UNIVERSITY OF SOUTHERN QUEENSLAND

TO WHAT EXTENT WILL THE ANNUAL NUMBER OF EPISODES OF ACUTE CONFUSION WITHIN A MEDICAL UNIT BE REDUCED FOLLOWING THE INTRODUCTION OF HIGH RISK INDICATORS AND EARLY INTERVENTION STRATEGIES

A Dissertation submitted by

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ABSTRACT

This simple quantitative descriptive case controlled research compared cases (subjects at risk for acute confusion) with controls (subjects without the attribute); comparison was made on the exposure to potential contributing factors suspected of causing acute confusion, for example, heavy smoking, or the number of alcoholic drinks consumed per day. Case-control studies were also retrospective, because they focused on conditions in the past that might have caused subjects to become cases, rather than controls. The basic purpose of this research design was essentially the same as that of experimental research: to determine the relationships among variables.

This report demonstrates that, with relatively good adherence by the nursing team, proactive screening using a structured risk assessment protocol can be successfully implemented for medical patients. This assessment was associated with a statistically significant 50% reduction in the incidence of acute confusion in the intervention group, compared with usual care retrospectively. Reduction in acute confusion was not associated with shortened length of stay, but length of stay was often predetermined by protocol or critical pathway.

Correlation analysis demonstrated that risk screening appeared most effective in preventing or reducing acute confusion in patients without preadmission dementia or ADL impairment. In patients with significant preadmission impairment, the stress of hospitalisation may be sufficient to precipitate an episode, despite otherwise optimal management. Less-impaired patients may require additional insults to precipitate acute confusion, some of which are avertable by risk screening and subsequent early intervention.

Determined risk indicators were consistent throughout the four year timeframe set for this research project. This demonstrated that although there were multiple patient types presenting to this clinical area, they were consistently the same over a longitudinal timeframe. It meant they were reproducible, which gave this research additional strength. Also, based on the descriptive statistics, this research has shown

that in this clinical area where intervention was introduced the combination did have a positive impact on annual numbers of acute confusion.

In summary, these findings suggest that without risk screening and the direction for appropriate management the likelihood of an episode can more than double. In the three subgroups expected to pose the greatest challenges for the risk assessment (i.e. those 70 years or older, those with suspected drug dependency, and those with symptomatic infection), risk assessment retained excellent sensitivity, (a) (d) specificity, and relevant correlation with reduction of episodes.

This research has demonstrated throughout that high risk screening and associated intervention based on the risk indicator can decrease the annual number of actual episodes of acute confusion. Interventions to prevent or reduce an episode of acute confusion, as outlined by Wakefield (2002) and this research, definitely increases as a result of high risk screening. Beyond doubt, from both the literature reviewed and the findings of this research, is that risk screening does need to be adapted to the individual clinical setting and cannot be generic.

Certification of Dissertation

I certify that the ideas, research, results and conclusions reported in this dissertation are entirely my own effort, except where otherwise acknowledged. I also certify that the work is original and has not been previously submitted for any other award, except where otherwise acknowledged.

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ENDORSEMENT

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CHAPTER 1: INTRODUCTION

In a paper presented by Schor (1992), acute confusion was first described by Hippocrates and has been associated with significant morbidity and mortality over the subsequent centuries. The term was first used by Celsus in the first century, and has been the consensus term for the syndrome since its inclusion in any management criteria (Schor 1992). The syndrome is defined as an acute fluctuating mental disorder of impaired consciousness, alertness, awareness and global impairment of cognition. It is a multifactorial disorder which occurs across the spectrum of medical practice and is often missed by clinicians (Francis 1992).

Acute confusion is a syndrome manifested by simultaneous disturbances of consciousness, attention, perception, memory, thinking, orientation, and psychomotor behaviour that develops abruptly and fluctuates diurnally. The primary deficit is one of attention. It is estimated to affect 14-56% of all elderly hospital patients, with an associated increase in morbidity and length of stay. It has been estimated that acute confusion, or delirium, is also associated with an increase in mortality rate of 10-65% (Inouye et al. 1996). In the U.S. the expected cost of delirium to health care is more than $4 billion dollars (in 1994) per year. Inouye et al. (1999) found Australia does not have an accurate estimate, however, anecdotal evidence would suggest, in comparison, a similar problem. Costs are also carried over into the community after discharge from hospital, with the need for increased care of the confused patient in institutions, rehabilitation programs or home care. There is some evidence that acute confusion will result in a degree of continuing cognitive impairment after discharge from hospital and even up to six months later (Francis 1990; Levkoff 1994).

The epidemiology is not clearly defined, but factors such as age and prior cognitive impairment have been demonstrated in prospective cohort studies (Francis 1992; Williams et al. 1985; Francis 1990; Schor 1992; Rogers 1989; Thomas 1988; Rockwood 1993; Johnson 1990) as significant markers of risk for delirium. Bedford (1955) described the relationship between host susceptibility and precipitants—and this research has recently been expanded by Inouye (1993) and O'Keefe (1996), who have both presented algorithms of an inverse relationship between predisposing and

precipitating factors, and acute confusion. The patient has an underlying level of vulnerability which is then affected by a variety of precipitants: where predisposition is high, as in chronic cognitive impairment, the precipitant may be relatively minor (for example, constipation), but where predisposition is low, the nature of the precipitant must be significant (for example bilateral knee replacement) the incidence of acute confusion post-operatively is reported to be 41% (Williams-Russo 1992).

The combination of age and chronic cognitive impairment leads to a high risk of acute confusion, with the associated increased risk of a prolonged hospital stay, complications, and poor outcomes. The management of acute confusion has commonly been multifaceted—the primary emphasis has always been on the diagnosis and therapy of the precipitating factors, but as these may not be immediately resolved, symptomatic and supportive care may become of major importance (Britton et al. 2003; Lipowski 1987). Additionally, with no precipitant identified, symptomatic and supportive care may also become of major importance (Francis 1990). As the syndrome is often missed or mis-diagnosed in a high percentage of inpatients, cognitive assessment at both admission and regularly during hospitalisation should be included in any management programme (Roca 1994). In the decade or so since 1987, there has been more uniformity in terminology enabling comparisons between studies to be made, and chronic cognitive impairment has been consistently shown to be a predictor of the occurrence of acute confusion in hospitalised patients. The cognitively impaired are also more likely to have multiple precipitants, so symptomatic management is an important aspect of care (Francis 1990). The outcomes of prolonged hospital care and increased length of stay are more frequent in those patients with a multifactorial aetiology of acute confusion (Francis 1990; Levkoff 1994).

The primary significance stemming from the literature is that there are many options for research into the management of acute confusion. The epidemiology, pathophysiology, diagnosis (including diagnostic instruments) and the aetiology and relationship with other disorders affecting cognitive function are not well defined in acute confusion, and research into any of these aspects would be beneficial to the care of patients.

Unlike previous research, findings from this study, namely, ‘To what extent will the annual number of episodes of acute confusion within a medical unit be reduced following the introduction of high risk indicators and early intervention strategies?’, focused primarily on the prevention and/or reduction of episodes of acute confusion for newly admitted patients. It aimed to reduce any impact on patient outcomes, or established routines and operational delivery. The overall aim of the intervention was to reduce total episodes of acute confusion in one high risk medical unit by identifying patients who were at high risk of an episode of acute confusion, thereby enabling the introduction of a preventative management plan for these patients. This management plan focused on ongoing assessment for early evidence of acute confusion and introduced reduction strategies by ensuring key contributing factors towards acute confusion were eliminated or reduced.

The issue of identifying high risk patients for potential episodes of acute confusion stemmed from a working party which had a set directive to deal with the issue of patient restraint. The overall opinion of this working party, as it evolved, was that the key focus was not so much the management of restraint, but rather the initial management and/or prevention of acute confusion. One of the strategies put forward to assist in early detection of acute confusion was a prediction tool. Although this was not the focus of the research, it was a necessary step in progressing it. As a result, an expert panel designed a prediction tool that would identify patients at risk of acute confusion. An extensive literature review revealed no such tool had yet been developed. From the literature, however, the expert panel were able to determine common contributing factors towards acute confusion. Based on retrospective information from the health care institution and clinical unit where the research was to be conducted, a list of seven key indicators was determined. To support the introduction of this risk screening tool, an extensive education campaign was implemented for those health professionals who were to use the tool. To encourage compliance through clinical governance, a supporting policy was developed to outline staff responsibilities and accountabilities.

Key objectives were set out for all nursing and medical staff, namely:

- all patients entering the Toowoomba Health Service District would have documented a detailed list of risk indicators for confusion;
- a clinical prediction tool would be used during the initial patient assessment to determine the likelihood of a patient developing an episode of acute confusion during the patient's stay;
- all patients presenting with pre-existing confusion would have an initial and ongoing medical assessment to ascertain the contributing factors for the confusion;
- where a patient was confused on initial presentation a recognised assessment tool would be applied and that patient would automatically commence in a confusion reduction management plan;
- any patient who was determined to be at a high risk for an episode of acute confusion would be placed on a prevention/reduction management plan. The format of any confusion management plan would be left to the discretion of the treating medical team. It would, however, require a medication treatment regime to be formulated as a PRN order and evidence provided of a 24 hour review by the treating consultant, or a proxy, for weekend admissions.

Where a patient presented with, or experienced, an episode of acute confusion the following procedures would be observed:

- a timely and thorough root cause analysis by senior medical staff (through medical assessment) to determine the contributing factors once notification has occurred;
- minimisation strategies included as part of a management plan, i.e. eliminating noise, minimising light, eliminating risks for injury, and including the family in any care (Algorithms for care were adopted from recognised, validated tools, e.g POOLES algorithm); and
- a twelve hourly review of any treatment regimes to determine the effectiveness of management by senior medical staff.

Restraint was only indicated in exceptional circumstances and primarily for the welfare of the patient. Staff were asked to note that the restraint of confused patients was to be in accordance with the revised *Mental Health Act 2000*.

Medical officers were given the following accountabilities and responsibilities:

- Ensuring a complete medical history was taken to ensure the detection of risk indicators.
- Where a patient was viewed to be of a moderate to high risk, orders were to be documented by medical staff as to how their patient should be managed if there should be actual onset of acute confusion.
- Where a management plan had been formulated for a high risk indicator, medical officers would be required to ensure that this management plan was reviewed daily and that outcomes from this management plan were documented.
- Assess the effectiveness of any medication regime prescribed for the management of acute confusion every 24 hours on a nocte basis, or where nursing staff had raised concerns about its effectiveness.
- Responsible for documenting findings, results, and ensuring follow-up on tests that had been ordered.
- If the patient was at risk of harming self or others, seek advice from consultation team in the Mental Health Service.

Nursing staff were given the following accountabilities and responsibilities:

- Ensuring the clinical prediction tool was completed on admission for every patient and ensuring that it was included as a component of the detailed admission sheet when caring for a patient with acute confusion or at risk for acute confusion. Nurses would ensure that their patients were monitored closely for early signs of confusion and any such symptoms would be reported immediately to the medical team caring for that patient, or to the after-hours medical officer on duty.
- Communicating effectively and efficiently any changes to the patient's condition, including test results via a thorough handover to fellow nurses and the medical team responsible for that patient.
- Documenting findings and results in medical record.

- Ensuring vital elements of a management plan were incorporated into the patient care. These included:

    - Level of consciousness (GCS)—if the patient is clouded, this was viewed as potentially a medical emergency and a medical officer would be informed immediately; cognitive mental status—assessment of orientation to time and place; physical findings—TPR, BP, SaO2, U/A, BSL; skin tugor and colour, urinary output, bowel status; pain level; sensory status; environmental impact—noise, light, unfamiliarity, isolation, boredom, immobility; and social problems.

CHAPTER 2: LITERATURE REVIEW

Where was the literature obtained for critical review?

The objective of this literature review was to assess the available evidence of the effectiveness of previous interventions, or preventive strategies, in the coordinated care of patients with acute confusion contributed to by any underlying contributing factors. A thorough search of all available databases and sources of references was carried out early in 2003. This search comprised the following databases: The Cochrane Library, Cinahl, Medline, Psychinfo and all EBM Reviews—Cochrane DSR, ACP Journal Club, DARE, and CCTR.

From the literature reviewed there was no evidence to suggest prior research on the issue of acute confusion included patients with prior cognitive impairment. Therefore, the management of patients with acute confusion could not be assessed. This literature review also revealed that there was very little information on the strategies to manage an episode of acute confusion. However, there was a significant amount of information about the frequency of incidence, associated risks and the poor outcomes of the disorder. All reviewed literature agreed acute confusion was a complex medical problem which can occur in a variety of clinical settings. Research articles critiqued for this literature review, because of differences in methodology, variations in population and varied theories, were not comparable.

This literature review has been structured into the format of subheadings to categorise themes found in the literature and to give direction for discussion. It has been structured as follows:

1. Initial overview: A brief description of the principle diagnosis under study.
2. Leading causes of acute confusion.
3. Medications to watch for high risk populations.
4. Environmental and supportive interventions.
5. Symptomatic and supportive care.
6. Previous research and outcomes.
7. Preventive and treatment strategies.
8. Health professional intervention—what can health professionals do to either prevent or reduce an episode?
9. Early assessment at admission can uncover risk factors.
10. Nursing risk assessment.

Initial overview: A brief description of the principle diagnosis under study

Confusion was predominately viewed as prevalent in the aging population and yet it was considered to be frequently misdiagnosed and, thus, mismanaged. Because confusion was found socially disabling and has made unusually high demands on medical, nursing and social resources, it was considered important for health care providers to understand the condition. However, the issue of confusion was rarely discussed by itself; rather, it was often viewed by authors only as a symptom of another problem, for example, dementia. As Nagley and Dever (1989, p. 80,) point out, 'While there may be a shared understanding of confusion among practitioners, a clear and concise definition of confusion for scientific study is lacking'. Anything that interrupts or violates the homodynamic equilibrium between man, body, self, and the environment can precipitate confusion. In the literature. aged persons were overwhelmingly thought of as particularly vulnerable to disequilibrium, due to losses associated with the aging process and various sociocultural factors that enhance the perception of stress (Hall 1986).

Wolanin and Phillips (1981) delineated five sources of confusion: 1) compromised brain support; 2) sensoriperceptual problems; 3) disruption in pattern and meaning; 4) alterations in normal physiologic states; and 5) the true dementias. These sources provided the conceptual framework for a study of the knowledge and opinions of nursing home personnel regarding reversible and irreversible types of confusion (Lincoln 1984). Findings suggested that nursing staff were not very knowledgeable about the irreversible dementias, although a positive correlation was noted between the amount of formal education of the staff and knowledge of the sources of confusion. As suggested by Wolanin and Phillips (1981), a distinction should be made between confusional states with reversible and irreversible aetiologies: in the case of reversible aetiologies, medical and nursing interventions can often restore normal function. Although conceptually fuzzy, confusional states with reversible aetiologies will herein be referred to as acute confusional states, or delirium, and those with irreversible aetiologies will be referred to as chronic confusional states, or dementia.

Cole et al. (1996) offered a valuable contribution to this review, but are unclear about pre-existing cognitive impairment. A study by Inouye et al. (1999) used case-controlled research design addressing both the management and prevention of acute confusion. Previously, cognitively-impaired patients were considered in the study and multiple strategies were shown to reduce the incidence of acute confusion, but no significant effect was seen on the acute confusion episode when it occurred. Inouye et al. (1999) and Cole et al. (1996) determined that it was clear that prevention of delirium by appropriate interventions in at-risk groups should be considered and studied more widely, as larger numbers and continued intervention with people who develop acute confusion may lead to better outcomes in the ongoing management of such patients.

Acute confusion, in the majority of literature, was generally considered reversible and present in 10-15% of elderly patients at admission. Subsequently, another 5-30% of younger inpatients were considered at risk (Inouye et al. 1999). Poor functional outcomes were two to three times more likely in patients with acute confusion, compared with outcomes in cognisant patients (Hart et al. 2002). Acute confusion was an issue was considered complicated by some authors because it could remain unrecognised, thereby leading to inappropriate management by nurses and doctors alike. Hart et al. (2002) recognised acute confusion as one of the geriatric syndromes which, along with incontinence and falls (because of their frequent occurrence) tended to be normalised by staff. Further, Hart et al. (2002) observed that acute confusion often triggered a cascade of adverse events and functional decline because of complications that included physical and chemical restraints, falls, urinary catheterisation, skin breakdown, under-nutrition, and sensory deprivation or overload. As acute confusion had multiple causes, was often iatrogenic, and could lead to a variety of adverse outcomes, preventative strategies should be considered and a thorough medical history on admission, with baseline observation, was viewed essential (Hart et al. 2002).

With the majority of recent and previous studies conducted on acute confusion it was evident that there had been a strong focus towards the aging population, with little emphasis on those at risk populations under the age of 50. There would not appear to

be any bias with this trend, however, it was very clear that age in itself should be considered a high risk indicator for acute confusion (Hart et al. 2002).

Historically, acute confusion has been considered a benign condition that should be expected with acute illness in most patients. In light of the consequences, this belief seems unreasonable (Foreman 1999). Acutely confused patients were more likely to experience an adverse or unwanted effect of a diagnostic or therapeutic intervention. They more frequently experience falls, pressure ulcers, infections, and adverse reactions to therapeutic doses of medications. Due to their inability to think clearly, acutely confused patients cannot care for themselves and frequently exhibit unsafe behaviours that require greater nursing surveillance (Foreman 1999).

