MEDICATION: MANAGEMENT MATTERS

A TOOLKIT TO PROMOTE IMPROVED MEDICATION MANAGEMENT
IN COMMUNITY DWELLING OLDER ADULTS

A Project

Presented to the faculty of the Departments of Gerontology and Nursing
California State University, Sacramento

Submitted in partial satisfaction of the requirements for the degree of

MASTER OF ARTS
in
Special Major
(Aging and Health Education)

by
Felicia C. Juntunen

FALL
2012
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Felicia C. Juntunen

Approved by:

__________________________________, Sponsor
Cheryl Osborne, EdD.

__________________________________, Committee Member
Dian Baker, Ph.D.

______________________________
Date
Student: Felicia C. Juntunen

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Chevelle Newsome, Ph.D.                     Date

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Abstract

of

MEDICATION: MANAGEMENT MATTERS

A TOOLKIT TO PROMOTE IMPROVED MEDICATION MANAGEMENT
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Felicia C. Juntunen

Problems associated with the use of multiple medications, or polypharmacy, are amplified in older adults. This toolkit, a web-based set of modules, provides instruments for the non-medical student, preparing for a career in geriatric care management or other aging services, to assist the older adult and their caregivers in accomplishing safe and effective medication management according to professional and agency protocols. The four modules address the key themes of: (a) age related changes and medication, (b) the impact of medication adherence, (c) transitional care, and (d) issues for adults aging with intellectual and developmental disabilities. Background data development involved review of the literature and interviews with content experts. The standard for inclusion of electronically available resources established that each resource had to relate to either medication management and/or one of the four module themes. A web-based format was chosen for the project supported by principles of adult learning theory, reflected in the
web site design. Each module includes a goal, objectives, activities that link users to available resources, self-evaluation questions, and references. Content was reviewed for currency, accuracy, and evidence base by an expert panel. Representing future consumers, a focus group evaluated the accessibility, clarity, and relevance of the web site. Analysis of the project evaluation confirms the effectiveness of the project in accomplishing the aim to provide medication management education for gerontology students and entry-level professionals.

_______________________, Sponsor
Cheryl Osborne, EdD.

_______________________Date
DEDICATION

This project is dedicated to my grandmother, Cora Nadine Courter. She helped provide the foundation for this endeavor with her active example in the art of caring for elders during my formative years, her support during my initial years of higher education, and her unconditional love. My achievement of this degree is part of her legacy.
ACKNOWLEDGEMENTS

I consider myself especially fortunate to have the opportunity to complete this degree. Many people, who provided the encouragement and support so essential to the realization of my goal, deserve recognition.

My husband, John, and two youngest children, Isaak and Wyatt, earned my gratitude with their patience during the three years it has taken me to earn this degree. Often, they provided help with computer issues, picked up the slack in areas of home life, and regularly gave me the time I needed to write. My sincere appreciation goes to my mother, Karen, for her frequent words of encouragement and support to complete my goal. Many thanks, too, to George for his many kindnesses. To my friends, Nancy, Martha, Karin, Ruth and Maureen, I owe my thanks for your constant prayers, inquiries, interest, and overall support.

I am indebted to my advisor, Dr. Cheryl Osborne, for welcoming me back to CSUS, expanding my academic horizons, and providing encouragement in the journey. Thank you, Dr. O. for your approachable, kind-heartedness. It has been such a delight to learn under you. I am also grateful to my committee member, Dr. Dian Baker, who extended an invitation to participate in the Interdisciplinary Training Program of the Center for Excellence in Developmental Disabilities (CEDD) at the UC Davis MIND Institute. I never anticipated the dimension that this participation would add to the project. Thank you, Dr. Baker for your inspiration and assistance. I have no doubt the knowledge I acquired about adults aging with developmental disabilities will be
immensely useful in my future work in the field of aging. Many thanks to the CEDD for the support it provided.

Behind each of these significant people and their contributions, God was at work. My ultimate praise and thanks is to my Savior, Jesus Christ, who opened and then led me through doors of opportunity. Even in times of difficulty, He provided the resources to meet my desire to accomplish this goal. May He be glorified through my service to aging adults.
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Introduction

Management of medication is a topic that commands the attention of any professional involved in the care and support of aging adults. As average life expectancy has increased so has the growth in the number of medications available to treat chronic health conditions, and the use of prescription and over-the-counter medication is now almost synonymous with aging. Older adults represent approximately 13% of the population, yet take at least one third of drugs that are prescribed and use approximately 40% of over-the-counter medications that are purchased (Saxon, Etten, & Perkins, 2010). Adults aged 75 and older take an average of 7.9 prescription drugs every day (National Council on Patient Information and Education, 2007).

Problems associated with the use of multiple medications, or polypharmacy, are amplified in older adults. Though medications are prescribed to treat disease and improve health, the use of multiple medications increases the risk of poor health outcomes, including prescribing and adherence problems (Steinman & Hanlon, 2010). A study of older adults, average age 75, found that 40% did not adhere to instructions for taking their prescribed medications (Saxon et al., 2010). Because the ability to properly manage medication is recognized as an instrumental activity of daily living, a skill critical for older adults to maintain their independence (Hayes, Larimer, & Kaye, 2009), the mismanagement of medication has the potential to threaten an older adult’s ability to remain in their home (Bergman-Evans, 2006). Frequently, poor medication management becomes evident when an older adult experiences a fall or other health-threatening event, which jeopardizes their independence (MacLaughlin et al., 2005).
Medication mismanagement also has a financial toll. Estimates are that the direct and indirect health care cost of inadequate medication adherence alone, is $177 billion annually (National Council on Patient Information and Education, 2007). Medication nonadherence is responsible for more than 10% of hospital admissions among older adults (Schlenk, Dunbar-Jacob, & Engberg, 2004). Poor medication management practices among older adults can affect quality of life for seniors and their caregivers, and financially strain the systems who seek to support older adults to maintain their desired independence, including aging adults living with developmental disabilities.

Along with the increased longevity of the general population, adults aging with developmental disabilities are also experiencing a lengthened life span (Heller, 2010). Almost 80% of individuals living with developmental disabilities reside at home and in 25% of those households the family caregiver is 60 years or older. Many adults with developmental disabilities experience earlier onset of chronic conditions than the general aging population and often, life-long medication use. Coupled with the effects of aging, the impact of medication mismanagement is magnified for this population and their aging family caregivers.

The increasing number of older adults, both those aging with and without developmental disabilities, combined with the increasing use of medications to treat chronic conditions inherent to aging and the risks associated with poor medication management, makes medication management one of the foremost challenges faced by professionals working across the health and elder care continuum (National Council on Patient Information and Education, 2007). Given the serious impact on the quality of life
for older adults, the issue of medication management is of critical interest to gerontology students when preparing for professions that serve community dwelling older adults.

In response to the challenges of supporting older adults in proper medication management, the development of an opportunity for medication management education for gerontology students and entry-level professionals is the purpose of the project.

**Project Purpose**

This project provides a cohesive and accessible resource of information on the issue of medication management as it relates to the community dwelling older adult. The purpose of this project is to provide gerontology students with evidence-based information and resources in medication management to first develop the user’s awareness of the importance of medication management and illustrate why and how all professionals and care providers who serve older adults play a critical role in the success of medication management. Secondly, the project seeks to increase the user’s competence to support strategies for improved medication management for community dwelling older adults and thereby assist them in their ability to age in place.

Gerontology students preparing for a career in aging services may consider geriatric care management. A geriatric care manager (GCM) is one type of professional focused on assisting and serving older adults and their families. The overall goal of a plan of care developed by a GCM is to “strive to assist the older person to attain the highest level of health and quality of life that is possible within his/her particular set of circumstances” (National Association of Professional Geriatric Care Managers [NAPGCM], 2011, p.5). Bergman-Evans (2006), states, “all providers and professionals
who care for older adults have an important role to play in the process of managing medications” (p. 11). Regardless of the career path chosen, if gerontology students engage in employment related to the support older adults, they are likely to encounter medication management issues with clients and as Bergman-Evans notes, they will have a role to play in the success of those processes. Gerontology students may find it challenging to locate a cohesive source of information on medication management for the non-medical professional.

There are a variety of programs and resources available for medication administration in regulated, assisted care settings. These programs typically train formal care providers how to administer medication within legal parameters and how to document this care provision. For the student preparing for a career in geriatric care management or other aging services, this is particularly challenging. For the non-medical professional, medication administration is not their proper or legal role; rather, their role is to assist the older adult and their caregivers in accomplishing safe and effective medication management according to the protocol of their profession and whichever organization they represent.

The project will equip gerontology students and entry-level professionals with knowledge about medication management fundamentals and increase their ability to support the desired independence of the community dwelling adults whom they serve.
**Project Description**

The project is a web-based tool kit, a collection of evidence-based information and electronically available resources, selected to provide medication management education for gerontology students and entry-level professionals.

The online toolkit is conceptualized as a self-directed learning opportunity, based on Knowles’ theory of adult learning, which equates the effectiveness of adult education with self directed learning, relevant material, and self evaluation (Knowles, 1980). Studies regarding the effectiveness of online learning experiences of adults align with Knowles’ theory, and establish the validity of the web site format for the project (Kim & Frick, 2011, Park & Choi, 2009, U.S Dept of Education, 2010).

The subject content of the toolkit is a result of the literature review, where four key areas or themes emerged which contribute to understanding and improving medication management for community dwelling older adults. These themes are: (a) age related changes and medication, (b) the impact of medication adherence, (c) transitional care, and (d) issues for adults aging with intellectual and developmental disabilities. To represent the four themes identified in the research, a four-module format was implemented for the web site.

Remaining consistent with Knowles’ (1980) adult learning theory, each module includes a goal, objectives, activities that link learners to available resources, self-evaluation questions, and references. Narrative learning content within each module is based on integrative analysis of the relevant literature. The inclusion of activities and self-evaluation questions in each module corresponds with research by The U.S.
Department of Education (2010), and Kim and Frick (2011) that online learning experiences produce greater learning outcomes when opportunities are included for the participant/learner to (a) interact with resources and (b) evaluate their own experience with the course content. Learning activities embedded in the web site refer to resources such as readings, videos, assessments, and tools that support the module goal. Self-evaluation questions are designed to assist the learners in determining their own learning outcomes from the modules.

Developed in Microsoft Word and utilizing principles of web site design provided by the Student Technology Center at CSUS (Academic Technology, 2010), the web site strives to (a) create a clear visual hierarchy on each page; (b) utilize recognized or conventional design; (c) break up pages into clearly defined sections; (d) make links to outside material obvious to the user; and (e) include necessary information, in an uncluttered presentation. Screen shots of each module, along with the URL are presented in Appendices A, B, C, and D. The complete web site is posted on the CSU web server.

The project described is an online tool kit of evidence-based information and electronically available resources selected to provide medication management education for gerontology students and entry-level professionals. The project will strengthen learners’ ability to support successful medication management strategies and help maintain the independence of community dwelling older adults whom they serve.
Significance and Benefit of Project

A number of established facts underscore the significance and benefit of a project aimed at enhancing medication management knowledge and skills for gerontology students and entry level professionals serving community dwelling older adults. Within the older adult population, the risks of poor medication management are amplified by high rates of consumption of both prescription medication and over-the-counter drugs, and low rates of medication adherence to prescribed regimens (Saxon et al., 2010). These observations about medication use among aging adults are coupled with other realities that make this project important: the increasing population of older adults, the increasing longevity of adults living with intellectual and developmental disabilities, and the rising costs of health care and subsequent federal mandates to bring costs under control (Society of Hospital Medicine, 2012).

