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Evidence-based policy for asymptomatic bacteriuria in the institutionalized elderly

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EVIDENCE-BASED POLICY FOR ASYMPTOMATIC BACTERIURIA IN THE INSTITUTIONALIZED ELDERLY

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EXECUTIVE SUMMARY

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The practice of mistaking asymptomatic bacteriuria (ASB) for urinary tract infections (UTI) is widespread in nursing homes and is contributing to patient overtreatment and adverse side effects such as *clostridium difficile* and multi-drug resistant microorganisms. The purpose of this DNP capstone project was to (a) write evidence-based policy and procedures (P&Ps) for evaluating institutionalized elders with clinical status changes when UTI was suspected, (b) utilize nursing leadership teams (NLT) in four northern Colorado nursing homes to implement evidence-based practice (EBP), and (c) evaluate implementation methods for their success in changing practice. Bandura's self-efficacy theory, Plsek's philosophy of adopting innovation in health care, and Grol and Wensing's framework for successful EBP implementation provided the groundwork for working with the NLTs. New, unified, and evidence-based P&Ps for ASB and UTIs were created and fully replaced all nursing homes' former policies. Successful implementation was achieved in three of the four nursing homes. The nursing leadership team was critical to both the success and failure of implementation. The DNP capstone project supported current literature on implementing EBP in health care settings, as well as provided new insight into cross-organizational barriers needing to be overcome and how to sustain EBP once it has been implemented.

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INTRODUCTION

Background and Significance

Urinary tract infections (UTI) are the most commonly diagnosed bacterial infection in the long-term care setting. The incidence is 0.1-2.4 cases per 1,000 resident-days (Nicolle, 2000b). Together, pneumonia and UTI represent the greatest infectious disease burden in this population (Loeb et al., 2005). Antibiotic use for suspected UTIs in the institutionalized elderly is common. However, many written prescriptions are inappropriate since nearly 33% of presumed UTIs in this population are actually asymptomatic bacteriuria (High, Yoshikawa, & Snustad, 2009). Although antibiotics for bacteriuria have been recommended in pregnant women and children, four randomized controlled trials (RCTs) have demonstrated no benefit from treating bacteriuria in the institutionalized elderly (Benton, Young, & Leeper, 2006). In fact, treating asymptomatic bacteriuria (ASB) has been shown to promote excessive costs, micro-organism resistance to antibiotics (e.g., methicillin-resistant Staphylococcus aureus and vancomycin-resistant Enterococcus species including cephalosporins and quinalones), and residents' experience of adverse side effects including *Clostridium difficile* colitis (Nicolle, 2000a, 2000b; Nicolle et al. 2005). Reinfection with organisms of increasing resistance has led the Infectious Disease Society of America (IDSA) to recommend elderly nursing home residents not undergo screening or treatment of ASB (Nicolle et al., 2005). Due to the overuse of antibiotics in

long-term care facilities (LTCF), they have become a reservoir for antibiotic resistant pathogens. Not only is antimicrobial resistance a concern within LTCFs, but it is also a concern because elderly residents requiring periodic hospitalization can carry resistant organisms across sites of care (Nicolle, Bentley, Garibaldi, Neuhaus, & Smith, 1996).

During any 12-month period of residence in a nursing home, 50-70% of residents will receive at least one course of antimicrobial therapy for some type of infection (High et al., 2009). Since UTIs represent the greater majority of diagnoses for which antibiotics are prescribed and 25-75% of these prescriptions are for ASB (Nicolle, 2000a, 2000b), it becomes imperative that the distinction be made between true UTIs and ASB. Automatic assumption of UTI in the context of bacteriuria with or without pyuria delays or entirely overlooks alternate reasons for clinical deterioration that may require specific therapy. Other infections to consider in these residents are gastroenteritis from norovirus, Clostridium difficile, Giardia, and other enteropathogens (salmonella and shigella species and Escherichia coli O157:H7), skin and soft tissue infections, conjunctivitis, bacteremia, pneumonia, respiratory viral infections, and prosthetic devices (High et al., 2009).

Asymptomatic Bacteriuria vs. Urinary Tract Infection

A common condition exists in the elderly that resembles a UTI on paper: asymptomatic bacteriuria (ASB). ASB is a condition in which bacteria exists in the urine without an infection. Pyuria can also exist in the presence or absence of bacteriuria. Positive urine cultures for bacteria do not prove that a nursing home resident has a urinary tract infection. A true urinary tract infection is bacteriuria with symptoms specifically associated with the genitourinary (GU) system. It is a clinical diagnosis based on symptomology. The treatment is guided by diagnostic testing. Men who have

one urine culture containing > 100,000 cfu/ml of a single isolate obtained by a clean catch specimen without GU symptoms have ASB. Asymptomatic bacteriuria is defined similarly in women, except two consecutive urine cultures containing a single isolate with > 100,000 cfu/ml must be collected (Nicolle et al., 2005). Patients who have significant bacteriuria without localizing GU symptoms have ASB and not a UTI. Genitourinary symptoms include dysuria, urgency, frequency, hematuria, new or worsening incontinence, costovertebral angle tenderness, and bladder tenderness (Benton et al., 2006). It has been reported that the positive predictive value (PPV) of positive urine cultures without localizing urinary symptoms is only 10% in nursing home residents. The PPV of a positive urine culture and fever, but without localizing urinary symptoms, is only 12% (Nicolle, 2000a, 2000b; Orr et al., 1996).

Pyuria is a commonly used diagnostic marker among clinicians when trying to establish the presence or absence of urinary tract infections. Pyuria is defined as > 10 WBCs/hpf on urinalysis. Pyuria is evidence of inflammation in the genitourinary tract and is frequently found in patients with ASB since ASB does not go unnoticed by the individual's immune system. Prevalence rates of pyuria in those with bacteriuria have been described as follows: 32% in young women, 30-70% of pregnant women, 70% of diabetic women, 90% of elderly institutionalized patients, 30-75% in patients with short-term catheters, and 100% in patients with long-term catheter use (Nicolle et al., 2005). Pyuria can exist without bacteriuria as well in which other inflammatory conditions are present (sexually transmitted diseases, renal tuberculosis, or interstitial nephritis). Pyuria was found in 30% of nursing home elderly without bacteriuria and in 90% of those with it. Thus, by itself, or in conjunction with bacteriuria, pyuria is not sufficient to

differentiate between symptomatic and non-symptomatic urinary tract infections (Nicolle, 2000a; Nicolle et al., 2005). However, the absence of pyuria is a good predictor that a urinary tract infection is not present. Its negative predictive value is 80-90% (Benton et al., 2006).

Epidemiology

Asymptomatic bacteriuria exists to some degree in all age groups, men and women. Epidemiological studies have found bacteriuria in 2-3% of women age 15-24, in 20% of women age 65-80, and in 25-50% of women over 80 years old (Rahn, 2008). In long-term care facilities, the prevalence of ASB is approximately 25-50% in women and 15-40% in men. Community dwelling prevalence rates of ASB in elderly women and men are 10.8-16% and 3.6-19%, respectively (Epocrates, 2011; Nicolle, 2009). One study examined three groups of women living in a retirement community. Bacteriuria was measured in women living in independent living, assisted living, and the nursing home. As women required higher levels of care, asymptomatic bacteriuria prevalence increased (Benton et al., 2006).

Long-Term Care Culture

Nurses live on the front lines when it comes to providing care to LTCF residents. Nurses are the eyes and ears of physicians and advanced practice nurses (APNs) for the initial assessment of patients' symptoms and they report subtle changes in residents' status to physicians (Juthani-Mehta et al, 2008). Walker, McGeer, Simor, Armstrong-Evans, and Loeb (2000) conducted a qualitative study to examine reasons why nursing home residents continue to receive antibiotics for ASB. The following reasons were cited:

- Nurses' and physicians' interpretation of non-specific symptoms with bacteriuria as constituting a "symptomatic UTI"
- Urine cultures ordered for non-specific status changes in residents
- Central role of nurses in communicating non-specific health status changes to family and physicians
- Difficulty eliciting specific symptom reports from frail elderly residents
- Physician's uncertainty about the significance of positive urine cultures
- Concern from nurses and physicians regarding liability.

How can we change this practice of treating ASB with antibiotics? Non-specific symptoms constitute the main contributing factors to the difficulty of diagnosing a UTI accurately. Non-specific symptoms or health status changes in the elderly include, but are not limited to, altered mental status; change in level of consciousness; behaviors such as agitation, restlessness, aggression; resistance to care; decreased appetite; and malaise. Although, the definition of a symptomatic UTI requires that localizing urinary symptoms must be present, nurses and physicians alike start thinking about a urinary diagnostic workup when non-specific changes occur in residents' health status. A study by Juthani-Mehta et al. (2005) reported the top five clinical and laboratory criteria used by practitioners for diagnosing and treating UTIs in the nursing home were: change in mental status, change in voiding pattern, fever, dysuria, and change in urine character. Urine dipstick was the first diagnostic step for 48% of the practitioners and urinalysis with urine culture for 40% of the practitioners. Approximately 50% of the practitioners were unfamiliar with guidelines to guide diagnostic testing and treatment for UTIs in the nursing home elderly. Colón-Emeric et al. (2007) examined barriers and facilitators to

the diffusion of clinical practice guidelines (CPGs) in a qualitative study including four nursing homes. Of the 35 interviews conducted with medical directors, physicians, APNs, directors of nursing, nurses, and certified nurse assistants, only three individuals were familiar with CPGs.

Cost-of-Illness

Cost-of-illness is one mechanism for understanding the burden of disease in a population (Henderson, 2009). Because urinary tract infections are not a reportable condition in the United States, their cost of illness is not easily identified. One report by Foxman (2002) indicated the annual cost of urinary tract infections to be $1.6 billion in the United States. This is not specific to the institutionalized elderly. However, site specific cost-of-illness studies may be conducted rather easily, by considering direct and indirect costs. Direct costs include: facility equipment and supplies, laboratory testing, and prescription antibiotics. A review of oral antibiotic prescription medications for UTIs revealed a price range from $90 (generic) to $186 (brand; Epocrates, 2011). One high dose oral drug (Levaquin, 750mg daily) was $880, which is used for some complicated UTIs. Intravenous antibiotics use is increasing in the institutionalized elderly. Interviews with two national diagnostic service providers revealed average testing costs for suspected UTIs to be as follows: urinalyses = $35 and urine cultures = $64. Microorganism's susceptibility reports had no additional costs with one service provider but were $85 for each organism's susceptibility report at the other (Lab technician, personal communication, January 19, 2012).

Several indirect UTI costs include nursing time, physician time, patients' discomfort with testing, adverse outcomes of antibiotic treatment (clostridium difficile,

drug-drug interactions), increased laboratory tests for assessing drug and therapeutic responses, and rising antibiotic resistance, to name just a few. If a long-term resident was being evaluated for a urinary tract infection, the total costs of nursing time, facility supplies, laboratory testing, and any antibiotic prescribed would be substantial. For those residents who actually have ASB and not a UTI, these become avoidable costs.

Problem Statement and Purpose

The purpose of this capstone project was to initiate a practice change for screening and treating ASB and UTIs in the elderly institutionalized so that fewer cases of asymptomatic bacteriuria would be mistaken for and treated as urinary tract infections; and thereby, reduce the number of inappropriate antibiotic prescriptions prescribed. The method for accomplishing this goal was twofold:

1. Write new evidenced-based policy and procedures on UTIs and ASB for nursing home facilities in order to correctly guide their practice.
2. Educate and train nursing leadership teams in four nursing homes to implement and evaluate the use of evidence-based P&Ps for UTIs and ASB in their individual nursing homes.

The long-term goal, extending past the life of the capstone project, was to: (a) Reduce the number of inappropriate urinary diagnostic workups as measured by the number of urinalyses (UAs) and urine cultures ordered on residents without genitourinary symptoms, (b) Reduce the number of inappropriate diagnoses of UTI as measured by the number of UTI diagnoses without supporting clinical documentation of genitourinary symptoms, and (c) Reduce the number of inappropriate antibiotic prescriptions written.

The apparent difficulty in distinguishing a true symptomatic urinary tract infection from asymptomatic bacteriuria and the concern for potentially harming a patient from either overuse or underuse of antibiotics presented the perfect scenario for initiating the evidence-based practice process. This clinical difficulty for nurses and providers alike became the clinical question that birthed this DNP capstone project.

A simple rule that guides most if not all clinicians is "First, do no harm." In light of this mindset, it was assumed that clinicians and nurses would be open to considering the literature about ASB and its contribution to poor patient outcomes when ASB is treated as though it were a UTI. However, it was acknowledged that several roadblocks could still arise in the minds of nurses and physicians when told not to treat ASB, such as "Could I harm a patient by not treating ASB?" and "Does ASB contribute to future UTIs, urosepsis, bacteremia or death?" To address these concerns, a clinical question was written in PICOT format (i.e., Patient population, Intervention/Issue of interest, Comparison intervention or group, Outcome, and Time) as outlined by Fineout-Overholt and Melnyk (2011). The PICOT question was as follows: "In the nursing home elderly 65 years and older (P), does *treating* asymptomatic bacteriuria (ASB) with antibiotics (I) compared to *not treating* ASB with antibiotics (C) improve outcomes measured by morbidity (urosepsis, bacteremia, UTIs) or mortality over a three month period of time?" The answers to this PICOT question were astounding. The answers also informed the purpose of the capstone project which was to initiate a practice change in nursing homes by writing evidence-based practice (EBP) policy and procedures for UTIs and ASB and by utilizing nursing leadership to implement EBP.

Search Method

A search for the best evidence was conducted using the key terms in the PICOT question. EBSCOhost was used to access Academic Search Premier, Business Premier, CINAHL, Cochrane central register of controlled trials, Cochrane database of systematic reviews, Cochrane methodology register, DARE, and Health technology assessments. Keywords and controlled vocabulary were used for *nursing home elders, urinary tract infections, asymptomatic bacteriuria,* and *antibiotics*. This yielded 1,763 hits (1979-2011, non-full text and full text, any language). Limiting articles to peer reviewed reduced hits to 1,358. Limiting the publish date after the year 2000 reduced hits to 935. Requiring references yielded 556 articles. Since the PICOT question asked about an intervention, the best research designs to answer this question were well-designed, randomized, controlled trials. Case-control and cohort studies would also provide useful information.

The 556 articles were reviewed by title for applicability to the PICOT question. Only pertinent titles were kept for abstract review. Abstracts were read for appropriate fit. Articles that were saved for review were categorized into types of evidence: clinical practice guidelines, systematic reviews, narrative systematic reviews, and original studies (i.e., randomized control trials, quasi-experimental trials, cohort studies, case-control, qualitative and phenomenological studies, and expert opinion). Saved articles were read. A rapid, critical appraisal checklist was used to assess each remaining study's validity, reliability, and usefulness to caring for the patients considered in the PICOT question (Fineout-Overholt & Melnyk, 2011). This appraisal eliminated several articles. Original study articles were assigned a level of evidence as described by Fineout-Overholt and

Melnyk (2011) and pre-appraised literature was assigned weight using DiCenso, Bayley, and Hayne's (2009) hierarchy of evidence in the "6S" model. Two clinical practice guidelines (CPGs), three RCTs, one cohort, three narrative systematic reviews, and one descriptive and two qualitative studies were analyzed to answer the PICOT question. Further analysis assessed each study for its theoretical basis, research design, sample characteristics, major variables, measurement, data analysis, findings, and worth to practice. Of note, the Infectious Diseases Society of America (IDSA) published the two CPGs--one for ASB (Nicolle et al., 2005) and the other for evaluating fever and infection in the institutionalized elderly (High, et al., 2009).

Outline of the Evidence

The grading system used by the IDSA for assessing the strength and quality of their guidelines came from the *U.S. Public Health Service Grading System for Ranking Recommendations in Clinical Guidelines* (High, et al., 2009; Nicolle et al., 2009). For ease and simplicity, this scoring system was used in the following paragraphs. The quality of evidence was indicated by the Roman numeral I, II, or III. Roman numeral I was evidence from at least one properly randomized controlled trial. Roman numeral II is evidence from at least one well-designed clinical trial, without randomization; or from cohort or case-controlled analytic studies. Roman numeral III was evidence from opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees. The grading system can be found in Appendix A. A glossary of terms and definitions is in Appendix B.

Outcomes of Asymptomatic Bacteriuria

Long-term care residents' outcomes do not change in ASB with or without treatment. Mortality, morbidity, functional decline, renal failure, and symptomatic infections were not correlated with not treating ASB (II). However, evidence indicated that treating ASB resulted in increased side effects, cost, and antimicrobial resistance (II). Thus, the American Geriatric Society (AGS), Center for Disease Control (CDC), and ISDA have together agreed that treating ASB causes more harm than good (II). Furthermore, they recommend residents not be screened for asymptomatic bacteriuria including those with diabetes, spinal cord injuries, and indwelling urinary catheters (I). One exception is screening for and treating ASB in individuals preparing to undergo urological procedures for which mucosal bleeding is anticipated (III). The most reliable indicators for a true UTI in the long-term care facility resident are those symptoms arising from the urinary tract specifically and not just bacteriuria, pyuria, or non-specific clinical changes (I-II; High et al., 2009; Nicolle et al., 2005).

Diagnostic Workup

Changes in behavior or clinical status observed in a LTC resident should not prompt the ordering of urinalyses and urine cultures if there are no urinary tract symptoms (II). Urinary diagnostic testing should be reserved for those with acute onset of UTI symptoms (i.e., dysuria, hematuria, new/worse UI, suspected bacteremia, or fever in addition to one or more of these) or for suspected urosepsis (fever, shaking, chills, hypotension, delirium; II). Specimens should be mid-stream or clean catch from men (II), straight catheter for women (III), or from a newly changed catheter (II). Minimum testing includes leukocyte esterase and nitrate levels by dipstick and microscopic analysis

for WBC on UA (II). If these are positive, urine cultures are recommended with anti-microbial testing (III). The absence of pyuria is a strong predictor that no UTI exists (80-90%). Bacteria and pyuria do not equal a symptomatic UTI (I). If urosepsis is suspected, urine and paired blood specimens should be obtained, if feasible, for culture and antimicrobial susceptibility testing and a Gram stain of uncentrifuged urine should be requested (III; High et al., 2009; Nicolle, Bradley, et al., 2005).

Evaluating Diagnostics, Treatment, and Follow-up

The ISDA's clinical practice guidelines place a heavy emphasis on remembering that bacteriuria or pyuria alone, or the combination of both, is not sufficient to diagnose a UTI when no urinary symptoms are present (I). Pyuria does not differentiate between symptomatic and asymptomatic urinary infections (I). Positive urinary diagnostic testing plus urinary tract symptoms are the hallmark for diagnosing a true UTI in the LTC resident, for which antibiotics are warranted (I; High et al., 2009; Loeb et al., 2005; Nicolle et al., 2005).

When residents present with urinary tract symptoms, have urine collected for testing, are started on antibiotics, but end up having negative urine cultures, antibiotics should be discontinued (II). The goal of treating individuals with chronic indwelling catheters who have symptomatic UTIs is to control systemic symptoms, not to eliminate bacteria. Therefore, treatment duration can be shorter (I). It has been noted that approximately 50% of residents treated with antibiotics will have bacteria in their urine within 6 weeks after treatment. Therefore, regularly monitoring post-therapy urine cultures for test of cure is not recommended unless GU symptoms persist or reoccur (II). Finally, unsubstantiated speculation about UTIs as a cause of multiple symptoms and

condition changes is highly discouraged. Unless an individual is febrile and has symptoms referable to the urinary tract, other potential causes--such as fluid and electrolyte imbalance or adverse drug reactions--should be strongly considered instead of, or in addition to, a UTI (II; High et al., 2009; Loeb et al., 2005; Nicolle et al., 2005).

Analysis of the Evidence

Consensus

Synthesis of the systematic literature review clearly indicated there was no role for screening or treating asymptomatic bacteriuria in the nursing home. The only exception for screening and treatment of ASB was in men and women preparing for urologic procedures for which mucosal bleeding was anticipated. Sterilizing the urine with antibiotics in asymptomatic bacteriuria only temporarily eliminated the bacteria present, usually for 6 weeks. The presence of ASB was not associated with increased incidence of symptomatic UTIs, urosepsis, bacteremia, or death. However, treatment of ASB with antibiotics was associated with increased medication costs, antibiotic resistance, and adverse side effects from the medication.

Missing Information

There remains legitimate difficulty for LTCF clinicians and nursing staff who try to implement the best available evidence in day-to-day practice for ASB. The chief difficulty is explaining the value of non-specific symptoms (i.e., altered mental status, behavior changes, fevers, malaise, etc.). Thus far, the best evidence lends itself to define specific symptoms for a true UTI as those symptoms localized to the genitourinary tract (i.e., dysuria, urgency, frequency, hematuria, suprapubic pain, flank pain, costovertebral

angle tenderness [CVAT]), and new or worsening incontinence (Benton et al., 2006; High et al., 2009; Loeb et al., 2002; Nicolle et al., 1996). However, because it is well-known and taught in the educational setting that the elderly do not present with typical signs and symptoms, nurses and physicians on the front lines beg to differ with limiting UTIs to localized GU symptoms (Gau & Clay, 2008; High et al., 2009; Snustad, 2009). In an effort to put this conflict and diagnostic difficulty to rest, numerous original studies, ranging from well-designed RCTs to qualitative and descriptive studies, have and are being conducted to determine the predictability of non-specific symptoms in identifying a true UTI in the institutionalized elderly (Nicolle, 2009). Other studies are aiming to provide predictability rates of UTIs for specific symptoms (Gau & Clay, 2008; Juthani-Mehta et al., 2005; Juthani-Mehta et al., 2009). These efforts are for the chief purpose of providing the best evidence-based definition of a symptomatic UTI.