Patients with pre-existing cognitive impairment were at higher risk for acute confusion than cognitively intact patients, and might also experience 'sundown syndrome', or after-hours episodes. Despite the memory problems that may preclude new learning, dementia patients could benefit from a rehabilitation approach that emphasises preserving pre-morbid function and enable a return to community living, even after acute medical intervention (Elie, Cole, Primeau & Bellavance 1996).

Leading causes of acute confusion

Literature suggests that despite a variability in aetiology, the major physiological causes of acute confusion have been identified. The most common of these physiological causes found in literature is medication, particularly drugs with anticholinergic properties or those that have potent central nervous system effects, for example, diphenhydramine (Benadryl) (St Pierre 1998). The second most prevalent aetiology found in literature is infection, especially urinary tract and respiratory infections. However, it is not known whether this is a direct effect of the infecting organism, a result of the hyperthermic response to the infectious process, or due to other physiological aspects of infection, such as the immune, inflammatory, and hormonal response mechanisms (Wesley et al. 2001). Most studies suggest fluid and electrolyte imbalance, especially hypo- or hypernatremia and hypo- or hyperkalemia, could be considered a leading cause of acute confusion. Further literature suggests metabolic disturbances such as azotemia, pH alterations, and

nutritional deficiencies are also a likely cause. Smith et al. (1995) and Neelon et al. (1992) suggest that extremes in a patient's environment-sensory deprivation or overload, for example, are commonly associated with acute confusion. The hospital setting can subject patients to multiple psychological stressors and unpleasant stimuli, often in an anxiety-provoking atmosphere of urgency and crisis.

Neelon et al. (1992) found patients report feeling stressed by being spoken about, rather than spoken to. They list the following as examples:

- Enduring frequent, unexplained, intrusive, and invasive procedures that are performed on them, rather than with them.
- The presence of an array of strange equipment emitting unusual and frightening sounds.
- The seemingly ever-present pain, discomfort, and noxious odours, and a lack of environmental cues to provide a sense of orientation and meaning (Neelon 1990).

Matthiesen and colleagues (1994) found patients may be upset by the frustration and helplessness of his/her significant others, the afflictions of fellow patients, and uncertainty about the outcome of their illness. All of these stimuli add up to a threatening situation. Findings suggested that although uncertainty exists on whether environmental factors are causally related to acute confusion or merely contribute to the patient's vulnerability, a patient who does not exhibit symptoms of physical and psychological stress in response to hospitalisation should be considered the exception, and not the rule (Matthiesen et al. 1994).

Neelon (1990) views acute confusion as a disturbance of consciousness and cognition with fluctuating symptoms. Neelon (1990) found that acute confusion develops rapidly, is short-term, worsens at night, and is associated with severe disturbances of thinking, perception, and communication. Neelon’s (1990) research suggests dementia develops gradually, is permanent, and is associated with progressive memory loss and an impaired capacity for abstract thought. Further, he found depression, a disorder of mood and effect, develops abruptly (usually in association with a major life change), lasts longer than a state of acute confusion, is

worse in the morning, and is not associated with distortions of thinking or perception (Neelon 1990).

Mathiesen (1994) recommends cognitive assessment should be done routinely—once each shift, for example—so that any change in functioning can be detected promptly. If this assessment indicates that the patient is alert and oriented, one can reasonably limit the assessment to these parameters alone. Further recommendations suggest that if the patient has an altered level of alertness, is disoriented, or has a noticeable change in behaviour (such as a cooperative patient becoming agitated, or a talkative patient becoming uncommunicative and withdrawn), a more comprehensive assessment of all aspects of the patient's cognitive abilities is necessary.

A recent study by Hart and colleagues (2002) concludes assessments should be standardised and systematic so that they are performed similarly by all nurses. Research findings showed changes in a patient's cognitive abilities are observed consistently, and certainty exists that the observations reflect the patient's status and not differences in how the assessment was conducted. Similarly, this research demonstrated the clinical evaluation tool should be the same to ensure confidence in the documented results.

Literature suggests that cognitive assessment should be comprehensive enough so that acute confusion can be differentiated from depression and dementia. Inouye (1994) demonstrated that this can be achieved using a mental status questionnaire, a behavioural rating scale, or other evaluation instruments—singly or in combination. As outlined in this study, the emphasis is not so much on which instrument is used, but rather that it is used routinely. Additionally, any results of this assessment should be accurately documented in the hospital or medical record and promptly communicated to the appropriate medical personnel to ensure a timely and relevant response (Inouye 1994).

Medications to watch for high risk populations

As determined by Foreman (1993):

Products with anticholinergic activity	Histamine2-blocking agents	Sedative-hypnotics	Cardiovascular drugs	Analgesics
thioridazine	cimetidine	halcion	nifedipine	nonsteroidal anti-inflammatory drugs (NSAIDs)
amitriptyline	ranitidine	benzodiazepines	quinidine	
neuroleptics	meperidine		beta blockers	
tricyclic antidepressants				
atropine				
theophylline				
diphenhydramine				
OTC antihistamines				

Environmental and supportive interventions

These interventions were generally recommended for all patients with delirium. Environmental interventions are designed to reduce or eliminate environmental factors that exacerbate delirium. They include providing an optimal level of environmental stimulation, reducing sensory impairments, making environments more familiar, and providing environmental cues that facilitate orientation. Cognitive-emotional supportive measures include providing patients with reorientation, reassurance, and information concerning delirium that may reduce fear or demoralisation. In addition to providing such supportive interventions themselves, it was helpful for psychiatrists to inform nursing staff, general medical physicians, and family members of their importance (The University of Iowa 1998).

The choice of somatic interventions for delirium will depend on the specific features of a patient's clinical condition, the underlying aetiology of the delirium, and any associated co morbid conditions. Antipsychotic medications are often the pharmacological treatment of choice. Haloperidol is most frequently used because it has few anticholinergic side effects, few active metabolites, and a relatively small likelihood of causing sedation and hypotension. Haloperidol may be administered orally, intramuscularly, or intravenously and may cause fewer extrapyramidal symptoms when administered intravenously. Haloperidol can be initiated in the range

of 1-2 mg every 2-4 hours as needed (0.25-0.50 mg every 4 hours as needed for elderly patients), with titration to higher doses for patients who continue to be agitated. For patients who require multiple bolus doses of antipsychotic medications, continuous intravenous infusions of antipsychotic medication may be useful (e.g. haloperidol bolus, 10 mg i.v., followed by continuous intravenous infusion of 5-10 mg/hour; lower doses may be required for elderly patients). For patients who require a more rapid onset of action, droperidol, either alone or followed by haloperidol, can be considered. Recently, some physicians have used the newer antipsychotic medications (risperidone, olanzapine, and quetiapine) in the treatment of patients with delirium. Patients receiving antipsychotic medications for delirium should have their ECGs monitored. A QT c interval greater than 450 msec or more than 25% over baseline may warrant a cardiology consultation and reduction or discontinuation of the antipsychotic medication (The University of Iowa 1998).

Benzodiazepine treatment as a monotherapy is generally reserved for delirium caused by withdrawal of alcohol or sedative-hypnotics. Patients with delirium who can tolerate only lower doses of antipsychotic medications may benefit from the combination of a benzodiazepine and antipsychotic medication (The University of Iowa 1998).

Other somatic interventions may be considered for patients with delirium who have particular clinical conditions, or specific underlying aetiologies. Cholinergics, such as physostigmine, may be useful in delirium known to be caused specifically by anticholinergic medications. Paralysis, sedation, and mechanical ventilation may be required for agitated patients with delirium and hypercatabolic conditions. Palliative treatment with opiates may be needed by patients with delirium for whom pain is an aggravating factor. Multivitamin replacement should be given to patients with delirium for whom there is the possibility of B vitamin deficiencies (e.g. those who are alcoholic or malnourished) (The University of Iowa 1998).

Symptomatic and supportive care

Foreman et al. (1994) found identifying patients that may benefit form symptomatic and supportive care is often left until acute confusion is well determined (see below for evidence of this). The second principle is to provide symptomatic and supportive care. Below are some strategies provided by Foreman et al.

> Provide a balance of rest and activity. Excessive activity leading to fatigue can present as acute confusion, as the individual has inadequate energy for attending to information and processing of information. Conversely, inadequate activity and stimulation also leads to apathy and little desire to attend to information (Foreman et al. 1994).
>
> Communicate clearly and simply. For a message to be understood it must be communicated clearly. Additionally, given the multiple stimuli inevitable in hospital environments and the distraction of acute illness, complex messages may overwhelm the patient. Make statements direct, concise, and unambiguous (Foreman et al. 1994)
>
> Look for ways to add meaning to the patient's surroundings. The absence of personal possessions, the presence of strange equipment, and the blunting of the difference between day and night contributes to an environment devoid of meaning that can be disorienting. Whenever possible, the introduction of familiar objects, or other changes that make the hospital environment more homelike, can help to relieve this stress (Foreman et al. 1994).

If primary prevention (the missing link) were to be incorporated into initial patient assessment these symptomatic and supportive care strategies could be implemented where it is highly likely the patient may experience an episode of acute confusion. The extensive literature search fails to recognise this strategy (Foreman et al. 1994).

Foreman's (1993) view is that acute confusion is such a common occurrence in many hospitalised patients that it may not always be regarded seriously enough. As part of the effort to optimise patient outcomes among high risk populations, it is important to promptly identify those patients at risk for acute confusion. The most effective way to prevent or effectively treat this obstacle to recovery is to establish a protocol

of routine, systematic assessment for potential confusion. Clearly lacking in the management of these high risk patients is the means to predict an episode (Foreman 1993).

Previous research and outcomes

A study by Cole (1999) included an objective to review evidence related to the effectiveness of systematic interventions in preventing or detecting and treating delirium in hospitalised patients. The type of intervention related to the prevention, diagnosis and treatment acute confusion. Prevention interventions included: psychiatric assessment and support reorientation, psychiatric interview, spousal education, patient education, special nursing care, patient-controlled analgesia, and special medical and surgical care. Detection and treatment interventions included: screening for post-operative confusion, monitoring, screening for hypoxia and provision of supplementary oxygen, geriatric psychiatric consultations, special nursing care, and training of housestaff to diagnose and manage delirium. Participants included hospitalised patients. Participants reported in the review included those undergoing cardiac surgery, orthopaedic surgery, medical patients (not specified) and those undergoing chest surgery (Cole 1999).

The incidence of acute confusion was considered in the assessment of prevention studies. The assessment of detection and treatment studies considered the incidence of acute confusion, post-operative complications and severe confusion; length of hospital stay, level of cognition, anxiety, depression and function, and mortality. Controlled trials, randomised and non-randomised, for detection/treatment studies, and cohort studies using accepted criteria for delirium were also included (Cole 1999)

A broad spectrum of systematic interventions appeared to be modestly effective in preventing acute confusion in young and old patients. Systematic detection and treatment programs and special nursing care appeared to add large benefits to traditional medical care in young and old patients, and modest benefits in elderly medical patients; however, it seemed that the more precise the target of the detection and the treatment program, the greater the benefit (Cole 1999).

A study by Cole et al. (1996) assessed the effectiveness of interventions to prevent delirium in hospitalised patients. The authors intended intervention was to prevent acute confusion. Specific interventions included psychiatric consultation or interview; post-operative re-orientation by nursing personnel; post-operative education of the patient's spouse; pre-operative education; pre-operative psychiatric assessment plus post-operative psychotherapy; pre- and post-operative nursing assessments; and pre- and post-operative clinical assessment. Cole et al. (1996) assessed incidence of acute confusion at follow-up. This was assessed mainly in terms of the number of patients developing symptoms of acute confusion, though the actual symptoms assessed varied between studies.

Cole et al. (1996) concluded interventions to prevent acute confusion among surgical patients may be modestly effective, but further trials are necessary. Further mechanisms for detecting potential acute confusion are also necessary.

Marcantonio et al, (2001) found acute confusion affects 35-65% of patients after hip-fracture repair, and has been independently associated with poor functional recovery. The researchers performed a randomized trial in an orthopaedic surgery service at an academic hospital to determine whether proactive geriatrics consultation can reduce acute confusion after hip fracture. Detailed assessment through interviews with patients and designated proxies and review of medical records was performed at enrolment to ascertain pre-fracture status. Subjects were then randomized to proactive geriatrics consultation, which began preoperatively or within 24 hours of surgery, or ‘usual care’. A geriatrician made daily visits for the duration of the hospitalization and made targeted recommendations based on a structured protocol. The 62 patients randomized to geriatrics consultation were not significantly different from the 64 usual-care patients in terms of age, gender, pre-fracture dementia, co-morbidity, type of hip fracture, or type of surgical repair. Sixty-one percent of geriatrics consultation patients were seen preoperatively and all were seen within 24 hours postoperatively. A mean of 10 recommendations were made throughout the duration of the hospitalisation, with 77% adherence by the orthopaedics team. Acute confusion occurred in 20 intervention patients, versus 32 usual-care patients, representing a relative risk for the consultation group. One case of acute confusion

was prevented for every 5.6 patients in the geriatrics consultation group. There was an even greater reduction in cases of severe acute confusion, occurring in 7 of intervention patients and 18 of usual-care patients. Despite this reduction in acute confusion, length of stay did not significantly differ between intervention and usual-care groups, likely because protocols and pathways predetermined length of stay. In subgroup analyses, geriatrics consultation was most effective in reducing acute confusion in patients without pre-fracture dementia or activities of daily living functional impairment. Proactive geriatrics consultation was successfully implemented with good adherence after hip-fracture repair. Geriatrics consultation reduced acute confusion by over one-third, and reduced severe confusion by over one-half. This trial provides strong preliminary evidence that proactive geriatrics consultation may play an important role in the acute hospital management of hip-fracture patients and leads the way in managing the issue of acute confusion reduction and prevention (Marcantonio et al. 2001).

A multicomponent intervention to prevent delirium in hospitalized older patients by Inouye et al. (1999) found that since in hospitalised older patients delirium is associated with poor outcomes, an evaluation of the effectiveness of a multi-component strategy for the prevention of acute confusion was necessary. The authors studied 852 patients, 70 years of age or older, who had been admitted to the general-medicine service at a teaching hospital. Patients from one intervention unit and two usual-care units were enrolled by means of a prospective matching strategy. The intervention consisted of standardised protocols for the management of six risk factors for delirium: cognitive impairment, sleep deprivation, immobility, visual impairment, hearing impairment, and dehydration. Acute confusion, the primary outcome, was assessed daily until discharge. Acute confusion developed in 9.9 percent of the intervention group as compared with 15.0 percent of the usual-care group. The risk-factor intervention strategy that was studied resulted in significant reductions in the number and duration of episodes of delirium in hospitalised older patients. The intervention had no significant effect on the severity of acute confusion or on recurrence rates; this finding suggests that primary prevention of acute confusion is probably the most effective treatment strategy and is a significant implication for research (Inouye et al. 1999).

One recent study by Francis et al. (1994) indicated that hospitals might lose an average of $30,000 per acutely confused patient. Mortality is as much as six times greater for patients who are, or have been, acutely confused. Clearly, acute confusion is costly to the patient, health care personnel, and institutions. In 1986, it was estimated that if the length of hospitalisation could be reduced by just one day for every acutely confused patient in U.S. hospitals, Medicare could save as much as $1 to $2 billion annually. These figures could be easily translated into Australian dollars.

Elie et al. (1996) conducted a study titled 'Delirium Risk Factors in the Elderly—A Meta-Analysis'. The objective of this study was to identify, through systematic literature review (meta-analysis), the risk factors associated with the development of delirium in hospitalised geriatric patients. Among the literature review in this study, eight studies were done on medical patients, eight on surgical patients, two on medical and surgical patients, and three on psychiatric patients. A total of 955 subjects with delirium were studied. Forty-four different risk factors were identified, the five most common being cognitive impairment, increasing age, medical illness, male sex, and multiple medication use. Methodological weaknesses were present in many studies. It could be concluded from this study that despite the methodological limitations, certain risk factors for acute confusion seem to be consistent and could help identify high-risk patients (Elie et al. 1996).

Williams-Russo et al. (1992) investigated post-operative delirium: predictors and prognosis in elderly orthopaedic patients. This study was implemented to compare the effect of post-operative analgesia using epidural versus intravenous infusions on the incidence of delirium after bilateral knee replacement surgery in elderly patients. Additional risk factors and impact on post-operative recovery were also assessed. Sixty consecutive patients undergoing bilateral knee replacement surgery with epidural anaesthesia were approached—51 patients were eligible and consented. The mean age was 68, 55% were women, and there was a high prevalence of co morbid medical disease. No patient was demented pre-operatively.

A study by Wakefield (2002) demonstrated that high risk screening was effective in detecting potential episodes of acute confusion. Elderly individuals are at risk for

acute confusion acute confusion during hospitalisation. Using a prospective design, this study assessed the relationship between admission risk factors and subsequent development of acute confusion in 117 elderly hospitalised patients. Acute confusion was ascertained using the NEECHAM Confusion Scale. Other measures included demographic data, cognitive status, physical function, laboratory data, medications, infections, activity, pain, and nursing acuity. The cumulative incidence estimate was 14%. Patients who developed acute confusion were more likely to be admitted to the hospital from somewhere other than home, to have lower admission NEECHAM and MMSE scores, and to have restricted activity levels, an infection, and abnormal lab values. These patients were more cognitively and physically frail and may have been chronically undernourished and dehydrated on admission to the hospital. Nurses can be trained to routinely assess for acute confusion using easily-implemented instruments incorporated into a research-based protocol (Wakefield 2002). As this study failed to show a reduction in total episodes of acute confusion, Wakefield (2002) recommends further research is needed with an emphasis on the reduction of episodes of acute confusion using risk indicators and the strategies that stem from them.