The 2010 U.S. Census recorded over 40 million people 65 years of age and older representing a 15% increase since the 2000 Census (Werner, 2011). The aging of baby boomers (people born between 1946 and 1964) will contribute significantly to the growth of the 65 and older population in the United States over the next 20 years (Vincent & Velkoff, 2010). By 2030, the last of the baby boomers will reach age 65 and there will be about 72.1 million older persons in this country, approximately 20 percent of the U.S. population. As baby boomers transition into the oldest old age category (85+), the projection is by 2050 their proportion will increase to more than 21 percent of the older population. The impact of this growth across every field of health and human services
cannot be overemphasized, as the aging population will require additional caregiving and supportive resources (Vincent & Velkoff, 2010). The awareness of the increased need for supportive services also applies to those adults aging with developmental disabilities.

Within the growing older adult population, adults aging with intellectual and developmental disabilities (I/DD) are also experiencing increased longevity (Saxon et al., 2010). There are an estimated 641,000 adults, aged 60 and older living with intellectual and other developmental disabilities, such as cerebral palsy, autism, and epilepsy (Heller, 2010). Projections are their numbers will double to 1,242,794 by the year 2030 (Heller, 2010). With the increased life span of adults with I/DD, the length of caregiving responsibility for their families has subsequently increased, pointing to the necessity of raising the level of awareness of the needs of both groups as they age (Heller, 2010). The growing population of older adults with intellectual and developmental disabilities will increase the need for services that promote independence and quality of life (Heller, 2010; Shaw, Cartwright, & Craig, 2011). The inclusion of this population in the project, along with resources that relate to medication management issues of adults aging with I/DD, will prepare learners for serving these adults and their caregivers.

Along with the increasing older adult population, rising health care costs contribute to the significance of this project. Poor medication management is implicated in transitional care problems that contribute to poor health outcomes, hospital readmissions, and the rising price of health care (Kurtzman, Olds, & Hirschman, 2011). Medication management is problematic for older adults as they transition between health
care settings (Flora, Parsons, & Slattum, 2011). One impact of transition errors is hospital readmission and approximately one in five Medicare hospital patients are readmitted within thirty days of discharge at a cost of more than $26 billion per year (Flora et al., 2011). Beginning in 2013, those hospitals with higher than expected readmissions rates will experience a reduction in Medicare payments (Society of Hospital Medicine, 2012). Such measures reinforce the necessity of increased knowledge of medication management strategies and their relationship with practices that are aimed at reducing hospital readmissions and improving health outcomes (Flora et al., 2011). The project will prepare learners to support proper medication management in older adult clients who are in transition between hospital and home, contributing to client’s independence and preserving health care resources.

The significance and benefit of this project are supported by the increasing population of older adults, the rising costs of health care, and the risk posed by the increased use of prescription and over-the-counter medications by older adults.

**Project Limitations**

There are a number of limitations inherent in the project. Although researched and documented, resources selected for the toolkit are based on the author’s bias and definition of significance to the project. The author identified those resources that the author believes will provide the foundational knowledge in medication management relative to the roles that learners may fulfill in professional capacity. Restricting the number of resources to keep the project manageable in size limits the scope of its coverage. Resources selected for the toolkit may change or become
unavailable over time. Additionally, the digital construction of the project may limit its access in the future.

**Definition of Terms**

The defined terms are selected because of their significance to the project. While gerontology students may easily understand some terms, they may be unfamiliar to other learners who could benefit from the project. The terms are listed alphabetically for ease of reference.

- **Activities of daily living (ADLs).**
  
  Actions such as bathing, dressing, toileting, transferring, feeding (Cress, 2007).

- **Age in place.**
  
  Enabling people to stay in their homes/preferred place of residence and programs as they age (Cress, 2007).

- **Assisted care setting.**
  
  A housing option for older adult who do not have severe medical issues but do need assistance with some ADLs (Cress, 2007).

- **Baby boomer.**
  
  People born between 1946 and 1964 (Vincent & Velkoff, 2010).

- **Community dwelling.**
  
  Residing in one’s own home, either with or without assistance (Yang, Tomlinson, & Naglie, 2001).

- **Comorbidity.**
  
  The presence of more than one disease in a patient (Saxon et al., 2010).
Fragmentation of care.

Refers to inconsistency in care due to multiple providers, lack of providers, and poor communication between separate networks of care (World Health Organization, 2003).

Geriatric care manager.

A professional geriatric care manager (GCM) may have a background in social work, nursing, gerontology, or other human services oriented professions and will employ tools similar to case management strategies in those professions, including: assessment, care planning, coordination of services, and continual monitoring (Cress, 2007). A GCM’s services are directed toward coordinating the care of older adults and disabled adults to improve their quality of life and preserve their independence for as long as possible (NAPGCM, 2011).

Geriatric syndrome.

Conditions or behaviors commonly associated with aging (Peron and Ruby, 2012).

Health literacy.

Refers to a person’s ability to obtain, process, and understand basic health information to make good health care decisions, including the skills necessary to read and complete medical and health insurance forms, effectively communicate with healthcare providers, and follow basic instructions and medical recommendations (Saxon, Etten, & Perkins, 2010).

Intellectual and Developmental Disabilities (I/DD).
Developmental disabilities are severe chronic disabilities that can be cognitive, physical, or both, appear before the age of 22, and are likely to be life-long. Intellectual disability, which appears before the age of 18, is characterized by significant limitations both in intellectual functioning (reasoning, learning, problem solving) and in adaptive behavior, which impact a range of everyday social and practical skills. Intellectual and developmental disabilities often co-occur; developmental disability is an umbrella term that includes intellectual disability but also includes other disabilities that are acknowledged during early childhood. (American Association on Intellectual and Developmental Disabilities [AAID], 2012).

Medication adherence.

The degree to which a patient follows a prescribed regimen, the term most commonly refers to prescription drug therapy. ‘Adherence’ is the preferred terminology over the older term ‘compliance.’ (MacLaughlin et al., 2005).

Medication management.

Refers to a person’s ability to obtain, organize, and follow directions for taking medication (Cress, 2007). A geriatric care manager or other professional supports the client and caregivers to accomplish proper medication management in order to maintain preferred independence within their community.

Nonadherence.

Refers to behavior patterns that interrupt a prescribed medication regimen (Schlenk, Dunbar-Jacob, & Engberg, 2004).

Pharmacokinetics.
The study of the time it takes drugs to be “liberated, absorbed, distributed, metabolized, and excreted from the body” (Saxon et al., 2010, p. 367).

Polypharmacy.

The use of multiple prescription medications (Saxon et al., 2010).

Transitional care.

A process which refers to a set of actions planned to assure the continuity of care delivered when a patient transfers between different locations (hospital to home, for example) or between different levels of care within the same location (Chalmers & Coleman, 2006).

Conclusion

Aging adult population projections, including adults aging with developmental disabilities, combined with the knowledge about the impact of poor medication management within the older population stress the importance of developing this project. The project equips learners with information to increase their confidence in supporting strategies to improve community dwelling clients’ medication management and preserve their much-desired independence. The implementation of this knowledge can also contribute to reducing unnecessary hospitalizations and preserving health care resources. Incorporating awareness of adults aging with intellectual and developmental disabilities will assist these older adults and their caregivers to improve their quality of life and contribute toward the likelihood of their aging in place. Participation in successful medication management has never been more critical in supporting the health and independence of aging adults.
Organization of Remaining Chapters

The literature review chapter explores medication management as it relates to the community dwelling older adult. The literature review supports the project content with the four themes: (a) age related changes and medication, (b) the impact of medication adherence, (c) transitional care, and (d) issues for adults aging with intellectual and developmental disabilities. Also substantiated with the literature is the theoretical foundation for the development, implementation, and evaluation of the project.

The project overview chapter discusses the procedure undertaken to build the project and the process of completion. The process of evaluation for the project is presented as well as any products and services used in the construction of the project.

The project evaluation chapter offers a summary of the evaluation and effectiveness of the project, including any noted limitations. The project experience related to the literature review is discussed as well as conclusions and recommendations.

The appendices and references follow the chapters.
Literature Review

Management of medication is a subject of which all professionals involved in the care and support of aging adults are increasingly aware. As the average life span has increased so has the growth in the number of medications available to treat chronic health conditions, and the use of prescription and over-the-counter medication is now a virtually accepted aspect of aging. Adults aged 75 and older take an average of 7.9 prescription drugs every day (National Council on Patient Information and Education, 2007). Though medications are prescribed to treat disease and improve health, the use of multiple medications increases the risk of poor health outcomes, including prescribing and adherence problems (Steinman & Hanlon, 2010). A study of older adults, average age 75, found that 40% did not adhere to instructions for taking their prescribed medications (Saxon, Etten, & Perkins, 2010).

Problems associated with the use of multiple medications, or polypharmacy, are amplified in older adults and medication mismanagement has the potential to threaten an older adult’s independence and ability to remain in their home (Bergman-Evans, 2006). Medication mismanagement also has a financial toll. The estimated direct and indirect health care cost of inadequate medication adherence alone, is $177 billion annually (National Council on Patient Information and Education, 2007). Poor medication management practices among older adults can affect quality of life for seniors and their caregivers, and financially strain the systems who seek to support older adults to maintain their desired independence.
Along with the increased longevity of the general population, adults aging with developmental disabilities are also experiencing a lengthened life span (Heller, 2010). Almost 80% of individuals living with developmental disabilities reside at home and in 25% of those households, the family caregiver is 60 years or older (Heller, 2010). Many adults with developmental disabilities experience earlier onset of chronic conditions than the general aging population and often, life-long medication use (Heller, 2010). Coupled with the effects of aging, the impact of medication mismanagement is magnified for this population and their aging family caregivers.

The increasing number of older adults, both those aging with and without developmental disabilities, and the increasing use of medications to treat chronic conditions inherent to aging, combined with the risks associated with medication mismanagement, point to a need for medication management education opportunities for the gerontology student and entry-level gerontology professional. This knowledge will enhance the goal of supporting the desired independence of their clients.

This review of the literature explores medication management as it relates to the community dwelling older adult, whose independence is threatened by poor medication management practices (Bergman-Evans, 2006). The literature review supports the development of a web-based tool kit, a collection of evidence-based information and electronically available resources, selected to provide medication management education for the gerontology student and entry level professional, with the goal of improving the medication management and quality of life in community dwelling older adults whom they serve. The online toolkit is conceptualized as a self-directed learning opportunity,
based on Knowles’ theory of adult learning, which equates the effectiveness of adult education with self directed learning, relevant material, and self evaluation (Knowles, 1980).

The sections of this literature review relate to the tool kit content: age related changes and medication, the impact of medication adherence, transitional care, and issues for adults aging with intellectual and developmental disabilities. Also substantiated with the literature is the theoretical foundation for the development, implementation, and evaluation of the tool kit.

**Age Related Changes and Medication**

As the body ages, it is common that individuals over age 65 will develop various and compound health problems, often in more than one major body system (Saxon, Etten, & Perkins, 2010). In such circumstances, the use of prescription medication becomes the routine treatment, frequently resulting in polypharmacy, the use of multiple medications. (Saxon et al., 2010). However, prescribing and managing medication for older adults differs from younger adults partly because older adults are underrepresented in clinical drug trials, leading to a shortage in evidence for therapeutic treatment (Peron & Ruby, 2012).

The literature provides insight into the bodily changes that occur with age and how these changes affect medication therapy for older adults. In a comprehensive and exemplary text on the physical changes associated with aging, Saxon, Etten, and Perkins (2010) provide a review of older adults and medications that covers the physical response to drugs, discusses over-the-counter and generic drugs, and provides a helpful summary
of commonly prescribed drugs. According to Saxon et al. (2010) “the standard normal adult dosage cited in drug literature is developed for 150-pound males, 22 to 26 years old” (p. 366). However, the biological changes of aging affect the absorption, distribution, and elimination of medications in the body, making a traditional therapeutic dose potentially toxic for an older adult (Saxon, 2010).

Peron and Ruby (2012), provide a peer reviewed examination of medication use in older adults that is specifically written for the non-clinician. The article presents information on clinical trials, medication guidelines, risks of medication use, and use of generic drugs. The authors concur that with reduced physical resources, older adults are at increased risk of drug side effects because their bodies cannot respond as quickly to stress.