This dilemma leads readers to remember three points. First, screening and diagnostic tests are not 100% accurate in sensitivity or specificity, thereby, eliminating all doubt as to the diagnosis. Second, patients' experiences of symptoms are subjective and symptoms can be attributed to more than one cause. For example, a urethral caruncle causes dysuria, bladder outlet obstruction causes urgency, overflow incontinence causes frequency, a cystocele can cause incontinence, and bladder cancer can cause hematuria. Third, the evidence-based practice agenda has incorporated into its definition the need for clinical expertise and patients' preferences. As pointed out in the preamble of the IDSA document for the diagnosis and treatment of ASB in adults, "The guidelines are intended to be just that, guidelines, not hard-and-fast rules; clinical judgment will always play a

role and may override a given recommendation in a specific situation" (High et al., 2009, p. 2158).

Research Implications

Further research is needed for increasing clarity in decision making regarding UTIs and ASB, both in determining the sensitivity of GU symptoms and identifying any non-specific symptoms that reliably correlate with symptomatic UTIs. One example is to evaluate additional characteristics of symptomatic presentations of urinary infection in elderly institutionalized populations with a high prevalence of bacteriuria. Another example is identifying specific diagnostics tests to discriminate between symptomatic infections and ASB. Studies in progress are exploring the immune and inflammatory response in UTI for the purpose of improving diagnostic capability (Nicolle, 2009). Alternative treatment options for suspected UTI could also be researched, i.e., comparing hydration versus antibiotics for suspected UTIs or immediate versus delayed antibiotic treatment for suspected UTIs. However, until such assessment findings are further elucidated, education needs to center on correcting nurses' knowledge base for identifying UTIs based on specific GU symptoms, while expanding nurses' knowledge of other causes of non-specific declines in health status.

Philosophy, Conceptual Model, and Theoretical Framework

A literature review was also undertaken to find a suitable philosophy for working with the nursing leadership at the chosen agency site, a theoretical framework to strengthen the rationale for choosing implementation approaches, and an evidence-based practice framework for guiding the execution of the project. The following paragraphs are a discussion of Plsek's philosophy for adopting innovation in health care (may make

all of them health care), Albert Bandura's self-efficacy theory, nursing research models for evidence-based implementation, and 's evidence-practice model to promote quality care.

Philosophy: Complexity and the Adoption of Innovation in Health Care

The philosophical perspective underlying this DNP Capstone project was derived from understanding the health care system as a complex adaptive system (Institute of Medicine, 2001; Plsek, 2003).

> A complex adaptive system is a collection of individual agents who have the freedom to act in ways that are not always totally predictable, and whose actions are interconnected such that one agent's actions change the context for other agents. Examples include the immune system, a colony of insects, the stock market, families, and health care organizations. (Plsek, 2003, p. 3)

It is important to distinguish between simple, complicated, and complex problems. Simple problems, such as baking a cake, can be approached in recipe fashion; whereas complicated problems, such as launching a rocket to the moon, are best addressed through formulas and expert knowledge. When aberrancies occur in complicated problems, they usually can be fixed through study and system improvements. However, complex problems are more like raising children. Finding success in raising one child does not ensure success in raising another. Methods, expert advice, and past experiences only serve as good starting points. Complex adaptive systems are best approached by avoiding a machine-metaphor mindset and adopting a living organism understanding. The mental model of a machine implies a "designer dictates the relationship among the parts, patterns are a deterministic function of structures and processes, and any 'emergent behavior' would be a failure of the system that we would want to militate against in the

future" (Plsek, 2003, p. 6). Instead, in complex adaptive systems, it is important to understand that relationships are central. Characteristic of complex adaptive systems include: constant adaptation, inherent non-linearity, attractor patterns, internalized simple rules and mental models, experimentation, and pruning. For example, a more insightful view for spreading innovation, which suggests a driving force with its own agenda, would be to involve individuals in generating change. A common attractor pattern for most people is the preference for ideas they feel they were involved in generating (Plsek, 2003).

Health care systems, such as nursing homes and individuals working in them, are complex. They are living organisms. Properties of complex systems were considered in the education of the nursing leadership teams for this project. For example, relationships were made central. Internalized simple rules and mental models were addressed. The need for this was evident when nurses were told to not screen residents for a UTI when non-specific clinical changes arose. The mental model or simple rule, "First, do no harm" had to be tackled. Nurses feared harming residents by "overlooking" a UTI if they did not request urine testing whenever non-specific clinical changes occurred (instead of GU specific changes). Reframing the issue from "do not screen or treat" to "don't overlook another cause for nonspecific changes" or to "screening for and treating ASB does residents harm" was effective. Nurses were given autonomy to enhance their engagement as they were guided through the capstone project. Experimentation and pruning allowed the nursing leadership t/eam (NLT) to implement EBP while trying strategies uniquely created for their facilities. The concept of inherent non-linearity instilled hope in the DNP student. Inherent non-linearity is when small changes make a

large impact but large changes make a small impact. For example, an intense educational effort may have minor effects, but a conversation by two nurses at the lunch table about ASB and UTIs might result in a major clinical change process. Insight from complex adaptive systems aided the generation, implementation, and spread of EBP guidelines for ASB and UTIs in this health care organization.

Social Learning and Self-Efficacy: A Theoretical Guide

Albert Bandura (1977, 1997) has contributed significantly to the literature and modern day understanding of social learning, behavior, and self-efficacy. His social learning theory hypothesizes that individuals learn from one another by means of observing, imitating, and modeling. Bandura (1977) has been quoted as saying, "Most human behavior is learned observationally through modeling: from observing others, one forms an idea of how new behaviors are performed, and on later occasions this coded information serves as a guide for action" (p. 22). Self-efficacy is at the heart of social cognitive and learning theories. According to Bandura (1997), self-efficacy is "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations" (p. 2). Otherwise stated, self-efficacy is a person's belief in his or her ability to succeed in a particular situation; these beliefs become determinants of how people think, behave, and feel (Bandura, 1997). Self-efficacy continues to grow as individuals acquire new skills, experiences, and understanding. Four sources of self-efficacy are mastery of experiences (performing a task successfully), social modeling (witnessing others successfully completing a task), social persuasion (verbal encouragement from others to help overcome self-doubt), and psychological responses (the moods, emotional reactions, and stress levels of individuals). Both the education and

role modeling used with the NLT in this capstone project purposed to increase nurses' knowledge of ASB and their self-efficacy in using their new knowledge to implement changes. Nursing leaders had the opportunity to observe, imitate, and practice correct ways of assessing and managing specific and non-specific clinical changes in LTC residents, analyze practice gaps, choose appropriate implementation strategies, and formulate action plans. By targeting the four sources of self-efficacy throughout all educational efforts, the nursing leadership was better positioned to embody and implement the practice change successfully.

Evidence-Based Nursing Requires Evidence-Based Implementation

A relatively new field called implementation science has appeared to serve the purpose of effectively guiding the translation of research into practice. Several successful examples exist. John's Hopkins University School of Nursing, Radboud University Nijmegen Medical Centre in The Netherlands, Stanford University, and the San Jose State University School of Nursing have published their successes at translating EBP at the individual and organizational level and with nursing leaders, nurses, and patients. Each of these works informed the capstone's course of action for hands-on leadership training at the four nursing homes. Instrumental themes utilized in this project are discussed below.

At John Hopkins University, a model was developed that emphasized a "train the trainer" approach (Newhouse, Dearholt, & Poe, 2005, p. 37). A mentored educational experience was utilized, where nurse leaders participated as beginner EBP champions, learned a pertinent EBP subject in active formats, and subsequently turned around and trained their own nursing staff. Tremendous success was had and attributed to the

practical approach design, dedicated time and resources, and the collaboration between academic and clinical nurses in a mentorship relationship (Newhouse et al., 2005). Achterberg, Schoonhoven, and Grol (2008) discussed a number of implementation theories and models from nursing research and health services research. Of particular interest to this capstone project was Grol and Wensing's (2005) model that emphasized analyzing the target group, context, and practice problem for determining implementation strategies. This can be done by observation, focus groups, interviews or questionnaires. Armed with such assessment knowledge, individuals can choose strategies for implementing change which are linked to the determinants. The most effective implementation strategies are those founded on theory and have empirical evidence supporting their use. The NLT was guided in such an analysis prior to choosing their implementation strategies. At Stanford University, Dr. Kate Lorig, RN, Ph.D., has a long-standing history of promoting individual patient behavior change in her Chronic Disease Self-Management Program (CDSMP). Research suggested this success was due to patients' improved self-efficacy, which is at the core of her program (2005, 2003, 2001, 2001, and 1999). The CDSMP has been adopted as a United States health initiative and has been well-received internationally too. The CDSMP incorporates a population health approach and has been evaluated by the RE-AIM framework (Glasgow, Vogt, & Boles, 1999; Lorig, 2004). Building self-efficacy in the NLT was at the heart of this capstone project. A final example is the group of nursing researchers from San Jose State University at Santa Clara Medical Center, who utilized Albert Bandura's self-efficacy theory to develop an educational intervention to reduce PICC occlusions in their hospital.

Their work proved Bandura's self-efficacy theory to be effective for educating staff and significantly changing practice (Ngo & Murphy, 2005).

Iowa Model for Evidence-Based Practice to Promote Quality Care

Prior to translating research into practice, clinical problems have to be recognized and the evidence-based practice cycle has to be entered. This cyclical process for finding and using the best evidence is best guided by a conceptual model or framework. Among eight evidence-based practice models reviewed, one stood out for its appropriateness in the long-term care setting: the Iowa Model of Evidence-Based Practice to Promote Quality Care. This model is known for providing guidance to nurses as well as other clinicians making decisions regarding patient care outcomes. The model is based on problem solving and the scientific process and is reported to be easy to use by multi-disciplinary health care teams (K. Brown, personal communication, July 25, 2011; Fineout-Overholt & Melnyk, 2011). The long-term care facility is a complex organization consisting not only of administration, directors of nursing, nurse managers, nursing and nurse assistants, but also medical directors, physicians, advanced practice nurses (APNs) physical/occupational/speech therapists, dieticians, and social workers. The model's characteristics made it an excellent choice for the variety of team members and levels of education represented in the LTC setting (see Appendix C).

CHAPTER II

PROJECT DESCRIPTION

Problem and Purpose

Current nursing home practice for asymptomatic bacteriuria does not adequately reflect the use of best research evidence. Juthani-Mehta et al. (2009) argued that this incorrect practice happened due to the relatively indiscriminant use by criteria staff to guide their decision making when there is clinical deterioration in a bacteriuric resident. It is under these circumstances that this capstone project proposed to write new evidenced-based policy and procedures for UTIs and ASB for use in nursing home facilities and to train nursing leadership teams to implement and evaluate the use of the new P&Ps in their individual nursing homes. The central piece of the new policies and procedures was the requirement that genitourinary symptoms be present when clinical changes occurred in a resident before nurses proceeded in requesting a urinary diagnostic workup from physicians and APNs. If genitourinary symptoms were not present, the nurses were directed to evaluate the resident for other causes of clinical deterioration.

Project Objectives

This DNP capstone project's overarching objectives were twofold: (a) to deliver new, unified, and EBP policies and procedures to participating nursing homes regarding ASB and UTIs and (b) to educate and mentor nursing leadership in successfully implementing the P&Ps and evaluating practice changes. These two broad categories given rise to more detailed objectives which are outlined below.

Writing Policy and Procedures

- Assess current incident rates of UTIs in four northern Colorado nursing homes according to CMS's Nursing Home Compare website
- Assess four individual nursing homes' incident rates of collected urine dips, urinalyses, and UTI diagnoses
- Assess perceived need for a practice change from the clinical services director, operating head of the four nursing homes
- Assess currently held policy and procedures for UTIs and ASB in four northern Colorado nursing homes
- Write new P&Ps for ASB and UTIs to reflect current EBP clinical guidelines that would replace old P&Ps in all four facilities

Training Nursing Leadership

- Communicate the capstone project author's philosophy and theoretical framework
- Request the nurses' individual and collective expertise in making the project successful
- Educate nursing leadership on EBP for ASB and UTIs and on the new P&Ps
- Answer questions and clinical caveats
- Charge nursing leadership to assess the attitudes, behaviors, and practice patterns of nurse aides, nurses, and providers in their four nursing homes (qualitative)
- Assist nursing leadership to identify practice gaps and root causes of incorrect practice

- Present EBP implementation strategies and guide the NLT to identify appropriate implementation strategies that would target root causes for practice problems
- Facilitate teams in identifying their barriers and facilitators to implementing the P&Ps and changing practice
- Instruct the NLT on how to create action plans and guide them in developing action plans for each respective facility
- Instruct the NLT to write down short- and long-term goals for practice change to measure improvement
- Assist NLT in choosing evaluation measures suitable to the implementation strategy chosen
- Administer a survey to evaluate the education and mentoring workshop

Evaluating Practice Changes

- Convene with the NLT in 3 months to follow-up on action plans of each facility
- Facilitate focus group discussions on the experience of implementing EBP through their action plans
- Assess whether action plans were carried out, adjusted, or abandoned
- Identify impact of action plans, implementation strategies, and new P&Ps on practice
- Plant seeds among the NLT on future ideas for reinforcing implementation and for expanding their efforts, as well as for sharing their EBP journey at conferences

The goal for the DNP capstone project was to begin a practice change in four nursing home facilities so fewer cases of asymptomatic bacteriuria would be assessed and treated as urinary tract infections. In the short term, this was initiated by changing the policies and procedures for assessing and treating ASB and UTIS in these nursing homes. The knowledge base of nursing leadership was augmented and the NLT was trained on how to implement and evaluate evidence-based practice. The long-term goal, extending past the life of the capstone project, was to: (a) decrease the number of inappropriate urinary diagnostic workups as measured by the number of urinalyses (UAs) and urine cultures ordered on residents without genitourinary symptoms and (b) decrease the number of inappropriate diagnoses of UTI as measured by the number of UTI diagnoses without supporting clinical documentation of genitourinary symptoms.

Consistency With Other Agendas

The DNP capstone's purpose also united itself with agendas of others. Recognized geriatric care initiatives for asymptomatic bacteriuria have been published among professional organizations, including the American Geriatric Society, American Medical Directors Association, Geriatric Advanced Practice Association, and Society for Urological Nursing Association. Campaigns exist across the United States to advocate the judicious use of antibiotics in every state, including the State of Colorado (Get Smart Colorado, 2012). Finally, national and federal guidelines support avoiding the use of antibiotics for ASB in the institutionalized elderly, including the ISDA, National Association for Continence, National Guideline Clearinghouse, and the National Institutes of Health.

Project Description

Formulating Policy

This DNP capstone project proposed to utilize the Infectious Disease Society of America's clinical practice guidelines for the treatment of ASB in the institutionalized elderly for formulating the new policy and procedures for UTI and ASB (High et al., 2009, see Appendices D and E). Quantitative data collection was procured from each participating nursing home to identify current rates of urine dips, urinalyses, and UTI diagnoses for 2011. Antibiotic prescriptions were not accounted for because the assumption was made that a resident diagnosed with a UTI would receive antibiotics, unless advanced directives indicated otherwise. In January 2012, the nursing homes' current ASB and UTI policies and procedures were assessed for accuracy and unity. Assessment of the nursing homes' national standing for UTIs was also identified through the Nursing Home Compare website hosted by the Center for Medicare and Medicaid Services (CMS). The clinical services director was interviewed to assess the perceived need for evidence-based practice regarding UTIs and ASB and the coherency of the project's goals with those of the organization. After confirming the need for EBP guidelines for ASB and UTI policies, the new P&Ps were written for the nursing homes. Later, the entire NLT for the four nursing homes was educated about the evidence-based practice for ASB and UTIs, distinguishing between the two and the new P&Ps that would be implemented in their facilities. The nursing leadership teams for the capstone project were comprised of the directors of nursing (DON), assistant directors of nursing (ADON), infection control nurses, minimum data set (MDS) coordinators, and staff development coordinators (SDC). The consulting clinical services director (CSD) for all

facilities was the operating head for the team. After the first education session, the NLT was charged with collecting qualitative data on the attitudes, behaviors, and practice patterns of their certified nurse assistants (CNAs), nurses, and providers as it related to assessing and treating UTIs in the facilities. They could do this formally or informally. The team was given a month to digest the new knowledge, P&Ps, and collect their qualitative data.

Implementing Policy

Once the new policies and procedures were written, they were reviewed with the clinical services director. The documents were sent by email to the DONs prior to the second meeting in late February 2012. At the second meeting, the nursing leadership team responsible for staff nurses' practice in each respective facility adjourned for questions and answers and further training. Next, the nursing leadership team presented their findings regarding the attitudes, behaviors, and practice patterns of their CNAs, nurses, and providers. These results served to compare current practice with recommended practice. Practice gaps were easily recognized by the nursing leaders and assisted them in digging for root causes for incorrect practice. Each facility listed their barriers and facilitators for changing practice. Education on the importance on choosing evidence-based and theory-supported implementation strategies ensued. The previously recognized root causes enabled the four facilities to choose implementation methods which would target their underlying practice problems. Creating action plans was role modeled and each team built their own action plan for disseminating the P&Ps and implementing EBP. Nurses were guided in deciding on evaluation criteria for measuring

change. Each facility wrote short-term goals and the collective team identified unified long-term goals.

Internal Review Board Approval

Internal Review Board (IRB) approval was obtained through the University of Northern Colorado prior to formal initiation of the capstone project with the agency site (see Appendix F). A mutual agreement was crafted and signed by the agency site and the DNP student for the purpose of outlining the interactions and expectations of the DNP student, capstone project, and agency site (see Appendix G).

Agency Site

The hosts for the DNP capstone project were four nursing homes/ skilled rehabilitation facilities within a larger health care organization whose has focused on serving the needs of the senior population in northern Colorado for the past 40 years. The health care system consisted of 23 businesses, including 3 independent-living communities, 2 assisted-living communities, 4 long-term care and rehabilitation facilities, several home health care agencies, medical equipment and supplies, rehabilitations services, therapy services, pharmacy, lifestyle and wellness center, health club, geriatric education center, and 2 cafes.

Each of the four nursing home/rehabilitation facilities was run by a nursing home administrator (NHA). There was a director of nursing (DON), assistant DON, staff development coordinator (SDC), minimum data set (MDS) coordinator, and an infection prevention job role in each facility, filled by nursing prepared individuals. These five roles reported to the NHA and were run by the business office. A clinical services director (CSD), who was head of the health care system management office, consulted

with the nursing leadership at each facility. However, the nursing leadership team (NLT) did not officially report to the CSD. The CSD was a nurse as well. The CSD was the key facilitator and contact person for the DNP student in coordinating capstone academic efforts with nursing home leadership and activities. The CSD had a strong, positive relationship with the nursing leadership in each facility. During monthly meetings, the CSD gathered the nursing leadership teams together from each facility as one large group. All DNP capstone activities took place at these monthly meetings.

Each of the four facilities had a combination of long-term care (LTC) and skilled nursing beds. All beds were dually certified, meaning patients could be residing in any bed as one who needed skilled nursing care or long-term care. Bed facility sizes were 90, 103, 130 and 132. The average monthly census was within 10-13 beds of maximum capacity for each facility. Hours per resident day (hprd) is a measurement describing staffing levels provided to residents in a 24-hour period. The average monthly hprd in 2011 for the facilities was 4.29 for the 90 bed facility, 3.88 for the 103 bed facility, 4.09 for the 130 bed facility, and 3.79 for the 132 bed facility. These hprd numbers were nursing specific (registered nurse, licensed practical nurse, and nurse assistant) and did not include persons working as ward clerks, dietary, laundry, therapies, and activities. The skill mix of RN to LPN was different across the facilities. Hours per resident day in each facility represented a range of 19-25% registered nurses (RNs), 11-19% licensed practical nurses (LPNs), and 56-69% certified nurse assistants (CNAs). The facility with the greatest percentage of Medicare patient days per month had the highest RN rate for the calculated hprd.

Demographics of Nursing Leadership Team

The nursing leadership team consisted of 17 individuals, including the CSD, DONs, ADONs, minimum data set (MDS) coordinators, quality improvement nurses, and clinical educators. The DONs of each facility were RNs of which three were bachelor's prepared in nursing (BSN) and one educated at the associate's degree in nursing (ADN) level. The education of the ADONs ranged from "some college" (with no degree obtained) to a master's of science degree in nursing (MSN). The educational level of the remaining nurses consisted of "community college," associates' degrees, and bachelors' degrees. Among the leadership team, the average length of time in nursing was 16.7 years, (1 1/2 to 35 years), the mode 30 years. The average length of time in long-term care was 13 years, (1-35 years), the mode 12 and 15 years. The nursing leadership team (NLT) consisted of only females (see Table1).

Project Design

The following section delineates the capstone's implementation process step-by-step from beginning to end. Application of the Evidence-Based Practice to Promote Quality Care (Titler et al., 2001) provided direction for ordering the project's steps, while simultaneously honoring the philosophy of complex adaptive systems and self-efficacy theory (Bandura, 19977, 1997; Plsek, 2003)**.** Approval for using the model was obtained (see Appendix H). A project timeline can be viewed in Table 2.