Williams-Russo et al. (1992) investigated any infusions that were initiated at the first complaint of pain, and continued through the 36- to 48-hour stay in the recovery room. The overall incidence of acute delirium was 41%, with no difference between types of post-operative analgesia. Predictors of delirium were age, gender, and pre-operative alcohol use. All cases resolved within one week, and length of stay and achievement of physical therapy goals were the same for delirious and non-delirious patients. Williams-Russo et al. (1992) concluded that there is a high incidence of post-operative delirium in elderly non-demented patients following bilateral knee replacement, regardless of whether post-operative analgesia is administered by epidural or intravenous route.

Yeaw and Abbate (1993) classify acute confusion as a condition that is characterised by a disturbance of consciousness, a change in cognitive status, or a perceptual disturbance that develops over a short period of time and tends to fluctuate during the course of the day. They suggest manifestations could include hyper vigilance or inattentiveness, disorientation, memory impairment, illusions, hallucinations, or

misperceptions—all of which worsen in the evening when patients are fatigued. Results from these studies found some behaviour that can be recognised as inappropriate or unusual for a given individual. These findings, in general, found that patients who are older or sicker, or who have a pre-existing cognitive or functional impairment, are more vulnerable to acute confusion when they are hospitalised. By itself, chronological age did not place the individual at risk of becoming acutely confused, but many factors associated with aging did. For example, older persons possess less physiological reserve, so their ability to respond to stress and illness is diminished (Yeaw et al. 1993).

Yeaw et al. (1993) demonstrate predisposing factors of declining sensation, cognition, nutrition, and health may increase an older person's risk of acute confusion. Sensory functions, especially vision and hearing, decline with advancing age. While visual or auditory aids can compensate for some deficits, they cannot do so for all. This situation can be complicated if such aids malfunction, further distorting sensory information. And some patients may misplace their sensory aids or forget to use them.

An older study by Folstein et al. (1975) found the slowing of cognitive function that accompanies aging causes older patients to be more easily distracted. When these changes in cognition are combined with illness, fatigue, and anxiety, it may become more difficult for aged persons to think clearly.

Henderson (1990) found a lack of proper nutrition, either in the hospital or at home before admission, can also contribute to confusion. Malnutrition has been associated with delayed healing, protracted recuperative periods, and greater risk of adverse responses to treatments or medications. This factor has been documented in as many as 75% of all hospitalised adults.

Studies from the United States suggest that 80% of all elderly patients have at least two chronic health conditions for which they are receiving medical treatment. Results have shown that treatments are typically pharmacological, and patients may take as many as six medications daily, increasing the risk of acute confusion due to adverse drug interactions or reactions. These risks of poly-pharmacy have been

demonstrated in current literature to compound the enhanced risk of confusion associated with the conditions typically being treated. Examples of this include conditions such as chronic pulmonary or cardiovascular illness. Using alcohol or other intoxicating substances and previous episodes of confusion have also been listed within literature as adding to an individual's risk (Francis et al. 1990).

U.S. studies have estimated about 16% of all elderly patients admitted to hospitals have some symptoms of acute confusion. Studies estimate that during the course of hospitalisation, the incidence varies by the specific circumstances of the patient and when and how they are assessed (Foreman & Grabowski 1992). Foreman et al. (1999) found that overall, the incidence during hospitalisation in the United States ranges from a low of 6% in elective post-operative patients just before discharge from the hospital, to a high of 85% in terminally ill cancer patients. At discharge, approximately 30% remain acutely confused, with as many as 50% of these individuals returning home alone.

Pompei et al. (1994) concluded that acute confusion occurs shortly after admission to the hospital, usually between the second and third days of hospitalisation; few cases develop after the sixth day. The duration of confusion is highly variable and depends, in part, on how quickly the confusion and its causes are identified, and how promptly and accurately treatment is initiated. On average, it lasts three to four days (cases of acute confusion lasting more than seven days are rare).

Morency et al (1994) puts forward a list of potential contributing factors for confusion and suggests that most acute confusion is the result of multiple interacting causes, rather than a single cause. These dynamic factors have been grouped into four broad categories: physiological, psychological, sociological, and environmental. Attempts by researchers to isolate singular causes for acute confusion have found that certain clinical measures (PaO2, for example), when examined apart from the multiple interacting causes, become less important, or even insignificant (Morency et al. 1994).

Since these multiple interacting factors within the literature have generally occurred simultaneously in acute confusion, it is suggested one moderates the effects of

another. Consequently, measurable physiological shifts have often been minor and may not be perceived as clinically significant (The University of Iowa 1998) The University of Iowa (1998) considered that what appears insignificant may, in fact, be an abnormal clinical state, a characteristic witnessed in many patients that complicates identifying aetiology of acute confusion. (A low-grade fever, for example, may signify an infection of unexpected severity.) Further complicating aetiological investigation is the fact that causes of confusion can vary over the course of illness, with the nature of the health problem, and with the setting (home or hospital) (Vermeersch 1990).

Preventive and treatment strategies

In an article on a previous study involving hospitalized older adults by McCarthy (2003), it was argued that the theory of situated clinical reasoning explains why nurses often fail to recognize acute confusion. Further, the theory illuminates how nurses' perspectives toward health in aging affect the ways they regard, and ultimately deal with, older people in this particular clinical situation. The purpose of McCarthy's (2003) study was to challenge and refine the theory by exploring the influence of different care environments on clinical reasoning related to acute confusion. Following a period of participant observation, a purposive sample of 30 nurses, 10 each from a teaching hospital, a long-term facility, and a home care agency, participated in semi structured interviews. Dimensional analysis provided the methodological framework for data collection and interpretation. The results reinforced prior findings that the ability of nurses to recognize acute confusion and to distinguish it from dementia can be attributed to their personal philosophies about aging. Care environment was identified as a factor that influenced clinical reasoning in limited ways under certain conditions and within certain contexts. McCarthy (2003) recommended an alert system for nurses to overcome this influence on clinical reasoning.

The purpose of Wakefield's (2002) study, 'Behaviours and outcomes of acute confusion in hospitalized patients', was to describe behaviours associated with acute confusion (AC) in hospitalized patients and to determine whether acutely confused

patients experience more adverse outcomes compared with their nonconfused counterparts. Using a prospective design, 117 subjects were followed throughout hospital stay. Subjects who developed AC were more likely to fall, be incontinent, have a urinary catheter, and experience functional decline. Mortality was higher in subjects with AC. Contrary to popular belief, acutely confused patients exhibited decreased psychomotor activity. Wakefield (2002) concluded nurses can be trained to recognize AC using a standardized protocol to improve outcomes for this vulnerable population. Wakefield (2002) further supported the need for effective screening on admission.

Wakefield (2002) in his study reinforced that elderly individuals are at higher risk for acute confusion (AC) during hospitalization. Using a prospective design, Wakefield's (2002) study assessed the relationship between admission risk factors and subsequent development of AC in 117 elderly hospitalized patients. AC was ascertained using the NEECHAM Confusion Scale. Other measures included demographic data, cognitive status, physical function, laboratory data, medications, infections, activity, pain, and nursing acuity. The cumulative incidence estimate was 14%. Patients who developed AC were more likely to be admitted to the hospital from somewhere other than home, to have lower admission NEECHAM and MMSE scores, and to have restricted activity levels, an infection, and abnormal lab values. These patients were more cognitively and physically frail and may have been chronically undernourished and dehydrated on admission to the hospital. Wakefield (2002) supports previous research drawing further conclusion that nurses can be trained to routinely assess for acute confusion using easily-implemented instruments incorporated into a research-based protocol. Cacchione (1999) adds further to the evidence that frail older adults in long-term care (LTC) facilities are at high risk for acute confusion. Cacchione's (1999) study evaluated the reliability and validity of four acute confusion instruments for use in LTC: the Clinical Assessment of Confusion-A (CAC-A); the Clinical Assessment of Confusion-B (CAC-B); the NEECHAM Confusion Scale (NEECHAM); and the Visual Analog Scale for Acute Confusion (VASAC). Seventy-four residents from two LTC facilities were evaluated for acute confusion using the four instruments, as well as the Mini-Mental Status Examination (MMSE), the Geriatric Depression Scale (GDS), and Diagnostic and Statistical Manual for Mental Disorders (DSM IV) criteria for delirium. Coefficient

alphas were .82 for the CAC-A, .86 for the CAC-B, and .80 for the NEECHAM. Interrater reliability on 30 paired evaluations was .90 for the CAC-B, .87 for the NEECHAM, and .80 for the VAS-AC. All instruments were correlated with the MMSE and the DSM IV criteria for delirium at the $p < .001$ level. Predictive validity was supported for the CAC-B, the NEECHAM, and the VAS-AC. Discriminant validity using the GDS was supported for the VAS-AC. Construct validity using confirmatory factor analysis was supported for the NEECHAM, with a two-factor structure. Based on this study, the VAS-AC is recommended for use as a general screening instrument and, when it is positive for acute confusion, the NEECHAM should be used for a more in-depth assessment (Cachione 2002; Wakefield, 2002).

None of these recent authors, however, have investigated the potential of predicting acute confusion—but rather, detecting its early onset.

Lipinski (2003) asked the following question. ‘Once determined that your patient is either at risk for or already acutely confused, what can be done to either prevent or treat the condition?’and, in 1983, set forth two principles to guide effective prevention and treatment of acute confusion. The first is to prevent, eliminate, or minimise potential aetiological agents; the second is to provide symptomatic and supportive care.

Foreman (1993) suggests that preventing confusion in the first place requires addressing the causes and then adopting preventative strategies, namely:

> Administering medications. Use only those medications indicated by the patient's condition, and use the lowest possible dose to achieve the therapeutic effect of that medication. Continually evaluate the patient's response and toleration of therapy. These principles are important when considering that in older persons there is slowed hepatic detoxification and renal clearance of medications. As a result, the half-life of medications is prolonged (Foreman 1993).
>
> Also, in protein-malnourished individuals, drugs that normally bind to serum proteins become free-circulating drugs available to produce their effect. Thus, elders require lower doses at less frequent intervals to maintain therapeutic

levels. Additionally, some medications should be avoided in at-risk populations. For example, meperidine has an intermediate metabolite (normeperidine) with strong central nervous system effects that can frequently produce acute confusion and agitated behaviours. Morphine sulfate, in low doses, can provide pain relief without risk of confusion.

Long-acting benzodiazepines, such as diazepam, also are more likely to cause acute confusion. Marcantonio et al. (1994) recommend that, in acute care settings, there is no indication for the long-acting benzodiazepines, only for the temporary use of very short-acting benzodiazepines, such as lorazepam. When multiple medications are prescribed, cumulative anticholinergic effects need to be considered.

Preventing infection. At-risk populations are less able to naturally resist infections because of immunologic deficits. These same deficits also result in an atypical presentation of infection in elders. Rises in temperature and white blood cell count—traditional signs of infection—are blunted in elders. Acute confusion may be considered a cardinal sign of infection in this population. Thus, there is a need to increase protection from sources of infection and monitor the patient closely to detect infection early (Foreman 1993).

Maintaining fluid balance. At best, fluid balance in elders is tenuous. Many competing conditions associated with aging can contribute to inadequate fluid balance. Examples include mobility problems that limit access to fluids, incontinence becoming an incentive for an elder to limit fluid intake, and the use of diuretics to control congestive heart failure or hypertension. Also, since aging is associated with reduced renal functioning and diminished myocardial contractility, fluid retention may occur. Therefore, it is important to monitor fluid intake and output to assess fluid balance (Foreman 1993).

Promote electrolyte balance. Electrolyte balance is closely linked to fluid balance. Many of the medications intended for maintaining fluid balance affect electrolyte balance. For example, many diuretics cause loss of electrolytes such as sodium and potassium, while inadequate fluid intake can

lead to conditions like hypernatremia. Monitoring fluid intake and output, and providing adequate fluids at the bedside, are essential to the well-being of elderly patients (Foreman 1993).

These preventive strategies or recommendations provide a guide to developing high risk indicators, however, they have failed to provide a user friendly tool to identify this high risk patient population. They are, however, the platform from which such a tool can be trialed and validated (Foreman 1993).

The University Iowa (1998) suggest, ‘As acute confusion is primarily a disturbance of consciousness, attention, cognition, and perception but can also affect sleep, psychomotor activity, and emotions. It is a common psychiatric illness among medically compromised patients and may be a harbinger of significant morbidity and mortality’. The treatment of patients with acute confusion begins with an essential array of psychiatric management tasks designed to provide immediate interventions for urgent general medical conditions, identify and treat aetiology of the acute confusion, ensure safety, and improve the patient's functioning. Environmental and supportive interventions are also generally offered to all patients with delirium and are designed to reduce factors that may exacerbate delirium, and hence to reorient patients and provide them with support. Somatic interventions consist mainly of pharmacological treatment with high-potency anti-psychotic medications. Other somatic interventions may be of help in particular cases of acute confusion due to specific aetiologies, or with particular clinical features (The University Iowa 1998). Foreman et al. (1999) suggest that these treatment strategies can also be utilised in preventative management plans.

Psychiatric management is an essential feature of treatment for acute confusion and should be implemented for all patients with acute confusion (The University Iowa 1998). The specific tasks that constitute psychiatric management include the following: coordinating the care of the patient with other clinicians; identifying the underlying cause(s) of acute confusion; initiating immediate interventions for urgent general medical conditions; providing treatments that address the underlying aetiology of the acute confusion; assessing and ensuring the safety of the patient and others; assessing the patient's psychiatric status and monitoring it on an ongoing

basis; assessing individual and family psychological and social characteristics; establishing and maintaining a supportive therapeutic stance with the patient, the family, and other clinicians; educating the patient, family, and other clinicians regarding the illness; and providing post delirium management to support the patient and family and providing education regarding risk factors for future episodes (The University Iowa 1998).

Health professional intervention: What can health professionals do to either prevent or reduce an episode?

Health professionals could assist in the prevention of acute confusion by modifying known risk factors. Examples of interventions include reviewing medication profiles for drugs that could cause or contribute to acute confusion (i.e. those with anticholinergic or sedative effects), preventing nosocomial pneumonia and hypoxia by promoting pulmonary toilet, maintaining nutrition and hydration, and modifying the environment to prevent sensory deprivation or overload.

Educational programs conducted by advanced practice nurses to train bedside nurses should focus on early recognition of acute confusion, assessment of causative factors, and behavioural management. These types of educational initiatives have been successful in reducing acute confusion's negative impact on functional ability (Foreman et al. 1994; Cole, Primeau & McCusker 1996).

Despite much of the recent research focussing on the problem of acute confusion, the evidence remains difficult to utilise in management programs. Inouye (1999) determined research needs to be undertaken targeting specific groups known to be at high risk of developing acute confusion, for example, medical or surgical admissions. As has been highlighted by Francis (1994), acute confusion results in significant economic and health policy implications by increasing overall organisational cost and adverse clinical incidents (such as falls). Acute confusion in the literature has been viewed as a clinical problem which affects all aspects of care for patients including medication regimes, general activities of daily living, observations required, and any procedural workup for the patient.

Inouye's study (1999) lends weight, in the absence of more reliable evidence, to the use of focussed preventative strategies for all patients considered to have a significant risk of developing acute confusion. Inouye (1999) concluded that the management of acute confusion needed to be studied in a more clearly defined way before evidence-based guidelines could be developed. Roca (1994) found that there was considerable work still needed to be done on the basic instruments utilised to ensure the validity, sensitivity, specificity and their feasibility for use in normal clinical circumstances when predicting confusion.

Inouye (1999) theorised, in looking to the future and the need to gain more knowledge, that one method of case finding was to track all patients diagnosed with acute confusion from a memory clinic or community service. Once this had occurred they were randomised into different management groups on admission to hospital, monitoring both the incidence of acute confusion, course and subsequent recovery. Inouye's (1999) study adds weight, in the absence of randomised evidence, to the hypothesis that patients with acute confusion benefit from multidisciplinary team interventions that can decrease the severity of an episode. These findings also demonstrate that the prevention of acute confusion is possible.

Early assessment at admission can uncover risk factors

In acute admissions, the development of acute confusion can be the first indicator of undiagnosed conditions such as infection or drug toxicity. It has also been associated with increased length of hospital stay, the need for chemical and physical restraints, readmission, and increased mortality.

To identify any risk factors that might be present on hospital admission, Marcantonio, Flacker, Wright & Resnick (2001) evaluated 117 men, aged 65 and older, admitted to a Midwestern Veteran's Administration hospital. The men were screened with the NEECHAM Confusion Scale within 24 hours of admission, then daily for eight days, and then every third day until discharge. The Mini–Mental Status Exam and the clock drawing test were also used, and researchers controlled for physical functioning, laboratory data, and medications. Acute confusion developed in 14% of patients (n = 16) admitted to the acute care setting. Associated risk included a low NEECHAM score at admission (lower scores are associated with

higher confusion levels), restricted activity, abnormal laboratory values (sodium and albumin levels), and ‘never having smoked’ (perhaps because nicotine may improve attention). Also, patients who were admitted from somewhere other than home were more likely to develop acute confusion (Marcantonio et al. 2001).