Enhanced understanding of the response of an older adult’s body to prescription and over-the-counter drugs includes familiarity with pharmacokinetics, which is the “study of the time it takes for drugs to be liberated, absorbed, distributed, metabolized, and excreted from the body” (Saxon et al., 2010, p. 367). Liberation occurs when the coating of a pill dissolves in the mouth, exposing the active ingredient of the drug. Absorption begins when the medication is “ingested and absorbed in the mouth, stomach, or intestinal tract” (p. 368). The majority of medications are absorbed in the gastrointestinal tract where they pass into the blood circulation. Distribution happens when medications are sent to parts of the body in the bloodstream, often bound to proteins in the blood. Metabolism, performed most often in the liver, improves drug excretion through the kidneys. Finally, elimination of the medication occurs, most often
through the kidneys, though drugs are also excreted in feces, exhalation, perspiration, and saliva (Saxon et al., 2010).

Understanding the basic process of drug absorption and distribution in the body provides perspective on the impact of age on the effectiveness of medication. According to Saxon et al. (2010), age related changes that can affect absorption of a medication include a higher pH in the stomach, delayed emptying of the stomach, and decreased blood flow in the gastrointestinal tract, which affects motility, and slows passage of nutrients which can decrease a drug’s potential to work effectively. The process of drug distribution in the aging body can be negatively affected by the decline of blood proteins, potentially elevating the levels of a drug in the blood. Declining cardiac function can reduce blood flow to organs, affecting the distribution of drugs. Neurological reactions to medication can be altered, caused by a change in the “permeability of the blood/brain barrier” (p. 369). Blood flow to the liver is reduced with age, causing a reduction in enzyme activity, influencing the metabolism rate of medications and posing a threat of drug toxicity. Finally, those drugs eliminated through kidney function are believed to have a longer half-life in older adults, meaning an increase in time necessary for the drug concentration in the blood to decrease by 50% (Saxon et al., 2010). The presence of concurrent kidney diseases can increase the risk of toxicity from medications. Basic knowledge about pharmacokinetic processes impacted by aging is essential for comprehending the importance of proper medication management.

Understanding the physiological changes of aging on medication elevates awareness about the importance of safety in medication use. The impact of aging on
medication effectiveness combined with the lack of specific drug testing in older adults has called for the development of medication guidelines for older adults (Peron & Ruby, 2012). The American Geriatrics Society (2012) and an interdisciplinary panel of 11 experts in geriatrics and pharmacotherapy, recently updated the Beers Criteria, grading drugs on evidence of drug-related problems and adverse drug events in older adults. This updated guideline divides 53 medication classes into three categories: those medications to avoid using in older patients, those medications potentially inappropriate in older adults with specific diseases, and those medications for use with caution when prescribed for older adults. Other drug prescribing guidelines include the Screening Tool of Older Person’s Prescriptions (STOPP) and Screening Tool to Alert doctors to Right Treatment (START), both which provide detailed assistance for physicians in beginning and ending appropriate therapeutic treatment in older patients with specific, multiple conditions (Peron & Ruby, 2012).

The use of drug guidelines is an important safeguard when prescribing for older adults, but they do not replace the diligence of monitoring the impact a medication can have on an older adult or mistaking the consequences of medication mismanagement that impact quality of life. While the avoidance of adverse drug events and undesirable medication side effects are motives for utilizing drug guidelines, Peron and Ruby (2012) contend that “clinicians often fail to realize that medications can cause or contribute to problems that are common in older adults” (p.2). Problems that include falls, cognitive decline, and incontinence are commonly labeled geriatric syndromes but are “frequently
the result of medications” (Peron & Ruby, 2012, p. 2). Patient and advocate participation and awareness in the medication management process have never been more important.

The risks associated with medication use in older adults are amplified by the reality of limited drug trials utilizing older adults and subsequent limited evidence based recommendations, physiological changes associated with aging, comorbidity, polypharmacy, and assumptions made by care providers. This project addresses these realities and increases the student and entry-level practitioner’s knowledge of those aging processes that influence the effectiveness of medication and the practice of medication management. The risks of medication use in older adults are magnified when the issue of non-adherence to prescribed regimens is considered.

**The Impact of Medication Adherence**

The age related changes discussed in the previous section, comorbidity, and increasing polypharmacy, place older adults (≥ 65 years) at an increased risk of harm from nonadherence. Medication nonadherence refers to nonadherent patient behavior patterns in managing medication regimens. Identified patterns of nonadherence include the failure to begin a prescribed regimen, early discontinuance of a treatment, and alterations in dosage, which may include changing the dose, omitting a dose, or taking doses at the wrong intervals (Schlenk, Dunbar-Jacob, & Engberg, 2004). A study of older adults, average age 75, found that 40% did not adhere to instructions for taking their prescribed medications (Saxon et al., 2010). MacLaughlin et al. (2005), state, “conservative estimates suggest medication nonadherence accounts for 10% of hospital admissions and 23% of nursing home admissions” (p. 232). Nonadherence to prescribed
medication regimens can result in relocation and threaten an older adult’s ability to remain in their home (Bergman-Evans, 2006).

Adherence is a critical cornerstone of medication management and understanding adherence is a topic of central importance for inclusion in the project. Nonadherence to medication is a complicated, multifaceted issue that is best addressed when the risk factors associated with medication non-adherence are first understood.

**Multiple factors influence medication adherence.**

The research consistently recognizes that nonadherence commonly occurs for more than a single reason. In 2003, the World Health Organization issued a report on adherence, identifying five broad categories affecting adherence. The literature cited here supports this categorization of causes for nonadherence into the following categories: socio-economic; patient related; health care system related; condition related; and therapy related factors.

Socio-economic factors related to nonadherence include financial limitation in paying for medications, living alone, low health literacy, and cultural influences. Schlenk, Dunbar-Jacob, and Engberg, (2004) conducted a review of the literature regarding medication nonadherence among adults aged 50 and older. Their comprehensive evaluation explores factors associated with nonadherence, as well as methods of assessment and strategies for improving adherence. The authors identify the association of nonadherence with the following characteristics: drug regimen characteristics, patient health beliefs, medication side effects, social support, depression, and cognitive function. MacLaughlin, Raehl, Treadway, Sterling, Zoller, and Bond (2005) provide an
interdisciplinary review of the literature on medication adherence. The authors assign five categories to understanding the fundamental reasons for nonadherence in older adults: demographic, medical, medication, behavioral, and economic. Both studies cite support that concern over cost of medication contributes to nonadherence and Schlenk et al. (2004) state that lack of social support is positively correlated with nonadherence. Contributing to nonadherence is the socio-economic issue of inadequate health literacy.

Low functional health literacy, defined by MacLaughlin et al. (2005) as “the ability to read, understand, and act on health information” (p.235), can also affect adherence. Kripalani, Henderson, Chiu, Robertson, Kolm, and Jacobson (2006), conducted a cross sectional analysis of enrollment data from 152 participants in a randomized trial of patients (mean age 65.4) with coronary heart disease. The study evaluated the effects of low literacy, medication regimen complexity, and sociodemographic characteristics on participant’s ability to manage medications. The study concluded that adults with inadequate literacy skills are less able to identify their medications and may find it difficult to follow complicated regimens. MacLaughlin et al., (2005), note that health literacy is distinctly lower in older adults regardless of “gender, race, ethnicity, cognition, visual acuity and years of schooling” (p. 235). While poor health literacy influences adherence, so also do changes in vision, hearing, and cognition. Along with vision and hearing, cognitive impairment is a patient related factor that can influence adherence (World Health Organization, 2003). A practice guideline by Bergman-Evans, Adams, and Titler (2006) describes the implementation of the Medication Management Outcomes Monitor, including a description of each phase of the
process for improving medication management in older adults. The guideline presents four outcomes, including reducing inappropriate prescribing, decreasing polypharmacy, avoiding adverse events, and maintaining function. The guideline concurs with MacLaughlin et al. (2005) and Schlenk et al. (2004) that while forgetfulness is most commonly reported as the reason for not taking medications, impaired cognitive function is as a dominant indicator of risk for non-adherence. Initial studies signal that cognitive impairment causing a score of less than 24 on the MMSE places elders at significant risk (Schlenk et al., 2004).

The conclusion that mild cognitive impairment can significantly affect adherence, is amplified by a recent study that found small memory changes as a predictor of inability to manage a prescribed regimen. Hayes, Larimer, and Kaye, (2009) conducted a cross-sectional study of the ability of independently living healthy elders to follow a medication regimen. Thirty-eight study participants age ≥ 65 years, with an MMSE score greater than 23, were recruited from two continuing care retirement communities. All participants were currently managing their own medications. Study results show that older people living independently, who manage their own medications, have a wide range of adherence. Relatively impaired cognitive function is the distinguishing characteristic that affected the ability to adhere to a regimen. The authors promote that the results indicate increased risk of nonadherence for seemingly independent community dwelling elders (Hayes et al., 2009). In addition to the significant impact of impaired cognition, deficiencies in the health care systems that treat older adults also contribute to medication nonadherence.
Health care system related factors that affect medication adherence in older adults include poor provider communication with patients, and fragmentation of care due to poor communication between providers and systems regarding patient care (World Health Organization, 2003). Health care system related factors can impact adherence wherever a patient is receiving care, be it in the home, hospital, or outpatient clinic setting. Derived from published interdisciplinary research and theory, an article by Bergman-Evans (2006) describes the author’s medication adherence improvement model. The intervention is aimed at the variables under the influence of health care providers and nurses involved in the medication therapy of older adults. A literature review of medication adherence interventions tested with older adults, by Ruppar, Conn, and Russell (2008), evaluates 63 studies published between 1977 and 2005 with participants whose mean age is >60. The authors concur with Schlenk et al. (2004) and Bergman-Evans (2006) that the influence of the relationship between the patient and provider impacts success in medication management and that nonadherence to regimens can results from inadequate communication with the patient or fragmentation of care due to multiple providers. The connection between nonadherence and patient-provider communication is inherent as are the influence of condition related and therapy related factors.

While condition related factors and therapy related factors are two different categories of cause of nonadherence, they are intimately linked. Condition related factors refer to comorbidity, or, multiple chronic conditions associated with aging (World Health Organization, 2003). Depression is one specific condition that is positively correlated
with medication nonadherence (Schlenk et al., 2004). The reality that older adults live with an increasing number of chronic conditions that require multifarious medications, frequently leads to complex medication regimens (MacLaughlin et al., 2005). Therapy related factors that influence adherence are the result of such complicated prescription regimens and the side effects of medication (World Health Organization, 2003). Polypharmacy and medication regimen complexity is cited by MacLaughlin et al. (2005), Bergman et al. (2006), and Kripalani et al. (2006), as a cause of nonadherence, which increases significantly in relation to number of medications and doses.

The National Council on Patient Information and Education (2007), in the report *Enhancing prescription medicine adherence: A national action plan*, also address complex medication regimens as a cause for nonadherence. Representing more than 100 non-profit organizations, and compiled by advisors from leading professional societies, voluntary health organizations, and patient advocacy groups, the report assesses the extent and nature of poor medication adherence, the underlying factors, as well as health and economic costs. The report recognizes a person’s previous experience, personal beliefs, and perception about the effectiveness of therapy as influential in their concern over side effects. Schlenk et al. (2004) and MacLaughlin et al. (2005) also confirm that patient concern over the side effects of a medication is linked with nonadherence.

Understanding the causes of medication nonadherence in older adults according to the aforementioned categories and knowing that the causes are interlinked, encourages a more comprehensive and holistic approach to medication management and adherence and influences the adherence assessment process.
Assessment of medication adherence.

Determining the level of medication adherence practiced by an older adult requires knowing what an accurate assessment should include and how to obtain effectively the information needed to complete the assessment.

