and outcome of delirium in medical in-patients: a systematic literature review. *Age and Ageing*, 35, 350-364.
- Sweeney, S. J. (2008). Care of the Patient with Delirium. *American Journal of Nursing*, 108(5), 72CC-72GC.
- Trzepacz, P. T. (1988). A symptom rating scale for delirium. *Psychiatry Research*, 23, 89-97.
- Tullmann, D. F. (2008). *Evidence-based geriatric nursing protocols for best practice* (3rd ed.) (E. Capezuti, Ed.). New York: Springer Publishing Company.
- United States Bureau of the Census. (2002). U.S. Summary: 2000. In *Census 2000 Profile* (United States Census 2000). Washington, DC: U.S. Government Printing Office.
- Retrieved January 8, 2009, from U.S. Summary: 2000, Census 2000 Profile Web site: <http://www.census.gov/prod/2002pubs/c2kprof00-us.pdf>
- US Department of Health, & Human Services. (2008). *Nursing Home Compare* (Centers for Medicare & Medicaid Services). USA.
- US Food and Drug Administration. (2007). Information for Healthcare Professionals: Haldol (marketed as Haldol, Haldol Decanoate and Haldol Lactate) Retrieved April 2, 2009, from FDA Center for Drug Evaluation and Research Web site: <http://www.fda.gov/CDER/DRUG/InfoSheets/HCP/haloperidol.htm>
- US National Institutes of Health. (2009). *Rivastigmine Prophylaxis in Elderly Patients Undergoing Major Surgery*. Available from <http://clinicaltrials.gov/ct2/show/NCT00835159>
- Young, J. (2007). Delirium in older people. *British Medical Journal*, 334, 842-846.

(Shurkin, 2007)