Table 1

Nursing Leadership Team

Position	Number	Education	Average Years in Nursing	Average Years in Long-Term Care Nursing
Clinical Services Director (CSD)	1	Bachelor's degree in nursing (BSN)	20.0	11.0
Director of Nursing (DON)	4	3 BSN 1 Associate's degree in Nursing (ADN)	13.2	11.0
Assistant Director of Nursing (ADON)	3	"some college" BSN, Master's degree in Nursing (MSN)	6.1	3.4
Other Nurses (MDS Coordinator, IC, SDC)	9	Associate's degree in Nursing (AND) Bachelor's degree in Nursing (BSN)	21.0	16.7

Note. MDS = minimum data set, IC = infection control, SDC = staff development coordinator

Table 2

Timeline of Project Phases, 2012

	January	February	March	April	May	June	July/September
Proposal Defense	X						
Collect Pre-Policy Data	X						
Internal Review Board (IRB) Approval	X						
Rewrite Policy & Procedures (P&P)		X					
Educate Nursing Leadership Team		X	X				
P&P Implementation			X	X	X	X	
Collect Post-Policy and Implementation Data			X	X	X	X	
Evaluation					X		
Final Capstone Paper					X	X	X
Capstone Defense							X

- Problem focused trigger--identification of a clinical problem. This took place before the capstone project occurred when the DNP student noticed unusually high rates of UTI diagnoses in her clinical settings. The broad scope of this problem was elicited in the literature review. (*Rationale: A clinical question identified by a practitioner ensures interest from those who will be a part of the EBP process and practice change. Such enthusiasm is needed to complete the rigorous EBP process.*)
- Topic priority of ASB to the four nursing homes in northern Colorado. This topic was important to the organization due to their UTI rates being above state and national averages. (*Rationale: Identifying issues that are important to the facility aids in garnishing the support needed to carry out the project.*)
- Form a team--A formal team was created between the DNP student, CSD, four DONs, 4 ADONs, Minimum Data Set, and staff development coordinators, and infection control nurses. Facilities' medical directors also supported the project. (*Rationale: Teams aid in linking individuals to each other and to the change through sharing work, coordinating skills, and communicating progress.*)
- Assemble relevant research and related literature--This process was completed during the year of DNP courses prior to the capstone project. As necessary, evidence was updated. (*Rationale: This is necessary for answering the PICOT or "burning" clinical question.*)
- Critique and synthesize research for use in practice--This was completed prior to commencement of the project. Sufficient evidence was found for

supporting practice change. (*Rationale: Evidence must be leveled for validity, reliability, and applicability to patient care.*)

- Piloting the change in practice:
    1. Each facility's DON collected data and tallied the number of urinalyses, urine cultures, and UTI diagnoses for all residents during the 2011. Data collection occurred January 2012, after IRB approval.
    2. Policy and procedures for UTIs and ASB were written to reflect EBP.
    3. Nursing leaders were educated on new policy changes.
    4. Qualitative data were collected on the attitudes, behaviors, and practice patterns of CNAs, nurses, and providers for analyzing practice gaps and root cause analysis.
    5. Implementation strategies were identified to target root causes of practice gaps.
    6. Barriers and facilitators were identified.
    7. Actions plans were written for implementing the new P&Ps in each facility.
    8. Evaluation criteria were identified to measure practice change.
    9. Follow-up took place on action plans to determine implementation status and the impact on nursing practice.

10. Ongoing evaluation of the process occurred, January thru May, by means of feedback from the CSD, DONs, and NLT. (*Rationale: A plan was needed to implement and evaluate the change.*)

- Evaluate the process and outcomes before and after the practice change:
    1. Comparisons were made before and after P&P changes for UTI and ASB in each of the four facilities.
    2. A survey was administered to the nursing leadership team after their education on the new P&P (for DNP student feedback).
    3. Evaluation of each facilities executed action plans was conducted to determine impact of the implementation and subsequent practice change.
- Continue to evaluate quality of care and new knowledge:
    1. NLT assessed facilities' nursing practice through quality improvement (QI) processes already in place--including monthly QI meetings, report cards, and state mandated reporting systems.
    2. Provision of positive and corrective feedback offered at monthly staff meetings. (*Rationale: Necessary for integrating practice change into daily care; provided actionable feedback to nurses and clinicians and promoted sustained change.*)
- Disseminate results: Project results were given to the CSD and NLT, who in turn, communicated progress to their nursing staff and medical directors (May 2012). Nursing homes were encouraged to share their results and learning at

nursing home conferences. (*Rationale: Dissemination of results is important for professional learning, supporting EBP culture, and celebrating success.*)

CHAPTER III

EVALUATION

Evaluation entails careful appraisal or study to determine the significance, worth, or condition of something (*Merriam Webster Dictionary*, 2012). Evaluation is one of the final steps in the EBP process. Taking time to consider whether change has occurred may be overlooked in the wake of all prior EBP labor but, to remain true to the spirit of EBP, the circle must be closed through the process of evaluation. Upon evaluation, at least three findings are possible. First, change may not have occurred or only partially occurred. Second, change may have produced unintended consequences, positive or negative. Third, one may have discovered change had actively been incorporated into the clinical setting and was improving patient outcomes. The Institute of Medicine has identified six important areas of evidence when evaluating evidence-based practice, one of which was outcome measures (as cited in Melnyk & Fineout-Overholt, 2011). The purpose of this chapter is to outline how the capstone project was evaluated. Several outcomes, linked to their corresponding objectives, were chosen to measure the effect and value of the capstone project. These outcomes were grouped into the following categories: (a) policies and procedures; (b) nursing leadership education on ASB, UTIs, and P&Ps; (c) educating and mentoring nursing leadership on evidence-based implementation strategies and creating action plans; and (d) assessing action plans and impact on clinical practice. These four broad categories are further detailed below.

Evidence-Based Policy and Procedures

- Each of the four nursing homes were to have a new set of evidence-based P&Ps for ASB and UTIs that were identical among the four nursing homes and replaced their former P&Ps on ASB and UTIs.

Education of Nursing Leadership

A survey of the education workshop was administered to the NLT for every member to complete (post-workshop). The survey evaluated the nurses' perception of the relevance and quality of the project, subjective sense of understanding ASB and UTI and testing criteria, and sense of self-efficacy to implement and evaluate the new P&Ps. Open-ended questions provided room for nurses to evaluate the strengths and weakness of the project and offer any desired feedback. The survey was scored using a 1-5 Likert scale and by qualitative measures. Survey components were compiled from established post-presentation surveys and self-efficacy questionnaires.

Mentoring Nursing Leadership in Evidence-Based Implementation Strategies and Action Plans

- Practice gaps and root causes for incorrect practice were identified by each facility.
- Barriers and facilitators to changing practice were identified by each facility.
- Action plans were created by each facility for implementing the new P&Ps and evaluating their impact on practice.
- Short-term goals for changing practice were identified for each facility and long-term goals were identified collectively.

Evaluation of Action Plans and Practice Changes

- Focus group feedback: each facility reported on the execution of their action plan, success or not
- Focus group feedback: each facility reported on the impact of implementation and ensuing practice changes
- Future areas for progress were identified by the NLT

Confounding Variables in Measuring Outcomes

Although the Iowa EBP Model (Titler et al., 2001) guided the implementation and evaluation of this EBP project, it was important to return to the theoretical framework of complex adaptive systems for interpreting the outcomes being evaluated in this project. Because organizations are networks of living individuals, countless variables are at play during the implementation process. This was desirable and not to be feared. However, because this was true, a mechanistic mental model for assessing every possible variable for the success or failure of the project was not possible. It was understood that surprising outcomes might occur. For example, nurses armed with new knowledge about ASB and UTIs might assess and document symptoms previously overlooked; thus, testing might not decrease. Nurses might further investigate non-specific symptoms and uncover different diagnoses needing treatment. Thus, antibiotic use might not decrease. However, this would not be looked upon as failure. Instead, it was considered a step in the right direction because it reflected the use of critical thinking skills in the nurses. The ultimate goal regarding asymptomatic bacteriuria in the nursing home was that nurses use all their assessment skills and clinical judgment when caring for residents so residents

were not inaccurately diagnosed with a UTI when they had ASB. The autonomy of individuals, the life of the organization, the changing context of practice, and the uncontrollable variables inherent in real-time practice contributed to the beauty and richness of translating research into practice. It was recognized that the impact of EBP, subsequent outcomes, and lessons learned would only contribute to the ongoing growth process of the nursing leadership team, the health care organization, and the provision of the best care for nursing home residents.

CHAPTER IV

RESULTS

The purpose of this chapter is to describe the capstone project's results in writing and implementing EBP for asymptomatic bacteriuria in the institutionalized elderly. Pre-project assessment data are presented prior to post-project data for sake of comparison. The findings are discussed in chronological order of the project's specific objectives, detailing whether or not objectives were achieved, what barriers and facilitators were encountered, and whether findings supported the literature or contributed new knowledge to the literature. Unintended consequences are also discussed.

Baseline Assessment Data/Pre-Implementation Status

Urinary Tract Infection Rates

The Center for Medicare and Medicaid Services (CMS) hosts and operates Nursing Home Compare, a website and scorecard for nursing homes' health inspections, staffing, and quality ratings. According to CMS' report, the percentages of long-term care residents with UTIs in 2011 in these four northern Colorado facilities were 6%, 15%, 15%, and 21%. In 2011, CMS reported national UTI averages to be 9% and the average for the State of Colorado to be 8%.

Urinary Testing Trends in Facilities

The NLT members collected data on the number of monthly urine dips, urinalyses and UTI diagnoses in their four facilities during the 2011 year. The first facility reported

4-38 urinalyses per month in 2011 and it was unclear if these were urine dips or urine specimens sent to a lab for urinalysis. Monthly urine cultures ranged from 2-23 and numbers of UTI diagnoses were not reported. The second facility did not submit data on the number of collected urine dips, urinalyses, or UTIs. The third facility's urine dips ranged from 16-36 per month and urinalyses (UA) from 6-26 per month. Instead of reporting UTI diagnoses, this facility reported positive UAs, ranging from 5-21 per month. Sometimes the number of positive UAs outnumbered the number of UAs collected in a chosen month. The fourth facility reported monthly urine dips at 4-15, urinalysis culture and sensitivities at 7-20 and UTIs at 7-22. However, discrepancies between values indicated some infections were acquired in house and some from patient admissions into the facility (see Table 3). Although nursing leadership participated in data collection, it was obvious the data was both inconsistent and incomplete. Reasons for this might have been incomplete record keeping, knowledge deficits, or insufficient instruction.

Table 3

Urinary Testing Trends

Monthly Ranges	Facility #1	Facility #2	Facility #3	Facility #4
Urine dip performed	4-38	NR	16-36	4-15
Urinalyses ordered	4-38	NR	6-26	NR
Urinalyses (+)	NR	NR	5.21	NR
Urine culture and sensitivity	2-23	NR	NR	7-20
Urinary Tract Infection diagnosis	NR	NR	NR	7-22

Note. NR = Not Report

Organizational Readiness

A formal assessment tool was not used to assess the organizational or nursing leaderships' readiness for implementing evidence-based practice. Instead, interviews were conducted with the CSD and several nurses on the leadership team. They vocalized a perceived need for practice change in their health care system in regard to UTIs, ASB, and distinguishing between the two. They deemed this an important clinical issue and in keeping with organizational initiatives. The medical director for two facilities was interviewed and gave verbal support for the capstone project. The remaining two medical directors offered passive support for the project. By means of the CSD, the health care organization demonstrated its support by making resources available in the form of paid education time, nursing time, informatics, technology, and marketing.

Policies and Procedures

Prior to the DNP student writing new policy and procedures, each facility submitted their current P&Ps for anything urine related. Review of the documents revealed tremendous variation among the nursing homes. One facility had no P&Ps for when to obtain a urine dip or send a urinalysis. Two facilities had P&Ps in place that were only partially reflective of the current best evidence. One facility had accurate P&Ps in place. The combination of CMS' scorecards, CSD interview, data collection, and current P&Ps in these facilities confirmed the relevance and necessity of this project to these four northern Colorado nursing homes.

Translating the IDSA's evidence-based practice guidelines for the treatment of ASB in the institutionalized setting was the most simplistic and comprehensive method for reflecting the extensive literature available for ASB and UTIs in this patient

population. The agency site did not have a standard method for writing P&Ps, thus, the DNP student created her own form for each topic. After writing the new P&Ps and comparing them with the ISDA's guidelines for accuracy, they were submitted to the CSD. Exact and uniform copies of the P&Ps were then emailed to each DON and ADON prior to the education and training workshops. These new documents successfully replaced all old P&Ps in the four facilities.

Attitudes, Behaviors, and Practice Patterns

For the month of February 2012, each facility chose to use observation and conversation to assess the attitudes, behaviors, and practice patterns of the providers, nurses, and nurse assistants as it related to UTIs in their nursing homes. The findings suggested similar themes existed among the four nursing homes. The NLT noted a culture where residents' behavior, mental status changes, or confusion prompted urine testing almost immediately, and certainly before considering other causes. The nurses' findings were comparable to the literature review depicting current nursing home practices across the country. Pressure to obtain urinary testing came to nurses by other disciplines working in the nursing homes (physical/occupational/speech therapy, social work, and dietary) which was unique to these facilities and not elucidated in the literature (see Table 4). The NLT made statements such as:

> We definitely have a culture that is UA happy. If a resident is having an off day or is a little confused, this is the first thing staff will mention or request. I also see us caving in to family pressure a lot when families want serial UAs or follow-up UAs. Instead of standing our ground and providing ongoing education, we choose the path of least resistance and accommodate the order. (Facility #1)

> Urine samples are obtained when elders are confused. CNAs and nurses start this process. GU events in the EMR are opened when confusion occurs…we have had changes in NP services . . . old practice patterns return after a period of time from

previous education. . . . Culture and sensitivities (C&S) with mixed organisms are still treated and antibiotics are initiated for 3 days while C&Ss are pending. (Facility #2)

Currently any resident exhibiting a change in behavior and/or mental status is immediately tested for a UTI, regardless of whether additional urinary symptoms exist or not. The ease and availability for nurses to "order" a urine dip test using the clean catch procedure as compared to a more accurate straight catheter method also encourages testing for UTI's . . . a rule out culture exists, where the primary reaction is to test for UTI first and then consider other causes or contributing factors. (Facility #3)

Insecurity exists with providers because they don't want to miss something. Some providers are barriers. Some patients go to the hospital and get a UTI diagnosis even when there is no C&S. Misconceptions exist regarding sediment in urine or dark, foul smelling urine equals a UTI. (Facility #4)

Table 4

Attitudes, Behaviors, and Practice Patterns

	Facility #1	Facility #2	Facility #3	Facility #4
Current Attitudes, Behaviors, and Practice Patterns of nurse aides, nursing staff and providers	-"UA happy" -If a resident has off day or confusion, our 1st thought is UTI -caving into family requests/ Pressures -choose path of least resistance instead of providing education	-UA is collected if resident is confused -UAs are prompted by aides and nurses' requests -EMR UTI events are opened whenever confusion occurs -UA C&S reports of mixed organisms are treated with antibiotics -Return to old practice habits -Antibiotics are started for 3 days while C&S are pending	-Any resident exhibiting behavior or mental status change automatically gets UA test, whether GU symptoms are present or not -Easy access to urine dip testing for nurses, esp. with clean catch collection method - a "rule out" culture exists -primary reaction is to test for UTI 1st then consider other causes or contributing factors	-Providers seem insecure, they get UA because they don't want to miss something - Residents go to hospital and get UTI diagnosis even when there is no C&S - Mis-conception that dark urine, foul odor or sediment implicates UTI

Post-Policies and Procedures and Education Status

Educating Nursing Leadership Survey

The educational workshop was split into two sections. The first was for reviewing the new P&Ps for ASB and UTIs and for answering questions and clinical caveats (see Appendix I). Once the NLT was clear on the new guidelines, the second portion of the workshop started. The group was divided into each facility's leadership members. This was to facilitate specific adaption of implementation and goal setting to each facility's needs. The nurses were educated and guided in identifying root causes for non-evidence-based practice, assessing the targeted group for appropriate interventions, the importance of using evidence-based implementation strategies, identifying barriers and facilitators, and creating action plans. After action plans were crafted, goals, evaluation, and outcome assessments were established.

After the workshop, each NLT member received a survey (see Appendix J). Participation was optional but submitted surveys became eligible for a gift drawing. The survey focused on appraising the nurses' opinions regarding the presentation and delivery of the content, their understanding of ASB and UTIs and how to differentiate between the two, knowledge when to request urinary testing, subjective appraisal of readiness to implement the new P&Ps, and to evaluate the outcomes of implementation. Each NLT member chose to complete a survey (see Table 5). Items were either Strongly Agreed upon (*5*) or Strongly Disagreed (*1*). Overall satisfaction with the workshop was high. The highest mean score was given for the relevance of UTI and ASB to nursing homes' interests and needs. Other strong components of the workshop included improved

understanding of ASB and UTIs (4.9) and the credibility of the DNP student (4.9). The NLT found the implementation and evaluation strategies to be useful (4.6 and 4.5, respectively), and rated their confidence to successfully implement and evaluate the new P&Ps in their facilities at 4.4 and 4.3, respectively. The lowest mean score was given for the workshop's time length, approximately 2 1/4 hours (4.2). Nursing leaders were assessed for their extent of felt understanding regarding ASB and UTIs after the workshop. The minority stated they already knew a topic (18% ASB, 29% UTI) but the majority stated they came to understand both ASB and UTIs fairly well to completely. Nurses' felt preparedness for implementing and evaluating the new EBP policies and procedures was also assessed (see Table 6). Over 70% felt prepared to implement the new P&Ps and 65% felt prepared to evaluate the outcome (see Table 7).

Table 5

Survey Results for Workshop

Feedback from ASB Education/Implementation Workshop	Mean Score
The presentations on UTIs and ASB was relevant to my nursing homes interests/needs	5.0
The new P&Ps were clear and concise	4.4
The presentation was well organized	4.5
There were sufficient examples, visual aids and materials to support the presentation	4.8
The handouts were useful	4.8
The implementation strategies offered were useful	4.6
The evaluation strategies offered were useful	4.5
My understanding of UTIs and ASB was improved by this DNP project to create evidence-based P&Ps	4.9
The presenter was prepared and had a good command of the subject	4.9
The presenter handled questions well	4.9
The presenter managed time well	4.2
Following this presentation, I am certain I will succeed at implementing the new P&Ps in my facility	4.4
Following this presentation, I am certain I will succeed at evaluating the effect of the new P&Ps in my facility	4.3

Note. N = 17. Scale *1-5* = Strong Disagree (*1*) to Strongly Agree (*5*)

Table 6

Nurses' Extent of Felt Understanding

Rating	Not Very Well	Fairly Well	Completely	Already Knew
Topic: UTIs		35%	53%	29%
Topic: ASB		53%	35%	18%
Topic: When not to order urinary testing		41%	53%	18%
Topic: When to order urinary testing		41%	59%	18%

Table 7

Nurses' Extent of Felt Preparedness

Rating	Not Much	Somewhat	A Lot
Topic: Implement the new P&Ps	0%	29%	71%
Topic: Evaluate outcomes of new P&Ps	0%	35%	65%

Facilities Practice Gaps, Barriers and Facilitators

After the NLT completed their individual quantitative and qualitative assessments on their facilities, they recognized that UTIs were being inappropriately tested for. A practice gap did indeed exist. These leaders confirmed their belief that ASB was a relevant practice issue and the team demonstrated a desire to bring change within their specific realms of influence. Each individual facility team identified "nursing knowledge deficit" as the key contributor to non-evidence-based practice. Education was agreed

upon as the necessary intervention, specifically educating nurses on the prevalence and harmlessness of ASB and on the reduction of requesting urine dips and UAs when GU symptoms were absent. These two change targets were identical for the four facilities. Prior to choosing implementation strategies and creating action plans, an assessment of barriers and facilitators was made (see Table 8). Barriers included:

> "Orders from less educated providers, family fears and requests, pressure from other departments (social services and therapies), lack of comprehensive lab interpretation skills amongst nursing staff" (Facility #1). . . . Current mindset of charge nurses to 'rule-out' UTIs as a primary response; limited education of nurses, CNAs, families and other staff on UTI vs. ASB; lax enforcement of need for GU symptoms to accompany behavioral or mental status symptoms of residents prior to ordering UA or dip test; and lack of cooperation or buy-in from physicians and nurse practitioner" (Facility #3). . . . And "The insecurity amongst providers who don't want to miss something; specific providers; patients returning from the hospital with a diagnosis of UTI; families; short stay residents; and misconceptions regarding sediment or dark/foul smelling urine" (Facility #4). Each facility reported similar facilitators, which included: "Strong and educated nursing management teams, nurses' desire to do what is right for their residents, individuals who could act as educators and cheerleaders for the new policies and procedures." (DON, ADON, and three neighborhood managers)

A very notable but unnamed facilitator among the NLT was the organization's support in time and resources, both human and financial, representative in the CSD. The CSD used her time, consulting, and leadership skills to bring the NLT together. She called upon the marketing and informational technology departments to assist the individual facilities in implementing system's and process changes.

Table 8

Barriers and Facilitators

	Barriers	Facilitators
Facility #1	-Orders from less educated providers	-Strong and educated nursing management team
	-Family fears and requests	
	-Pressure from other departments (social services and therapies)	-Nurses desire to do what is right for their residents
	-Lack of lab interpretation skills by nursing staff	
Facility #2	-State survey occurred during project time period	-Strong and educated nursing management team
		-Nurses desire to do what is right for their residents
Facility #3	-Mindset to rule out UTI as charge nurses primary response	-Individuals who can act as educators and cheerleaders for new ASB and UTI policies, identified as the DON, ADON, and 3 neighborhood nursing managers
	-Limited education of nurses, aides, families and other staff of ASB	
	-Lax enforcement for GU symptoms to be present before urine dip or UA testing if a resident has behavioral or mental status changes	
	-Lack of cooperation/ buy-in from physicians and NP	
Facility #4	-Insecurity of providers who don't want to miss something	-Nursing staff want to get better -Strong clinical educator
	-Specific providers	
	-Residents returning from hospital with UTI diagnosis without symptoms or testing	
	-Families	
	-Short stay residents in skilled rehab	
	-Misconception that sediment, foul odor and dark urine is a UTI	
Corporate		-Supportive clinical services director
		-Time and resources provided
		-Education
		-Use of marketing department
		-Information technology and electronic medical record

Action Plans

Although enthusiasm might tempt individuals to develop fun and challenging programs for changing practice, a crucial step of developing strategies for implementation is deliberately selecting an approach that addresses the barriers and facilitators while still aiming at the specific target change (Achterberg et al., 2008). Drawing on nursing research and systematic reviews for evidence-based implementation methods, the DNP student educated the NLT on how to use relevant theories to move from determinants causing practice gaps to the selection of strategies, especially where empirical evidence supported use of the theory. For example, effective strategies for knowledge deficits included active learning and advanced organizers, as proven by research on social cognitive theory and information processing theories. Self-efficacy barriers responded well to role modeling and planning coping responses (social cognitive theory and attribution theory). Social norm barriers responded well to role modeling and leadership (social cognitive theory and quality management theory). Organizational barriers responded to priority setting at the organizational level (organizational culture theories; Achterberg et al., 2008). Particular strategies considered by the NLT included interactive education, reminders, decision support tools, information technology, and rewards. Formulating an action plan was described and role modeled. Action plans were utilized for combining implementation strategies, goal setting, and evaluation measures since the psychological, nursing, and organizational research backed the success of using action plans (Bandura, 1977, 1997; Lorig, 1999, 2001b, 2004). Components of an action plan can be reviewed in Table 9.