Citing multiple relevant studies, Schaffer and Yoon (2001) discuss evidence-based recommendations for assessing and improving adherence. Recommendations are categorized into three domains: affective, behavioral, or cognitive strategies. Their discussion concludes that an emphasis must be place on assessment of patient level adherence followed by individualized interventions according to affective, behavioral or cognitive domains. The early phase of treatment is a favorable time to identify adherence potential (Schaffer & Yoon, 2001) or when a patient’s condition does not respond to therapy (National Council on Patient Information and Education, 2007). If a decline in the patient’s functional ability is observed, poor adherence should be investigated (MacLaughlin et al., 2005). Assessment of level of literacy is recommended prior to the prescribing of medication, especially in patients with whom the physician may be unfamiliar (MacLaughlin et al., 2005).

Popular methods of assessing adherence may not be as reliable as assumed. Bergman-Evans (2006) states that the “brown-bag assessment” (p. 5) or the practice of patients bringing their medications with them to a medical appointment, is a frequently used method of assessment. However, Yang, Tomlinson, and Naglie (2001) challenge the validity of this standard with a cross sectional study of 50 community residing outpatients, with a mean age of 78.9 years. Semi structured clinic based interviews were
conducted, in which participants produced a medication list, followed by in-home searches to confirm the list information. A comparison of the clinic-produced lists with the in-home medication lists revealed that 48% of the participants had at least one omission of any medication and 19% had at least one omission of a regular prescription medication. The authors conclude that the clinic based interview lists resulted in a complete listing of all regular medications in only 52% of the study participants.

Research has also demonstrated that self-reports, pill counts, and the examination of pharmacy records are traditional assessment methods associated with underestimation of nonadherence (MacLaughlin et al., 2005; Schlenk et al., 2004). These findings stress the importance of communication with patients prior to assessment, and the inclusion of specific instructions to include all prescription drugs and over the counter remedies in patient medication lists.

Communication techniques employed during an assessment can contribute to assessment effectiveness. Yang et al. (2001) recommend more directed questions by physicians when gathering information to assess patient medication adherence. An assessment that includes a complete review of the patient’s health care providers, prescribed regimens, and risk factors will provide the information necessary to formulate effective intervention strategies (Schlenk et al., 2004). Similarly, MacLaughlin et al. (2005) suggest that a complete assessment will also consider the patient’s perspective of the treatment plan. They also recommend that pharmacists employ open-ended statements to facilitate a conversation that provides information about the risk for nonadherence. Because adults aged 65 and older purchase more non-prescription drugs
than any other age group, the review recommends that assessment include the patient’s perspective about over-the-counter drugs, herbal and dietary supplements, thus providing the physician a more complete picture of patient regimen patterns (MacLaughlin et al., 2005).

While there are several methods available to assess medication adherence, no single method proves consistently reliable and a combination of methods that address causes of nonadherence is recommended to provide better accuracy (MacLaughlin et al., 2005). The Drug Regimen Unassisted Grading Scale (DRUGS) is one example of an assessment of an older adult patient’s capacity to manage their own medications that addresses many of the causes of nonadherence in a concise manner. This assessment can be completed in approximately five minutes and has been tested for reliability (Bergman-Evans, 2006). This approach uses open-ended, non-judgmental questions related to medication management, and can help identify problems with adherence in a “nonthreatening manner” (MacLaughlin et al., 2005, p. 232). Roth, Weinberger, and Campbell (2009) discuss the benefits and limitations of current strategies to measure medication use older adults. Utilizing a case study to illustrate the variations in measurement across five assessments, the authors recommend a more comprehensive approach to assessment, as well as an approach that accounts for individual complexities and responds to patient values and needs. This recommendation is consistent with a holistic perspective of assessment; taking into account that nonadherence typically has multiple causes. The theme of employing multiple approaches also applies to adherence improvement strategies.
**Strategies to improve medication adherence.**

Medication adherence strategies are aligned with the five categories of causes of nonadherence: socio-economic focused; patient focused; health system focused; condition focused; and therapy focused strategies. Much like the medication adherence assessment process, the literature confirms that use of multiple interventions to improve adherence produces better results (Bergman-Evans, 2006; MacLaughlin et al., 2005; Schaffer & Yoon, 2001). Bergman-Evans et al. (2006) and Schaffer and Yoon (2001) encourage the selection of intervention strategies chosen to address an individual’s unique and often complex needs and situation, again reinforcing a holistic perspective.

Socio-economic and patient focused strategies include addressing health literacy gaps, acknowledging caregiver participation, linking patients with resources to increase the affordability of medications and modifying the older adult’s environment to accommodate changes in vision, hearing, mobility, and dexterity. Health literacy education can include medication review along with suggestions for incorporating medication use into daily routines (Schlenk et al., 2004). Related strategies include medication reminders such as charts or calendars, though Ruppar et al. (2008) remind that these strategies are rarely employed alone. Effective interventions can include the individualization of 1 page of instructions that are printed in a 14-point font size, written at a 5.1 grade reading level, and explained to the patient in a “quiet environment” (Bergman-Evans, 2006). Effectiveness increases when instructions are arranged in lists versus paragraphs and information is given in the same order about each drug (Schlenk et al., 2004). Older adults who receive help with activities of daily living (ADLs) and
medication management in the home have a reported greater adherence rate (Schlenk et al., 2004). The combination of caregiver participation and the use of succinct and clear medication instruction can improve adherence (Bergman-Evans, 2006). Together, such strategies can improve comprehension of a prescribed regimen early in the process – a factor in successful adherence (Schlenk et al., 2004).

Health care system focused strategies emphasize communication between patients and health care providers and interdisciplinary behavior between all care providers. A collaborative relationship between the patient and health care provider contributes significantly to effective adherence intervention strategy according to MacLaughlin et al. (2005). Bergman-Evans, (2006), states a “positive association between perceived communication with the health care professional and the proportion of clients with correct knowledge and compliance” (p. 8). Improved communication between health care providers and their patients should include what the patient can expect from the treatment, and should address concerns the patient may have about side effects as well as their comfort level, preferences, and ability to follow the prescribed regimen (National Council on Patient Information and Education, 2007). Optimally, a team approach to medication management will include multiple disciplines in the health care system, resulting in a comprehensive assessment, decreased fragmentation of care and an appropriate intervention plan (National Council on Patient Information and Education, 2007). Peron and Ruby (2012) advocate patient awareness and involvement in medication therapy and promote pharmacist consultation as an information resource. A multidisciplinary approach to improving adherence is holistic in philosophy and practice
and includes health care providers and prescribers working in tandem with pharmacists, nurses, home health care and informal caregivers.

Condition focused and therapy focused strategies are closely linked, employing methods to simplify treatment regimens to reduce the daily number of doses in a medication regimen and ensure that a treatment plan is consistent with a patient’s values and needs (Roth et al., 2009). Bergman-Evans (2006) recommends that when nonadherence is identified, the plan of care should be examined and adjusted according to causes, especially taking into consideration side effects, complicated regimens, and patient understanding of purpose and perspective of therapy. Dose modification, the reduction of the daily number of doses in a regimen, is a strategy that results in considerable improvement of adherence (Ruppar et al., 2008; Schaffer & Yoon, 2001).

Cooperation among multiple providers can result in the elimination of duplicate or competing medications and contribute to dose modification. Continued supervision is critical to maintaining the most simple medication regimen possible, a goal that can be achieved by regular evaluation of the appropriateness of medications taken by the patient (Bergman-Evans, 2006).

Despite the evidence for medication adherence as a major influence in the health and well-being of older adults, many current methods of evaluating and managing patient medication regimens are serving neither the older patient nor the fiscally strained health care system (Roth et al., 2009). The increasing popularity of herbal, natural, or alternative therapies affects adherence and complicates accurate assessment and treatment outcomes (Yang et al., 2001). The DRUGS tool represents one of the most reliable and validated
assessments and while easy to use it still requires time, is subject to influence by observer bias, and potentially neglects to reflect actual behaviors of the patient at home (MacLaughlin et al., 2005). Physicians and other care providers are challenged by lack of uniformity and unreliability of strategies like the brown-bag assessment (Bergman-Evans, 2006). Fragmentation of care due to multiple providers, sometimes from different health care systems, makes difficult the creation, review, and update of records (Bergman-Evans, 2006). The development of this project will make available information and resources on adherence to help prepare gerontology students and entry-level professionals to participate as part of the multidisciplinary team that supports medication management for community dwelling older adults.

The multidisciplinary team approach emphasizes the importance of communication between providers at every level of care, a practice critical to the delivery of good medication management in transitional care.

**Transitional Care**

Assisting older adults to maintain good medication management and their independence is often complicated by health events related to chronic illness or surgery that result in hospitalization. The daily patterns of life, including medication regimens are disrupted and new care providers enter the decision making and medication prescribing process. As patients transfer from home to hospital and back again, the risks of medication mismanagement multiply.

The research addresses patient care transitions and the problems inherent in transferring between health care settings. According to the American Geriatrics Society
care delivery locations might include hospitals, skilled nursing facilities, rehabilitation centers, a patient’s home, primary and specialty care offices, and long-term care facilities. The report addresses the potential for fragmentation of care resulting from clinicians’ trend to restrict practice to single care settings and not follow the care of patients as transitions to other settings occur.

The literature supports that management of medications is problematic when a patient is relocated from one healthcare setting to another. Chalmers and Coleman (2006), in their paper describing transitional care interventions, state that patient related risks associated with care transitions include medication mistakes, unnecessary duplication of services, and avoidable use of emergency department and hospital readmissions. An elevated risk is posed for older patients with multiple chronic or comorbid conditions (American Geriatric Society, 2007). Addressing the risk of medication errors in older home health patients, McDonald and Peterson (2008), describe an initiative developed to improve geriatric medication management in home health care that targets nurses and therapy managers directly involved with home health clients. They report that one-third of home health clients aged 65 and older exhibit a potential medication problem. Utilizing four case scenarios, Flora, Parsons, and Slattum (2011) discuss issues that can occur during care transitions and presents strategies to reduce medication errors. Flora et al. (2011), state that “medication errors, poor communication, and lack of care coordination are at the forefront of problems attributed to transition errors”( p.37).
Medication discrepancies are a common example of mistakes that occur in care transitions. Patients experience an average of three medication changes at each transition, elevating the risk for medication errors (Flora et al., 2011). In an issue brief, Naylor and Sochalski (2010) describe a nurse-led, interdisciplinary team approach developed to improve patient outcomes in care transitions. The authors cite that “sixty percent of community-based chronically ill elders transitioning from hospital to next sites of care…experience medication errors” (p. 2). Health care providers struggle with determining what medications a patient is taking when admitted to the hospital. Flora et al. (2011) document a staggering 46 percent of hospital admissions indicate medications from a patient’s home regimen are not properly and completely documented.

Errors that occur during care transitions contribute to increased use of health care and rising health care costs. One impact of transition errors is hospital readmission – approximately one in five Medicare hospital patients are readmitted within thirty days of discharge at a cost of more than $26 billion per year (Flora et al., 2011). Beginning in 2013, those hospitals with higher than expected readmissions rates will experience a reduction in Medicare payments (Society of Hospital Medicine, 2012). Naylor, Aiken, Kurtzman, Olds, and Hirschman (2011) employ a systematic review and summary of twenty-one randomized clinical trials of transitional care interventions targeting chronically ill adults. The review found that “nearly 13 percent of Medicare beneficiaries discharged from hospitals experienced three or more provider transfers during a thirty day period” (p. 747).
Medication mismanagement is implicated in transitional care problems that contribute to poor health outcomes, hospital readmissions, and rising health care costs.

**Transitional care models.**

In response to the problems in care transitions that lower quality of care, impact health outcomes, and increase costs, models have been developed to focus on improving continuity of care across transitions. Chalmers and Coleman (2006) define transitional care as a process that refers to a set of actions planned to assure the continuity of care delivered when a patient transfers between different locations or different levels of care within the same location. The authors describe the Care Transitions Program, developed by University of Colorado Health Sciences Center, a transitional care model that promotes the use of patient oriented tools to facilitate an active patient role in the transition process. The program also utilizes tools designed to assist providers in medication reconciliation.