Marcantonio et al. (2001) recommend that nurses be aware of the risk factors for acute confusion and assess patients for the condition on admission, and periodically thereafter to allow for early identification and intervention.

Nursing risk assessment: tools that may assist in the management of acute confusion

Despite posing the greatest threat to the older adult's functional status, hospitals are the least likely health care setting to emphasize functional assessment (Pompei et al. 1994) Admission assessment of the elderly patient's optimal functional status is critical, serving as the goal for functional maintenance and rehabilitation. The key then lies in frequent reassessment to detect deviation from the patient's baseline. Patient self-reports may overestimate self-care ability during the course of the hospital stay, which reinforces the importance of performance-based measures of function (Neelon 1990; St Pierre, 1998). For example, a patient who fears loss of independent living or a patient with early dementia may not give an accurate report of abilities. Detection of changes in function from baseline serves as the trigger for nursing intervention.

Nursing assessment must focus on key functional domains, including self-care, physical mobility, and cognition. Although nurses routinely collect much of this data on admission, the information and the manner in which it is collected varies (Elie et al. 1996). According to Coles (1996) research functional assessment tools that are valid and reliable are available to collect functional data, but may not be incorporated into standard assessment forms. Also, interviewing skill levels may vary in nurses, affecting the reliability and validity of the data. Although it was beyond the scope of Cole’s (1996) research to discuss the implementation of individual assessment tools and interview techniques, it was evident that inadequate functional assessment may overlook functional morbidity (Cole et al. 1996). The advanced practice nurse may have a role in the selection of age-specific assessment tools and in the monitoring of

their use, including acting as a role model in effective interview and communication techniques.

Relatively few systematic studies have described nursing risk indication for acute and chronic confusional states, or distinguished among the several types of dementias and other changes that accompany the aging process that could assist the nursing assessment process (Maas & Buckwalter 1991). Some notable exceptions include the recent work of Neelon, Champagne and colleagues (1986) at the University of North Carolina. They developed the NEECHAM Confusion Scale (Champagne, Neelon, McConnell & Funk 1987) to permit rapid bedside documentation of normal information processing, early subtle cues of acute confusion behaviour, and acute confusion. The tool was tested in comparison to clinical indicators of acute confusion in nursing home residents and with 158 hospitalized elderly patients. A NEECHAM score of 24 or below predicted confusion with a sensitivity of 0.95 and a specificity of 0.78. Thus, the NEECHAM scale promised to be a useful instrument in the prediction and monitoring of confused older persons. Booth and Whall (1987) conducted a three-phase study designed to: 1) use case histories to describe the onset and progression of acute confusion; 2) to develop a health history profile (called the Life Factor Profile) to discriminate between acute confusion and other disorders; and 3) test the discriminate validity of the case history instrument. Psychiatric symptoms, especially depression, were described as being often associated with dementing illness. Because standardized instruments designed specifically to measure depressive symptoms in the demented population were lacking, Kumar, Peterson, Kumar and Fulk (1989) conducted a comparative study of 38 community-dwelling dementia patients to assess: 1) the usefulness of existing instruments to discern psychiatric illness that could be treated; 2) the ability of the relationship between various measures of cognitive function and behavioural changes to predict the course of the psychiatric illnesses; and 3) the ability of various measures to predict institutionalization. Results indicated a high level of depression that increased over time, and contradicted the belief that depression is more common in mildly demented persons than in severely demented persons. Future research should include evaluating common psychiatric and cognitive tools should be conducted on confused patients residing in long-term care settings.

Although assessment tools were reported in the literature that profess to assist the nurse in accurately describing the behavioural manifestations of confusion and distinguishing specific aetiologies, few nursing assessment tools have been rigorously evaluated in terms of their clinical usefulness. For example, Nagley (1986) found that the Short Portable Mental Status Questionnaire, used in many studies of confusion, did not adequately capture the phenomenon of confusion. She recommended that nurses use a combination of cognitive and behavioural responses in their assessment, and that confusion is best studied through daily, or continuous, observation and testing of mental status. McCartney and Palmateer (1985a; 1985b) compared assessment techniques of physicians and nurses using the Cognitive Capacity Screening Examination (CCSE) in a sample of hospitalized medical/surgical patients. They found that assessments did not routinely include either formal cognitive testing or enough precise behavioural descriptions, and that both physicians and nurses failed to identify a significant number of cognitively impaired elderly. Studies of this nature should be replicated with long-term care populations.

The development and testing of comprehensive functional assessment instruments that incorporate perceptual, cognitive, and environmental components have received little attention in the nursing research literature. Noting that instruments to measure activities of daily living (ADL) were developed to assess physical function and were not designed to assess cognitive dysfunctions that influence self-care abilities, Beck (1988) designed and tested a Dressing Performance Scale for use with persons with dementia. Following a task analysis of dressing behaviour based on multiple observations of demented persons and caregivers, a hierarchy of types of caregiver assistance required was defined. These types of assistance include: 1) no assistance; 2) stimulus control; 3) initial verbal prompt; 4) gestures or modelling; 5) occasional physical guidance; 6) complete physical guidance; and 7) complete assistance. Beck (1998) is currently using the Dressing Performance Scale in a study funded by the Alzheimer's Disease and Related Disorders Association to teach caregivers to use behavioural strategies as interventions for the demented to carry out ADLs. This type of assessment can be refined to assist in care planning for short term hospital patients experiencing an onset of acute confusion (Foreman 1994).

Sandman, Norberg, Adolfsson, Axelsson and Hedly (1986) studied five hospitalized patients in different stages of acute confusion to describe the behaviours of patients and nurses during morning care. All of the acutely confused patients required some assistance with morning care—defined as a procedure involving a series of actions that are combined into meaningful wholes, for example, washing, showering, combing, tooth-brushing, shaving, and dressing in a special environment. A 12-step classification was developed as a guide to understand and determine abilities essential for performance of morning care for confused patients. The study found that missing abilities could be determined; highest level of performance varied from day to day; and nurses could compensate for the acutely confused patient's fragmented behaviour. Apraxia was identified as the critical factor in morning care. Paratonia (increasing muscle tone during passive movements of different strength) was observed frequently and could be falsely interpreted as conscious resistance or refusal to participate, indicating the need for nurses to continuously assess the acutely confused patient's abilities and the assistance required throughout morning care.

In an experimental study to evaluate the effects of a Special Alzheimer's Care Unit (SCU) on dementia patients' functional status, Maas and Buckwalter (1986) developed and tested a Functional Abilities Checklist (FAC). The instrument was developed because existing measures did not address all behaviours characteristic of demented patients that influence their ability to function in their environment. The areas of functional abilities included in the scale are: self-care abilities (7 items); inappropriate behaviours (4 items); cognitive status (6 items); mobility status (6 items); communication behaviours (3 items); and emotional status (7 items). This instrument is undergoing psychometric evaluation. Interrater reliability yielded a Pearson r = 0.92 for the total scale among registered nurse raters. Internal consistency reliability coefficients (Cronbach's Alpha) by subscale have ranged from 0.63 to 0.86. Data for the instrument have been correlated with data collected using the Geriatric Rating Scale (GRS) (Plutchik & Conte, 1972) as estimates of concurrent and construct validity. Pearson correlations were determined among the subscales of both instruments yielding statistically significant coefficients of 0.52 or greater for self-care and mobility dimensions, and small or inverse correlations for

inappropriate behaviour, cognitive status, communication, and emotional status. Again, these types of tools appear to have a place in managing people with short term episodes of acute confusion (Anouye 1999).

Clearly, further research is needed to develop and test tools that measure specific deficits so that nursing interventions can be designed to help potentially confused persons remain as functionally able as possible. The adaptation of existing functional assessment measures is needed for nursing assessment of patients suffering from both acute and chronic confusional states. These instruments must take into account the highly variable cognitive, psychosocial and physical deficits among confused patients, and the interaction of these deficits with the patient's specific environment. Determination of the effect of cognitive function on performance of ADLs and identification of the nursing interventions needed are two critical issues that must be addressed (Beck 1988).

CHAPTER 3: METHODOLOGY

This research has utilised a simple quantitative descriptive case controlled research design. This study qualifies as quantitative descriptive case controlled research because the researcher was simply a passive observer, rather than an active agent in experimental work. This case-control study compared cases (subjects at risk for acute confusion) with controls (subjects without the attribute); comparison was made on the exposure to potential contributing factors suspected of causing the cases, for example, heavy smoking, or the number of alcoholic drinks consumed per day. Case-control studies were also retrospective, because they focused on conditions in the past that might have caused subjects to become cases, rather than controls. The basic purpose of this research design was essentially the same as that of experimental research: to determine the relationships among variables.

To conduct this study, a sample of patients were assessed for a period of 12 months by an assessment tool, which recorded high risk indicators for developing acute confusion. Each patient was assessed on admission for their potential of developing an episode of acute confusion whilst an in-patient. Of interest in this part of the data collection phase was how many, and how often, these high risk indicators arose for the total population of patients admitted to these clinical areas. Data collected for every patient admitted identified high risk indicators as determined by nursing staff and linked these to actual episodes of confusion. From this, the research was able to determine if only patients highlighted as being at risk developed confusion, or if a percentage of those classified as low risk also went on to develop symptoms of confusion. Also of interest to this research was whether determining high risk for confusion—and as a result intervening with prevention/reduction strategies—would correlate with a reduction in the total number of acute confusion episodes for this period of time, compared with no early detection and no intervention. If so, it could be said that identifying high risk patients correlated negatively with the number of episodes of acute confusion.

A set of six high risk indicators, as already determined by an expert panel within a Health Service District and in the format of an assessment tool, was utilised to determine a patient's potential to develop confusion.

The panel narrowed down more than 20 indicators to six key high risk indicators to reflect the patient population in question, based on evidence from an extensive literature search and evidence from within the Health Service District. Following the development of this assessment tool an education and staff awareness campaign was implemented to assist with the adherence to the tool. An interview was conducted with the Unit Manager of the trial site to ascertain if there were any major concerns with implementation. The single factor to stem from this discussion was the issue of additional red tape on admission for patients, as admission processes were already rather lengthy. An information session was provided by the expert panel because of this concern. The benefits and risks were addressed in a brainstorming session with the unit manager and staff. From this information session, the expert panel were able to demonstrate clearly the numerous positive points as opposed to the few risks to any established routine and operational delivery. Following a small pilot of the high risk screening tool, a gap analysis for risk indicators in the clinical unit was conducted. Thereafter, additional feedback from nursing and medical staff on the risk of nicotine withdrawal was added to the tool. Patients were labelled as high risk if determined to be heavy smokers. The expert panel remained a forum throughout the duration of this study and at their discretion chose to alter or add to the listed high risk indicators when it become apparent they were not accurately capturing this at-risk population. The intent of this research was not to validate the indicators or a tool, but rather to prove that the introduction of such indicators and the strategies that stemmed from them were directly correlated with a reduction of the onset of acute confusion within an acute medical/surgical hospital.

To decrease any misunderstanding of the correct use of the refined assessment tool and to therefore improve the reliability of data post collection, clinical staff were offered a once--only pre implementation education session on:

- project methodology
- high risk screening tool
- likely prevention and reduction strategies
- local policy and procedure or clinical governance.

Once all staff working in this clinical area had been exposed to this education, no further sessions were offered. The research team considered doing so may coerce staff to introduce interventions in situations where they were normally unlikely to do so. Therefore, the compliance with the screening tool and any subsequent interventions was measured continuously throughout the prospective data collection phase and at no time, where there may have been a concern over compliance with policy, was any intervention taken.

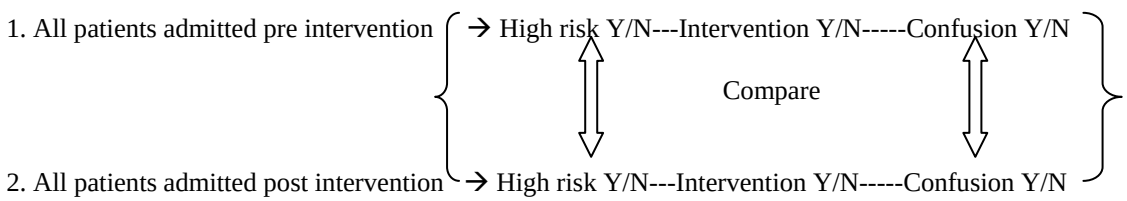
To offer assistance in staff guidance and education, a formal policy and procedure document was created utilising the local policy and procedure process. This outlined to all clinical staff the expectations required in the health facility for risk screening and the management of acute confusion. This document encouraged the use of the tool and the creation of appropriate management plans for either the reduction or prevention of acute confusion.

For the purposes of this study, acute confusion was defined as:

> Acute confusion is a condition that is characterised by a disturbance of consciousness, a change in cognitive status, or a perceptual disturbance that develops over a short period of time and tends to fluctuate during the course of the day and may last for a period of days (Yeaw et al. 1993).

Schematic diagram: A

Schematically, this research methodology took this format based on the hypothesis to be tested for data collection and analysis. The diagram represents retrospectively whether or not those patients pre study implementation with confirmed confusion during their length of stay received intervention to prevent or reduce an episodes of acute confusion. This is compared to the post study implementation patients where a risk screening tool was in use encouraging intervention.



Research question

Will, and if so to what extent, will the annual number of episodes of acute confusion within a medical unit be reduced following the introduction of high risk indicators and early intervention strategies?

Hypothesis to be tested and expected outcomes

1. The total episodes of acute confusion over a twelve month period after the introduction of high risk indicators will be lower than before their introduction.
2. The introduction of high risk screening will increase the evidence of intervention strategies in an attempt to prevent an episode of acute confusion.

NULL HYPOTHESIS

1. The total episodes of acute confusion for in-patients in a medical unit over a twelve month period after the introduction of high risk indicators will not be affected.
2. The introduction of high risk screening will not increase intervention strategies in an attempt to prevent episodes of acute confusion.

Expected Outcome:

1. A reduction in episodes of acute confusion.
2. Increased intervention to prevent episodes of acute confusion.

Variables

Dependant variable: Episodes of acute confusion

Independent variables: (High risk indicators & Multidisciplinary Strategies) listed below: The independent variables were broken down into two different categories for measurement. Firstly, it was important to classify the indications (high risk indicators) for potential acute confusion. These were narrowed down to six key contributing factors for measurement. From these indicators staff were advised to consider the implementation of prevention/reduction strategies (early intervention strategies). These variables were considered to be important for the study as they

would assist in determining the level of intervention attempted by the health care team in preventing an episode. Below are, firstly the key risk indicators, followed by the multidisciplinary strategies.

Population

Inclusion criteria: One medical unit with numerous patient types including palliative care, cardiac, respiratory, and general medical. The patients' symptoms/diagnosis included lung and bowel cancer, chronic obstructive lung disease, asthma, myocardial infarction and chronic heart failure. This unit, on average, had a throughput of 150 admissions per month. Anecdotal evidence suggested that 5-10% of those patients admitted experienced an episode of acute confusion.

Further rationale for this population selection was as follows. From anecdotal evidence within the organisation under study it was very apparent that this clinical area had one of the higher rates of confusion per 1000 occupied bed days. It was also apparent that the management of some of this patient population was inconsistent with recommended guidelines or overarching principles. From anecdotal evidence it was clear that patient incidents occurring in these clinical areas, particularly falls, were linked to acute confusion. Also the total number of patients being restrained in these areas was far higher than evidence based practice suggested it should be.

It was estimated that approximately 160 or more patients per month over a twelve month period, totalling approximately 2000 patients, was a more than adequate number of participants to study. Secondly a decision was made to initially focus on one unit as a trial with the intention of extending this research if results were positive. Also, it was felt particular attention needed to be directed to an area that was already considered to be high risk when compared with literature classifications. Clinical areas consistently mentioned in comprehensive literature reviews outlined the general medical area as a high risk area. Environment was also a factor for consideration when determining the patient population. Literature had suggested that an acute medical area with a higher patient turnaround was more likely to experience greater episodes of acute confusion within their patient population. A greater throughput meant more admissions, and more admissions meant an increased likelihood of an episode occurring. Hence, the environment of a busy medical ward

clearly stood out as the most appropriate clinical setting. These particular clinical settings were also identified with unique lighting, and noise levels. Lighting and noise were commonly linked within the reviewed literature as contributing factors or exacerbating factors towards acute confusion. Busy acute medical clinical settings have endless sources of noise from infusion pumps, monitors, and other medical devices. Typically, these are not noises patients would be used to in their home environments and, therefore, where initial confusion may be apparent, unfamiliar noises can often escalate the depth of confusion. Patients presenting to the emergency department that had initial nursing assessment completed prior to admission to the medical unit were also included in the study.

Exclusion criteria

Exclusion criteria included any patients that were not admitted to the clinical unit involved within the inclusion criteria. Patients admitted to the unit under study but later transferred to another clinical area were not included for data collection, as tracking charts for audit was difficult and made data collection, at times, impossible.

CHAPTER 4: DATA COLLECTION

An Excel spreadsheet was chosen for initial data entry for the following reasons:

1. An SPSS database was unavailable due to restrictions at the local university where this Masters research was undertaken; and
2. Corporate governance in the health care institution where the research was taking place restricted the types of databases made available for use. It was, therefore, decided to use compatible software such as Microsoft Excel so that data transfer could occur at a later date. To ensure compatibility for data transfer all information collected from chart audits, both retrospective and prospective, were entered in a numeric format where possible, represented by (1 OR 0). Where a numeric value was not possible, this data was translated into numeric values following transfer into the SPSS software.