Table 9

Components of an Action Plan

1. **Decide what one wants to accomplish**
   - It is important the activity comes from the individual and not the facilitator; the individual uses "*I will"* statements.
2. **Making a plan**
   - This is most difficult and important part of an action plan and should contain these elements: exactly what is going to be done, how much (measurable), when (time sensitive), and how often.
3. **Checking the action plan**
   - On a scale of 1-10, with 0 being not at all confident and 10 being totally confident, the individual needs to answer how confident he/she is that the action plan will be carried out verbatim. If the answer is at or above 7, it is probably a realistic plan. If the answer is below 7, assess uncertainty and barriers. Discuss and offer solutions. Individual must revise plan to achieve score of 7 or more.

Adapted from Lorig, K. R., Gonzalez, V., & Laurent, D. (2010). *The chronic disease self-management workshop leader's manual*. Palo Alto, CA: Stanford University.

Three of the four nursing home facilities' leadership created action plans. Interestingly, one facility's leadership said "ditto" to another group's plan when called upon to share their self-created action plan. While no explanation was offered for this chosen course of action, the outcomes for this decision were notable in the months to follow. Insight into this chosen course of action was gleaned two months later during follow-up. One team's goal was to increase nurses' knowledge of ASB through small group discussion. They planned to use a newly chosen champion from within the leadership team to discuss (a) definition of ASB, (b) signs and symptoms needed before obtaining a urine dip, and (c) how to evaluate confusion in a resident without assuming UTI. They planned to conduct these small groups within 2 weeks to evaluate their small group discussion education through administering a quiz before and afterward. They

planned to use coachable moments in daily practice to reinforce the education. Confidence level was rated a 7 (Facility #2, February 27, 2012).

Another team's goal was to increase awareness and understanding of ASB among the staff and to reduce the number of urine dips and UAs ordered by 50% within 3 months (June 1, 2012). They planned to recruit neighborhood managers (RNs) as facility "champions" and train them with in-depth education regarding ASB vs. UTIs within 2 weeks (March 15, 2012). They planned to develop an easy-to-use algorithm with the help of neighborhood managers for determining whether to request a UA or obtain facility urine dip testing (within 4 weeks, April 1, 2012). A date of April 15, 2012, was chosen for accomplishing unit managers' buy-in on the new UA/Urine Dip policy and algorithm. Their confidence level for being able to accomplish this was greater than 7 out of 10 (Facility #3, February 27, 2012).

The final team's goal was to use case studies to introduce the new P&Ps, educate their nurses on ASB, and increase their ability to distinguish ASB from a UTI. They "possibly" planned to educate a group of NPs and physician assistants (PAs) that frequently provided services to their residents. They determined a date to educate their charge nurses within 6 weeks and floor nurses within 8 weeks. This building had another project they were currently undertaking, thus, deliberately postponing implementation. They planned to incorporate ASB into their annual infection prevention in-service and to reinforce the topic as needed. A three-item question test was developed for use before and after education. Confidence was rated greater than 7 (Facility #4, February 27, 2012). Each facility's implementation strategies targeted staff nurses. One facility hoped to reach out to providers, but this did not come to fruition. At the request of one facility,

the CSD facilitated the development of a brochure for families and lay personnel working through utilizing the marketing department. See Table 10 for implementation strategies used.

Implementation and Practice Changes

Following the February 27th workshop, the facilities were given 3 months to complete their chosen action plans. This time period accommodated the pressures of daily responsibilities the nursing leaders faced while incorporating new practices. Research by Dr. Kate Lorig, RN, Ph.D. indicated that the transfer of responsibility from one person to another, as evidenced by one assuming a self-management role, was best accomplished when individuals were given autonomy (Lorig, Gonzalez, & Laurent, 2010). Self-created action plans are a means of accomplishing this. It was important to note that individuals did not have to adhere strictly to their action plans to be successful self-managers or to have their action plan be considered completed. If barriers arose and the action plan was modified to achieve the goal, then success was achieved. Even abandoned action plans, when reflected upon, were worthy for their inherent feedback and self-learned lessons. These considerations were taken into account when the NLT reconvened in May to report on their action plans. On May 24, 2012, the NLT reconvened and the DONs acted as spokespersons for sharing their facility's results. The experiences of these nursing leaders EBP journey were fascinating (see Table 11).

Table 10

Implementation Strategies Utilized

Site	Target Group	Implementation Strategies	Confidence Rating
Facility #1	Nurses	-hand out materials for reading and discussion	7
Facility #2	Nurses	-small group learning, champions, education, pre- and post-quizzes, coachable moments in daily practice	7
Facility #3	Nurses and families	-dashboards with quantitative goals, champions, education, self-created algorithm	> 7
Facility #4	Nurses and providers	-education, poster board presentations, case scenarios, post-test	> 7
Corporate	Assist NLT	-education, team building, reconfigure EMR to direct decision making in line with EBP, marketing expertise to create brochure for families and lay persons, spreadsheets to better identify key identifiers and track evaluation outcomes	No Report

Table 11

Changed Practices: Impact of Implementation

	Outcomes	Barriers Overcome	Lessons Learned
Facility #1	Gave P&Ps to nurses to read and then talk about during morning IDT meetings	EMR implementation Fluctuating NP services in building	
Facility #2	Held education small groups, had pre-quizzes, discussed results, coachable moments, created new form for obtaining urine dips that reflected EBP criteria	Had state survey come in; education was postponed but still completed	
Facility #3	Algorithm and brochure created, education of all nurses, removed urine dip sticks from all stations to the DON office; had 50% reduction in UTI's and over 400% reduction in urine dips performed, feel of the culture has changed	Resistance from in house NP, startled nurses initially,	Include nursing aides in education
Facility #4	Small group education, all nurses and CNAs participated in P&P education, case studies and quiz, fewer requests for UAs, UTI rate down, more 'hydration' EMR events opened instead of UTI when residents have clinical changes, nurse 'more savvy'	EMR implementation, time, attendance	Leadership learned about their teaching style and how to be more effective as teachers and promote EBP
Corporate	EMR changes being made Brochures being placed in new resident packets and in common waiting areas for families Further identification of evaluation outcomes to track		"I had the opportunity to better see each of our Nursing Leaders ability to work through the Quality Improvement process from start to finish. I was able to see where strengths were and help develop those where I saw weaknesses and they weren't necessarily where I anticipated them to be. I was able to have conversations around project management and strategies to use."

Facility #1

As stated earlier, the first facility "dittoed" another facility's action plan. This facility's DON confessed to not performing the "dittoed" action plan and revealed her personal rationale, "I like new knowledge to be neatly packaged and tidy." This had not yet become a reality for her as she attempted to assimilate the new knowledge on ASB. Instead of continuing to postpone implementation of the new P&Ps, she reported "handing the P&Ps out to groups of nurses to read and talk about." Frequent discussions about ASB were starting to occur in morning interdisciplinary team meetings. A number of external barriers she faced were simultaneous implementation of a new electronic medical record (EMR) and "patchwork coverage by NPs" at the building. At follow-up, these two barriers no longer existed since initial EMR stages were complete and a full-time NP had been hired. After the DON received verbal encouragement from the DNP student for "preparing the ground" for implementation, the DON appeared encouraged and created a new action plan of her own initiative for moving forward with implementation (Facility #1, May 28. 2012). No practice changes were noted in Facility #1.

Facility #2

The second facility planned to hold small group discussions with nurses and host a pre- and post-test quiz. They faced a major challenge when they were unexpectedly visited by surveyors from the State of Colorado. As a result, the action plan was delayed by several weeks. However, it was still carried out. They held two RN meetings, 5 nurses the first time and 10-12 the second time. A pre-quiz created from the P&Ps was administered and the average correct score was 50%. Instead of retesting after the small

group education, the answers to the pre-quiz were reviewed with the nurses. The leadership team reported seeing a change in how nurses were viewing residents' clinical status changes and "were not jumping to grab a urine dip right away." New urine dip forms were created that listed the necessary criteria for appropriately choosing to obtain a urine sample (Facility #2, May 2012).

Facility #3

The third facility's DON eagerly shared their story.

> We were so excited to get started that we didn't realize we were dragging our neighborhood managers into the change instead of bringing them along like you taught us to. So we stopped and incorporated the managers into what we wanted to do and how we should go about it. This made all the difference.

A diagnostic algorithm was crafted that assisted nurses in considering what to do if a resident became confused or developed GU. An ASB and UTI quiz was constructed and both education of the new P&Ps and the quiz were administered to all nursing staff. Tri-fold and one-page brochures were created and given to staff and placed in new admission packets for residents and their families. These brochures were utilized across the health care organization. A startling move was made when this facility's leadership decided to confiscate all the urine dipsticks from the nursing stations and supply rooms and to place them in the DON's office only. A urine dipstick could not be acquired unless a nurse requested one and gave a rationale for doing so. In order to "honor clinical judgment and intuition and not just blindly administer the guidelines," a verbal policy was communicated to the staff indicating that, "If despite absence of clinical criteria a nurse had a deep suspicion a UTI was indeed a resident's problem then urine testing was allowed" (DON, May 28, 2012). Several barriers were encountered along the way: "The

in-house NP was more resistant than we thought she would be" and "The nurses really resisted at first until they understood our explanations." The DON reported that,

> We never included the CNAs in our education and we would do this differently in the future. Because they didn't understand what we were doing, they would get upset with the nurses when the nurses didn't listen to their request for urine testing on a resident.

However, the impacts of their efforts were significant. Facility #3 noted a shift in their culture, buy-in from nursing staff, gradual acceptance of the new P&Ps by the NP, and family education. They successfully reduced their infection rate by 50% in 3 months. UTIs numbered 8 in January and February and 7 in March. They had performed 53 urine dips between January and March. Since April 5, 2012, the facility had performed only one urine dip (a period of 49 days). One urinalysis had been sent for testing in April and four in May, all which were positive on C&S with accompanying GU symptoms. No adverse patient outcomes occurred. Culture changed from "obtaining a urine dip for everything" to "if a resident has a clinical status change that includes GU symptoms then we bypass the urine dipstick and obtain a urine sample for urinalysis with culture and sensitivity if indicated" (DON, May 28, 2012).

Facility #4

The fourth facility educated nursing managers in small groups. A tri-fold poster board presentation, three case studies, and a quiz were used to educate staff nurses and CNAs. Nurses were required to read the board and case studies and then take the quiz. A signature log ensured compliance. CNAs were only required to read and sign the signature log. A "Betty White" theme was used and became somewhat of an icon for ASB in the facility. The nurse educator revealed that she "opened up as a teacher by requesting feedback on her teaching style" and "asked the nurses how she could help

them more as an educator." She confessed, "I'm usually pretty closed and I was scared, but it actually helped me a lot." Barriers were encountered along the way for this group too. They were starting a new EMR system, time seemed to be short and scarce, and attendance for education was lower than desired. They circumvented these by waiting until the EMR was fully employed before educating the nurses on ASB and by hosting the poster board instead of a meeting. Facility #4 noted the following practice changes: "UTI rate has decreased, nurses are more knowledge savvy, there are fewer requests for UAs, and more hydration events are opened in the EMR instead of UTI."

Corporate Level

Although an action plan was not created at the corporate level, the CSD supported the nursing leadership's efforts at the organizational level. The CSD acquired the assistance of the marketing team to help create a full-page hand out and tri-fold brochure titled "Do I Really Have a Urinary Tract Infection?" These tools were used by all four facilities at family-care conferences, in new admission packets, and at brochure and literature stands. The CSD used the information technology (IT) department to change the flow of decision making in the EMR, making it to be more comprehensive, better reflect the evidence, help nurses meet GU criteria for suspected UTIs, and incorporate a "STOP" if such criteria were not met. If GU criteria were not met, the EMR opened a different pathway for evaluating residents' status changes. The EMR changes had not yet been implemented. However, the four facilities were being educated on using the new EMR pathways in preparation for startup.

Three of the four participating nursing homes demonstrated uptake of the new P&Ps as evidenced by successful implementation with positive impact on nursing

knowledge, removal of identified barriers, and fewer urinary diagnostic workups for asymptomatic patients. Although each facility's nursing leadership was present for the education and workshop, one facility chose not to create an action plan or really operationalize the new guidelines. However, taken as a whole, the capstone project's objectives were achieved among these four northern Colorado nursing homes. The receptivity, enthusiasm, and involvement evidenced in the nursing leadership team for promoting evidence-based practice exceeded the DNP student's expectations.

Unintended Consequences

As stated previously, the possibility of unintended consequences were inherent in any change. These unintended consequences may be positive or negative. The directors of nursing were contacted via email in July 2012 to gain feedback on observed unintended consequences. Three facilities reported "no unintended consequences, positive or negative." One facility reported being surprised at the resistance expressed by their employed NP stating,

> She (NP) seemed on-board (with the expected amount of reservations) in the first month of having the new policy implemented throughout the facility, and our UTIs and use of ATBs really decreased. However, recently it seems that she has been ordering more UAs (and repeat UAs) on residents, so that has been a little frustrating. Each time we discuss it, it seems that she is a bit defensive and annoyed with our reasons for questioning why we did another UA. I don't see this as a major problem; I think in the end, we will all hopefully arrive back on the same page. Once we clear this hurdle, I feel that this change to our policy will be huge at our facility, but most importantly, hugely beneficial to our residents. (DON, email, July 2012)

Facilities reported an ongoing reduction in the number of UTIs among their residents each month. One facility hoped for more receptivity moving forward. Among the four facilitie', the DONs reported there were no cases of inadvertent global health decline, missed urinary tract infections, bacteremia, sepsis, or death. Benefits included decreased

iatrogenic effects, improved nursing clinical thinking, and reduced health care dollar waste.

The CSD reported a positive unintended consequence when she witnessed her NLT walking through the implementation process,

> It gave me the opportunity to better see each of our Nursing Leaders ability to work through the Quality Improvement process from start to finish. I was able to see strengths and help develop them. I saw weaknesses and they weren't necessarily where I anticipated them to be. I was able to have conversations around project management and strategies to use. . . . We still need to develop our evaluation tools. . . . It was also really good role modeling for them to see the process . . . for developing a new policy. I have been trying to steer them more and more to evidence and having them see that in action via your process really strengthened that for some. (CSD, July 2012)

CHAPTER V

DISCUSSION AND RECOMMENDATIONS

The purpose of this chapter is twofold. Its first purpose was to connect what was currently known in the literature with the discoveries made in this EBP project, highlighting both similarities and differences. The rare discoveries collected in this project illuminated a future path for the nursing profession, as well as for the medical profession and health care organizations seeking to improve patient care through EBP. The second purpose was to discuss recommendations for the long-term care setting as it related to writing policies and procedures to promote EBP and making use of nursing leadership as the vehicle for which to implement evidence-based practice changes. These recommendations were informed by the results and findings from the DNP capstone project. The knowledge and insights gained from this project, in conjunction with further research into the literature, shed light on exciting new directions for the doctoral prepared advanced practice nurse in today's health care arena.

The State of Evidence-Based Practice

Incorporating research into practice by health professionals was believed to be a vital key for unlocking the door to improving health care quality and patient outcomes. Tremendous research efforts are being poured into answering the challenging question "How is EBP best implemented, incorporated into practice, and sustained within an organization?" (Achterberg et al., 2008; Baker et al., 2010; Grol & Grimshaw, 2003; Matthew-Maich, Ploeg, Dobbins, & Jack, 2012; Melnyk, Fineout-Overholt, & Mays,

2008; Newhouse et al., 2005; Ploeg, Davies, Edwards, Gifford, & Miller, 2007; Resnick, Quinn, & Baxter, 2005). A literature review was conducted to answer this question and to evaluate the results of this capstone project. Several themes repetitively emerged, which revolved around:

1. Developing evidence-based strategies for implementation (Achterberg et al., 2008; Baker et al., 2010; Grol & Grimshaw, 2003; Newhouse et al., 2005),
2. The importance of underlying theoretical frameworks (Achterberg et al., 2008; McConnell, Lekan-Rutledge, Nevidjon, & Anderson, 2004; Ngo & Murphy, 2005; Plsek, 2003),
3. Utilizing leadership and management roles (Collins, & Holton, 2004; Gifford, Davies, Edwards, & Griffin, 2004; Gifford, Davies, Edwards, & Graham, 2006; Gifford et al., 2012; Gifford, Davies, Tourangeau, & Lebebre, 2010; Harrow, Foster, & Greenwood, 2001; Mumford, Marks, Connelly, Zaccaro, & Reiter-Palmon, 2000; Newhouse, 2007; Sandstrom, Borglin, Nilsson, & Willman, 2011; Wilkinson, Couns, Nutley, DipMan, & Davies, 2011),
4. Organizational characteristics and readiness (Fineout-Overholt, Williamson, Kent, & Hutchinson, 2010; Hamilton, McLaren, & Mulhall, 2007; Kothari, Edwards, Hamel, & Judd, 2009; Larson, Early, Cloonan, Sugrue, & Parides, 2000), and
5. Sustaining post-implementation outcomes (Bowman, Sobo, Asch, & Gifford, 2008; Matthew-Maich et al., 2012; Stirman et al., 2012).

The following is a discussion addressing these themes (implementation strategies, theory, nursing leadership, organizational characteristics and readiness, and sustaining change) in relationship to the capstone's findings. Because health care is diligently searching for successful means by which to incorporate EBP into nursing practice and patient care, the outcomes of this DNP project were encouraging. Similar to other facilities in the nation, Canada, or abroad, the nursing homes in this project faced high percentages of UTI diagnoses, frequent use of urine dips and urinalyses to screen residents with non-specific clinical changes, and cultural qualities that caused UTIs to be considered first when altered mental status or behavior changes were noticed (High et al., 2009; Juthani-Mehta et al., 2005; Juthani-Mehta et al., 2008; Nicolle, 2000a, 2000b; Walker et al., 2000). These nursing homes faced similar unfamiliarity with clinical practice guidelines (CPGs) and EBP, information overload, and time constraints (Colón-Emeric et al., 2007; Newhouse et al., 2005). Nursing managers and leaders faced comparable pressures related to day-to-day job role responsibilities, as well as inconsistency between actual roles and those advocated in the literature as being necessary for implementing practice changes (Fineout-Overholt et al., 2010). Despite these hindrances, the four northern Colorado nursing homes in this project possessed qualities in their leadership and organization that proved instrumental to their success in implementing new EBP policies and procedures. In addition to these qualities, the strategic use of theory and the methods employed in this capstone project contributed to its overwhelming success. The results of this project supported the literature in numerous arenas and the literature explained the success of this project. One unique finding to this project was the cross-organizational difficulties reported to impede progress in adhering

to EBP guidelines. This barrier was not previously described in the literature. A need existed for cross-organizational educational and collaboration, exhibited by identifying shared concerns and working toward solutions.

After reflecting on both the EBP journeys of others depicted in the literature, as well as this capstone's EBP journey, future recommendations were made for sustaining and expanding the effects of implementing EBP for ASB and UTIs in the long-term care setting. Truly, the doctoral APN is uniquely positioned to carry the torch required for promoting EBP not only in the nursing profession but also in health care organizations, and for bridging the gap between the nursing and medical communities as it relates to providing the best care possible to patients.

Compare and Contrast

Evidence-Based Strategies for Implementation

Numerous conceptual models and frameworks have appeared in recent years to aid those engaged in evidence-based practice. Among these are: the model for EBP and promoting quality care (Titler et al., 2001), Stetler's model, Pettigrew and Whipp's model, Rogers' Diffusion of Innovation, the Veteran's Association's QUERI (as cited in Achterberg et al., 2008), Kitson's PARHIS model (Rycroft-Malone & Bucknall, 2010, and Grol and Wensing's (2005) framework. In these models, the important step of implementation was usually only one among many other steps considered. These models were created for explaining and guiding the entire process of EBP rather than solely on implementing it. New research focusing solely on EBP implementation suggested several factors important for consideration. The first factor was to review barriers and facilitators to EBP. Assessing the playing field in this manner was best achieved using

both quantitative and qualitative methods. These methods increased the probability implementation strategies would be tailored to the targeted problem, its context, and the individuals and organization itself (Baker et al., 2010; Collins & Holton, 2004; Ploeg et al., 2007). A meta-analysis by the Cochrane Library sought to assess the effectiveness of interventions tailored to address identified barriers on changing professional practice or patient outcomes (Baker et al., 2010). Authors concluded that, while tailoring interventions to prospectively identified barriers was probably helpful, no one method for doing so has been recognized as best. A meta-analysis of 83 studies seeking to determine the effectiveness of managerial leadership development programs to promote implementation described substantial gains in both practitioners' knowledge and skills when ample front-end analysis was performed for tailoring interventions. Performance, expertise, and knowledge increased at the individual, team/group, and organizational level when such time was taken for analysis. The most effective intervention related to knowledge outcomes exercised a pre/post-test design (Collins & Holton, 2004). An analysis of barriers and facilitators, both quantitative and qualitative, was undertaken before implementation strategies were chosen in this capstone project. This proved invaluable for the nursing homes in this EBP project.