The Transitional Care Model (TCM), developed at the University of Pennsylvania, features thorough in-hospital planning which follows the patient home with continued monitoring. Naylor and Sochalski (2010) define transitional care as “a broad range of time-limited services designed to ensure health care continuity, avoid preventable poor outcomes among at-risk populations, and promote the safe and timely transfer of patients from one level of care to another or from one type of setting to another” (p. 747). Services included in the TCM are provided by an advanced practice nurse with training in the care of older adults. The TCM pivots on a holistic, multidisciplinary approach to care that includes the patient, family, informal and formal
caregivers as part of the team, with emphasis on communication between all parties.

Another transitional care initiative closely aligned with Naylor’s Transitional Care Model and the Care Transitions Program is Project BOOST, specifically developed in response to Affordable Care Act that includes mandates for hospitals to reduce readmissions and improve care transitions (Society of Hospital Medicine, 2012). Each of these models is designed to address national priority areas, including promoting patient centered care and patient safety especially as it relates to medication therapy.

Transitional care models have been developed to address directly the problems of medication mismanagement that occur during care transitions. Transitional care strategies that directly apply to improved medication management include patient maintained medication lists which are current and accurate, a discharge process that emphasizes proper transfer of information, patient and caregiver involvement in decision making, and patient and caregiver education in self care (Flora et al., 2011). Medication reconciliation, an ongoing process that provides a thorough and systematic review of a patient’s medication regimen at every care transition, is especially effective in preventing medication errors (Flora et al., 2011).

Transitional care models are demonstrating effectiveness in both quality of care and financial savings. Naylor and Sochalski (2010) describe the essential components of the patient-centered model, discuss how it differs from other post acute care interventions, and provide a brief look at the significant outcomes associated with 20 years of clinical trials utilizing transitional care interventions. The authors document that transitional care focused on high-risk chronically ill older adults “improves the quality of
care, physical function, quality of life, and satisfaction with the care experience among patients and their family caregivers while achieving significant total cost savings” (p 3). The same issue brief discusses those TCM elements that produced lower hospital readmissions, including “in-person contact with patients and family caregivers and a coordinated interdisciplinary team approach to managing care” (Naylor & Sochalski, 2010, p 7). The summary review by Naylor et al. (2011) identifies nine interventions that reduce hospital readmissions and three strategies that reduce readmissions through six or twelve months. The authors conclude the findings with strategies to guide the implementation of transitional care under the Affordable Care Act. Included among the recommendations, is dedicating investment for the preparation and support of informal caregivers, recognizing the critical role family members fulfill in transitional care.

Because of the vulnerability of patients to medication-related problems during transitions between settings, application of transitional care strategy is essential to reduce medication related errors (Flora et al., 2011). Models of transitional care underscore the importance of an interdisciplinary approach and improved communication.

**Transitional care and communication.**

An increasingly recognized element of successful transitional care is the importance of communication between care providers and patients, among care providers, and between health care settings. Research demonstrates that improved transitions must emphasize interdisciplinary communication and make medication assessment or reconciliation a priority. Chalmers and Coleman (2006) advocate that improved care transitions will result from increased patient involvement, and increased
collaboration and information integration across sites of care. In its 2007 position statement, the American Geriatrics Society emphasizes the necessity of effective methods of communication and collaboration between practitioners, clients and caregivers across health care settings. The case studies presented by Flora et al. (2011) effectively demonstrate the influence of communication in managing medications during care transitions. The authors emphasize the impact of interdisciplinary communication and collaboration on effective care transitions, including patient and caregiver involvement, and proper medication assessment and reconciliation.

Critical to addressing the issue of transitions and medication error is examination and understanding of the communication process within and between individual care settings. Markley and Winbery (2008), address the critical role communication plays in preventing medical errors. With observations derived from home health agency experience, the article discusses strategies to strengthen nurse-physician communication, specifically describing the SBAR technique. The article provides a summary review of clinician perspective on participation in home health and promotes that successful home health agencies will employ a physician communication plan and communication organization tool for reporting to physicians. The Situation-Background-Assessment-Recommendations (SBAR) technique, provides an easy to remember and useful format for organizing information to present to a clinician and is a model that can be adapted for use by any professional or caregiver who may be involved in transitional care (Markley & Winbery, 2008). According to Flora et al. (2011), care settings often function in isolation, inhibiting the communication necessary to prevent errors, while interdisciplinary
communication is enhanced and supported with techniques that provide a framework for communication about a patient's condition.

Along with strengthening interdisciplinary communication, transitional care strategies emphasize the need for enhanced communication with patients and caregivers, integrating them into efforts to improve care coordination (Coleman & Williams, 2007). The Care Transitions Intervention model equips patients with skills and tools in order to play an active role in their transitions and acknowledges family caregivers for their role in quality assurance, safety, and adherence to patient preferences. The intervention types family caregiver roles by using the acronym FACED: F = Financial; A = Advocacy; C = Care coordination; E = Emotional support; D = Direct care provision (Coleman & Williams, 2007). Such an approach facilitates improved communication within the health care team, clarifying caregiver roles within the plan of care (Coleman & Williams, 2007). Whether interdisciplinary like SBAR or patient level, communication must include not only the transfer of information but also guarantee the comprehension of that information and provide opportunity for dialogue between parties as necessary (Coleman & Williams, 2007).

Community dwelling older adults, their family members and their formal and informal caregivers are vital participants in the communication chain of medication management, and essential to successful transitions that support improved medication management. The inclusion in the project of transitional care issues and strategies will equip students and entry-level professionals to engage in the care transition
communication process so crucial to effective medication management that supports their client’s continued independence.

**Issues for Adults Aging with Intellectual/Developmental Disabilities**

Integrating awareness of the medication management issues for adults aging with intellectual and developmental disabilities (I/DD) is a critical aspect of the overall perspective on medication management for community dwelling older adults. There are an estimated 641,000 adults, aged 60 and older living with intellectual and other developmental disabilities, such as cerebral palsy, autism, and epilepsy (Heller, 2010). Projections are their numbers will double to 1,242,794 by the year 2030. Approximately 76% of individuals living with developmental disabilities reside at home and in 25% of those households the family caregiver is 60 years or older. With the increased life expectancy of adults with I/DD, the length of caregiving responsibility for their families has subsequently increased, raising the level of awareness of the needs of both groups as they age (Heller, 2010).

The existing literature speaks of a number of age related concerns for these individuals and their caregivers. Writing for a feature issue on aging and people with intellectual and developmental disabilities, published by the University of Minnesota, Institute on Community Integration, Heller (2010) discusses the demographic trends of adults aging with I/DD, the impact on their aging family caregivers, and challenges to public policy. The author advocates for increased support for consumer directed and family based care and the reduction of environmental barriers to health and community participation. Adults with I/DD desire services to enable them to maintain a level of
functioning which will support independent living to the extent that is possible, whether they reside alone, with family, or in other settings (Heller, 2010). Shaw, Cartwright and Craig (2011) conducted focus groups and individual interviews of fifteen adults with intellectual disabilities (ID) and ten family members involved in the care of adults with ID, to determine housing and support preferences of both for adults with ID as they age. Thematically analyzed results concluded with three themes that demonstrate a desire for aging in place and an integration of aging and disability services to support the maintenance of social networks if transition to formal housing is required as people with ID age.

While many of the same medication management issues that affect the independence of older adults in the general population also affect adults aging with I/DD, the unique challenges of I/DD contribute to additional medication management issues that require attention. With the summary of Healthy People 2010 and the transition to Healthy People 2020, nine new objectives were added to the Disability and Health Topic Area, including the use of inappropriate medications among older adults with disabilities (U.S. Department of Health and Human Services, 2010). For those pursuing gerontology oriented careers, incorporating knowledge of the adult aging with (I/DD) into their understanding of aging and medication management will prepare professionals to advocate for this population of aging adults.
Aging process and medication for adults with I/DD.

Understanding the medication management needs of adults aging with I/DD is explored by examining the issue through the same themes as the general aging population, beginning with the aging process and medication.

Although adults with I/DD experience the same health concerns as the general aging population, they have significant additional challenges because of the progression of their disability combined with the onset of issues related to older age. Saxon, Etten, and Perkins (2010) provide an inclusive look at aging with disabilities that specifically addresses aging with Down syndrome (DS) and Cerebral Palsy (CP) and speaks to the problem of obesity in the adults aging with intellectual disability. Adults aging with DS or CP are prone to “an accelerated aging process due to complications and interactions with many secondary medical aspects accompanying their conditions” (p. 270).

Important to the understanding of medication management for older adults with I/DD, is knowing that the comorbidity frequently experienced over the lifespan of those living with I/DD is accompanied by long-term medication use, which can result in adverse consequences and complicate medication use and management as individuals age (Saxon et al., 2010).

Included in a feature issue on aging and people with intellectual and developmental disabilities, published by the University of Minnesota, Institute on Community Integration, Mark and Sisirak (2010) present an overview of the health changes experienced by adults aging with developmental disabilities (I/DD). Adults with I/DD have an elevated risk of developing chronic health problems at younger ages than
other adults develop, the result of biological factors related to disabilities along with inadequate health care, lifestyle, and environmental issues. Conditions to which adults with I/DD may be prone include, but are not limited to, disease related to “eating or swallowing, dental disease, gastroesophageal reflux, esophagitis, respiratory disease and infections (leading cause of death), and constipation…non-atherosclerotic heart disease, hypertension, hypercholesteremia, diabetes, obesity, reduced mobility, bone demineralization, and osteoporosis” (p.24).

In addition to earlier onset of chronic health conditions, there is a higher prevalence rate of Alzheimer’s disease in adults with DS than in the general population (Saxon et al., 2010). Berry (2010), delivers an overview of Alzheimer’s disease (AD) in adults with I/DD written for the non-clinician, including warning signs of AD for adults with IDD. The author reveals there have been no sizeable randomized controlled studies in adults with I/DD for the FDA approved medications commonly used to treat the symptoms of Alzheimer’s disease.

The comorbidity that frequently accompanies their aging process complicates medication therapy and medication management with older adults aging with I/DD. Authoring several chapters in the book Developmental Disability and Aging, Ince (2009) addresses the unique challenges of drug therapy for adults aging with DD. The author’s analysis includes pharmacokinetic considerations, adherence issues, and a guideline for treatment of dementia and Alzheimer’s disease. The same pharmacokinetic principles of the general aging population are intensified by comorbidities in adults aging with I/DD, calling for a cautious approach in dosing regimens when beginning a medication. Health
care providers or caregivers may overlook adverse reactions to medication, attributing the response to a pre-existing condition, behavior, or to the individual’s disability. Treatment of dementia and mental health problems in the aging I/DD population presents particular medication challenges to practitioners and caregivers (Ince, 2009).

As in the general aging population, caregivers who provide support for adults aging with I/DD play a crucial role in medication management success.

**Caregivers, medication management and adults aging with I/DD.**

The importance of caregivers in supporting the medication management practice of adults aging with I/DD is mentioned in the literature. Contributing to the publication *Developmental Disability and Aging,* Middleton and O’Brien (2009) offer insight on the necessity of providing support and education for caregivers of adults aging with DD. Mark and Sisirak (2010) acknowledge the central role played by family and professional caregivers in meeting the support needs of adults aging with I/DD, cautioning that many service delivery systems are ill prepared to meet the needs of adults with I/DD as they age and their parents are no longer able or available to provide for their care.