Chart audits were conducted by one person throughout the duration of the research timeframe to ensure reliability, continuity and consistency with the method of collection. Each chart audit took 10-15 minutes to complete and an average of 10 charts where audited per day for a period of two and a half years. Generally, charts were audited in a bulk amount of 20 to as many as 45, twice a week, taking, on average, 10 hours to complete. To ensure that charts did not go missing from the trial ward whilst the patient was still admitted, audits were either conducted at the unit level or retrospectively after patient discharge in Health Information Services. Data collection occurred utilising the following indicators.

Risk assessment (indicators)

- Drug toxicity: did the patient present with known or suspected drug toxicity?
- Evidence of alcohol/substance abuse: did the patient present with known or suspected alcohol or substance abuse, or is the patient a known heavy smoker?
- Poly pharmacy: A patient met this indicator if they presented with more than six medications likely to lead to drug interactions.

- Oxygen required to maintain PaO2 > 90%: patients with known respiratory complications automatically met this criteria or who, on presentation, required supplemental oxygen.
- Symptomatic infection: Patients presenting with respiratory infection, urinary infection, septicaemia, or other obvious signs of infection were classified in this criteria.
- Age > 70 yrs: As the ageing population are well known to be at risk for this syndrome an age bracket of >70yrs was set, based on some already-available retrospective information.

Strategies: multidisciplinary

- Review by Medical Officer of patient within six hours of admission: The expert panel considered this to be an essential strategy because a thorough medical review may lead to the detection of potential contributing factors.
- Notification of the treating Registrar of any high risk patients or a diagnosis of acute confusion: The expert panel considered this to be an essential strategy because the involvement of senior experienced medical staff would lead to earlier intervention.
- Implementation of Queensland Health clinical protocols for detoxification for patients with alcohol dependency. The expert panel considered this to be an essential strategy because evidence based literature advised these protocols to be very effective.
- Rechecking of patient's PaO2, BP, BSL and electrolytes and treatment of any abnormalities. The expert panel considered this to be an essential strategy because these baseline observations often revealed early indication for a potential episode.
- Ensuring of patient's orientation, and assessment of family and environmental factors. The expert panel considered this to be an essential strategy because the more comfortable and relaxed the patient feels in the hospital environment, the less likely something in that environment is to trigger an episode.
- Ensuring of PRN order of haloperidol or midazolam should acute confusion arise. The expert panel considered this to be an essential

strategy because having these medications pre-ordered and readily available would lead to earlier intervention and a greater reduction in the confused state should an episode arise. Anecdotal evidence has suggested that drug intervention has been delayed.

- Treating or providing intervention for high risk indicators. The expert panel considered this to be an essential strategy because early intervention for these known contributing factors has, in other studies of a similar nature, been shown to be very effective.

In order to determine a direct correlation between the dependent variables and the independent variables, data were collected through two mechanisms: firstly, via current admissions to each unit and; secondly, from a central storage area for medical charts. From these admissions, patients who experienced acute confusion had a chart audit. The chart audit was designed to determine the following:

- The patient's initial diagnosis on admission. This is an essential criterion that will determine the fragility of the patient.
- The patient's history and initial observations on admission. This information was also relevant as it may have demonstrated a predisposition to a confused state.
- If the patient is determined to be at high risk—Y/N?
- Whether there is initial medical intervention in an attempt to reduce the risk.
- If a preventative management plan was instituted. This was defined as written intervention of any kind in an attempt by medical staff to prevent or reduce acute confusion.
- The type of management implemented. Was this preventative, or was it a reduction management plan?

Data collected against these variables were on daily, through to weekly, intervals by retrospective audit of patient admission sheets, charts and admission details obtained from Health Information Services. These data were then compared with previous retrospective audits that referred to episodes of acute confusion during the previous three ears in 12 month blocks, before the introduction of the indicators. Data were

then prepared for analysis by coding the independent variables and then written data was collected and translated into categories or numeric form. These codes were captured into an Excel spreadsheet. Data analysis was quantitative in nature and involved the integration and synthesis of narrative, non-numeric data.

The retrospective review was designed to determine the total number of episodes of acute confusion over three 12-month intervals, determining any evidence of high risk consideration and reduction/prevention strategies that may have been implemented without formal consideration. This data was then compared directly with data gathered from the study with the intent of revealing any significant reduction in total episodes as outlined in the schematic diagram A (page 37). Ward statistic reports were utilised to determine the number of patients admitted or transferred into the unit, as compared with those discharged or transferred out of the unit. These figures used were the nominator. The denominator was determined by those either at risk or not at risk with intervention or no intervention. These ward reports were used both retrospectively and for the duration of the data collection phase. Acutely confused patients were identified using a specific code utilised by information services to classify patient groups. This enabled a figure of comparison when determining whether those identified at high risk did or did not develop symptoms.

Retrospective data collection included the following:

- The patient's initial diagnosis on admission. This is an essential criterion to determine the fragility of the patient.
- The patient's history and initial observations on admission. This information may have demonstrated a predisposition to a confused state.
- Documentation by staff that the patient was at risk of an episode—Y/N. This assessed the initial insight staff may have had in foreseeing a confused state.
- Documentation of any medical intervention after admission. Where there was concern about potential confusion, did the staff develop management strategies?
- Documentation of a reduction/prevention management plan. Had consideration been given to the ongoing management of the patient?

- The type of management implemented: Was this preventative, or was it a reduction management plan?

These data collection indicators were utilised to ensure the consistency and dependability of a measuring instrument, and provide reliability for the data collected. That is, they were set up as an indication of the degree to which they gave the same answers over time, across similar patients and irrespective of who collected the information.

CHAPTER 5: STATISTICAL ANALYSIS

Prior to the implementation of the high risk screening tool, construct validity was considered to be an effective theoretical base for testing the concept of predicting an episode of acute confusion. By determining the extent to which the tool actually measured that concept in a small pilot conducted over a one month period, the expert panel were able to test the reliability of the high risk screening tool in its trial site. Construct validity was determined using experimental manipulation by experimenting with the screening tool to test the theory or conceptual framework underlying the tool, followed by an expert panel meeting to further refer the screening tool to the needs of the clinical setting.

Data cleansing was performed whilst in the Excel format to ensure zero emissions of data and zero errors upon entry. This was performed using the following formula as an example:

=COUNTIF(G2:G2263, G2263) + =COUNTIF(G2:G2263,6386)= . Where the result was equal to that total found in the entire column of the spreadsheet, further cleansing was not required. Where the result was not equal to the amount found in that column, the column was manually scanned for error.

Once data cleansing was considered satisfactory in the Excel template, captured data was transferred into an SPSS database platform for analysis.

The goal for data analysis in this research, like any research project, was to provide answers to the research question. The plan for data analysis came directly from the question, the design, the method of data collection, and the level of measurement of the data. The choices made in these areas were viewed to both directly affect and limit what this research could do to analyse data.

Analysis model

The following model was used for data analysis:

Stage:	Description
1	Data entry
2	Building an IF formulae to convert text into numbers
3	Developing an identification scheme for variables
4	Running the IF formulae
5	Creating the SPSS template by copying excel numeric data onto SPSS

Once data had been transferred into the SPSS format, data that could not be recognised by this software needed to be translated into a numeric format with one representing YES and Zero representing NO. Records of intervention from the Excel spreadsheet also required a numeric representation when transferred over to the SPSS database for analysis. This was achieved by categorising the interventions into numeric values from one to twenty. Once data had been translated ready for analysis utilising the SPSS software a pilot analysis was conducted to determine the level of analysis required in order to test the hypothesis and strengthen outcomes data.

The initial pilot was conducted utilising the following schematic diagram B:

This pilot analysis led to a very decisive data analysis plan. Firstly, descriptive statistics were utilised to group a very large amount of data >8000 chart audits with over 30 points of data entry each into several descriptive summaries to determine, through observation of this data, whether there may have been a link between intervention and a reduction in acute confusion. Also, was there a particular intervention that had a stronger relationship with a reduction in acute confusion? Descriptive analysis was conducted firstly on pre intervention data, followed by post implementation or prospective data.

Running SPSS data analysis

The order of analysis was as follows:

Descriptive statistics. This was very limited in use with SPSS as most of the descriptive statistics were performed using the Excel database with simple sum calculations and comparisons. SPSS was solely utilised to provide a summary of data and to ensure accuracy at data capture.

Descriptive analyses that were undertaken were the following:

Frequency distribution: Frequency distribution was used to display the chaos of numbers in an organised manner so such questions could be answered easily. This frequency distribution was represented in a simple table (A histogram) that, at a minimum, displayed how many times in a data set each response or "score" occurred.

Missing value (Count If) : This was utilised as a component of data cleansing before proceeding with further analysis. This was to ensure reliability of data.

Sum: A simple sum equation was utilised as a component of frequency distribution

Descriptive statistics were utilised in order to organise raw data into a format that was user friendly. This allowed a grouping of the collected data into several categories. Descriptive statistics were utilised for initial analysis because it would describe patterns and general trends in a data set. Results from the descriptive analysis were sought to both describe and make inferences about the results. One of the goals of this research was to understand a connection between interventions and a reduction in episodes of acute confusion. Therefore, descriptive statistics were utilised to show clear differences in figures. Actual figures and percentages, plus some averages for retrospective data, were utilised. No other statistical values from descriptive statistics were viewed as relevant, as they did not contribute to the anticipated

outcome. This analysis was mainly interested in monitoring decreases or increases in actual numbers but, before these could be understood, it was imperative to be able to describe it. In some sense, descriptive statistics were used as a bridge between measurement and understanding. Outside of the descriptive analysis used in SPSS, simple sums and count formulas were utilised in an Excel spreadsheet format. From there, descriptive graphs were formulated to best present the results in a user friendly format. SPSS was only utilised to table the data in a user friendly summary to validate data entry.

Further, descriptive analysis of a case process summary was utilised for the following reasons:

- to check the data was satisfactory for further analysis.
- further descriptive analysis using SPSS was unnecessary because the study was not concerned about finding averages, or the standard deviation.
- the case process summary contributed greater assurance of data accuracy at the data capture level.

Correlation analysis

Following descriptive statistics, correlation analysis was performed on both pre implementation data sets and post implementation data sets.

Correlation analysis was utilised for the following reasons:

- to establish cohesion or strength between variables/constructs of this study

Cases used: Statistics for each pair of variables were based on all the cases with valid data for that pair.

Spearman,s rho as a nonparametric statistic was utilised as it is a much safer statistic in circumstances with ranked data, providing increased certainty that a significant result is, indeed, significant.

- Spearman's Rank Correlation is a technique used to test relationships between two variables. In other words, its a device to show whether any one set of numbers has an effect on another set of numbers.

- It uses the statistic Rs which falls between -1 and +1.

A two tailed test was selected as this research was not stating a directional hypothesis. It was chosen because it is one of the most widely used statistical tests, and certainly the most widely known. It is simple, straightforward, easy to use, and adaptable to a broad range of situations..

Its utility is occasioned by the fact that scientific research very often examines the phenomena of nature two variables at a time, with an eye toward answering the basic question: Are these two variables related? If we alter the level of one, will we thereby alter the level of the other? Or alternatively: If we examine two different levels of one variable, will we find them to be associated with different levels of the other?

It was anticipated that there would be positive correlation between nursing interventions and the number of actual episodes of acute confusion. It was also anticipated that there would be significant correlation between identified risk indicators and actual episodes of acute confusion.

Once this test was performed, data demonstrating significance were extracted into simple tables to outline identified relationships. Retrospective data were then compared with prospective data and tabled together to identify similarities or differences in relationships.

Further to this, correlation analysis was performed on the following post implementation risk indicators.

CODE	Risk Indicator
A	Drug/alcohol toxicity on admission
B	Evidence of alcohol/drug/nicotine dependence on admission
C	Polypharmacy
D	Oxygen
E	Symptomatic infection on admission
F	Age > 70 years of aged on admission

These risk indicators were then compared with the following variables:

- initial principle diagnoses
- confusion on admission
- normal observations
- documented risk
- risk indicators
- evidence of intervention
- other intervention
- intervention
- management plan
- type of management plan
- episode of acute confusion
- confusion history.

Only variables where **correlation was significant at the 0.01 level (2 tailed) were included in the results.

CHAPTER 6: RESULTS

Descriptive statistics

Table 6.1 represents a case process summary of collected data. The table demonstrates evidence of data accuracy after entry and the types of data collected. A through to F indicates the risk indicators that were collected as seen in Table 6.1

Case Processing Summary						
	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
initpdcd	1001	100.0%	0	.0%	1001	100.0%
confadmi	1001	100.0%	0	.0%	1001	100.0%
confhist	1001	100.0%	0	.0%	1001	100.0%
normobs	1001	100.0%	0	.0%	1001	100.0%
docrsk	1001	100.0%	0	.0%	1001	100.0%
A	1001	100.0%	0	.0%	1001	100.0%
B	1001	100.0%	0	.0%	1001	100.0%
C	1001	100.0%	0	.0%	1001	100.0%
D	1001	100.0%	0	.0%	1001	100.0%
E	1001	100.0%	0	.0%	1001	100.0%
F	1001	100.0%	0	.0%	1001	100.0%
others	1001	100.0%	0	.0%	1001	100.0%
evdocint	1001	100.0%	0	.0%	1001	100.0%
interven	1001	100.0%	0	.0%	1001	100.0%
othinter	1001	100.0%	0	.0%	1001	100.0%
mgtplan	1001	100.0%	0	.0%	1001	100.0%
tymgtpl	1001	100.0%	0	.0%	1001	100.0%
episode	1001	100.0%	0	.0%	1001	100.0%

Table 6.1 Case Processing Summary

CODE	Risk Indicator
A	Drug/alcohol toxicity on admission
B	Evidence of alcohol/drug/nicotine dependence on admission
C	Polypharmacy
D	Oxygen
E	Symptomatic infection on admission
F	Age > 70 years of aged on admission

Table 6.2 Risk Indicators

From a total sample size of over 8000, descriptive analysis reveals that without intervention the medical unit under study can expect, on average, 30.6) episodes per year. This result is based on three years of retrospective data. Prospective data based on one year of data reveals a much small annual number of episodes (16). This data supports Hypothesis 1. The total episodes of acute confusion over a twelve month period after the introduction of high risk indicators will be lower than before their introduction (see Figure 6.1).

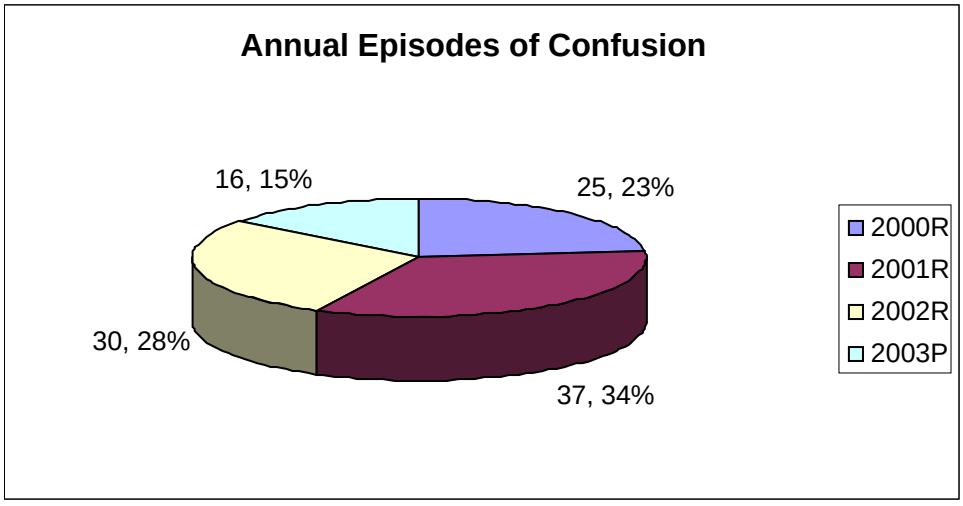


Figure 6.1 Annual Episodes of Confusion

Throughout the duration of the four years of data, both retrospective and prospective similarities exist in the total number of potential risk indication, as seen in Figure 6.2 below.