Barriers noted in the literature, common to the four nursing homes in this capstone project, included: negative staff attitudes or behaviors, time constraints, culture, buy-in, accountability, reticent leaders, family fears, and unfamiliarity with the evidence or process of implementation (Hamilton et al., 2007; Juthani-Mehta et al 2005, 2008, 2009; Ploeg et al., 2007; Resnick et al., 2005). Barriers not reported by the NLT, but often cited in research studies, included documentation loads, prn staff, high turnover

rates of nursing staff and nursing leadership, shift carry over, past negative change experiences, and limited integration of the guidelines with organizational structures and processes (Hamilton et al., 2007; Jones et al., 2004; Ploeg et al., 2007; Resnick et al., 2005). Barriers unique to the northern Colorado nursing homes in this project were providers' fears or "insecurity" about "missing a diagnosis," pressure from other departments in the facility (therapy, dietary, social services), and hospital emergency departments.

Facilitators noted in the literature that were akin to the nursing homes in the capstone project involved stakeholder support, organizational commitment to education, strong team climate, past success with change, supportive and strong leadership, champions, teamwork and collaboration, external support with academia, group interaction, time and human resources, role modeling, and alignment with organizational policies and goals (Gifford et al., 2006; Hamilton et al., 2007; Harrow et al., 2001; Newhouse, 2007; Ploeg et al., 2007; Resnick et al., 2005). Professional associations, networks, and inter-organizational collaboration as well as time for research, reading, and planning were noted as facilitators in the literature but not largely present for the nursing homes in this project. One facilitator unique to this project was "Nurses' desire to do what is right for their patients," quoted by several directors of nursing. Future use of assessing barriers and facilitators is highly recommended to all long-term care settings seeking to employ EBP.

Beyond assessing barriers and facilitators, research indicated identifying the group targeted for change, determining the context of the problem, and choosing implementation strategies supported by theory and or empirical evidence as necessary for

success (Achterberg et al., 2008, Grol & Wensing, 2005). These recommendations were employed by the nursing homes in this project. The NLT initially targeted their staff nurses for intervention and knowledge deficits were deemed the most significant issue. CNAs were included in some facilities. Facilities that did not include CNAs later wished they had. Because CNAs played an integral role in patient care, it was discovered that including them in all efforts to accurately assess for UTI vs. ASB was important. Although not formally planned, patients and families received education through created brochures. Emergency department doctors and providers providing patient care in nursing homes needed education in order for facilities to be successful in implementing EBP, especially since nursing leadership described the awkwardness of disagreeing with higher level providers.

Theory

A number of theories and models existed for assisting utilization of evidence-based practice with individuals and organizations (Achterberg et al., 2008, Grol & Wensing, 2005, Melnyk & Fineout-Overholt, 2011; Ngo & Murphy, 2008; Titler et al., 2001). A newly developed middle-range theory and conceptual framework (SUNG) described essential processes used by nursing leadership to advance EBP uptake into nursing practice. Nurses' evolution of coming to believe in and use EBP was also described in the framework (Matthew-Maich et al., 2012). Whereas, theories such as PARIHS (Rycroft-Malone & Bucknall, 2010), Knowledge to Action (Graham & Tetrone, 2010), dissemination and use of research evidence for policy and practice (Dobbins, 2010), and Rogers' (2003) diffusion of innovations have been predominantly positivistic, emphasizing deterministic explanations and prediction, Matthew-Maich's et al. (2012)

middle-range theory, Supporting the Uptake of Nursing Guidelines (SUNG) boasts a constructivist approach. It offered a more fluid approach to describing the complex process of guideline uptake. This was welcomed since translating research into practice is was complex and not as clearly defined as conducting research itself. The study supporting the SUNG theory discovered choosing credible, relevant guidelines, collaborating with internal and external partners on many levels, and embedding guidelines into organizational structures and policies made guideline uptake possible. The NLT in this capstone project found these three principles effective too. Another theory purported to effectively change nursing practice was demonstrated in a study by Ngo and Murphy (2008). These authors employed Albert Bandura's self-efficacy theory to build an educational and skills intervention to implement EBP to reduce peripherally inserted central catheters (PICC) occlusions in the hospital. Post-tests demonstrated nurses increased their self-confidence in both knowledge and skills. A significant reduction in PICC occlusions was noted in following months. Numerous studies confirmed self-efficacy being key to achieving behavioral change among individuals (Lorig, 1999, 2001a, 2001b; Lorig & Homan, 2003). Supporting change with theory was upheld by other authors studying implementation (Achterberg et al., 2008; Grol & Wensing, 2005). Post-education surveys in the DNP capstone project indicated the NLT increased their self-efficacy surrounding their ability to implement the evidence-based P&Ps and evaluate the outcome of doing so. In turn, the NLT used theory when choosing implementation strategies. Strategies included active learning, role modeling and leadership, and positive peer pressure. These strategies were borrowed from social

cognitive theory and the theory of quality management to address knowledge deficits and social norm barriers.

Nursing Leadership

Perhaps one of the more pivotal factors associated with the success of the capstone project was the nursing leadership team, including the CSD. The literature supported this evident truth (Gifford et al., 2004; Gifford et al., 2006; Matthews-Maich et al., 2012; Sandstrom et al., 2011 Wilkinson et al., 2011). Several layers of nursing leadership interacted throughout the project: the advanced practice nurse as DNP student, the clinical services director, the directors of nursing and their support staff, and finally, neighborhood nursing managers in each nursing home. Whether it was the DNP student demonstrating positive communication, credibility, enthusiasm, and drive (Sandstrom et al., 2011), the positive milieu, commitment, resources, and value placed on research by the clinical services director (Harrow et al. 2001; Ploeg et al., 2007; Sandstrom et al., 2011), the organization's reputation for trying new things, holding similar strategic goals, and supplying additional resources (Gifford et al., 2006; Newhouse, 2007; Ploeg et al., 2007; Sandstrom et al., 20l1), or simply the receptivity and willingness of NLT to attempt a significant change, all contributed to the capstone's success in implementing EBP for ASB. Which layer was more important was not known, and probably not important. Most likely, it was a beautiful blending of teamwork that brought the new P&Ps to bear in nursing practice in an important way and with positive impact. Similar to the literature, one facility in the project did not implement EBP despite the optimum environment because it was thwarted by a non-participating leader (Gifford et al., 2012). It would be important to return to the non-uptake facility's DON to assess the needs they

had to effectively implement EBP. It has been said that sustaining an EBP culture and valuing research is best supported by a dedicated mentor or project leader who is a scholar in evidence-based practice and has advanced training (Melnyk & Fineout-Overholt, 2011). This project substantiated this truth, therefore, it is recommended that LTC facilities dedicate resources to having supportive individual employing EBP.

Organizational Readiness and Support

Organizations need to be ready to accept, incorporate, and sustain EBP, otherwise efforts are wasted. Methods for assessing organizations often proposed using quantitative and qualitative diagnostic analysis to gain good understanding of readiness. Organizations readily utilizing EBP usually had these desirable qualities: positive social contexts, allocation of necessary human, financial and otherwise needed resources, dynamic structures and processes to integrate new practices into daily activities, ability to incorporate guidelines into strategic initiatives, documentation and policies, and performance reviews that require active employee involvement with EBP (Fineout-Overholt et al., 2010; Gifford et al., 2006; Hamilton et al., 2007; Matthew-Maich et al., 2012; Newhouse, 2007; Ploeg et al., 2007; Resnick et al., 2005; Wilkinson et al., 2011).

Organizations who strived for such qualities were to be commended. However, it was important to remember that change was possible, albeit more difficult, even when an organization does not seem conducive to implementing EBP. A study by Matthew-Maich et al. (2012) discovered successful uptake of clinical practice guidelines in a negative organizational environment because individual leaders were passionate and enthusiastic. Kothari et al. (2009) developed and validated a tool for determining the capacity of health care organizations to use research. Not only was the tool useful,

organizations discovered group discussions following the tool's use were even more useful than the actual computed score. This stressed the importance of communication and participation by members engaging in changing practice. As one facility DON reported in this capstone project, "We realized we were dragging our neighborhood managers into the change and not brining them along." After efforts were halted to achieve buy-in first, the facility made forward progress.

A formal assessment tool was not used in this capstone project to judge the suitability of the agency site to the capstone project. Rather, an informal and intuitive approach was taken. A previous attempt to host the capstone project at another facility met with failure and lent the DNP student experiential knowledge for ascertaining the new site for its readiness to implement organizational, leadership, and practice change. Conversations, emails, and interviews with the medical directors of two of the four nursing homes and the head CSD provided substantial evidence that the capstone project was welcomed. In retrospect, had intuitive and informal assessment not been available, a formal assessment would have proven invaluable (Hamilton et al., 2007; Kothari et al., 2009), and therefore, was recommended to other LTC facilities seeking to employ EBP. Organizational structural determinants possessed by the capstone's agency site demonstrated qualities indicative of supporting and diffusing innovation. For example, the agency was a large health care system, had decentralized decision-making processes, exhibited a component of organizational slack and flexibility, and provided monetary and human resources. The site also demonstrated positive non-structural determinants known as absorptive capacity and receptive context for change. For instance, the majority of the NLT acquired, assimilated, transformed, and took advantage of the new knowledge

linking it to prior projects on the same topic. Its receptivity was evident in the strong leadership, clear strategic vision, and permission for experimentation (Kothari et al., 2009). Expanding the implementation of EBP for ASB and UTIs in other LTC facilities would be best achieved by first assessing organizations' readiness.

Sustaining Change

Sustainability has been defined as "the continued use of core elements of an intervention and persistent gains in performance as a result of those interventions" and "embedding practices within an organization" (Bowman et al., 2008, pp. 3, 11). Certainly, there existed a difference between achieving improvements and sustaining them. During implementation, there was usually ample supply of effort in the way of personnel and other resources, but how these gains were sustained once the defined project period ended, funding was reduced or absent, enthusiasm waned, and project leaders left or assumed a new initiative were pertinent questions. Population health researchers have asked these questions. Glasgow et al. (1999) RE-AIM framework has been one effort by public health to answer these questions. The M in RE-AIM referred to maintenance, or the intervention's long-term effects (minimum 6-12 months), attrition rate, and modified, dropped, or institutionalized components. QUERI is another initiative addressing the implementation and maintenance of research at the acute care level. QUERI was the U.S. Department of Veterans Affairs Quality Enhancement Research Initiative. In QUERI, Bowman et al. (2008) explored the concept of sustainability and attempts to answer the question "What needs to be sustained and what are the behavioral and organizational factors influencing sustainment?" To determine persistence of an

intervention over time, one has to determine what to measure, when to measure, how to measure an intervention or program, as well as how to fund its continuance in practice.

Sustaining the "what, when, and how" of ongoing implementation was proposed for ASB and UTI policies and procedures in the LTC setting. "What should we measure?" It was not sufficient to focus solely on either the process for achieving an endpoint or the endpoint itself. Together, they told the story. For example, projects often evolved to fit an organization as they were implemented. Project components were adapted, pruned, or eliminated. Measuring processes helped identify effective approaches, but processes were prone to adaptation. Ongoing measurement of an effective approach may be a waste of time. Once the project's objectives were achieved and implementation was completed, "What remains at the heart of the program?" These questions helped identify what truly should be measured for sustainability. For example, in the case of this DNP capstone project, the strategy used was effective at three facilities but not the fourth. A follow-up interview with the DON would be appropriate for tailoring future implementation strategies to the unique needs of the DON and her facility. It was important to remain mindful that the vehicle for change may alter with time, situation, context, and persons. Besides measuring processes, measuring endpoints gave feedback on whether or not desired health objectives were achieved. In an effort to reduce inappropriate screening for UTIs in LTC, an important endpoint to measure was the number of urine dips and UAs ordered without documented GU symptoms. This was easily quantified. But even endpoints need to be revisited for their appropriateness now and again. New research is constantly emerging. For instance, scientific breakthroughs might supply nurses and providers with biological and laboratory markers that

differentiate UTIs from ASB or new evidence of non-specific GU symptoms that were highly predictive of UTIs. In this case, it would no longer be appropriate to measure UAs ordered with documented GU symptoms.

"When or for how long should we measure?" Ongoing quality improvement measures are time consuming. Only necessary and feasible endpoints should be continuously measured, lest they be abandoned; and should only be measured for as long as the intervention or program is useful to the organization. "How should we measure?" Because implementing EBP is a long-term goal and ongoing developmental process, people and organizations change, and new evidence is always emerging; both quantitative and qualitative methods should be used. Quantitative data give feedback on whether goals have been accomplished, whereas, qualitative analysis assesses any ongoing barriers and facilitators that are affecting the ability to achieve desired endpoints. Clinical practice is fluid since health care's knowledge base is growing and interactions vary among individuals, groups, and organizations. Sensitivity is needed in order to remain effective, adaptive, and relevant in providing patient care that produced health and reduces harm.

A systematic review of 125 studies reviewing the sustainability of new programs and innovations revealed partial sustainability occurs most often, even when full implementation was achieved. Among the diverse discipline fields evaluated, sustainability was always influenced by context (both outer-policy, legislation and inner-culture, structure), processes (fidelity monitoring, evaluation efforts, aligning project to setting), capacity for sustainment (funds, workforce, resources, interpersonal processes) and the intervention itself (fit, adaptability, and effectiveness) (Stirman et al., 2012).

Sustainability or maintenance of an intervention ought to be considered prior to implementation. The context, processes, capacity, and fit of the intervention should be assessed for maximum benefit. Once a decision is make to implement EBP, identifying what and how to measure sustainment ought to be considered. Simple and financially easy methods are best.

Permanently implementing P&Ps for evidence-based evaluation and treatment of ASB and UTIs in the LTC settings is needed. Antibiotic use is prevalent and multi-drug resistant organisms are increasing. Distinguishing between diagnoses that require antibiotics and those that do not is critical to maintaining the health and well-being of our society. The agency hosting this DNP capstone possessed numerous qualities and specifications spelled out in research conducive to successful uptake of EBP. Specific literature based recommendations are offered for embedding practice changes by making them automatic and second nature.

- Build strong relationships
- Offer regularly scheduled education for distinguishing between ASB and UTIs
- Reinforce P&Ps as the standard operating procedures when EBP is not followed
- Fully incorporate the evidence-based guidelines into the EMR for decision making and documenting
- Choose a few simple endpoints to follow for evaluating success

- Assess what is and is not working by talking to staff, nurses and aides: keep what works, prune what sort-of works, create action plans to overcome what is not working
- Communicate progress and setbacks with staff
- Incorporate research utilization into employee performance reviews

Cross Disciplinary and Organizational Collaboration

The NLT shared instances where emergency departments, attending physicians, nurse practitioners, and specialists caring for their residents did not follow the evidence-based recommendations being endorsed in the capstone project. Examples were plenty. Concerns arose on how to address these barriers, especially since nurses expressed the feeling of being the "lowest or least educated" among the providers caring for their patients. Issues of authority, as well as insecurity, by both themselves and other providers, were central themes. The NLT felt immature in their knowledge and confidence to address providers not practicing according to EBP guidelines. The NLT also described witnessing insecurity in providers when "they order extra tests because they are afraid of missing something." Such barriers did not materialize in the literature examined for this capstone project. However, the idea of needing multi-disciplinary teamwork is not a new concept when trying to achieve quality patient care.

The John Hopkins School of Nursing and School of Medicine have implemented interprofessional education (IPE), a funded initiative in its third year of operation. They recognized that health care professions struggle to work together to provide patient care, which may be due in large part to lack of knowledge on how to do so. Health care disciplines were educated and trained in silos and then expected to understand each other

and work together in the clinical setting. The initiative was started in response to the nation's changing health care system, the World Health Organizations study group for global practice, and the Institute of Medicine's 2001 report on the future of nursing. Increased partnerships between health care professions started at the faculty level in an effort to change how nursing and medical students, advanced practice nurses, and medical residents were educated. Thus far, nursing and medical students have expressed enthusiasm and energy with their IPE experiences; each group contributing their different strengths and impressed with what others bring. Physicians and nurses already in practice who were not trained with an IPE perspective need help bridging the gap experienced in providing patient care together (Proch, 2012). Specific recommendations for LTC settings to improve multi-disciplinary collaboration, both inside and outside this project, included:

- Utilize administration and nursing leadership to initiate collaborative relationships with hospital emergency department heads, physician practices, and groups of providers who provide care to their residents
- Positively communicate intentions to improve patient care for all residents by means of working together and understanding setting-specific concerns
- Problem solve setting specific issues amongst leaders of cross-disciplinary organizations and groups
- Host onsite and invite providers to interprofessional education by respected professionals and EBP scholars
- Communicate a shared vision and common goal as the reason for joining forces

- Model respect and receptivity to learning and acting as a team

A need exists for multi-disciplinary education and collaboration, exhibited by a willingness to learn and work with one another. This need was shared by the American Association of Colleges of Nursing (AACN, 2006) in their paper on the Doctor of Nursing Practice degree,

> Today's complex, multi-tiered health care environment depends on the contributions of highly skilled and knowledgeable individuals from multiple professions. In order to accomplish the IOM mandate for safe, timely, effective, efficient, equitable, and patient centered care in a complex environment, healthcare professionals must function as highly collaborative teams. (p. 14)

Site Specific Recommendations

The purpose of this section is to discuss specific recommendations for the agency site at which the project was conducted, specifically whether the project should be abandoned, continued, or expanded, and whether any ongoing evaluations are needed which would extend past the life of the DNP project. Recommendations were placed within the organization's vision, mission, and strategic plan. Guidance was offered for which parties could be involved in or responsible for future phases. Finally, these recommendations were written with attention to the possible application of this project in other settings.

The strategic plan of the health care organization represented by the four nursing homes in this project was well-defined on their website. The organization emphasized providing a network of services designed to address the needs, comfort, and safety of seniors while interacting frequently with other community organizations. The health care organization was locally owned and operated and has been a part of its community for over 40 years. Collaborative relationships existed with local hospitals, local education

centers, and community businesses. The organization employed many residents in the local community. It was well-respected and had a reputation of being innovative and progressive. It was reasonable to assume the health care organization not only had the ability to implement EBP in its facilities (as was demonstrated in the EBP project) but also had the ability to bridge the gap between LTC, hospitals, and physician provider groups in an effort to promote evidence-based practice for the geriatric population.

It was believed EBP for ASBs should be continually implemented and sustained at the agency site. Incorrect practice for asymptomatic bacteriuria and UTIs permeated nursing homes and was as strongly cultural as it was educational. Changing culture, beliefs, attitudes, and behaviors surrounding acute declines in residents' health status would take time and persistence. The initiative to change practice for ASB and UTIs should be strengthened and reinforced or its impact would diminish with time. The following recommendations capitalize on the strengths and successes of the four nursing homes, the foundation and findings of the capstone project, and the themes noted in literature that contribute to sustaining EBP in organizations.

1. Adopt an implementation model that suits the facility, a method by which the organization could repeatedly implement new EBP initiatives, such as Grol and Wensing (2005) or Achterberg et al. (2008); thereby, increasing process confidence and efficiency through repetition.
2. Connect implementation strategies to identified root causes of incorrect practice and to the appropriate target. Use strategies based on theory, such as Bandura's self-efficacy theory, learning theories, organizational theories, change theories, or the SUNG framework. An educational tool

for assessing pre- and post-knowledge of ASB and self-efficacy tool for assessing ability to use ASB knowledge Algorithms existed to aid decision making processes (see Appendices K, L, M, N, and O).

3. Utilize leadership management. The NLT should continue to be used as a vehicle for implementing EBP into the facilities since there exists among the group strong relationships, good communication, and support from the organization and one another. The team meetings should be used as a place for collaboration, teamwork, brainstorming, discussing barriers and facilitators, evaluating outcomes and learning how to measure outcomes. Potential measures include: urine dips, UAs, UTI diagnoses, CMS' website data, infection control data and EMR data. Include staff by communicating facilities' performance through dashboards.
4. Make use of good relationships. Utilize the existing strong relationship between the CSD and DON in the non-uptake facility to assess the barriers to and the needs for successful implementation--was it a physical barrier than could be overcome, a role barrier, a knowledge barrier, skill barrier, attitude barrier? Identifying a different EBP champion may reduce the DON's work burden and be useful for EBP implementation. A variety of skills are useful for promoting EBP and individuals' skill sets need to be matched with task assignments.
5. Enhance desirable organizational characteristics and readiness. Several potential tools are available. Kothari et al.'s (2009) tool assesses an organization's current research utilization for the purpose of assisting

organizations to further translate research into practice. The study validating the tool indicated conversations ensuing completion of the assessment tool were even more useful than the tool itself. Organizational strengths and weaknesses were assessed. The SUNG theory was useful for understanding how nurses came to believe in and use EBP, thereby, providing leadership with the understanding and insight necessary to work with nurses. Assessing job role descriptions was good for determining whether or not EBP was emphasized in nursing roles and whether or not room existed for participating in it. Creating job positions specifically for EBP and its implementation was effective.

6. Create a plan to sustain post-implementation outcomes. This could be readily accomplished by identifying what should be monitored, for how long, and how. Simple, easy, and economically feasible answers to these questions could prevent further strain on an already taxed health care system, both in human and financial terms. For example, nursing homes could monitor the number of UAs ordered and whether or not necessary GU symptoms were documented prior to obtaining the UA (the WHAT). Such data would lend immediate feedback to whether or not the guidelines were being followed, more than tracking the number of UAs or UTI diagnoses alone. Collecting this data may have to be collected manually through chart audits/computer audits or be incorporated into smart EMRs that could tag documented symptoms with order sets, labs, or diagnoses. Essential to data collection will be transferring the data to useable

knowledge and communicating it with staff. Word and excel software could easily translate data into graphs that readily communicate performance to staff (the HOW). Monitoring would be only needed for the length of time it proved valuable to the organization. Once initiatives become second nature and cultural, priorities change. At some level, UTIs and ASB will always be measured, at least UTI incident rates, through QI, infection control and CMS (the HOW LONG). Excess monies may be scarce in LTC organizations. The easiest, simplest method should be used when sustaining EBP. One method for conserving monies should be achieved by allowing computer systems to do what human resources would have to be paid for in time (FUNDING).