The impact of caregivers is confirmed with insight gained from two interviews. Sharon Galloway (2012), coordinator for the Transition through Adulthood Project with CEDD at the U.C. Davis Mind Institute, affirms the need for educational materials inclusive of adults aging with developmental disabilities. Donna Bettencourt (2012), of InAlliance, a non-profit organization in Sacramento, dedicated to supporting the independence of persons with disabilities, also emphasizes the need for caregiver training regarding aging issues for adults with I/DD. Caregiver observation of the client can
negatively influence prescribing if the caregiver is overwhelmed or ill prepared and
incorrectly assesses that the client needs medication (D. Bettencourt, personal
communication, May 1, 2012). When mental health services are difficult to access,
overmedication for mental health issues may occur (D. Bettencourt, personal
communication, May 1, 2012). Caregivers should be trained to recognize subtle changes
in clients that may signal several things: medication toxicity (which can be confused with
onset of dementia), onset of a new condition, pain, and side effects of medication (D.
Bettencourt, personal communication, May 1, 2012). As the population of adults aging
with I/DD experiences increased longevity, health literacy and skills training for
caregivers must include awareness of issues like dementia and Alzheimer’s, and other
needs across the holistic spectrum of aging (D. Bettencourt, personal communication,
May 1, 2012).

Just as education about the aging process and medication management issues of
adults living with I/DD is important for inclusion in the project, so also is information
about adherence issues faced by this population.

**Adherence and adults aging with I/DD.**

Many of the same factors associated with medication nonadherence in the general
aging population also contribute to medication nonadherence in adults aging with I/DD.
Included among these common causes are fragmentation of care, comorbidity,
polypharmacy, and concern over side effects of medications (Ince, 2009). For the older
adult living with I/DD and desiring to maintain as high a degree of independence as
possible, medication adherence is often compounded because communication, vision,
hearing and dexterity issues and problems with cognitive function are more prevalent among adults aging with I/DD (Ince, 2009).

Improving medication adherence for adults aging with I/DD involves careful assessment, acknowledgment of caregiver roles, and the development of ‘person-centered’ goals that meet with the satisfaction of the older adult patient/client. Middleton and O’Brien (2009) stress person-centered care founded on holistic assessment, regular review, and quality of life. Heller (2011) advocates for increased support for consumer directed and family based care. Holistic assessment focused on improving medication adherence with adults aging with I/DD recognizes the influence of a patient/client’s capacity (S. Galloway, personal communication, April 16, 2012). The highly individualized nature of each older adult’s condition, abilities, care, and resources makes assessing the risk versus the autonomy of any client a one person at a time process (S. Galloway, personal communication, April 16, 2012).

The achievement of person-centered care and improved medication management, including adherence, must emphasize the involvement of the older adult in the decision making process. Often, people living with I/DD are marginalized during the treatment process, while questions and information are directed to their family members or caregivers (Ince, 2009). Including the adult with I/DD in the decision making process can increase their self-efficacy and confidence and lead to increased medication adherence (Ince, 2009).

Along with assessment, acknowledgement of caregiver roles, and an emphasis on person-centered care, there are additional measures to support improved medication
adherence for adults aging with I/DD. Strategies that can improve adherence include the use of visuals and wellness journals (S. Galloway, personal communication, April 16, 2012), medication administration training for staff, bubble pack dispensing, medicine trays, phone reminders, and electronic reminders such as watches (D. Bettencourt, personal communication, May 1, 2012). The use of strategies to improve medication adherence contribute to the goal of person-centered supported living, which is the support of services crafted around what older adults need to maintain their desired independence.

Improved medication adherence for adults aging with I/DD revolves around assessment and support of person-centered care, actions which are dependent on quality communication practices.

**Care transitions and communication with adults aging with I/DD.**

As in the general aging population, assisting older adults aging with I/DD to maintain good medication management and independence is subject to disruption by health events that cause hospitalization or relocation to another health care setting. The problems inherent in care transitions and resultant risks of medication mismanagement are amplified for adults aging with I/DD.

Proper medication management is threatened by health care delivery that makes it particularly challenging for adults aging with I/DD to access needed care on a regular basis and especially during a care transition. Fragmentation of care is among the threats to continuity of care for adults with I/DD, especially those whose care is publicly funded (D. Bettencourt, personal communication, May 1, 2012). Regular system changes often restrict access to former providers who have become familiar with patient/client needs.
As the managed health care system is stretched, there is a shortage of physicians willing to treat the complex needs of these clients. Fragmentation of care contributes to communication break down and sharing of patient health information between networks or systems of care is limited (D. Bettencourt, personal communication, May 1, 2012).

Communication in care transitions for older adults with I/DD is not only limited between systems and health care providers, but between physician and patients and their caregivers. Perkins (2012) presents information about the communication difficulties encountered by clinicians when treating people with intellectual disabilities (I/DD). Results of a needs assessment study of people with I/DD, conducted by the Florida Center for Inclusive Communities, revealed the need for more appropriate interaction and better communication by health care providers. Many physicians lack the training necessary to feel well equipped to communicate with a patient with I/DD. Regardless of the health care setting, an apprehensive health care professional combined with an unprepared or uniformed caregiver can result in inadequate communication and a poor clinical outcome for the patient (Perkins, 2012). Improving transitional care for adults with I/DD requires strengthening the communication practices of health care providers, patients, and their caregivers.

There are strategies that can narrow the communication gap that so often exists in the care of adults aging with I/DD. Awareness of the importance of other people involved in the care and support of the older adult is critical. Any professional involved in supporting the adult should know who is responsible for the shared decision-making and health education of the person. Referred to as a ‘trusted helper’ or ‘wellness partner’ –
health care providers need to be familiar with the individuals who help listen and guide the client (S. Galloway, personal communication, April 16, 2012). As in the general aging population, the success of any plan of care for an adult living with I/DD, regardless of their location of care, must acknowledge the role and needs of the caregiver (Marks and Sisirak, 2010). Because over 75% of people with I/DD live with families and more than 25% of these family care providers are over the age of 60, understanding their needs is particularly critical to developing transitional care strategies that will meet the needs of the care recipient (Heller, 2010). Family Caregiver Alliance (2006), one of the original nonprofit organizations to address the needs of caregivers and recognized as a forerunner in health services, promotes the utilization of caregiver assessment as a standard part of practice across care settings.

Developing communication that supports improved care transitions and health outcomes for adults aging with I/DD includes attention to style of language. Health care providers and others involved with supportive care of adults aging with I/DD should incorporate the use of person-centered language when communicating to or about the patient/client (S. Galloway, personal communication, April 16, 2012). Snow (2012), parent, author, and speaker on the topic of developmental disabilities, provides a definition and summary of People First Language, a paradigm that discourages defining individuals by their medical diagnosis. People First Language seeks to break away from negative stereotypes and “reframes problems into needs” (Snow, 2009). Using language that promotes the value and respect of individuals should be coupled with all communication about and toward people with I/DD (Snow, 2012).
Documentation is another strategy to help improve health outcomes and transitional care of adults aging with I/DD. The use of comprehensive, concise, portable documentation about the person’s health and care needs can help unfamiliar providers modify their own communication strategies, environment, and behaviors toward their patient (Perkins, 2012). My Health Passport, developed by Florida Center for Inclusive Communities/UCEDD, is an example of the kind of communication device that fits these parameters. My Health Passport is a colorful, comprehensive and yet concise form that helps transfer critical information about needs and desires a patient has to health care personnel (Perkins, 2012). A versatile form with an adaptable format, it can be used in a variety of healthcare settings.

Any person planning to work with aging adults is likely to encounter adults aging with intellectual and developmental disabilities and/or their aging caregivers. Knowledge of and implementation of these accessible communication strategies will enhance the effectiveness of transitions across healthcare settings and support improved medication management practices.

The review of the literature thus far has presented scholarly information about four key areas or themes that contribute to understanding and improving medication management for community dwelling older adults. These themes form the content of the tool kit: age related changes and medication, the impact of medication adherence, transitional care, and issues for adults aging with intellectual and developmental disabilities. The research offered substantiates that poor medication management threatens the independence of community dwelling older adults and supports the case for
medication management education for gerontology students and entry-level professionals. Patient and advocate participation and awareness in the medication management process have never been more important.

The final section of the literature review supports the development, implementation, and evaluation of the tool kit. The theoretical foundation for the project is presented as well as the evidence base for the project format.

**Theoretical Rationale**

The literature review establishes the importance of proper medication management for community dwelling older adults and supports the case for medication management education for gerontology students and entry-level professionals who work to sustain the independence of aging adults. Four themes are developed in the literature review that provide perspective on the problem and suggest solutions. A theoretical foundation is required to support creating and utilizing a web site to deliver the evidence-based information to the intended audience: gerontology students and entry-level professionals.

Adult learning theory by Knowles (1980) is the theoretical foundation for the project. Knowles theory of adult education, known as “androgogy,” is essentially a “model of assumptions” about the characteristics of adult learners (Knowles, 1980, p. 43). As opposed to younger learners, Knowles assumes that adults are self directed in their learning, find value in their own learning experience and analysis, seek out information they need, and learn best when the topic is of value or relevance to their interest. Knowles believes that these paradigms require a different way of thinking about
where and how learning takes place, and that the task of adult education is to link learners
with learning resources. According to the theory, instructors adopt the role of facilitator.
Strategies considered useful include the use of case studies, role-playing, simulations, and
self-evaluation (Knowles, 1980).

The literature confirms the validity of Knowles’ andragogy. Daloisio and
Firestone (1983) discuss a case study utilizing Knowles’ theory of adult learning. Under
the direction of the American Management Associations, a program is developed
employing a non-traditional approach to graduate management education in which
student developed learning plans drive the process of learning. The authors conclude that
while limitations exist regarding the success of all of Knowles’ assumptions, enough
value exists in the successful elements of the model to continue with the training
program.

Harper and Ross (2011) present a practice-based article on the application of
Knowles’ theories to an undergraduate Interdisciplinary Studies program at the
University of Southern Mississippi that allows learners to develop their own degree plan.
The authors assess the development and implementation of the program according to
Knowles’ principles. Their evaluation of the program experience reflects Knowles’
assumptions about adult learning.

The literature regarding effective online learning experiences of adults aligns with
several of Knowles’ assumptions about adult learning, particularly the importance of self-
regulation, content relevance, and learner reflection or self-evaluation. Park and Choi
(2009) present a study conducted to determine the individual, internal, and external
characteristics of adults who decide to discontinue or continue enrollment in online
learning. Quantitative data from 147 students, who discontinued or finished an online
course offered through a large Midwestern university, includes participant demographics
as well as perceptions of family support, organizational support, and motivation in terms
of satisfaction and relevance. The authors conclude that organizational support and
relevance of course content predict students’ decision to continue or quit.

In a report compiled for the U.S. Department of Education (2010), researchers
conduct a meta-analysis of 50 studies of web-supported learning. Study criteria included
those with objective measures of learning and controlled designs that met minimum
quality criteria. Though inconclusive about the effectiveness of blended learning
programs, the analysis yielded consistent information relative to learner reflection and
self-regulation and monitoring as mechanisms that improve learning outcomes.

Kim and Frick (2011) survey 368 adult learners from higher education and
corporate settings to investigate learner motivation in self-directed online courses. The
authors employed regression analysis to determine predictors of motivation to begin
online learning and predictors of motivation during online learning. Relevance of
learning goals and opportunity to integrate learned principles are linked with motivation.
The study concluded that findings were consistent with instructional, learning, and
motivation theory.

With support from the literature, the project is conceptualized as a web based tool
kit of evidence-based information and electronically available resources. Aligned with
Knowles’ (1980) theoretical assumptions, the web site is directed toward the adult learner
– both those students planning gerontology oriented careers and entry-level professionals who desire to supplement their knowledge with the project content. The web site is based on the self-directed assumption that in addition to their classroom or field based experience the adult learner will access the web site to acquire the information. Following with Knowles’ assumption that adults learn best what they find relevant to their experience, it is supposed that the web site user will pursue and learn from the material precisely because they find the subject relevant to their study and work with older adults. Corresponding to Knowles’ suggestion, included in the web site are several case studies that illustrate the content. Finally, it is presumed that just as Knowles believes adult learners find meaning in self-evaluation, the project users will find value in a self-evaluation component embedded within the web site.