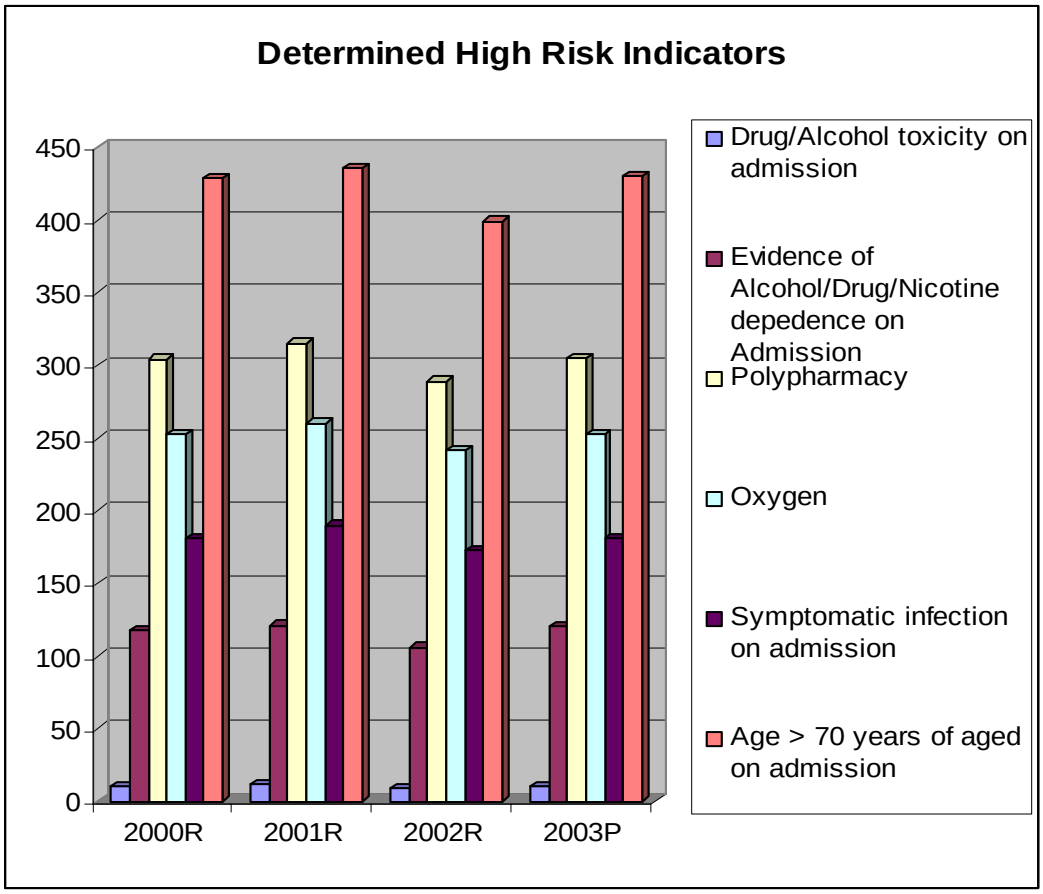
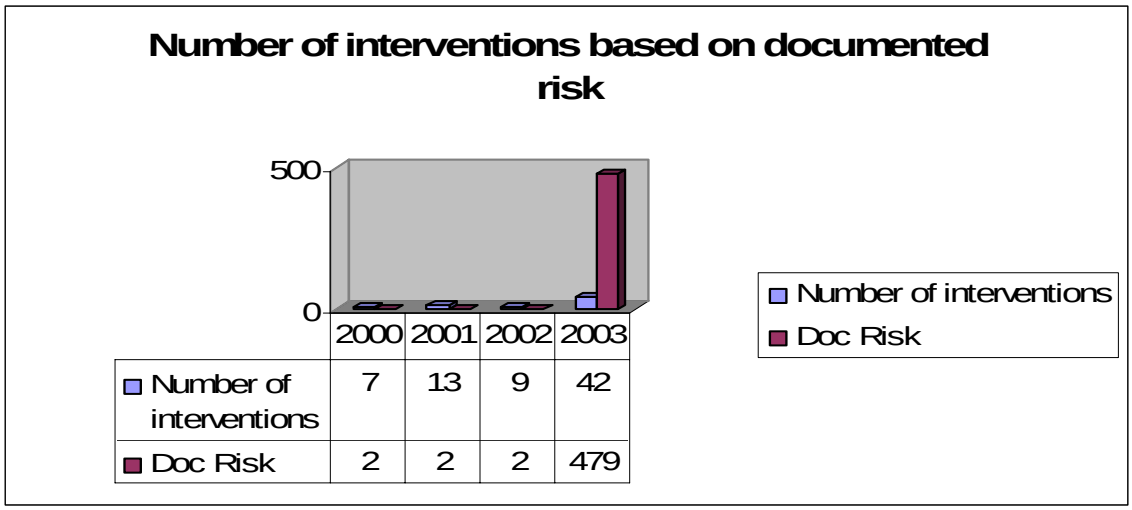


Figure 6.2 Determined High Risk Indicators

Figure 6.2 highlights that results over the four year timeframe have been consistently similar in their nature. This demonstrates that the patient population seen through this clinical area over a four year timeframe, present with risks that are sustainable over time. Age greater than 70 years on admission was a significant proportion of annual admissions for all four years. These results further support the expert panel's final decision when selecting the high risk indicators applicable to this clinical setting. This data then allows a distinct picture to be created. From the data obtained there is clear evidence that retrospective data revealed a very low percentage of patients who had been documented as at risk by health professionals. In fact, an average percentage over the time period from 2000-2002 showed a percentage as low as 0.15. Prospective data outlines a substantial increase in documented evidence of potential risk screening. This was an outstanding figure of 20.1% of 2003 patient admissions. Figure 6.3 below best demonstrates these findings.

Risk screening inevitably led to intervention. Interestingly for the years 2000-2002 (retrospective data) the actual interventions offered to reduce or prevent an episode of acute confusion were larger than the figures obtained for risk screening which results in a negative percentage (see Figure 6.3). Nine per cent of those patients screened as high risk in the 2003 prospective data received actual intervention to either prevent or reduce an episode. This figure is four times the amount of intervention on average offered in the 2000-2002 retrospective data. These results support the set hypothesis: the introduction of high risk screening will increase the evidence of intervention strategies in an attempt to prevent an episode of acute confusion.

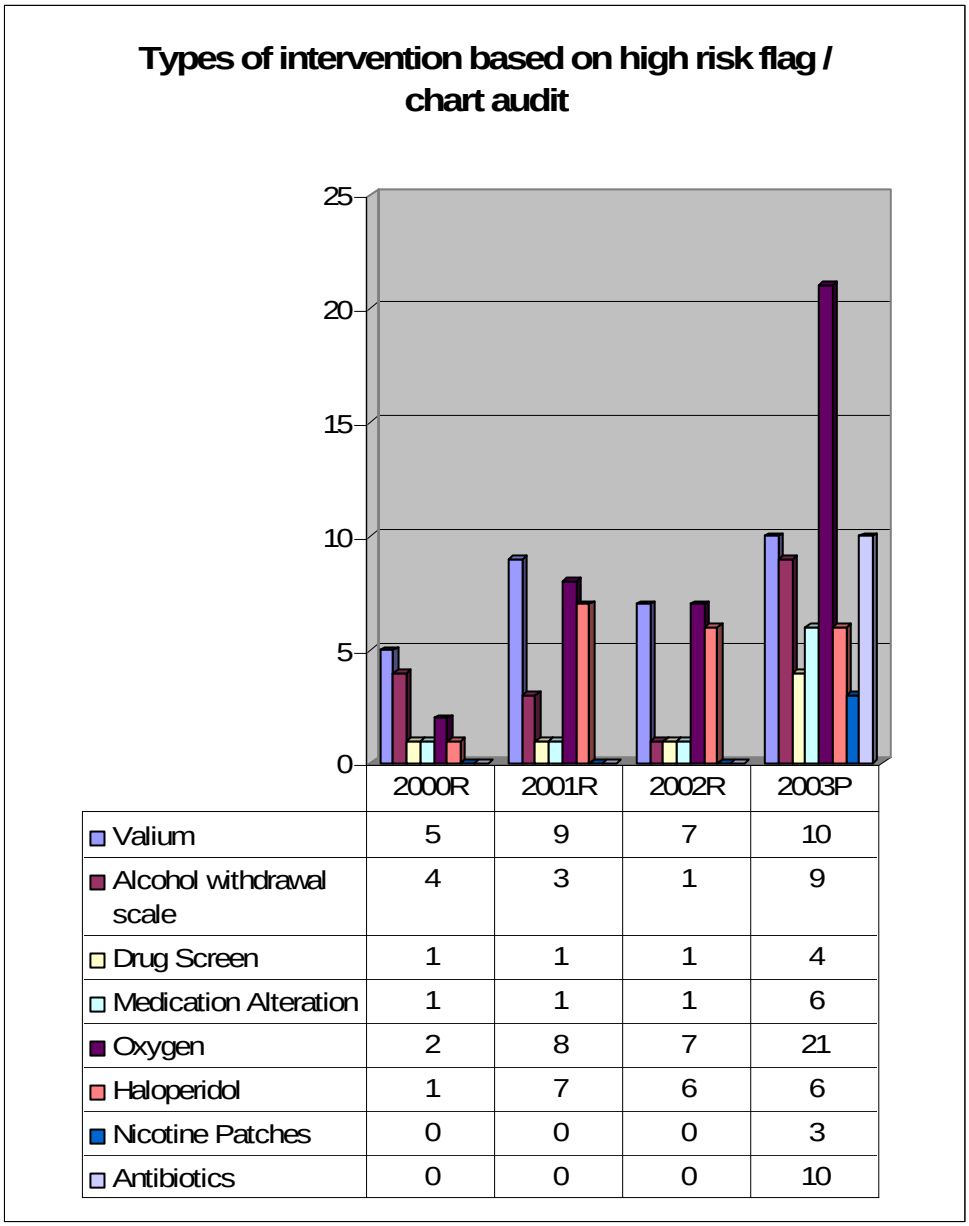


	2000	2001	2002	2003
Number of interventions	7	13	9	42
Doc Risk	2	2	2	479

Figure 6.3 Numbered of interventions based on documented risk

Figure 6.4 shows the breakdown of the data addressing types of interventions. Notable standouts from this data include oxygen therapy and the use of sedatives such as valium. Oxygen therapy prospectively as an intervention has tripled when compared to retrospective figures. Oxygen therapy was only recorded as an intervention if it was officially documented this way. Also worth noting was that all intervention types have increased prospectively. Interestingly, in the retrospective data set, antibiotics and nicotine were not used preventatively, although audit data revealed a potential need. Prospectively these have been used as interventions in a small number of cases and on two occasions successfully. Polypharmacy intervention was also a standout prospectively. Prospectively this occurred on six

different occasions, versus evidence of an average of one intervention for retrospective data.



	2000R	2001R	2002R	2003P
Valium	5	9	7	10
Alcohol withdrawal scale	4	3	1	9
Drug Screen	1	1	1	4
Medication Alteration	1	1	1	6
Oxygen	2	8	7	21
Haloperidol	1	7	6	6
Nicotine Patches	0	0	0	3
Antibiotics	0	0	0	10

Figure 6.4 Type of Intervention Based on High Risk Flag/Chart Audit

Table 6.3 below is an overall representation of the descriptive data. In-patient figures remain consistent, as do risk indicators flagged during audit procedures. However, evidence of intervention and actual episodes show marked differences.

	2000R	2001R	2002R	2003P
Total Inpatients	2263	2284	2111	2286
High risk indicators flagged	1294	1334	1218	1308
EOI	7	13	9	42
Actual episode	25	30	37	16

Table 6.3 Descriptive Data—In-patients

Figure 6.5 demonstrates the most frequent type of admission most likely to suffer from acute confusion during an admission. Table 6.4 below shows the total numbers. This is possibly a guide to health care in this clinical area as to which patients to be mindful of for potentially developing acute confusion. An interesting result was that a high percentage of patients suffering from acute confusion had a cardiac related condition. Bone metastasis, particularly secondary metastasis were also very prominent.

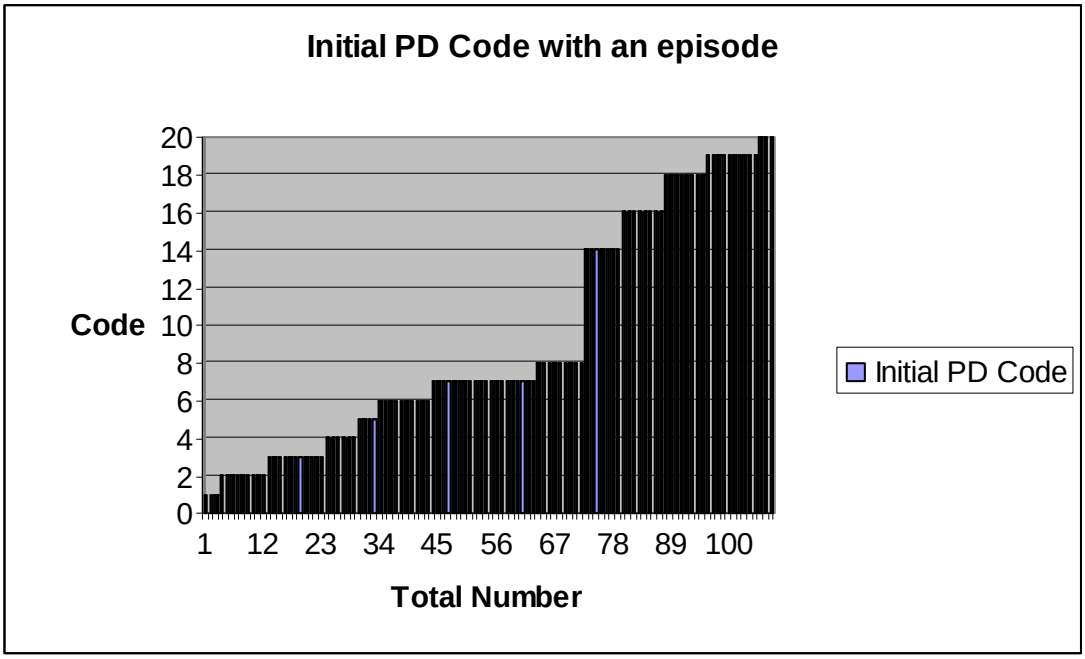


Figure 6.5 Initial PD Code with an Episode

Principal Diagnosis	Episodes	%
J18.9 Pneumonia, unspecified	9	
I21.4 Acute subendocardial myocardial infarction	11	10
R07.4 Chest pain, unspecified	6	5.5
I20.0 Unstable angina	5	4.5
C79.5 Secondary malignant neoplasm of bone and bone marrow	10	9.5
I50.0 Congestive heart failure	18	17
J44.0 Chronic obstructive pulmonary disease with acute lower respiratory infection	9	8.5
C78.6 Secondary malignant neoplasm of retroperitoneum and peritoneum	0	0
N39.0 Urinary tract infection, site not specified	0	0
Z75.11 Person awaiting admission to residential aged care service	0	0
J44.1 Chronic obstructive pulmonary disease with acute exacerbation, unspecified	0	0
R55 Syncope and collapse	0	0
I64 Stroke, not specified as haemorrhage or infarction	7	6.5
L03.11 Cellulitis of lower limb	0	0
N17.9 Acute renal failure, unspecified	8	7.5
C50.9 Malignant neoplasm of breast, unspecified part	0	0
C85.1 B-cell lymphoma, unspecified	8	7.5
G40.90 Epilepsy, unspecified, without mention of intractable epilepsy	10	9.5
I63.9 Cerebral infarction, unspecified	3	2.5
K52.9 Noninfective gastroenteritis and colitis, unspecified	0	0
C79.3 Secondary malignant neoplasm of brain and cerebral meninges	0	0
E86 Volume depletion	0	0
E87.7 Fluid overload	0	0
I48 Atrial fibrillation and flutter	0	0
Z50.9 Care involving use of rehabilitation procedure, unspecified	0	0
J45.9 Asthma, unspecified	0	0
R11 Nausea and vomiting	0	0
C34.1 Malignant neoplasm of upper lobe, bronchus or lung	0	0
I20.9 Angina pectoris, unspecified	0	0
Z49.0 Preparatory care for dialysis	0	0
C78.0 Other	0	0

Table 6.4 Total Numbers—Principle Diagnosis

Other identifying factors documented by health professionals include:

- Lack of motivation to initiate and/or follow through with goal-directed or purposeful behaviour;
- fluctuation in psychomotor activity;
- misperceptions;
- fluctuation in cognition;
- increased agitation or restlessness;
- fluctuation in level of consciousness;
- fluctuation in sleep-wake cycle;
- hallucinations.

Other contributing factors include
:

- uncontrolled pain;
- multiple morbidities,
- fluctuation in sleep-wake cycle.

Correlation Analysis: Only variables where **correlation was significant at the 0.01 level (2 tailed were included in the results).

Retrospective: Parametric correlation

Non-parametric correlation

3. **Spearman's correlation results**

Identified relationship between variables:
Confusion on admission ←→ documented risk
Confusion history ←→ documented risk
Documented risk ←→ confusion on admission + confusion history
Management plan ←→ documented risk
Polypharmacy←→ Intervention

Retrospective data without intervention revealed that variables were valid and were talking to one another. With multiple testing, results were reproducible for every test attempted. All three tests (Pearson, Kendall, & Spearman) produced similar relationships between variables. Similar between all tests was a significant correlation between evidence of intervention and documented risk. Both variables were also closely correlated with confusion, either on admission or based on patient history. Another interesting standout in this data is the relationship between confusion history and documented risk. Staff were more likely to document a risk where it was obvious. Interestingly, in early correlation analysis polypharmacy as a risk indicator showed significant correlation with intervention. Staff were altering prescribed medications due to risk of drug interaction and, on a number of occasions, documenting potential confusion as a rationale. Overall the variable consistently correlated with other variables was documented risk.

Documented Risk

→ confusion on admission
→ confusion history
→ evidence of intervention
→ management plan
→ type of management plan
→ episode

Documented risk, therefore, had a strong correlation in the data set and was a central point for all variable relationships.

Correlation Analysis (Post implementation data)

3. Spearman's correlation results

Data with intervention revealed that variables were valid and were talking to one another. With multiple testing results were reproducible for every test attempted. (Spearman) produced similar relationships between variables. Interestingly, management plans and the type of management plan had strong correlation with other variables, i.e. intervention, evidence of intervention, and episode. Also prominent amongst the variables was an actual episode which was strongly correlated with the following.