Conclusion

In conclusion, this capstone project to implement EBP for ASB and UTIs proved not only effective for nursing homes but also advantageous to the nursing profession for describing how EBP is successfully incorporated into the long-term care setting. The project also highlighted future areas for growth that exist between health care organizations and between health care workers.

CHAPTER VI

IMPLICATIONS FOR PRACTICE AND CAREER DEVELOPMENT

Doctor of Nursing Practice Essentials

The practice focused doctorate for advanced practice nurses (APNs) was designed to prepare experts in providing specialized care to patient populations. In this preparation, a heavy emphasis was placed on educating the APN to translate credible research findings, known as evidence-based practice, into practice within the health care system and with patient populations. This required a rigorous and scholarly approach, as well as individual dedication to advancing the nursing discipline. Whereas, a research-focused doctoral program contributed to the nursing discipline's ontological base through application of stringent research theory, designs, methods, and analysis; the practice-focused doctorate demanded APNs to become competent in the following: scientific underpinnings for practice, leadership for improving quality in organizations and health care systems, analytical methods for evidence-based practice and clinical scholarship, use of health care information and technology for improving outcomes, health care advocacy and policy for health care advocacy, inter-professional collaboration, clinical prevention and population health for advancing national health status, and specialized knowledge for advancing nursing practice (AACN, 2006).

The purpose of this chapter is to describe the DNP capstone's contribution to my personal leadership goals, as well as its implications for future practice and career

development. The DNP capstone was intended to unite coursework learning from the practice doctorate with application to the APN's chosen clinical field. My experience testifies to the capstone's ability to accomplish this end. From beginning to end, I integrated knowledge from epidemiology, health economics, health information technology (HIT), theory, EBP, population health, and leadership and policy into creating a successful project. Epidemiology equipped me to ask pertinent investigational clinical questions, such as "Why do we have such high UTI rates where I work?" and "Why do we have recurrent infections and higher than average antibiotic prescription use?" Knowledge and understanding of epidemiology, economics, and HIT tooled me to answer these questions. EBP equipped me to research, validate, and appraise the literature for the purpose of identifying best practice methods for UTIs. Population health allowed me to take an organizational and systems approach to the LTC setting and acquaint myself with how to effect system change in populations, particularly through the RE-AIM framework. Theory, leadership, and health policy equipped me to choose appropriate implementation methods, collaborate with stakeholders, and effectively lead and move a health care organization and group of nurse leaders to translate research into practice. The capstone was a culminating project that has tied together all previous learning and cemented the knowledge and skills I have acquired in the DNP program.

Because of the DNP capstone project, I wrote policies and procedures from the evidence-based clinical guidelines and I discovered meaningful, effective approaches for working with individuals in leadership to effect change in my capstone project. Although these skills and their subsequent outcomes were significant; the capstone project evolved into a learning experience greater than its original form. For me, the capstone has been

indispensable for giving me the experiential knowledge of the DNP essentials outlined in the AACN's documentary on the critical components of doctoral education for advanced practice nurses. These essentials, especially II, III, IV, VI, and VII, have given me understanding and wisdom for my future career aspirations. The knowledge and skills taught in the DNP program easily translated to the practice setting; thus, enabling APNs to broadly survey populations and health care systems with discernment for effectually working with stakeholders to bring positive change. I will delineate the DNP Essentials that have been actualized in my capstone learning below.

DNP Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

The AACN (2006) stated the following:

> DNP graduates' practice includes not only direct care but also a focus on the needs of a panel of patients, a target population, a set of populations, or a broad community. These graduates are distinguished by their abilities to conceptualize new care delivery models that are based in contemporary nursing science and that are feasible within current organizational, political, cultural, and economic perspectives. (p. 10)

Because of my DNP education, I was equipped to work in organizational and policy arenas as I provided patient care, both individually and with others. I was capable of assessing practice management and balancing productivity and quality of care in order to assure patient population health care needs were met. I was able to assess the impact of policies, improving strategies, and was a catalyst in creating and sustaining changes at the organizational and policy level while mindful of the culture, financial, and political structures affecting practice. I was qualified to use systems thinking, financial understanding, business principles, organizational culture, and policy work to promote the health of groups of individuals. I desired to accomplish this in the geriatric

population, particularly between hospitals, skilled nursing facilities, and LTC facilities. I also planned to use these skills in other countries where communities are struggling to improve their health care delivery to their people.

DNP Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

Scholarship and research are the trademarks of a doctorate education. Translating research findings into practice is a trademark feature of DNP education and assists in closing the gap between research and practice. DNPs serve to contribute to nursing's body of knowledge through applying knowledge: bringing evidence based practice into the clinical arena, evaluating EBP's impact on patient care, evaluating outcomes associated with EBP to reinform practice and processes, and collaborating with healthcare providers in research. (AACN, 2006, pp. 11-12)

As Melnyk and Fineout-Overholt (2011) pointed out, scholars in evidence-based practice are needed. Mentors are needed in the clinical setting. The DNP has prepared me to operate in this role in a variety of settings. As a result of actually performing each step of the EBP cycle, as outlined in the literature, I am confident I could repeat these processes to provide solutions to practice problems that arise in future work settings.

DNP Essential V: Health Care Policy for Advocacy in Health Care

The AACN (2006) stated the following:

> Health care policy--whether it is created through governmental actions, institutional decision making, or organizational standards--creates a framework that can facilitate or impede the delivery of health care services or the ability of the provider to engage in practice to address health care needs. Thus, engagement in the process of policy development is central to creating a health care system that meets the needs of its constituents . . . and the DNP graduate has the ability to

> assume a broad leadership role on behalf of the public as well as the nursing profession. (p. 13)

Through the DNP program, I feel prepared "to design, influence, and implement health care policies that frame health care financing, practice regulation, access, safety, quality, and efficacy and addresses issues of social justice and equity in health care" (AACN, 2006, p. 14). Through the capstone project, I have journeyed into proactively engaging in the development and implementation of health policy at the institutional level. I hope to repeat this important work at local, state, regional, federal, and international levels. As a DNP graduate, I want to lead others in the health care practice arena by providing a critical interface between practice, research, and policy AACN, 2006).

DNP Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes

The AACN (2006) stated the following:

> Today's complex, multi-tiered health care environment depends on the contributions of highly skilled and knowledgeable individuals from multiple professions . . . DNP members of these teams have advanced preparation in the interprofessional dimension of health care that enable them to facilitate collaborative team functioning and overcome impediments to interprofessional practice. Because effective interprofessional teams function in a highly collaborative fashion and are fluid depending upon the patients' needs, leadership of high performance teams changes. Therefore, DNP graduates have preparation in methods of effective team leadership and are prepared to play a central role in establishing interprofessional teams, participating in the work of the team, and assuming leadership of the team when appropriate. (p. 14)

This description has been a true reality for me in the past year, as I have worked with directors of health care organizations, nursing homes, medical directors, and hospitalist physicians and nurse practitioners. Because of these experiences, I have increased my ability to effectively communicate with other health-care team members to

develop practice models, review practice guidelines, implement evidence-based care, and review standards of care and provider policies. These will be essential to my future aspirations in geriatric and international health care.

DNP Essential VII: Clinical Prevention And Population Health for Improving the Nation's Health

Because the DNP program prepared the graduate to:

> Analyze epidemiological, biostatistical, environmental and other appropriate scientific data related to individual, aggregate, and population health and to synthesize these concepts, including psychosocial dimensions and cultural diversity, related to clinical prevention and population health in developing, implementing, and evaluating interventions to address health promotion/ disease prevention efforts, improve health status/access patterns, and/or address gaps in care of individuals, aggregates, or populations. (AACN, 2006, p. 16)

Because of the DNP, I have increased confidence to enter patient care arenas for the purpose of evaluating and improving health care delivery models. Not only is this useful for health care nationally, but also internationally.

Personal Application

The breadth of my future professional dreams are much broader than the narrow focus of ASB and UTIs in my capstone project; but I believe the combination of the DNP coursework, engagement in the capstone project, and the acquired DNP essentials will permit me to see my future goals become a reality. My professional goals include creating new health-care delivery models for geriatric care in the long-term care setting, coming alongside government officials who are determining health-care policies to inform and give advice, transforming health care for individuals living in poor nations, and promoting advanced nursing practice for the nation's future.

My personal and professional background have granted me the opportunity to pursue advanced education, visit 17 international countries, meet health-care leaders in other nations, and participate in several entrepreneurial health-care activities. Collectively, the knowledge, skills, and abilities these experiences have given me have birthed within me a vision and burden to serve governments and nations to creatively improve the health care offered to elders.

In the United States, the elderly are considered a medically underserved population by the Economic and Social Research Institute (Silow-Carroll, Alteras, & Stepnick, 2006). There is a true shortage of health professionals for the elderly, especially in LTC. Of the 148,000 APNs in the United States, only 4.1% are geriatric trained and less than 3% work in LTC (Auerhahn, Mezey, Standley, & Dodge Wilson, 2012). Primary-care services to those in the senior care continuum are offered in clinics, independent living, assisted living, LTCFs, Alzheimer units, and skilled nursing facilities (SNF). These patients' chronic conditions require comprehensive care. Specific knowledge and skills are required to collaborate with care providers and to understand this complicated arena of highly regulated health care systems. Giant health care concerns are faced in LTC, including inappropriate hospitalizations, resource waste, under-education, and poor utilization of health care information technology (HIT). A growing burden exists to better this health care system and find solutions to save Medicare and Medicaid dollars.

The DNP program has educated me in the science of epidemiology, population health, HIT, evidence-based practice (EBP) scholarship, health policy, leadership, advanced practice theory, and health care economics. Through my DNP capstone

project, I have united these concepts to write policy for LTC facilities systems so they reflect EBP. The DNP has prepared me to be a leader in the health care system, particularly with geriatrics.

Upon graduation, I would love to implement a proposal I have created for an innovative model of transitional care, whereby APNs bridge the gap for elders being discharged from the hospital to SNFs. Skilled nursing facilities are only a stepping stone for these elders toward their final destination, whether the destination be home, LTC, palliative, or hospice care. The proposal's purpose was to:

- Utilize APNs to provide a safety net for elders transitioning across this perilous care continuum
- Designate APNs as the uniting point for provider transfer communications (hospitalist, nursing home, primary care provider, family, home care, palliative, or hospice)
- Enable APNs to reduce inappropriate hospitalization readmissions during the high-risk 30-45 day discharge window (Hospital readmissions reduction program, section 3025, Patient Protection and Affordable Care Act [PPACA], 2010).
- Empower APNs to utilize their knowledge, skills, and abilities to save Medicare and Medicaid valuable resources, thereby contributing to Medicare's longevity and the states' economies.
- Employ APNs scholarship and teaching abilities to mentor LTC nursing staff and to implement critically needed EBP in an under-educated, under-resourced setting.

I would like to see LTC facilities join forces and collaborate with leaders and stakeholders in northern Colorado's hospitals for the purpose of piloting the proposal and amending it as needed. If the model was successful, I would disseminate the model to APNs, LTC facilities, hospitals, and home care services (PPACA, 2010, sections 3021 and 3026). The long-term care setting is an ideal clinical setting for training nurses, APNs, physician assistants, and medical residents to provide geriatric care. Certainly knowledgeable and experienced providers will be necessary for this growing patient population.

Progress in geriatric care is needed, both nationally and internationally, since similar elder care needs exist in other countries (Johri, Beland, & Bergman, 2003). Individuals who work to positively influence health care policy and government officials for older adults' health and well-being will be greatly appreciated in the decades ahead.

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APPENDIX A

GRADING SYSTEM FOR LEVELING EVIDENCE

Grading System for Leveling Evidence

Strength of recommendation

A Good evidence to support a recommendation for use; should always be offered

B Moderate evidence to support a recommendation for use; should generally be offered

C Poor evidence to support a recommendation; optional

D Moderate evidence to support a recommendation against use; should generally not be offered

E Good evidence to support a recommendation against use; should never be offered

Quality of evidence

I Evidence from at least 1 properly randomized, controlled trial

II Evidence from at least 1 well-designed clinical trial, without randomization; from cohort or case controlled analytic studies (preferably from more than 1 center); from multiple time-series; or from dramatic results from uncontrolled experiments

III Evidence from opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees

Authors: **Fever & Infection**: High, K. P., Bradley, S. F., Gravenstein, S., Mehr, D. R., Quagliarello, V. J., Richards, C., & Yoshikawa, Y. (2009). Clinical practice guidelines for the evaluation of fever and infection in older adult residents of long-term care facilities: 2008 update by the Infectious Diseases Society of America. *Journal of American Geriatrics Society, 57,* 375-394. doi:10.1111/j.1532-5415.2009.02175.x, **Asymptomatic Bacteriuria (ASB)**: Nicolle, L. E., Bradley, S., Colgan, R., Rice, J., Schaeffer, A., & Hooton, T. M. (2005). Infectious Disease Society of America: Guidelines for asymptomatic bacteriuria. *Clinical Infectious Diseases,* 40, 643-654.

Adapted from ISDA, U.S. Public Health Service Grading System for Ranking Recommendations in Clinical Guidelines

APPENDIX B

DEFINITIONS AND GLOSSARY

Definitions and Glossary

Terms

Acute non-obstructive pyelonephritis is a renal infection characterized by costovertebral angle pain and tenderness, often with fever; it occurs in the same population that experiences acute uncomplicated urinary infection.

Acute uncomplicated urinary tract infection is a symptomatic bladder infection characterized by frequency, urgency, dysuria, or suprapubic pain in a woman with a normal genitourinary tract, and it is associated with both genetic and behavioral determinants.

Asymptomatic bacteriuria, or asymptomatic urinary infection, is isolation of a specified quantitative count of bacteria in an appropriately collected urine specimen obtained from a person without symptoms or signs referable to urinary infection.

Bacteriuria > 100,000 colony forming units per milliliter of urine sample

Complicated urinary tract infection," which may involve either the bladder or kidneys, is a symptomatic urinary infection in individuals with functional or structural abnormalities of the genitourinary tract [5]. Uncomplicated urinary infection occurs rarely in men, and urinary infection in men is usually considered complicated.

Pyuria is the presence of increased numbers of polymorphonuclear leukocytes in the urine and is evidence of an inflammatory response in the urinary tract.

Reinfection is recurrent urinary tract infection with an organism originating from outside of the urinary tract, either a new bacterial strain or a strain previously isolated that has persisted in the colonizing flora of the gut or vagina.

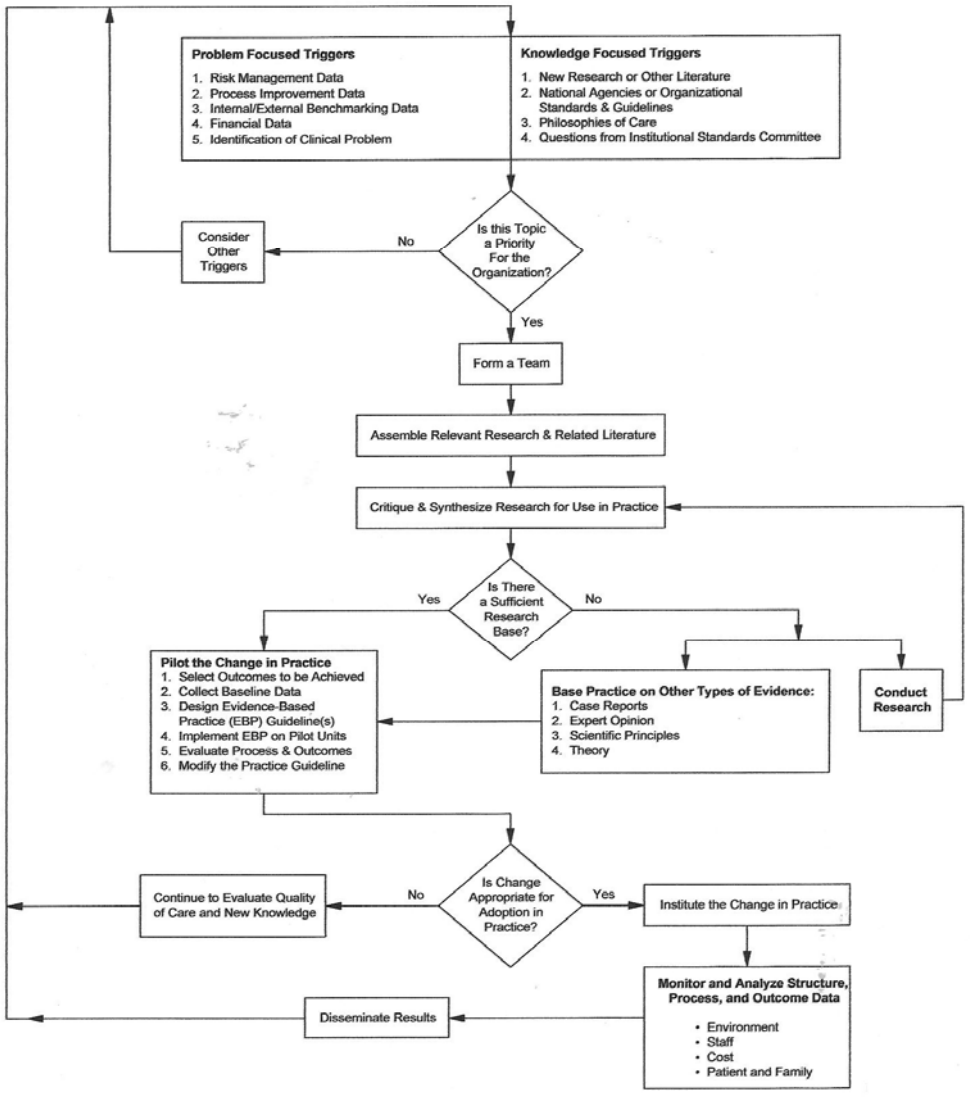
Relapse is a recurrent urinary tract infection after therapy resulting from persistence of the pre-therapy isolate in the urinary tract.

APPENDIX C

IOWA MODEL OF EVIDENCE-BASED PRACTICE

TO PROMOTE QUALITY CARE

The Iowa Model of Evidence-Based Practice to Promote Quality Care



◇ = a decision point

Reference
Titler, M.G., Kleiber, C., Steelman, V., Rakel, B., Budreau, G., Everett, L.Q., Buckwalter, K.C., Tripp-Reimer, T., & Goode C. (2001).The Iowa Model of Evidence-Based Practice to Promote Quality Care. *Critical Care Nursing Clinics of North America, 13(4), 497-509.*

APPENDIX D

INFECTIOUS DISEASE SOCIETY OF AMERICA'S

CLINICAL PRACTICE GUIDELINES FOR FEVER

Clinical Practice Guideline for the Evaluation of Fever and Infection in Older Adult Residents of Long-Term Care Facilities: 2008 Update by the Infectious Diseases Society of America

Symptoms and Signs of Suspected Infection

Typical symptoms and signs of infection are frequently absent in LTCF residents, and as one ages and becomes more frail, basal body temperature decreases, making it less likely that one will achieve classic definitions of fever. Infection should be suspected in residents with the following characteristics:

Infection should be suspected in LTCF residents with

A. Decline in functional status, defined as new or increasing confusion, incontinence, falling, deteriorating mobility, reduced food intake, or failure to cooperate with staff (B-II).

B. Fever defined as: (1) A single oral temperature > 100F; or (2) repeated oral temperatures > 99F or rectal temperatures > 99.5F; or (3) an increase in temperature of > 2F over the baseline temperature (B-III).

Evaluation of the Resident

CNAs are almost always the first to recognize a symptom or sign of infection in LTCF residents, but data suggest that they frequently misinterpret these clinical clues.

The initial clinical evaluation of infection should be a 3- tiered approach involving a CNA, the on-site nurse, and an advanced-practice nurse, physician assistant, or physician (B-III).

CNAs should measure vital signs (temperature, heart rate, blood pressure, and respiratory rate). Residents who are suspected of having an infection or who have fever, as defined previously should be reported immediately to the on-site nurse (B-II).

Clinical Evaluation

Few data are available to suggest which of the most helpful clinical evaluations should be performed in LTCF residents with suspected infection. However, on the basis of the most common sites of infection and the tenuous physiologic reserve for most residents of LTCFs, the following recommendations can be made:

Initial clinical evaluation should involve assessment of respiratory rate, hydration status, mental status, oropharynx, conjunctiva, skin (including sacral, perineum, and peri-rectal areas), chest, heart, abdomen, and indwelling devices (if present) (B-III).

Communication

Effective communication of a resident's status is perhaps intuitive, but some guiding principles can be stated.

Information should be relayed to the responsible advance practice nurse, physician assistant, or physician for decisions regarding further evaluation (B-III).

The full extent of the clinical evaluation should be documented as part of the medical record. If specific diagnostic measures are consciously withheld, the reasons should be recorded (B-III).

Laboratory Tests

A full summary of the evaluations for laboratory tests in specific situations is not possible, because they are too numerous to list. The reader is referred to the recommendations for specific syndromes (i.e., UTI, pneumonia, GI infection, and skin and soft-tissue infection [SSTI]). However, several overall guiding principles can be highlighted.

Initial Diagnostic Testing

Advance directives for residents should be reviewed prior to any intervention; if not prohibited by such directives; initial diagnostic tests for suspected infection can be performed in the LTCF if resources are available and if studies can be done in a timely manner (B-III).