The next chapter is the project overview. It discusses the procedure undertaken to build the project and the process of completion. The process of evaluation for the project is presented as well as services used in the construction of the project.
**Project Overview**

The literature review substantiated the observation that poor medication management threatens the independence of older adults and supports the case for medication management education for gerontology students and entry-level professionals. A theoretical foundation guides the development, implementation, and evaluation of a web site to meet this need.

This chapter describes the aim of the project and discusses the procedure undertaken to complete the project. The process of evaluation for the project is presented along with services used in the construction of the project.

**Project Aim**

The aim of this project is to provide gerontology students and entry level gerontology professionals who serve older adults, an evidence-based educational resource on the subject of medication management, to better support community dwelling older adults to maintain their capacity to age in place (Bergman-Evans, 2006). To accomplish this goal, a web site was developed that is accessible via the CSU Sacramento (CSUS) web server. This web site is a tool kit with evidence-based information and electronically available resources selected to first, develop the user’s awareness of the importance of medication management and illustrate why and how all professionals and care providers who serve older adults play a critical role in the success of medication management. Secondly resources are selected to increase the user’s competence to support strategies for improved medication management for community dwelling older adults and thereby assist them in their ability to age in place (Bergman-Evans, 2006; Peron & Ruby, 2012;
Saxon et al., 2010). Items selected for the toolkit can be adapted for use by care professionals in a variety of settings. Many items on the web site can be downloaded and copied for use.

**Project Completion**

The project completion began with the student assessing the need for the project based on a series of educational experiences related to older adults. Background data development involved review of the literature and several key interviews with content experts. Adult learning theory (Knowles, 1980) and principles of web site design (Academic Technology, 2010) helped guide the assembly of the project.

**Assessment of need for the educational project.**

During the fall of 2011, the student participated in an internship with a Sacramento area firm that specializes in geriatric care management. Interested in the field of geriatric care management as a possible career, the student was permitted to read case files, participate in assessment and case planning, and attend collaboration meetings with multidisciplinary staff, including a nurse case manager. During this time, the student observed that medication management issues were a common problem for the majority of care management clients (Peron & Ruby, 2012; MacLaughlin et al., 2005; Schlenk, et al., 2004). This observation coincided with the student’s previous care-giving experience with older adult adults: the complex issues surrounding the management of medication can complicate and threaten the continued independence of older adults (Bergman-Evans, 2006). Because of the combined experiences, the student became increasingly aware of
her own lack of knowledge regarding medication management and was convinced of the necessity to pursue more education on this subject. Enrollment in a research class produced the opportunity to write an integrative review on medication adherence in independent community residing older adults. This integrative review confirmed the student’s observation that medication management is indeed a critical issue for aging adults and their caregivers, and a subject of paramount concern for any professional intent on assisting older adults to age in place.

In December 2011, the student accepted an invitation from Dr. Dian Baker, of the CSUS nursing department and one of the student’s project committee members, to participate in the Interdisciplinary Training Program of the Center for Excellence in Developmental Disabilities, (CEDD), at the UC Davis MIND Institute in Sacramento. The CEDD is one of 67 centers across the country, authorized by the Developmental Disabilities Assistance and Bill of Rights Act and funded by the U.S. DHHS Administration on Developmental Disabilities (ADD). One of the goals of the CEDD is to cultivate interdisciplinary training and research regarding developmental disability and thereby increase the program’s effectiveness within the community. Participation in the interdisciplinary experience provided the student with unique support within which to develop the project while learning and integrating research regarding the emerging population of adults aging with developmental disabilities. In February 2012, the interdisciplinary group met to discuss individual project ideas. The student’s interest in developing a medication management educational resource was affirmed as applicable to the UCEDD program. Within the interdisciplinary group, a discussion also occurred
about models of transitional care. The idea of including transitional care (Chalmers & Coleman, 2006; Naylor & Sochalski, 2010) as an integral part of medication management was explored and added to the student’s agenda. A timeline for the project was also developed in February 2012 and revised twice over the course of the project completion.

**Background data for the development of the web site.**

Research completed for the integrative review on medication adherence served as a starting place and additional research for the literature review began. Accessing the California State University online library, Pub Med and Gerontology multi search databases were searched using various combinations of the key words medication management, medication adherence, older adults, elderly, community dwelling/residing, transitional care, and developmental disabilities. Selections were limited to full text, peer-reviewed articles published in English between January 2001 and 2012. Citations from relevant articles were examined, yielding additional resources. Selection criteria included research-based literature in which the older adult is specifically referenced with one or more of the following: (a) medication management (b) adherence (c) transitional care and (d) developmental disabilities.

Several key interviews were conducted to supplement the research on the developmental disabilities topic. In April 2012, the interdisciplinary group met with Sharon Galloway, coordinator for the Transition through Adulthood Project, with CEDD at the U.C. Davis Mind Institute. Ms. Galloway affirmed the need for educational materials inclusive of adults aging with developmental disabilities and offered key points for consideration within the project. In May 2012, the author met with Donna
Bettencourt, of InAlliance, a non-profit organization in Sacramento, dedicated to supporting the independence of persons with disabilities. Ms. Bettencourt also confirmed the importance of project inclusion of adults aging with developmental disabilities and provided helpful insight on the project focus.

Because the project concept incorporated the use of electronically available resources, a standard for inclusion was necessary. Each resource had to relate to either medication management and/or one of the four themes developed from the literature review: (a) age related changes and medication, (b) the impact of medication adherence, (c) transitional care, and (d) issues for adults aging with intellectual and developmental disabilities. In addition to the content standard, resources were also measured against a standard for evaluating web documents acquired online from Cornell University (Five Criteria, 2010). These criteria include: (a) accuracy: the resource lists the author and institution that published the document; (b) authority: the resource lists the author credentials and has a preferred domain (.edu, .gov, .org, or .net); (c) objectivity: the resource provides objective, accurate information with limited advertising; (d) currency: the resource is current; and (e) coverage: the resource can be viewed properly and is not limited to fees.

With the acquisition of content from the literature review and interviews complete, and with the resources evaluated according to the web document criteria standards, the assembly of the web site could begin.
Assembly of the web site.

The student desired to make the project as accessible as possible to gerontology students and entry-level professionals. A web based format was chosen for the project supported by principles of adult learning theory (Knowles, 1980), which assume that adults are self directed in their learning, find value in their own learning experience and analysis, seek out information they need, and learn best when the topic is of value or relevance to their interest. The literature supports the effectiveness of online learning experiences of adults and aligns with several of Knowles’ assumptions about adult learning, particularly the importance of self-regulation, content relevance, and learner reflection or self-evaluation (Kim & Frick, 2011; Park & Choi, 2009; U.S. Dept of Education, 2010).

Referring to the principles of web site design provided by the Student Technology Center at CSUS, the project web site was developed to (a) create a clear visual hierarchy on each page; (b) utilize recognized or conventional design; (c) break up pages into clearly defined sections; (d) make links to outside material obvious to the user; and (e) include necessary information, in an uncluttered presentation (Academic Technology, 2010).

To keep the size of the project amenable to users and represent the content developed in the literature review and supplemental research, a four-module format was implemented. To guide the assembly of information and resources for each module, a template was created (Appendix E).
Remaining consistent with Knowles’ (1980) assumptions about adult learners and reflecting the principles of web site design, each module includes a goal, objectives, activities which link users to available resources, self evaluation questions, and references. Module goals are derived from themes developed in the literature review; module objectives were written as SMART (specific, measureable, assessable, realistic, timely) objectives framed by Bloom’s taxonomy (St. Edward’s, 2001). Narrative learning content within each module was based on integrative analysis of the relevant literature. The inclusion of activities and self-evaluation questions in each module corresponds with research by The U.S. Department of Education (2010), and Kim and Frick (2011) that online learning experiences produce greater learning outcomes when opportunities are included for the participant/learner to interact with resources and evaluate their own experience with the course content. Learning activities embedded in the web site refer to resources such as readings, videos, assessments, and tools that support the module goal. Self-evaluation questions are designed to assist the learners in determining their own learning outcomes from the modules.

Using the module templates, construction of the project began in July 2012, with multiple revisions occurring until completion in early October 2012. The web site was posted on the CSU Sacramento web server in October 2012. Screen shots of each of the four modules including the URL, are located in Appendices A, B, C, and D.

The creation of a web site to fulfill the objective of the project included theoretical foundation, support from the literature review, and web site design
information. The evaluation of the project sought to confirm the effectiveness of the project.

**Process of Evaluation**

Evaluation of the project occurred in two spheres, an expert panel and a focus group. Content review was accomplished with the expert panel on an individual basis prior to the focus group. Representing future consumers, the focus group evaluated the accessibility, clarity, and relevance of the content.

The expert panel evaluated the content for accuracy and literary support. The panel consists of Cheryl Osborne, EdD, MSN, Director of Gerontology, and Professor of Gerontology and Nursing at CSUS; Dian Baker, PhD, APRN-BC, PNP, Associate Professor, RN to BSN Program Coordinator at CSUS and CEDD interdisciplinary group advisor; Caitlin Baumgardner, BSN, PHN and CEDD interdisciplinary group member; and Gail Arno, Certified Geriatric Care Manager. Each expert was selected based on a specific area to examine the currency, accuracy, and evidence base for the web site content.

**Future consumer focus group.**

Project objectives were evaluated with a focus group consisting of respondents representing future users. Procedure for conducting the focus group was developed based on a focus group guideline document by Eliot (2005), and made available online by Duke University. Additional evaluation methods employed for use with the focus group are
supported by Utah State University (USU) open courseware on web site usability (USU, 2008).

Focus group participants, according to Eliot (2005) can be recruited from an existing group. For this response group, student participants were desired. A recruitment flyer asking for focus group participants was posted on the Gerontology message board at CSUS and distributed to gerontology and nursing students via Dr. Cheryl Osborne (Appendix F). The inclusion criterion for the focus group was current enrollment as a gerontology, or related discipline, undergraduate or graduate student. Participants were offered an incentive gift card valued at ten dollars upon completion of the evaluation.

Following the guideline by Eliot (2005), evaluation methods utilized for the focus group included three forms: a demographics questionnaire, a feedback worksheet, and a post evaluation survey. Upon arrival, participants were asked to complete a half page form which included participant demographics, work experience in aging adult services, and participation in and/or familiarity with medication management (Appendix G).

Following the protocol of Eliot (2005), a brief introduction by the moderator asked participants to screen the web site for ease of use, clarity, and relevance. While viewing the web site, participants completed a form to record feedback in four areas: (a) missing information (b) confusing information (c) what they liked best about the web site and (d) three things they learned that could be applied to their practice with older adults (Appendix H). Based on recommendations from Eliot (2005) and USU (2008), participants shared observations with the focus group moderator after interacting with the web site.
As suggested by the web usability evaluation standards of USU (2008), focus group procedure concluded with respondents’ completion of a survey to confirm each focus group member’s experience with the web site (Appendix I). The moderator thanked each participant and distributed the honorarium.

Expert content reviewers were followed by a focus group, representing future consumers, who supplied feedback, provided evaluation of the project content accessibility, clarity, and relevance of the web site. Results and data from the focus group evaluation are presented and analyzed in project evaluation chapter.

**Products and Services Used in Project Development**

The development of the project required the student to access information and assistance relevant to web site creation. The Student Technology Center at CSU Sacramento served as the main source of assistance.

Beginning in April 2012, in preparation for the production of the web site, the student consulted the Student Technology Center (STC) on the campus of CSU Sacramento for advice on web construction and design. Several meetings were necessary to determine what web editing software was most practical for the project’s purpose and the student’s ability. Eventually, STC staff recommended using Microsoft Word to construct the web site, with the ultimate goal of posting it on the CSUS web server, making it accessible to anyone with the specific site URL. STC provided information on web design basics and met with the student five times from the outset to the completion of the project.
The student consulted introductory web design material made available by the STC (Academic Technology, 2010). At the suggestion of STC staff, the student browsed a variety of existing web sites to research for design options, including page layout, color, design features, and amount of material. The ADA 508 compliance of the web site was confirmed (Appendix J) using Cynthia Says, a free online service.