Episode

→ Type of management plan
→ Management plan
→ intervention
→ evidence of intervention

Pre intervention versus post intervention correlation. Table 6.5 below is a representation of the differences in correlation :

	Pre Implementation	Post Implementation
Spearmans	Confusion on admission → documented risk Confusion history → documented risk Documented risk → confusion on admission + confusion history Management plan → documented risk Polypharmacy→ Intervention	Evidence of intervention → Management Plan → Episode Intervention → management plan → type of management plan → episode Management plan → evidence of intervention → type of intervention → episode Type of management plan → intervention → management plan→ episode Episode → evidence of intervention → intervention → management plan → type of management plan

Table 6.5 Pre intervention versus post intervention correlation.

Clearly, in retrospective analysis, variables such as management plans and types of management plans are less prominent. Documented risk is the standout variable with strong correlation to many variables. Post implementation documented risk was not as strong. However, what is clear is that an actual episode is closely correlated with management plans and intervention. Also missing in the post data set were the variables confusion on admission, confusion history, and documented risk. There were clear differences in these results; however, correlation, both pre and post implementation has established cohesion or strength between variables/constructs of this study.

Further post implementation correlation was sorted between intervention risk indicators and variables. ***Significant Correlation Coefficients are tabled:***

Code	Risk Indicator	Correlations	Correlation Coefficients (r)
A	Drug/alcohol toxicity on admission	• confusion on admission • confusion history • evidence of intervention • other intervention • management plan • type of management plan	• .112(**) • .086(**) • .362(**) • .396(**) • .362(**) • .397(**)
B	Evidence of alcohol/drug/nicotine dependence on admission	• documented risk • evidence of intervention • age > 70 yrs • other intervention • management plan • type of management plan	• -.100(**) • .415(**) • .096(**) • .380(**) • .356(**) • .393(**)
C	Polypharmacy	• Intervention • Symptomatic infection • Other intervention • Type of management plan • Management Plan • Evidence of intervention	• .239(**) • -.147(**) • .087(**) • .269(**) • .268(**) • .264(**)
D	Oxygen	• Documented risk • Evidence of intervention • Intervention • Symptomatic infection • Other intervention	• -.376(**) • .123(**) • -.476(**) • -.126(**) • .133(**)

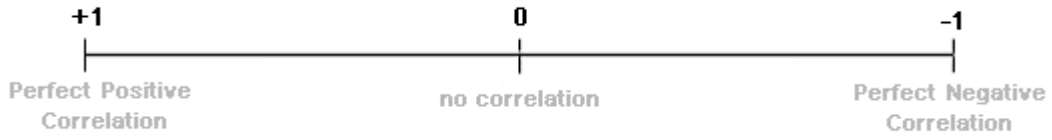
Code	Risk Indicator	Correlations	Correlation Coefficients (r)
		• Type of management plan	• .129(**)
E	Symptomatic infection on admission	• Documented risk • Evidence of intervention • Polypharmacy • Oxygen	• -.300(**) • .707(**) • .087(**) • .126(**)
F	Age > 70 years of aged on admission	• type of management plan • management plan • other intervention • Evidence of alcohol/drug/nicotine dependence on admission	• .099(**) • .096(**) • .102(**) • .099(**)

Table 6.5 Correlations

Correlation Coefficient (r)

Reported above in table 6.5 are the correlation coefficients quantifying the degree of linear association between two variables that show ** Correlation is significant at the 0.01 level (2-tailed).

The closer **r** is to +1 or -1, the stronger the likely correlation. A perfect positive correlation is +1 and a perfect negative correlation is -1.



Understandably, drug and alcohol toxicity was strongly correlated with confusion on admission and a history of confusion. All patients presenting with toxicity received intervention and a management plan. Suspected history of alcohol or drug abuse had a definite correlation with documented risk and intervention. The majority of admissions with suspected history of alcohol or drug abuse had some form of management plans. Interestingly, polypharmacy was closely related to symptomatic

infection, no correlation with documented risk, but a strong correlation with intervention. Oxygen therapy had a standout correlation with documented risk and strong correlation with intervention. Of further interest was the correlation with symptomatic infection. Assumptions were validated that symptomatic infection would be strongly correlated with polypharmacy, oxygen therapy, and documented risk. Interestingly, for the risk indicator Age > 70 years of aged on admission, there was mainly a strong correlation with evidence of alcohol/drug/nicotine dependence on admission and subsequent intervention, evidence of intervention, and management plans.

CHAPTER 7: DISCUSSION

This report demonstrates that, with relatively good adherence by the nursing team, proactive screening using a structured risk assessment protocol can be successfully implemented for medical patients. This assessment was associated with a statistically significant 50% reduction in the incidence of acute confusion in the intervention group, compared with usual care retrospectively. Reduction in acute confusion was not associated with shortened length of stay, but length of stay was often predetermined by protocol or critical pathway.

Correlation analysis demonstrated that risk screening appeared most effective in preventing or reducing acute confusion in patients without preadmission dementia or ADL impairment. In patients with significant preadmission impairment, the stress of hospitalisation may be sufficient to precipitate an episode, despite otherwise optimal management. Less-impaired patients may require additional insults to precipitate acute confusion, some of which are avertable by risk screening and subsequent early intervention. This is supported by the summative risk factor model for acute confusion proposed by Inouye et al. (1999).

These findings corroborate and extend those of previous investigations. Inouye et al. (1999) reported a similar reduction in acute confusion (matched OR = 0.6, 95% CI = 0.39-0.92) among general medicine patients age 70 and older, using a unit-based targeted multifactorial intervention. The intervention included specific protocols for cognitive impairment, sleep hygiene, immobility, visual impairment, hearing impairment, and dehydration carried out by trained lay interventionists and volunteers. This research addressed many of the same factors in multimodular intervention and achieved reductions of acute confusion of similar magnitude, but intervention was much more medically driven (Inouye et al. 1999).

This research supports findings by Marcontario et al. (2001) that risk assessment on admission by health professionals, particularly nurses, can effectively either prevent or offer early treatment strategies to reduce severity of an episode. As defined by Cole (1999), a broad spectrum of interventions is essentially necessary to offer

greater effect. What this research further adds to the work of previous researchers is that risk indicators and interventions need to be refined to the specific needs of that particular clinical environment. What is clear is that in the results obtained from data analysis the refined risk indicators and interventions by the expert panel in this research study successfully allowed for reductions in actual episodes. This study confirms that this is a necessary step in the process.

Although minimal in the data set, other indicators also became apparent from chart audit. This demonstrates that some acute confusion risk indicators will not be obvious in a clinical area and, therefore, the research methodology or quality assurance activity will need to allow for alteration to risk indicators if necessary.

Determined risk indicators were consistent throughout the four year timeframe set for this research project. This demonstrated that although there were multiple patient types presenting to this clinical area, they were consistently the same over a longitudinal timeframe. It meant they were reproducible, which gave this research additional strength. Also, based on the descriptive statistics, this research has shown that in this clinical area where intervention was introduced the combination did have a positive impact on annual numbers of acute confusion. This can be seen clearly in Figure 6.5 below.

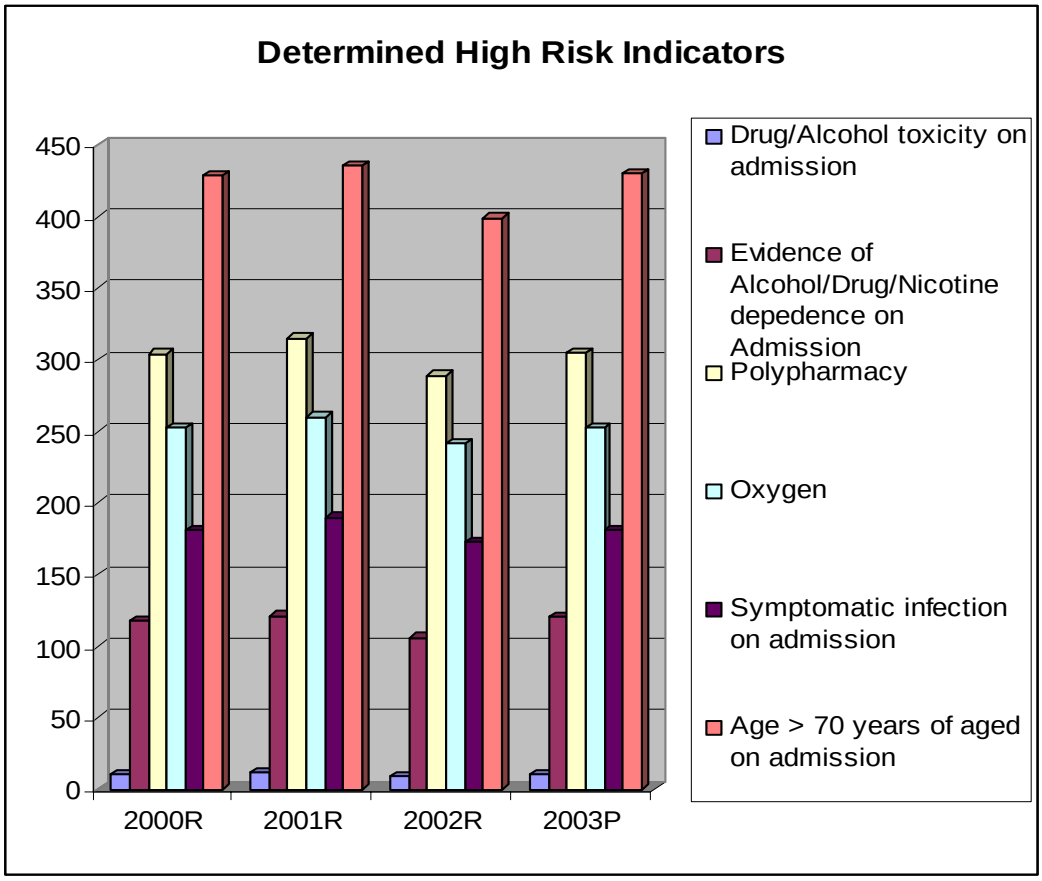


Figure 6.5 Determined High Risk Indicators

This study supports Wakefield's (2002) study which, although showing no positive reduction in episodes, reinforced his theory that nurses can be effective in screening, preventing and reducing episodes. Wakefield's (2002) research did confirm that high risk screening can detect potential episodes. This research has confirmed that risk indicator screening does positively influence intervention. The 50% reduction in episodes in this study would be interesting to measure from a sustainability perspective. Although this study is the longest undertaken when compared to the literature review, it would appear necessary to see if either this reduction was sustainable, could be further enhanced, or may again rise due to loss of interest from clinical staff. What is apparent is that this health care intervention can be effective and should be incorporated as a mandatory quality assurance initiative for all acute clinical settings. What is of concern from this research is that the figures only deal with one clinical area in a large acute health care institution. One could only guess the extent of the problem in other clinical areas.

This research study confirms that if mandatory quality assurance is not undertaken at an organizational level there is a very large risk of either adverse clinical incidents or public outrage which could damage the reputation of a health care institution. This is demonstrated solely by the reduction of numbers in episodes. Once this type of research outcome becomes part of evidenced based practice implementation, and hence public knowledge, there will be a public expectation that the processes include primary prevention. As Foreman et al. (1994) outlined, symptomatic and supportive care is often left until acute confusion is well determined. If retrospective figures obtained in this research are transferable to other acute settings, health care institutions are sitting on a ticking time bomb.

Descriptive statistics were very conclusive in this research. Results from descriptive analysis only clearly disproved the null hypothesis, i.e. 'The total episodes of acute confusion for in-patients in a medical unit over a twelve month period after the introduction of high risk indicators will not be affected'. This statement has clearly been proven to be incorrect. A reduction of up to 50% is very evident in the descriptive results and although this result is yet to be reproduced to demonstrate reliability the result is positive and further justifies research conducted by those such as Wakefield (2002), Foreman (1994) and Morency (2002). This study did not extend to determining whether acutely confused patients experience more adverse outcomes compared with their nonconfused counterparts as studied by Wakefield (2002). Wakefield (2002), using a prospective design, followed 117 subjects throughout hospital stay. Subjects who developed AC were more likely to fall, be incontinent, have a urinary catheter, and experience functional decline. Results from this research, however, demonstrates that using risk indicators and intervention strategies can reduce the potential risk of these adverse occurrences. Wakefield (2002) also found mortality was higher in subjects with AC. This research, when compared with previous research, highlights the extraordinary risk that undetected or unmanaged acute confusion can have on not only consumers, but also the acute health care institutions in which consumers are cared for. This demonstrates how useful these research findings are and the positive contribution such an initiative can have. It can only be assumed that a 50% reduction in episodes can decreased patient risk for harm, or worse, death, but research findings support this assumption. This

adds strength to the positive outcomes derived in this study and further confirms that these risk screening strategies should be common practice.

This statement is further supported by the results disproving the second null hypothesis, 'The introduction of high risk screening will not increase intervention strategies in an attempt to prevent episodes of acute confusion'. It was very evident that interventions by staff did increase, and almost immediately. This demonstrates that nurses can consistantly identify the potential risk of acute confusion if given the appropriate tools to do so. This disagrees with suggestions nurses fail to detect acute confusion and have difficulty distinguishing it from dementia (The University of Iowa 1998). This statement by The University of Iowa (1998) was drawn from results obtained using dimensional analysis exploring the clinical reasoning of nurses who care for hospitalized older adults to identify factors contributing to poor detection rates. Data analysis yielded a grounded theory of situated clinical reasoning, which proposes that the ability of nurses to identify acute confusion varies widely.

These research findings would suggest that adopting ward-grown risk indicators and intervention strategies can increase the likelihood of generic detection across all nurses in the one clinical area. The variation obtained by The University of Iowa (1998) can be attributed to the differences in nurses' philosophical perspectives on aging, not to the generic application of high risk screening. According to this theory, three distinct perspectives are unwittingly embraced by nurses who care for older patients. These perspectives influence how nurses characterize aging and the aged, and condition the ways in which they judge and ultimately deal with older adults in clinical situations. This research has dealt with age as one risk factor only and nurses were not expected to make assumptions of philosophical perspectives. They simply determined at risk or not at risk scenarios and allowed treating medical teams to act accordingly. One further explanation to this variation could be that nurses in this study were influenced by education.

Multiple interacting causes, as outlined in Morency et al. (1994), were evident in this research, particularly studying the Excel spreadsheet data sets. However, what was also very clear from this research was standout contributing factors. Oxygen in the

clinical area under study was clearly seen to triple prospectively as an intervention and on four occasions had strong links to preventing an episode of acute confusion. It is worth noting for discussion that there were no other apparent risks or interventions with these individuals. This is more than likely linked back to the patient principle diagnosis on admission. As outlined in the population information this group of in-patients in the majority of situations suffer from different forms of respiratory illness. Hypoxia or the risk of hypoxia was obviously a standout factor. Hypoxia, as mentioned by Morency (1994), was definitely a significant contributing factor to developing acute confusion

This finding also further validates the step taken in this research methodology to confine the risk indicators to the needs of the clinical area under study. If generic risk tools were to be adopted, as suggested by researchers such as Folstien (1975) and Pompie (1994), key variables for that particular clinical setting may be overlooked and specific preventative interventions, such as oxygen therapy, never attempted.

Evident from correlation was a strong relationship between intervention or evidence of intervention, management plans, and an episode. These results justify the inclusion of interventions on top of risk screening indicators as measures for reduction. Interestingly, the type of management plan was very strong also indicating the specifics of intervention were important in relation to the risk indicator highlighted, i.e. symptomatic infection → oxygen + antibiotics.

Morency et al. (1994) were adamant in their findings that in a case where multiple potential or actual contributing factors may be at play, interventions should be in direct response to those contributing factors. Although this research has demonstrated on some occasions in raw data that this has occurred, generally, analysed data has revealed one or two interventions at the most were only ever considered by the health care team. This research, therefore, comes very close to demonstrating that risk indicators can be so well defined for a clinical area that interventions can be pre-defined in the majority of situations.

Nicotine patches were utilized as interventions in prospective patients on two occasions. This, at present in the literature, is a very controversial issue. Tennetti et

al. (2002) suggested that craving and withdrawal symptoms may be sustained by different physiological pathways, and that only selected components of cigarette craving are influenced by NRT. It was therefore suggested that dependence should first be determined before intervention should occur. Hence, nicotine usage should not be a determined risk factor, but rather nicotine dependence, as this patient group is far more likely to endure an episode.

Results were of a similar nature to the study conducted by Lipowski (1989), who also found a decrease in correlation of specific interventions post implementation. In fact, both sets of research findings had strong ties to the set hypothesis.

Another interesting discussion point found in this research was the types of patient diagnosis in this clinical area who were more prone to developing acute confusion. Coronary heart failure was most prominent, with 17% of the total registered number of episodes for the 2000-2003 period, retrospective and prospective data included. Acute subendocardial myocardial infarction registered as 10% of the total number of episodes for this period. Chest pain and unstable angina registered together at 10% also. This painted an interesting picture with over one third of those patients suffering an episode of acute confusion having an initial principle diagnosis of a cardiac origin.

These results complement the work conducted by Marcantonio et al. (1994) who investigated a clinical prediction rule for delirium after elective noncardiac surgery. This result was conducted by Marcantonio as there was an assumption that cardiac patients, particularly coronary heart disease and myocardial infarction patients, are at high risk. It was interesting that Marcantonio and colleagues (1994) chose to single out this patient group and theorised they required their own refined prediction tool. In hindsight, results from this research highlight that these findings are likely to hold true. What would be very interesting as a secondary component to this research would be to implement Marcantonio and colleagues' (1994) prediction tool into the high risk indicator tool developed for this research and further test its impact.