Blood Cell Count

A complete blood cell (CBC) count, including peripheral white blood cell (WBC) and differential cell counts preferably a manual differential to assess bands and other immature forms), should be performed for all LTCF residents who are suspected of having infection within 12-24 h of onset of symptoms (or sooner, if the resident is seriously ill), consistent with local standards of practice (B-II).

The presence of an elevated WBC count (WBC count, _14,000 cells/mm3) or a left shift (percentage of band neutrophils or metamyelocytes, 46%; or total band neutrophil count, > 1,500 cells/mm3) warrants a careful assessment for bacterial infection in any LTCF resident with suspected infection, with or without fever (B-II).

In the absence of fever, leukocytosis and/or left shift, or specific clinical manifestations of a focal infection, additional diagnostic tests may not be indicated, because of the low potential yield (C-III). Non-bacterial infections, however, cannot be excluded.

Urinalysis and Urine Culture

Urinalysis and urine cultures should not be performed for asymptomatic residents (A-I).

In non-catheterized residents, the diagnostic laboratory evaluation of suspected UTI should be reserved for those with acute onset of UTI-associated symptoms and signs (e.g., fever, dysuria, gross hematuria, new or worsening urinary incontinence, and/or suspected bacteremia) (A-II).

In residents with long-term indwelling urethral catheters, evaluation is indicated if there is suspected urosepsis (i.e., fever, shaking chills, hypotension, or delirium), especially in the context of recent catheter obstruction or change (A-II).

Appropriately collected urine specimens include a midstream or clean-catch specimen obtained from elderly men who are cooperative and functionally capable; however, it is often necessary to use a freshly applied, clean condom external collection system, with frequent monitoring of the urine bag (B-II). Specimen collection from women will often require an in-and-out catheterization (B-III).

Residents with long-term indwelling urethral catheters and suspected urosepsis should have catheters changed prior to specimen collection and institution of antibiotic therapy (A-II).

The minimum laboratory evaluation for suspected UTI should include urinalysis for determination of leukocyte esterase and nitrite level by use of a dipstick and a microscopic examination for WBCs (B-II). If pyuria (410 WBCs/high-power field) or a positive leukocyte esterase or nitrite test is present on dipstick, only then should a urine culture (with antimicrobial susceptibility testing) be ordered (B-III).

If urosepsis is suspected, urine and paired blood specimens should be obtained, if feasible, for culture and antimicrobial susceptibility testing and a Gram stain of uncentrifuged urine should be requested (B-III).

Blood Culture

In a study of older adult nursing home residents, blood cultures were demonstrated to have a low yield and rarely to influence therapy; thus, they are not recommended for most residents of LTCFs (B-II) (note: this may not apply to all types of residents or to all types of LTCFs). Blood cultures may be appropriate for residents in whom bacteremia is highly suspected and if the LTCF has quick access to laboratory facilities, adequate physician coverage to respond to positive culture results, and a capacity to administer parenteral antibiotics.

APPENDIX E

INFECTIOUS DISEASE SOCIETY OF AMERICA'S CLINICAL PRACTICE GUIDELINES FOR ASYMPTOMATIC BACTERIURIA IN ADULTS 2005

Infectious Diseases Society of America Guidelines for the Diagnosis and Treatment of Asymptomatic Bacteriuria in Adults 2005

Authors: Lindsay E. Nicolle, Suzanne Bradley, Richard Colgan, James C. Rice, Anthony Schaeffer, and Thomas M. Hooton

SUMMARY OF RECOMMENDATIONS

1. The diagnosis of asymptomatic bacteriuria should be based on results of culture of a urine specimen collected in a manner that minimizes contamination (A-II) (table 1).

    - For asymptomatic women, bacteriuria is defined as 2 consecutive voided urine specimens with isolation of the same bacterial strain in quantitative counts > 105 cfu/mL (B-II).
    - A single, clean-catch voided urine specimen with 1 bacterial species isolated in a quantitative count > 105 cfu/mL identifies bacteriuria in men (BIII).
    - A single catheterized urine specimen with 1 bacterial species isolated in a quantitative count > 102 cfu/mL identifies bacteriuria in women or men (A-II).

2. Pyuria accompanying asymptomatic bacteriuria is not an indication for antimicrobial treatment (A-II).

3. Pregnant women should be screened for bacteriuria by urine culture at least once in early pregnancy, and they should be treated if the results are positive (A-I).

    - The duration of antimicrobial therapy should be 3-7 days (A-II).
    - Periodic screening for recurrent bacteriuria should be undertaken following therapy (A-III).
    - No recommendation can be made for or against repeated screening of culture-negative women in later pregnancy.

4. Screening for and treatment of asymptomatic bacteriuria before transurethral resection of the prostate is recommended (A-I).

    - An assessment for the presence of bacteriuria should be obtained, so that results will be available to direct antimicrobial therapy prior to the procedure (A-III).
    - Antimicrobial therapy should be initiated shortly before the procedure (A-II).
    - Antimicrobial therapy should not be continued after the procedure, unless an indwelling catheter remains in place (B-II).

5. Screening for and treatment of asymptomatic bacteriuria is recommended before other urologic procedures for which mucosal bleeding is anticipated (A-III).

6. Screening for or treatment of asymptomatic bacteriuria is not recommended for the following persons.

   - Premenopausal, non-pregnant women (A-I).
   - Diabetic women (A-I).
   - Older persons living in the community (A-II).
   - Elderly, institutionalized subjects (A-I).
   - Persons with spinal cord injury (A-II).
   - Catheterized patients while the catheter remains in situ (A-I).

7. Antimicrobial treatment of asymptomatic women with catheter-acquired bacteriuria that persists 48 h after indwelling catheter removal may be considered (B-I).

8. No recommendation can be made for screening for or treatment of asymptomatic bacteriuria in renal transplant or other solid organ transplant recipients (C-III)

APPENDIX F

INTERNAL REVIEW BOARD APPROVAL

UNIVERSITY of NORTHERN COLORADO
Institutional Review Board (IRB)

February 14, 2012

TO: Maria Lahman
Applied Statistics and Research Methods

FROM: The Office of Sponsored Programs

RE: Exempt Review of *Evidenced Based Policy and Procedures in Long Term Care for UTIS and ASP,* submitted by Anna R. Olson (Research Advisor: Faye Hummel)

The above proposal is being submitted to you for exemption review. When approved, return the proposal to Sherry May in the Office of Sponsored Programs.

I recommend approval.

M-K-L 3-4-12
Signature of Co-Chair Date

The above referenced prospectus has been reviewed for compliance with HHS guidelines for ethical principles in human subjects research. The decision of the Institutional Review Board is that the project is exempt from further review.

IT IS THE ADVISOR'S RESPONSIBILITY TO NOTIFY THE STUDENT OF THIS STATUS.

Comments: emailed 2-12 MKS

25 Kepner Hall ~ Campus Box #143
Greeley, Colorado 80639
Ph: 970.351.1907 ~ Fax: 970.351.1934

APPENDIX G

MUTUAL AGREEMENT FORM

DNP CAPSTONE PROJECT
STATEMENT OF MUTUAL AGREEMENT

The purpose of this "Statement of Mutual Agreement" is to describe the shared view between Columbine Health Systems and Anna R. Olson, (DNP student at the University of Northern Colorado) concerning the DNP Capstone required for graduation. This DNP capstone will entail writing policy for Urinary Tract Infections (UTI) and Asymptomatic Bacteriuria (ASB) for long-term care facilities (LTCFs).

PROJECT TITLE:

Evidence-Based Policy for Asymptomatic Bacteriuria in the Institutionalized Elderly: A DNP Capstone Project.

PROJECT DESCRIPTION:

AIM: to assist LTCFs to implement evidenced based practice (EBP) for UTIs and ASB by developing policy reflecting the most recent research evidence. The DNP student will write EBP policy for UTIs and ASB in accordance with the LTCFs policy and procedure process and in collaboration with the organization's leaders. GOAL: to align current nursing practice in Colorado with the best available evidence and current clinical guidelines for UTIs and ASB.

EDUCATION

A theory based educational intervention will be offered by the DNP student (as an APRN-BC, apart from the DNP capstone) to improve nurses' knowledge, self-efficacy and skills for treating asymptomatic bacteriuria (ASB. The education targets improving nurses' ability to distinguish between ASB and urinary tract infections. The proposed model for implementing the clinical guidelines is guided by the Evidence-Based Practice for Promoting Quality Care.

BACKGROUND

Proper evaluation of the bacteriuric resident with clinical status changes is needed. High percentages of institutionalized elderly have bacteria in the urine, which does not need to be screened or treated with antibiotics. However, large numbers of institutionalized elderly are screened for urinary tract infections despite an absence of genitourinary symptoms when there has been a change in resident status (dysuria, urgency, frequency, new or worsening incontinence, hematuria, flank pain for bladder tenderness). As a result, asymptomatic bacteriuria is being treated with antibiotics and real reasons for changes in clinical status are not being detected. Inappropriate antibiotic use is resulting in patients' experiencing adverse side effects, increased health care costs, and dangerous antimicrobial resistance.

OTHER ITEMS OF AGREEMENT:

1. Participating facilities will provide urinalysis, urine cultures and UTI incident rates (12 months prior and 3 months after) policy change.
2. After writing the new P&Ps, the DNP student will train leadership in EBP of UTIs and ASB for the purpose of disseminating new policy.
3. Columbine Health Systems would like to be referred to as four nursing homes in northern Colorado in publication materials.
4. All products resulting from the DNP capstone project will remain the property rights of Anna Olson.

Ann R. Olson, APRN-BC, DNP Student	Date
Annette Olson and/or LTCF Director of Nursing	Date
Dr. Faye Hummel, Committee Chair University of Northern Colorado (UNC)	Date
Dr. Catherine Dingley, Faculty Committee Member, UNC	Date
Dr. Rhonda Squires, Faculty Committee Member, UNC	Date

APPENDIX H

PERMISSION TO USE IOWA MODEL OF EVIDENCE-BASED PRACTICE TO PROMOTE QUALITY CARE

October 14, 2011

Anna R. Olson, APRN-BC
Nurse Practitioner
University of Northern Colorado
Gunter Hall 3080 Box 125
Greeley, CO 80639

Dear Ms. Olson:

As requested on October 13, 2011, you have permission to use the *1998 Model of Evidence-Based Practice to Promote Quality Care* in your student paper/assignment (Capstone Project) and in your classroom teachings.

Copyright of the *Model of Evidence-Based Practice to Promote Quality Care* will be retained by the University of Hospitals and Clinics.

Permission is not granted for placing the Model on the internet (world-wide web).

If you have any questions, please feel free to contact me at 319-384-9098 or kimberly-jordan@u.edu.

Kim Jordan
Administrative Assistant
Nursing Research and Evidence-Based Practice
Department of Nursing Services and Patient Care
University of Hospitals and Clinics
200 Hawkins Drive, T100 GH
 City, IA 52242-1009
319-384-9098
319-353-8669 (fax)
kimberly-jordan@u.edu

APPENDIX I

NEW POLICIES AND PROCEDURES

TITLE: URINAY TRACT INFECTIONS (UTIs)

POLICY:

Residents with suspected UTIs should be properly evaluated and treated. Because bacteria and pyuria is often found in the urine of nursing home residents, careful evaluation of the resident for **genitourinary symptoms** must occur before any urinary diagnostic tests are ordered or the provider called. **The most reliable indicators for a true UTI in the long-term care facility resident are symptoms arising from the urinary tract specifically and not just bacteriuria, pyuria, or non-specific clinical changes (I-II)**

PROCEDURE:

1. Changes in behavior or clinical status observed in a LTC resident should not prompt the ordering of urinalyses and urine cultures if there are no urinary tract symptoms (II).

2. Urinary diagnostic testing should be reserved for those with acute onset of UTI symptoms (i.e., dysuria, hematuria, new/worse UI, suspected bacteremia, or fever in addition to one or more of these) or for suspected urosepsis (fever, shaking, chills, hypotension, delirium; II).

3. Specimens should be mid-stream or clean catch from men (II), straight catheter for women (III), or from a newly changed catheter (II).

4. Minimum testing includes leukocyte esterase and nitrate levels by dipstick and microscopic analysis for WBC on UA (II).

5. If these are positive, urine cultures are recommended with anti-microbial testing (III).

6. The absence of pyuria is a strong predictor that no UTI exists (80-90% (I)).

7. Bacteria and pyuria do not equal a symptomatic UTI (I).

8. Pyuria does not differentiate between symptomatic and asymptomatic urinary infections (I).

9. Positive urinary diagnostic testing plus urinary tract symptoms are the hallmark for diagnosing a true UTI in the LTC resident, for which antibiotics are warranted (I; Loeb et al., 2005; High et al., 2009; Nicolle et al., 2005).

10. If urosepsis is suspected, urine and paired blood specimens should be obtained, if feasible, for culture and antimicrobial susceptibility testing and a Gram stain of uncentrifuged urine should be requested (III)

11. When residents present with urinary tract symptoms, have urine collected for testing, are started on antibiotics, but end up having negative urine cultures, antibiotics should be discontinued (II). The goal of treating individuals with chronic indwelling catheters who have symptomatic UTIs is to control systemic symptoms, not to eliminate bacteria. Therefore, treatment duration can be shorter (I).

12. It has been noted that approximately 50% of residents treated with antibiotics will have bacteria in their urine within six weeks after treatment. Therefore, regularly monitoring post-therapy urine cultures for test of cure is not recommended unless GU symptoms persist or recur (II).

13. Finally, unsubstantiated speculation about UTIs as a cause of multiple symptoms and condition changes is highly discouraged. Unless an individual is febrile and has symptoms referable to the urinary tract, other potential causes--such as fluid and electrolyte imbalance or adverse drug reactions--should be strongly considered instead of, or in addition to, a UTI (II).

The Infectious Disease Society of America and American Geriatric Society and Center for Disease Control place a heavy emphasis on remembering that bacteriuria or pyuria alone, or the combination of both, is not sufficient to diagnose a UTI when no urinary symptoms are present (I).

TITLE: ASYMPTOMATIC BACTERIURIA (ASB)

POLICY:

ASB has a high prevalence in nursing home residents. Synthesis of the systematic literature review clearly indicates there is no role for screening or treating asymptomatic bacteriuria in the nursing home. The only exception for screening and treatment of ASB is in men and women preparing for urologic procedures for which mucosal bleeding is anticipated. Sterilizing the urine with antibiotics in asymptomatic bacteriuria only temporarily eliminates the bacteria present, usually for six weeks. The presence of ASB has not been associated with increased incidence of symptomatic UTIs, urosepsis, bacteremia, or death. However, treatment of ASB with antibiotics has been associated with increased medication costs, antibiotic resistance, and adverse side effects from the medication.

PROCEDURE:

1. The diagnosis of asymptomatic bacteriuria should be based on results of culture of a urine specimen collected in a manner that minimizes contamination (A-II).

    - For asymptomatic women, bacteriuria is defined as 2 consecutive voided urine specimens with isolation of the same bacterial strain in quantitative counts > 10^5 cfu/mL (B-II).
    - A single, clean-catch voided urine specimen with 1 bacterial species isolated in a quantitative count > 105 cfu/mL identifies bacteriuria in men (BIII).
    - A single catheterized urine specimen with 1 bacterial species isolated in a quantitative count > 102 cfu/mL identifies bacteriuria in women or men (A-II).

2. Pyuria accompanying asymptomatic bacteriuria is not an indication for antimicrobial treatment (A-II).

3. Screening for and treatment of asymptomatic bacteriuria before transurethral resection of the prostate is recommended (A-I).

    - An assessment for the presence of bacteriuria should be obtained, so that results will be available to direct antimicrobial therapy prior to the procedure (A-III).
    - Antimicrobial therapy should be initiated shortly before the procedure (A-II).
    - Antimicrobial therapy should not be continued after the procedure, unless an Indwelling catheter remains in place (B-II).

4. Screening for and treatment of asymptomatic bacteriuria is recommended before other urologic procedures for which mucosal bleeding is anticipated (A-III).

5. Screening for or treatment of asymptomatic bacteriuria is not recommended for the following persons.

   - Premenopausal, non-pregnant women (A-I).
   - Diabetic women (A-I).
   - Older persons living in the community (A-II).
   - Elderly, institutionalized subjects (A-I).
   - Persons with spinal cord injury (A-II).
   - Catheterized patients while the catheter remains in situ (A-I).

6. Antimicrobial treatment of asymptomatic women with catheter-acquired bacteriuria that persists 48 h after indwelling catheter removal may be considered (B-I).

7. No recommendation can be made for screening for or treatment of asymptomatic bacteriuria in renal transplant or other solid organ transplant recipients (C-III).

TITLE: SUSPECTED INFECTION IN NURSING HOME RESIDENT

POLICY: Symptoms and Signs of Suspected Infection

Typical symptoms and signs of infection are frequently absent in LTCF residents, and as one ages and becomes more frail, basal body temperature decreases, making it less likely that one will achieve classic definitions of fever. Infection should be suspected in residents with the following characteristics:

PROCEDURE:

Infection should be suspected in LTCF residents with

A. Decline in functional status, defined as new or increasing confusion, incontinence, falling, deteriorating mobility, reduced food intake, or failure to cooperate with staff (B-II).

B Fever defined as: (1) A single oral temperature > 100^0F; or (2) repeated oral temperatures > 99^0F or rectal temperatures > $99.^5$F; or (3) or an increase in temperature of > 2^0F over the baseline temperature (B-III).

Evaluation of the Resident

CNAs are almost always the first to recognize a symptom or sign of infection in LTCF residents, but data suggest that they frequently misinterpret these clinical clues.

The initial clinical evaluation of infection should be a 3- tiered approach involving a CNA, the on-site nurse, and an advanced-practice nurse, physician assistant, or physician (B-III).

CNAs should measure vital signs (temperature, heart rate, blood pressure, and respiratory rate). Residents who are suspected of having an infection or who have fever, as defined previously should be reported immediately to the on-site nurse (B-II).

Clinical Evaluation

Few data are available to suggest which of the most helpful clinical evaluations should be performed in LTCF residents with suspected infection. However, on the basis of the most common sites of infection and the tenuous physiologic reserve for most residents of LTCFs, the following recommendations can be made:

Initial clinical evaluation should involve assessment of respiratory rate, hydration status, mental status, oropharynx, conjunctiva, skin (including sacral, perineum, and peri-rectal areas), chest, heart, abdomen, and indwelling devices (if present) (B-III).

Communication

Effective communication of a resident's status is perhaps intuitive, but some guiding principles can be stated.

Information should be relayed to the responsible advance practice nurse, physician assistant, or physician for decisions regarding further evaluation (B-III).

The full extent of the clinical evaluation should be documented as part of the medical record. If specific diagnostic measures are consciously withheld, the reasons should be recorded (B-III).

Laboratory Tests

A full summary of the evaluations for laboratory tests in specific situations is not possible, because they are too numerous to list. The reader is referred to the recommendations for specific syndromes (i.e., UTI, pneumonia, GI infection, and skin and soft-tissue infection [SSTI]). However, several overall guiding principles can be highlighted.

Initial Diagnostic Testing

Advance directives for residents should be reviewed prior to any intervention; if not prohibited by such directives; initial diagnostic tests for suspected infection can be performed in the LTCF if resources are available and if studies can be done in a timely manner (B-III).

Blood Cell Count

A complete blood cell (CBC) count, including peripheral white blood cell (WBC) and differential cell counts preferably a manual differential to assess bands and other immature forms), should be performed for all LTCF residents who are suspected of having infection within 12-24 hours of onset of symptoms (or sooner, if the resident is seriously ill), consistent with local standards of practice (B-II).

The presence of an elevated WBC count (WBC count, > 14,000 cells/mm^3) or a left shift (percentage of band neutrophils or metamyelocytes, 46%; or total band neutrophil count, > 1,500 cells/mm^3) warrants a careful assessment for bacterial infection in any LTCF resident with suspected infection, with or without fever (B-II).

In the absence of fever, leukocytosis and/or left shift, or specific clinical manifestations of a focal infection, additional diagnostic tests may not be indicated, because of the low potential yield (C-III). Non-bacterial infections, however, cannot be excluded.

Urinalysis and Urine Culture

Urinalysis and urine cultures should not be performed for asymptomatic residents (A-I).

In non-catheterized residents, the diagnostic laboratory evaluation of suspected UTI should be reserved for those with acute onset of UTI-associated symptoms and signs (e.g., fever, dysuria, gross hematuria, new or worsening urinary incontinence, and/or suspected bacteremia) (A-II).

In residents with long-term indwelling urethral catheters, evaluation is indicated if there is suspected urosepsis (i.e., fever, shaking chills, hypotension, or delirium), especially in the context of recent catheter obstruction or change (A-II).

Appropriately collected urine specimens include a midstream or clean-catch specimen obtained from elderly men who are cooperative and functionally capable; however, it is often necessary to use a freshly applied, clean condom external collection system, with frequent monitoring of the urine bag (B-II). Specimen collection from women will often require an in-and-out catheterization (B-III).

Residents with long-term indwelling urethral catheters and suspected urosepsis should have catheters changed prior to specimen collection and institution of antibiotic therapy (A-II).

The minimum laboratory evaluation for suspected UTI should include urinalysis for determination of leukocyte esterase and nitrite level by use of a dipstick and a microscopic examination for WBCs (B-II). If pyuria (4^{10} WBCs/hpf) or a positive leukocyte esterase or nitrite test is present on dipstick, only then should a urine culture (with antimicrobial susceptibility testing) be ordered (B-III).

If urosepsis is suspected, urine and paired blood specimens should be obtained, if feasible, for culture and antimicrobial susceptibility testing and a Gram stain of uncentrifuged urine should be requested (B-III).