Also interesting from the results was the numbers of patients admitted with epilepsy who experienced an episode of acute confusion. Again, this figure for the four year period under study was 10% of total episodes. Research conducted by Pollock and Mitchell (2000) concluded that nonconvulsive status epilepticus can contribute to the development of acute confusion. Again in retrospection, this, according to the findings of this research, should be included in pre assessment screening of the patient as a potential risk factor. Although Pollock & Mitchell (2000) found in their research that this was very difficult to prevent, the severity of an episode, however, could be managed.

CHAPTER 8: CONCLUSION

In this investigation, it has been shown that a 5-minute risk screening assessment instrument can indeed assist in the early detection of both actual and potential acute confusion. Prospectively, a snapshot of 100 consecutive medical patient admissions revealed acute confusion occurred on 0.40% occasions in comparison to a retrospective total of 1.25%. In summary, these findings suggest that without risk screening and the direction for appropriate management the likelihood of an episode can more than double. In the three subgroups expected to pose the greatest challenges for the risk assessment (i.e. those 70 years or older, those with suspected drug dependency, and those with symptomatic infection), risk assessment retained excellent sensitivity, (a) (d) specificity, and relevant correlation with reduction of episodes.

The strengths of this study include the challenging study population of medically diverse but severely ill patients, the large number of patient evaluations, and the use of recognized delirium experts for the reference standard ratings. Another important strength of the study design was the use of a well-constructed policy and procedure supporting a refined screening tool with supporting recommendations for intervention.

The limitations of this investigation warrant comment. In developing the screening strategies, the focus was to develop a tool for detecting delirium, not dementia. However, it is commonplace for mildly demented patients to be cared for in any acute medical setting. Because such patients could pose a challenge for this research, patients with suspected dementia were excluded, however, what would have made the findings more interesting would have been a subgroup analysis to verify performance of high risk screening and intervention in patients with dementia. This investigation also represents a selected population at a single site, and future studies will need to evaluate the generalizability of performance across other patient populations, including those with lower prevalence of acute confusion.

A quick evaluation for potential acute confusion on admission in an acute medical oncology unit is absolutely imperative. Although this assessment can be achieved by incorporating standard or usual tests and initial review achieved within five minutes,

the assessment should still be thorough. Vital signs should be standard practice and should assist in detecting contributing factors such as decreased peripheral oxygen levels, or increased pulse rate or respirations. These signs and symptoms could be attributed to stress, hypoxia, or substance withdrawal—which have definite links to developing acute confusion. Oxygen depletion in this study was without doubt the most significant factor identified and, although the data shows there was significant intervention from nursing staff with therapeutic oxygen, anecdotal evidence from this study does demonstrate that further research is required to ensure the oxygen is administered at the appropriate flow rates for different circumstances based on patient history. There is a definite possibility that incorrect flow rates (particularly higher doses of oxygen) may actually contribute to an episode of acute confusion by inducing carbon dioxide retention. Based on this assumption it would have been interesting for this study to also record the oxygen levels administered, compare these to the patient history and principle diagnoses, and then ascertain how many incorrect dosages led to an episode.

An oncology ward is unique in that it has a vast array of patients with varied principle diagnoses. In hindsight, many of the patients audited in this study presented with either lung or bowel cancer. Most were diagnosed with primary tumours, with potentially undetected secondary complications. Therefore, any acute confusion risk screen should have involved an evaluation for potential secondary metastases on the brain. Some data demonstrates evidence that if included as a risk indicator in this study at least three patients in the prospective data would have had an earlier detection of brain lesions. Consequently, regular computerised tomography should be performed on admission (Morency 1994).

Seizures, meningitis, glucose, creatinine, liver function tests also had potential links and therefore should be monitored, or even considered, for inclusion (Yeaw 1993).

Until proven otherwise, a sudden change in behaviour after the age of 60 should be considered to be acute confusion (Foreman 2001). Acute confusion is a true medical emergency because many of the causes such as anoxia, hypoglycaemia, meningitis, and alcohol withdrawal are potentially lethal and reversible (Yeaw 1993).

Effective management depends on prompt recognition of the condition, diagnosis and treatment of the underlying cause, management of agitation and disruptive behaviour, and provision of general supportive care (Batt 1989).

All non-essential drugs should be eliminated. Laboratory testing may uncover metabolic problems and fluid or electrolyte disturbances, which should be corrected without delay. Indications for brain imaging depend on the clinical situation. Although brain imaging often uncovers pre-existing central nervous system disease, a comprehensive medical evaluation is still needed to identify the precipitating illness, which is usually located outside the nervous system (Foreman 2000).

In hindsight, because of the very high risk of acute confusion among medical/oncology patients, the clinical judgment of a skilled geriatrician may have been helpful in prioritizing among many possible interventions to prevent acute confusion. In addition, the geriatrician could have assisted the medical team in the management of other medical issues that may arise during the hospitalization. Other approaches such as a specialised nurses, nursing-based intervention, or consultation by a psychiatrist might also be effective. Determining the most cost-effective strategy for different patient populations requires further study (The University of Iowa 1998).

As outlined in the discussion, alterations to the high risk screening method utilised in this research would need to include several additional risk indicators so as to further refine the clinical area's needs. History of, or admission with, coronary heart failure, myocardial infarction, chest pain or angina should be monitored more closely. As already mentioned, patients presenting with bone metastasis, particularly secondary, should be considered to be at high risk. Also outlined in the discussion was the interesting result on the number of patients presenting with epilepsy who developed an episode. Further research is required in this type of clinical setting to further define the exact elements of prominent principle diagnose that are contributing to an episode. What is unclear is whether the identified factor of epilepsy is due to a history of newly diagnosed epilepsy.

In summary, this research has demonstrated throughout that high risk screening and associated intervention based on the risk indicator can decrease the annual number of actual episodes of acute confusion. Interventions to prevent or reduce an episode of

acute confusion, as outlined by Wakefield (2002) and this research, definitely increases as a result of high risk screening. Beyond doubt, from both the literature reviewed and the findings of this research, is that risk screening does need to be adapted to the individual clinical setting and cannot be generic.

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APPENDICES

1. Retrospective Correlations

Nonparametric Correlations

Notes		
Output Created		21-JAN-2005 12:26:39
Comments		
Input	**Data**	C:\Documents and Settings\gururaja\Desktop\Clint.sav
	Filter	<none>
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	Split File	<none>
	N of Rows in Working Data File	1003
Missing Value Handling	**Definition of Missing**	User-defined missing values are treated as missing.
	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.
Syntax		NONPAR CORR /VARIABLES=confadmi confhist normobs docrsk evdocint interven /PRINT=BOTH TWOTAIL NOSIG /MISSING=PAIRWISE .
Resources	**Elapsed Time**	0:00:00.13
	Number of Cases Allowed	61680 cases(a)
a Based on availability of workspace memory		

Correlations								
Spearman's rho	**confadmi**	**Correlation Coefficient**	1.000	-.008	-.031	-.003	.019	-.009
		Sig. (2-tailed)	.	.805	.326	.913	.712	.770
		N	1003	1003	1003	1003	400	1003
	confhist	**Correlation Coefficient**	-.008	1.000	.027	-.004	.002	-.012
		Sig. (2-tailed)	.805	.	.396	.887	.962	.706
		N	1003	1003	1003	1003	400	1003
	normobs	**Correlation Coefficient**	-.031	.027	1.000	.012	-.056	.032
		Sig. (2-tailed)	.326	.396	.	.705	.260	.314
		N	1003	1003	1003	1003	400	1003
	docrsk	**Correlation Coefficient**	-.003	-.004	.012	1.000	.132(**)	-.005
		Sig. (2-tailed)	.913	.887	.705	.	.008	.866
		N	1003	1003	1003	1003	400	1003

	evdocint	**Correlation Coefficient**	.019	.002	-.056	.132(**)	1.000	-.010
		Sig. (2-tailed)	.712	.962	.260	.008	.	.838
		N	400	400	400	400	400	400
	interven	**Correlation Coefficient**	-.009	-.012	.032	-.005	-.010	1.000
		Sig. (2-tailed)	.770	.706	.314	.866	.838	.
		N	1003	1003	1003	1003	400	1003
** Correlation is significant at the 0.01 level (2-tailed).								

Spearman's correlation

Confusion on admission → documented risk

Confusion history → documented risk

Documented risk → confusion on admission + confusion history

Management plan → documented risk

2. Correlations Post Implementation

Notes		
Output Created		28-JAN-2005 13:36:09
Comments		
Input	**Data**	C:\Documents and Settings\gururaja\Desktop\ClintRET.sav
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	1004
Missing Value Handling	**Definition of Missing**	User-defined missing values are treated as missing.
	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.
Syntax		CORRELATIONS /VARIABLES=confadmi confhist normobs docrsk evdocint interven othinter mgtplan tymgtpl episode /PRINT=TWOTAIL NOSIG /MISSING=PAIRWISE .
Resources	**Elapsed Time**	0:00:00.03

Correlations											
		confadmi	confhist	normobs	docrsk	evdocint	interven	othinter	mgtplan	tymgtpl	episode
confadmi	Pearson Correlation	1	-.008	-.031	-.003	-.006	.010	.(a)	-.009	.006	-.012
	Sig. (2-tailed)		.806	.326	.913	.837	.751	.	.770	.849	.695
	N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
confhist	Pearson Correlation	-.008	1	.027	-.004	-.008	-.041	.(a)	-.012	.008	-.016
	Sig. (2-tailed)	.806		.396	.887	.790	.194	.	.706	.806	.612
	N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
normobs	Pearson Correlation	-.031	.027	1	.012	.022	.017	.(a)	.032	-.021	.017
	Sig. (2-tailed)	.326	.396		.705	.478	.580	.	.314	.512	.588
	N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
docrsk	Pearson Correlation	-.003	-.004	.012	1	-.004	-.048	.(a)	-.005	.003	-.007
	Sig. (2-tailed)	.913	.887	.705		.906	.129	.	.866	.913	.821
	N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
evdocint	Pearson Correlation	-.006	-.008	.022	-.004	1	-.093(**)	.(a)	.194(**)	.006	.217(**)
	Sig. (2-tailed)	.837	.790	.478	.906		.003	.	.000	.837	.000
	N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
interven	Pearson Correlation	.010	-.041	.017	-.048	-.093(**)	1	.(a)	-.110(**)	.103(**)	-.151(**)
	Sig. (2-tailed)	.751	.194	.580	.129	.003		.	.000	.001	.000
	N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
othinter	Pearson Correlation	.(a)	.(a)	.(a)	.(a)	.(a)	.(a)	.(a)	.(a)	.(a)	.(a)
	Sig. (2-tailed)	.	.	.	.	.	.		.	.	.

	N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
mgtplan	**Pearson Correlation**	-.009	-.012	.032	-.005	.194(**)	-.110(**)	.(a)	1	-.652(**)	.472(**)
	Sig. (2-tailed)	.770	.706	.314	.866	.000	.000	.		.000	.000
	N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
tymgtpl	**Pearson Correlation**	.006	.008	-.021	.003	.006	.103(**)	.(a)	-.652(**)	1	-.235(**)
	Sig. (2-tailed)	.849	.806	.512	.913	.837	.001	.	.000		.000
	N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
episode	**Pearson Correlation**	-.012	-.016	.017	-.007	.217(**)	-.151(**)	.(a)	.472(**)	-.235(**)	1
	Sig. (2-tailed)	.695	.612	.588	.821	.000	.000	.	.000	.000	
	N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
** Correlation is significant at the 0.01 level (2-tailed).											
a Cannot be computed because at least one of the variables is constant.											

Nonparametric Correlations

Notes		
Output Created		28-JAN-2005 13:36:09
Comments		
Input	**Data**	C:\Documents and Settings\gururaja\Desktop\ClintRET.sav
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	N of Rows in Working Data File	1004
Missing Value Handling	**Definition of Missing**	User-defined missing values are treated as missing.
	Cases Used	Statistics for each pair of variables are based on all the cases with valid data for that pair.
Syntax		NONPAR CORR /VARIABLES=confadmi confhist normobs docrsk evdocint interven othinter mgtplan tymgtpl episode /PRINT=BOTH TWOTAIL NOSIG /MISSING=PAIRWISE .
Resources	**Elapsed Time**	0:00:00.41
	Number of Cases Allowed	41943 cases(a)
a Based on availability of workspace memory		

Correlations												
			confadmi	confhist	normobs	docrsk	evdocint	interven	othinter	mgtplan	tymgtpl	episode
Kendall's tau_b	confadmi	Correlation Coefficient	1.000	-.008	-.031	-.003	-.006	.012	.	-.009	.006	-.012
		Sig. (2-tailed)	.	.805	.325	.913	.837	.687	.	.770	.849	.695
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	confhist	Correlation Coefficient	-.008	1.000	.027	-.004	-.008	-.037	.	-.012	.008	-.016
		Sig. (2-tailed)	.805	.	.396	.887	.790	.212	.	.706	.805	.612
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	normobs	Correlation Coefficient	-.031	.027	1.000	.012	.022	.008	.	.032	-.021	.017
		Sig. (2-tailed)	.325	.396	.	.705	.478	.783	.	.314	.511	.588
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	docrsk	Correlation Coefficient	-.003	-.004	.012	1.000	-.004	-.018	.	-.005	.003	-.007
		Sig. (2-tailed)	.913	.887	.705	.	.906	.540	.	.866	.913	.821
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	evdocint	Correlation Coefficient	-.006	-.008	.022	-.004	1.000	-.055	.	.194(**)	.006	.217(**)
		Sig. (2-tailed)	.837	.790	.478	.906	.	.066	.	.000	.837	.000
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	interven	Correlation Coefficient	.012	-.037	.008	-.018	-.055	1.000	.	-.104(**)	.123(**)	-.122(**)
		Sig. (2-tailed)	.687	.212	.783	.540	.066	.	.	.000	.000	.000
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	othinter	Correlation Coefficient	.	.	.	.	.	.	.	.	.	.
		Sig. (2-tailed)	.	.	.	.	.	.	.	.	.	.

		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	mgtplan	Correlation Coefficient	-.009	-.012	.032	-.005	.194(**)	-.104(**)	.	1.000	-.652(**)	.472(**)
		Sig. (2-tailed)	.770	.706	.314	.866	.000	.000	.	.	.000	.000
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	tymgtpl	Correlation Coefficient	.006	.008	-.021	.003	.006	.123(**)	.	-.652(**)	1.000	-.235(**)
		Sig. (2-tailed)	.849	.805	.511	.913	.837	.000	.	.000	.	.000
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	episode	Correlation Coefficient	-.012	-.016	.017	-.007	.217(**)	-.122(**)	.	.472(**)	-.235(**)	1.000
		Sig. (2-tailed)	.695	.612	.588	.821	.000	.000	.	.000	.000	.
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
Spearman's rho	confadmi	Correlation Coefficient	1.000	-.008	-.031	-.003	-.006	.013	.	-.009	.006	-.012
		Sig. (2-tailed)	.	.806	.326	.913	.837	.688	.	.770	.849	.695
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	confhist	Correlation Coefficient	-.008	1.000	.027	-.004	-.008	-.039	.	-.012	.008	-.016
		Sig. (2-tailed)	.806	.	.396	.887	.790	.212	.	.706	.806	.612
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	normobs	Correlation Coefficient	-.031	.027	1.000	.012	.022	.009	.	.032	-.021	.017
		Sig. (2-tailed)	.326	.396	.	.705	.478	.784	.	.314	.512	.588
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	docrsk	Correlation Coefficient	-.003	-.004	.012	1.000	-.004	-.019	.	-.005	.003	-.007
		Sig. (2-tailed)	.913	.887	.705	.	.906	.541	.	.866	.913	.821
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	evdocint	Correlation Coefficient	-.006	-.008	.022	-.004	1.000	-.058	.	.194(**)	.006	.217(**)
		Sig. (2-tailed)	.837	.790	.478	.906	.	.066	.	.000	.837	.000

		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	interven	**Correlation Coefficient**	.013	-.039	.009	-.019	-.058	1.000	.	-.110(**)	.130(**)	-.129(**)
		Sig. (2-tailed)	.688	.212	.784	.541	.066	.	.	.000	.000	.000
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	othinter	**Correlation Coefficient**	.	.	.	.	.	.	.	.	.	.
		Sig. (2-tailed)	.	.	.	.	.	.	.	.	.	.
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	mgtplan	**Correlation Coefficient**	-.009	-.012	.032	-.005	.194(**)	-.110(**)	.	1.000	-.652(**)	.472(**)
		Sig. (2-tailed)	.770	.706	.314	.866	.000	.000	.	.	.000	.000
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	tymgtpl	**Correlation Coefficient**	.006	.008	-.021	.003	.006	.130(**)	.	-.652(**)	1.000	-.236(**)
		Sig. (2-tailed)	.849	.806	.512	.913	.837	.000	.	.000	.	.000
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
	episode	**Correlation Coefficient**	-.012	-.016	.017	-.007	.217(**)	-.129(**)	.	.472(**)	-.236(**)	1.000
		Sig. (2-tailed)	.695	.612	.588	.821	.000	.000	.	.000	.000	.
		N	1004	1004	1004	1004	1004	1004	1004	1004	1004	1004
** Correlation is significant at the 0.01 level (2-tailed).												