Blood Culture

In a study of older adult nursing home residents, blood cultures were demonstrated to have a low yield and rarely to influence therapy; thus, they are not recommended for most residents of LTCFs (B-II) (note: this may not apply to all types of residents or to all types of LTCFs). Blood cultures may be appropriate for residents in whom bacteremia is highly suspected and if the LTCF has quick access to laboratory facilities, adequate physician coverage to respond to positive culture results, and a capacity to administer parenteral antibiotics.

APPENDIX J

WORKSHOP SURVEY

Evaluation Form

Evidence-Based Policy and Procedures for UTI and ASB

Date:

Staff position _____ Highest level of education _____

Gender _____ Average length of time (in years as nurse) _____

in long-term care _____

1) Strongly Disagree 2) Disagree 3) Neutral 4) Agree 5) Strongly Agree Scale

1)	The presentations on UTIs and ASB was relevant to my nursing homes interests/needs	
2)	The new P&Ps were clear and concise	
3)	The presentation was well organized	
4)	There were sufficient examples, visual aids and materials to support the presentation	
5)	The handouts were useful	
6)	The implementation strategies offered were useful	
7)	The evaluation strategies offered were useful	
8)	My understanding of UTIs and ASB was improved by this DNP project to create evidence-based P&Ps	
9)	The presenter was prepared and had a good command of the subject	
10)	The presenter handled questions well	
11)	The presenter managed time well	
12)	Following this presentation, I am certain I will succeed at implementing the new P&Ps in my facility	
13)	Following this presentation, I am certain I will succeed at evaluating the effect of the new P&Ps in my facility	

After this DNP Capstone project, to what extent do you understand the following topics?

	Not Very Well	Fairly Well	Completely	Already Knew
Topic: UTIs				
Topic: ASB				
Topic: When not to order urinary testing				
Topic: When to order urinary testing				

To what extent has the project prepared you to:

	Not Much	Somewhat	A Lot
Topic: Implement the new P&Ps			
Topic: Evaluate outcome of new P&Ps			

To what extent did the DNP student:

	Not Much → Great Deal				
Provide adequate opportunities for interaction/participation	1	2	3	4	5
Provide specific answers to your questions	1	2	3	4	5
Respect your knowledge and experience	1	2	3	4	5
Use appropriate examples	1	2	3	4	5
Provide clear explanations	1	2	3	4	5
Find the right balance between delivery of information, group tasks, and individual tasks	1	2	3	4	5

What were the strongest elements of the new P&Ps?

What elements needed improvement? Was there anything covered that remains unclear?

Please share any additional comments you may have.

APPENDIX K

LOEB'S CRITERIA FOR ORDERING URINE CULTURES AND PRESCRIBING ANTIBIOTICS

LOEB CRITERIA

Loeb, M., Bentley, D.W., Bradley, S. et al. (2001). Development of minimum criteria for the initiation of antibiotics in residents of long-term-care facilities: Results of a consensus conference. *Infection Control Hospital Epidemiology*, 22:120-124.

1. In the presence of an indwelling urinary catheter, one of the following criteria must be met.

    - fever (>37.91C (100F) or increase of 1.5C (2.4F) above baseline temperature)
    - new costovertebral angle tenderness _ rigors (shaking, chills) with or without identified cause
    - new onset of delirium

2. If a catheter is not present:
    - acute dysuria alone OR fever (>37.91C (100 F) or increase of 1.5 C (2.4 F) above baseline temperature)

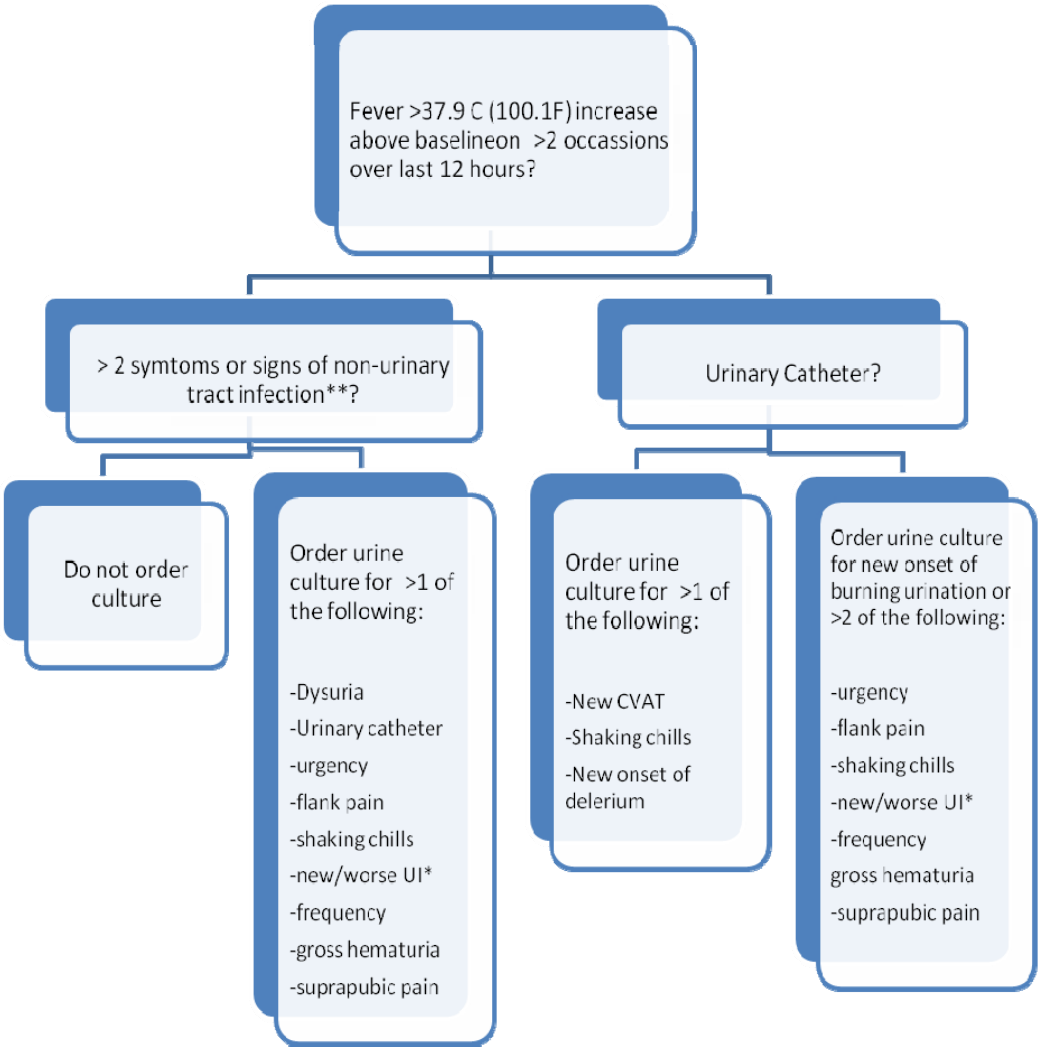
AND at least one of the following:

- new or worsening urgency
- frequency
- suprapubic pain
- gross hematuria
- costovertebral angle tenderness
- urinary incontinence

APPENDIX L

LOEB‘S ALGORITHMS

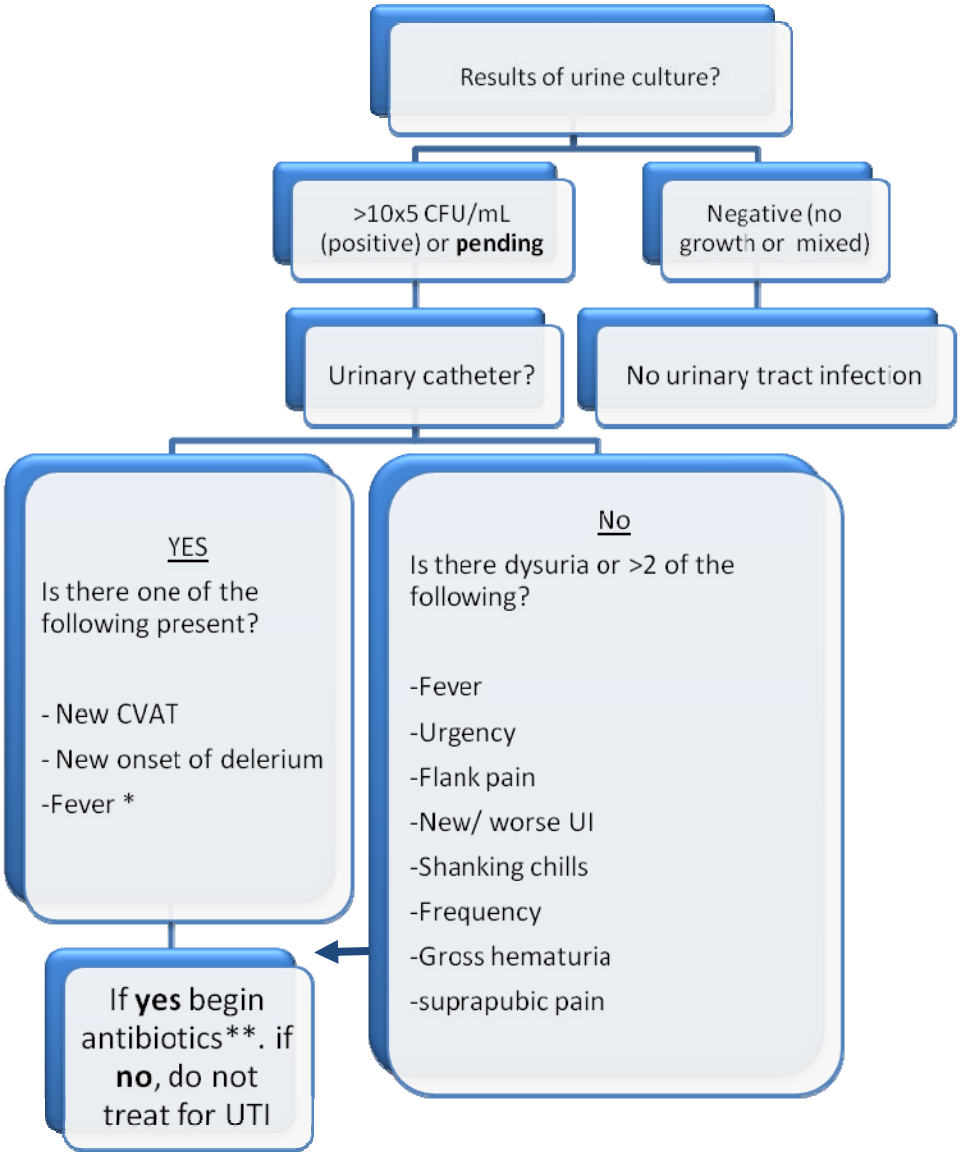
<u>Diagnostic Algorithm</u> for ordering urine cultures for nursing home residents



*UI= urinary incontinence
** Respiratory symptoms include increased shortness of breath, increased cough, increased sputum production, new pleuritic pain.
** Gastrointestinal symptoms include nausea or vomiting, new abdominal pain, new onset of diarrhea
** Skin and soft tissue symptoms include new redness, warmth, swelling, purulent drainage

Adopted from Loeb, M., Brazil, K., Lohfeld, L., McGeer, A., Simor, A., Stevenson, K., . . . Walter, S. D. (2005). Effect of a multifaceted intervention on number of antimicrobial prescriptions for suspected urinary tract infections in residents of nursing homes: Cluster randomized controlled trial. *British Medical Journal, 333,* 669. doi:10.1136/bmj.38602.586343.55

<u>Treatment Agorithm</u> for prescribing antibiotics to nursing home residents



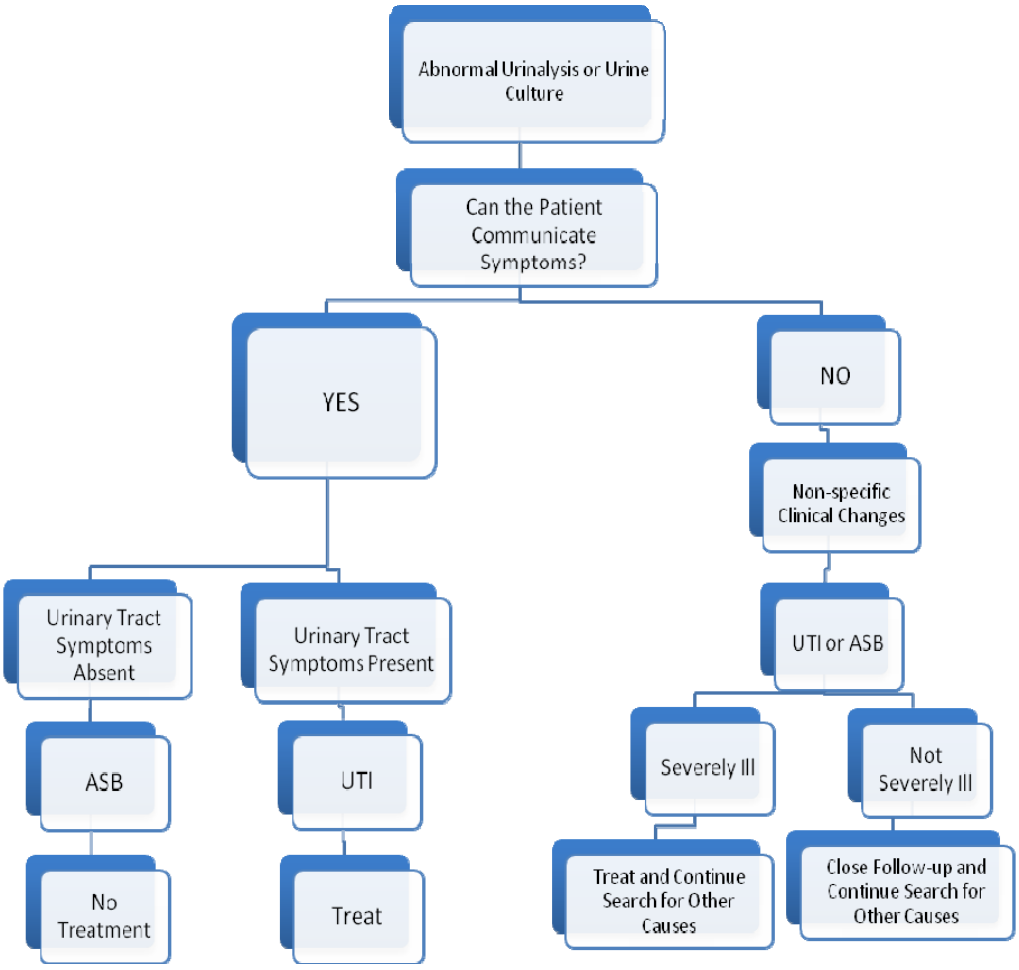
>37.9 C (100 F) or 1.5C (2.4 F) above baseline on 2 occasions over last 12 hours.
**Stop antibiotics if urine culture is negative or no pyuria is present

Adopted from Loeb, M., Brazil, K., Lohfeld, L., McGeer, A., Simor, A., Stevenson, K., . . . Walter, S. D. (2005). Effect of a multifaceted intervention on number of antimicrobial prescriptions for suspected urinary tract infections in residents of nursing homes: Cluster randomized controlled trial. *British Medical Journal, 333,* 669. doi:10.1136/bmj.38602.586343.55

APPENDIX M

BENTON'S ALGORITHM

Distinguishing ASB from UTI in nursing home residents



Adopted from Benton, T. J., Young, R. B., & Leeper, S. C. (2006). Asymptomatic bacteriuria in the nursing home. *Annals of Long Term Care, 14*(7), 17-22.

Monday, February 13, 2012

Dear Dr. Loeb,
I am writing to request permission to make copies of your article in 2005 regarding the "Effects of a multifaceted intervention on antimicrobial prescriptions for suspected UTI in residents of nursing homes: cluster RCT." I appreciated the algorithms and would like to use them in our LTC communities.
Sincerely,
Anna R. Olson, APRN-BC
970-308-6792

Dear Anna,
It certainly is fine with me. I don't know if BMJ has any policies about this but I would imagine that it is OK.
Best regards,
Mark

Monday, February 13, 2012

Dear Dr. Benton,
I am writing to request permission to make copies of your article on "Asymptomatic bacteriuria in the nursing home" (2006) for use in our LTC communities in Colorado. Thank you! Your article and work has positively impacted my practice and I would like to spread it!
Sincerely,
Anna R. Olson, APRN-BC
970-308-6792

Hi Anna,
I'm sorry for the delay. I have had email problems recently. My coordinator, Joanne, mentioned that you called about using the algorithm in the article. I certainly don't care if you use it but be aware that the journal also has some ownership of the article too. They usually don't care so long as it's used for educational purposes.

My hope was to develop a research project based on that algorithm. Perhaps we could collaborate on such a research project sometime?

If I can help in any way please don't hesitate to send me a note. All the best,
Tim Benton

APPENDIX N

URINARY KNOWLEDGE QUESTIONNAIRE

Urinary Knowledge Questionnaire

1. Asymptomatic bacteriuria (ASB) is defined as the presence of bacteria in the urine (of any amount, including > 100,000 cfu/ml), with or without pyuria (WBC > 4/hpf) in a resident with no complaints of urinary symptoms (dysuria, frequency, urgency, hematuria, new or worsening incontinence, ladder tenderness or low back pain). **T/F**

2. A urinary tract infection (UTI) is defined as the presence of bacteria in the urine, with or without pyuria, with the presence of urinary symptoms. **T/F**

3. Asymptomatic bacteriuria requires antibiotic treatment. **T/F**

4. Asymptomatic bacteriuria is very common in the elderly. **T/F**

5. ASB looks exactly like a UTI on testing. The only difference is the presence or absence of urinary symptoms. **T/F**

6. If my patient is 'not acting right,' he/she needs her urine checked? **T/F**

7. If my patient has a fever but no urinary symptoms, he or she needs her urine checked? **T/F**

8. If my patient has cloudy or foul smelling urine, he or she needs her urine checked? **T/F**

9. Circle all that apply.
   Giving a patient an antibiotic for asymptomatic bacteriuria:

   A. Increases antibiotic resistance in the patient and in the facility
   B. Increases the risk of side effects, like *clostridium difficile*
   C. Increases the financial burden on patient and family
   D. Protects my patient from urosepsis, bacteremia and death

10. If my non-catheterized patient is experiencing dysuria, urgency, frequency, hematuria, new or worsening incontinence, bladder tenderness or flank pain, I should request a urinary workup (urine dip, urinalysis, and urine culture with susceptibility if UA is positive). **T/F**

11. Bacteria reside in the urine of all catheterized patients (after 4 weeks). **T/F**

12. Circle all that apply.
In a catheterized patient, I should request a urinary workup if which of the following are present:

    A. New CVAT
    B. Rigors
    C. New onset of delirium
    D. Cloudy or foul smelling urine

13. A fever is only 12% likely to accurately predict a real urinary tract infection. **T/F**

14. A positive urinalysis and urine culture means my patient has a UTI and needs antibiotics? **T/F**

15. Circle all that apply.
If my patient is resisting care, is being more aggressive, or is not acting his/her 'normal self' but is not having urinary symptoms, it could be:

    A. Psychosocial (bad day, lonely, angry)
    B. Biological (hungry, tired, hurting)
    C. Medical (drug side effects or normal symptoms of disease processes)
    D. Metabolic (dehydrated, abnormal blood sugar)
    E. Spiritual

16. Circle all that apply. If my patient has a fever > 100. or temperature > 2.4 degrees above baseline, on at least 2 occasions in 12 hours, but has no urinary symptoms, the cause could be:

    A. Respiratory
    B. Gastrointestinal
    C. Skin or soft tissue

17. Urinalysis and urine cultures should not be performed in asymptomatic patients. **T/F**

18. The only time asymptomatic bacteriuria requires antibiotics is when a patient will be undergoing a urologic procedure in which mucosal bleeding is anticipated. **T/F**

19. Your patient was appropriately started on antibiotics because of urinary symptoms and a positive urine dipstick. However, if the urinalysis comes back with no WBC's or if the culture is negative, should the antibiotics be stopped? **Y/N**

APPENDIX O

ASYMPTOMATIC BACTERIURIA SELF-EFFICACY

Asymptomatic Bacteriuria (ASB) Nurses' Self-Efficacy Scale

For each of the following statements, please rate your certainty by the number scale that corresponds to how certain you are that you can do the following tasks regularly at the present time.

Very Uncertain	1	2	3	4	5	6	7	8	9	10	Very Certain

ITEMS

1. I can always manage to solve difficult problems if I try hard enough.

2. How certain are you that you can distinguish between asymptomatic bacteriuria from a urinary tract infection in a resident?

3. How certain are you that you can act appropriately on behalf of your patient when there is a change in condition but urinary symptoms are absent?

4. How certain are you that you can act appropriately on behalf of your patient when there is a change in condition and urinary symptoms are present?

5. How certain are you that you can accurately detect a potential urinary tract infection in a catheterized patient?

6. How certain are you that you can accurately detect a potential urinary tract infection in a non-catheterized patient?

7. How certain are you that you can correctly collect a urine specimen?

8. How certain are you that you can teach another nurse how to distinguish the difference between ABS and a UTI?

9. How certain are you that you can explain to a resident's family member the difference between ASB and a UTI?

10. How certain are you that you can give the doctor the right information to meet the patient's needs?

11. If needed, how certain are that you can find another nurse to validate your ASB management skills?

12. How certain are you that you can correctly document a resident's symptoms to match the diagnosis of ASB and UTI?

13. How certain are you that you can adopt appropriate assessment of a patient with ASB as a routine care skill?

14. How certain are you that you can encourage your nursing peers to assess for GU symptoms in a resident before requesting urinary diagnostic testing (dipstick, UA, or cultures)?

(ASB = asymptomatic bacteriuria; UTI= urinary tract infection)

SCORING

The score for each item is the number circles. If two consecutive numbers are circled, code the lower number (less self-efficacy). If the numbers are not consecutive, do not score the item. The score for the scales is the mean of the **14** items. If more than two items are missing, do not score the scale.