**Conclusion**

This chapter has described the project process of completion from early stages of assessment of need to project creation and evaluation. The web site, developed as a result of the process, seeks to accomplish the aim of the project: create an accessible, evidence-based educational resource for gerontology students and entry-level gerontology professionals, to strengthen their ability to support successful medication management strategies and help maintain the independence of community dwelling older adults whom they serve.

The next chapter presents the evaluation and analysis of the project. The effectiveness and limitations of the project are discussed, the project experience is related to the literature review, and conclusions and recommendations are made accordingly.
Project Evaluation

The literature review supports the assertion that the increasing use of medications to treat chronic conditions inherent to aging, combined with the risks associated with medication mismanagement, point to a need for medication management education opportunities for the gerontology students and entry-level gerontology professionals, whose goal is to support the desired independence of community dwelling older adults. A project is conceptualized and a web site with evidence-based information and electronically available resources is completed to meet this need.

This chapter describes the process undertaken to evaluate the effectiveness of the web site for its intended audience: gerontology students and entry-level professionals. The process of evaluation is followed by evaluation results. The results are analyzed, compared to the project objectives, and limitations are discussed. The project effectiveness is evaluated in light of the research. Finally, conclusions are presented and recommendations made.

Process of Evaluation

Evaluation of the project occurred in two spheres, an expert panel and a focus group. Content was reviewed for currency, accuracy, and evidence base by the expert panel during completion of the project and prior to the focus group. Representing future consumers, the focus group, evaluated the accessibility, clarity, and relevance of the actual project, the web site. The focus group process, results, and analysis are explored here.
Future consumer focus group.

Project objectives were evaluated with a focus group consisting of respondents representing future users. Procedure for conducting the focus group was developed based on a focus group guideline document by Eliot (2005), and made available online by Duke University. Additional evaluation methods employed for use with the focus group are supported by Utah State University (USU) open courseware on web site usability (USU, 2008).

Focus group participants, according to Eliot (2005) can be recruited from an existing group. For this response group, student participants were desired. A recruitment flyer asking for focus group participants was posted on the Gerontology message board at CSUS and distributed to gerontology and nursing students via Dr. Cheryl Osborne (Appendix F). The inclusion criterion for the focus group was current enrollment as a gerontology, or related discipline, undergraduate or graduate student. Participants were offered an incentive, a gift card valued at ten dollars, upon completion of the evaluation.

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information (b) confusing information (c) what they liked best about the web site and (d) three things they learned that could be applied to their practice with older adults (Appendix H). Based on recommendations from Eliot (2005) and USU (2008), after interacting with the web site, participants shared observations with the focus group moderator. The moderator recorded and added these comments to remarks made on the feedback form.

As suggested by the web usability evaluation standards of USU (2008), focus group procedure concluded with respondents’ completion of a survey to confirm each focus group member’s experience with the web site (Appendix I). The moderator thanked each participant and distributed the honorarium.

**Evaluation Results**

Demography of focus group respondents included two gerontology undergraduate students and one social work graduate student. All respondents were female; age ranges include one, 20 to 30 years old; one, 31 to 40 years old; and one, 41 to 50 years old. All three respondents had less than five years of work experience in an aging services field. One respondent indicated familiarity with medication management resources.

Feedback derived from the focus group discussion and respondent review forms were collated and responses reviewed for similarities. Appendix K includes collated responses to the first three response items: (a) information missing from web site, (b) information confusing in the web site, and (c) what reviewers liked best about the website. While there was no duplication in what focus group participants identified as
information missing from the web site, three of the four responses related to information that was different from anything addressed in any of the web site modules. Regarding participants’ feedback on confusing information in the web site, three of the four responses were related to format issues regarding placement of items on the page and visibility of important features. Feedback related to what focus group participants liked best about the web site provided multiple responses about format. These comments addressed specific features of the page developed to guide the learner, including bulleted information, key point summaries, and the self-evaluation component. Reviewers also identified the provision of the additional resources linked within the web site as desirable.

Two other comments were directed toward two specific information resources.

Appendix L includes collated responses to the final response item on the respondent review form: three things reviewers learned that could apply to their own practice with older adults. Response regarding what was learned that could be applied to the reviewer’s individual practice with older adults fell into three categories or themes. The most common response related to the theme of resources, with respondents identifying specific items or information as helpful for the task of medication management with older adult clients. Two comments identified as helpful the information related to adults aging with development disabilities. Several general responses indicated the benefit of increased awareness of medication issues for aging adults.

The post evaluation survey contained six statements to confirm the focus group members’ experience with the website (Appendix I). With each of the respondents, there
was little variation in statements of agreement: each reviewer chose either ‘Strongly Agree’, or ‘Agree,’ for each of the statements.

This section has presented a thorough report of the results derived from the focus group evaluation experience. Next is a summary of effectiveness of the project, an analysis of the results with regard to the intended objective or aim of the project.

**Summary of Effectiveness**

The aim of this project is to provide gerontology students and entry-level gerontology professionals an evidence-based educational resource on the subject of medication management for community dwelling older adults. To accomplish this goal, a web site was developed that is accessible via the CSU Sacramento (CSUS) web server. This web site is a tool kit with evidence-based information and electronically available resources selected to develop the user’s awareness of the importance of medication management and illustrate why and how all professionals and care providers who serve older adults play a critical role in the success of medication management. Also developed is the user’s competence to support strategies for improved medication management for community dwelling older adults. A focus group evaluation of the web site was conducted and the results of the evaluation have been recorded.

The goal of the project includes reaching gerontology students and entry-level professionals with the content information, thus it is particularly important that two of the respondents are gerontology undergraduates, who indicate they have no exposure to medication management experience. Equally as important, the social work graduate respondent, who represents a discipline related to gerontology, indicates some familiarity
with medication management resources. The demographics of the focus group respondents provide a baseline against which to measure the effectiveness of the web site.

Determining the effectiveness of the web site with the users is based on the analysis of the responses from the focus group feedback form (Appendix H) as well as the post evaluation survey (Appendix I). Feedback related to what focus group participants liked best about the web site, provides insight about the effectiveness of the web site design or format as well as the web site content. The comments addressed specific features of the page developed to guide the learner, including bulleted information, key point summaries, and the self-evaluation component. Focus group participants indicated these features were effective and made the information easy to follow. Reviewers also identified the provision of the additional resources linked within the web site as desirable. Other comments specified the value of two information resources: a diagram illustrating pharmacokinetics and a health record information tool for adults aging with developmental disabilities. This feedback related positively to the effectiveness of both the design format and the content of the web site.

The effectiveness of the web site is also evident in the analysis of respondent comments regarding what was learned that could be applied to the reviewer’s individual practice with older adults. Feedback in this category fits into three themes. The most common responses relate to resources, with respondents identifying specific items or information found in the web site as helpful for the task of medication management with older adult clients. Two comments identified as beneficial the information related to adults aging with development disabilities. Several general responses indicated the
benefit of increased awareness of medication issues for aging adults. The feedback provided directly corresponds to the objective of the project to: a) develop the user’s awareness of the importance of medication management and illustrate why and how all professionals and care providers who serve older adults play a critical role in the success of medication management and (b) increase the user’s competence to support strategies for improved medication management for community dwelling older adults. Finally, the consistent and positive results of the post evaluation survey (Appendix I) confirm the value of learner interaction with the web site.

Analysis of the project evaluation, accomplished with the use of a focus group representing future project consumers, confirms the effectiveness of the project in accomplishing the aim to provide medication management education for gerontology students and entry-level professionals. Just as the analysis reveals the strengths of the project, so also the limitations of the project are exposed.

Limitations

The focus group evaluation produced results that require discussion about the limitations of both the project content and format. Determining the limitations of the web site, according to the reviewers’ experience, is based on the analysis of the comments from the focus group feedback form (Appendix H).

Focus group participants identified information missing from the web site. Three of the responses identified separate topics the individual reviewers deemed important to address in the context of medication management for aging adults. Topics identified include (a) clarifying the difference between misuse of medication and drug abuse, (b)
medication non-adherence with mental illness, and (c) the consideration of residential care or assisted living administrators. The distinct nature of the comments alludes to the limitation of the web site’s comprehensiveness of the topic of medication management. Though the web site provides information on four research-supported areas, which influence medication management in aging adults, the content is not all-inclusive, and the individual experience and background of the learner will expose gaps in the project content.

While limitations in the project content were revealed, so also were limitations in the project format. Participants’ feedback on confusing information in the web site included three responses related to format issues regarding placement and visibility of important features on the page. The consistency of comments referring to confusing format reveals limitations in the web site’s design that may prevent future learners from fully accessing the information.

Focus group evaluation provided feedback for analysis of the project to reveal limitations in the web site content and format. These reviewer interactions with the web site also provide context for a discussion of the project experience related to the research.

**Project Experience Related to Research**

An analysis of evaluation results, provided from a focus group representing future users of the web site, validates the selection of project content and confirms the theoretical foundation of the project supported in the literature review.

The literature review establishes the importance of proper medication management for community dwelling older adults and supports the case for medication
management education for gerontology students and entry-level professionals who work to sustain the independence of aging adults. Four themes developed from the literature review provide perspective on the problem, suggest solutions, and form the content of the web site. The first theme is age related changes and medication (Peron & Ruby, 2011; Saxon et al., 2010). The second theme is the impact of medication adherence (Bergman-Evans, 2006; MacLaughlin et al., 2005; Ruppar et al., 2008; Schlenk et al., 2004; Yank et al., 2001). The third theme is transitional care (Chalmers & Coleman, 2006; Flora, et al., 2011; Markley & Winbery, 2008; Naylor et al., 2011). Finally, the fourth theme is issues for adults aging with intellectual and developmental disabilities (Heller, 2010; Ince, 2009; Marks & Sisirak, 2010; Perkins, 2012; Saxon et al., 2010).

The analysis of comments in Appendix L displays learner validation of the content selected for the web site. Respondent comments, regarding what was learned that could be applied to the reviewer’s individual practice with older adults, confirmed the web site provides information helpful for the task of medication management with older adult clients (Bergman et al., 2006; Flora et al., 2011; Peron & Ruby, 2012; MacLaughlin et al., 2005;). Additional comments identifying the information as beneficial related to adults aging with development disabilities, affirmed the inclusion of medication management issues for this population of adults in the project content (Heller, 2010; Ince, 2009; Marks & Sisirak, 2010; Middleton & O’Brien, 2009). The analysis of focus group feedback affirmed content determined important by the literature review.

The literature review includes the theoretical foundation for the project, adult learning theory by Knowles (1980). Adult learners, according to Knowles, are self
directed in their learning, find value in their own learning experience and analysis, seek out information they need, and learn best when the topic is of value or relevance to their interest. The literature regarding effective online learning experiences of adults aligns with several of Knowles’ assumptions about adult learning, particularly the importance of self-regulation, content relevance, and learner reflection or self-evaluation (Kim & Frick, 2011; Park & Choi, 2009; U.S. Dept. of Education, 2010).

The theoretical foundation and the validity of utilizing a web-based format for the project are confirmed in the analysis of feedback related to what focus group participants liked best about the web site. The comments addressed specific features of the web site developed to guide the learner, including bulleted information, key point summaries, and a self-evaluation component (Kim & Frick, 2011; Knowles, 1980; Park & Choi, 2009; U.S. Dept. of Education, 2010). Focus group participants confirmed that these features were effective and made the information easy to follow. Knowles’ assumption that adults are self-directed in their learning is critical to the effectiveness of the project, which depends on the adult learners’ motivation to seek out needed and desired information. Participants affirmed the availability of resources to learners using the web site. This validation of the resources is an indication of learner willingness to further investigate and utilize the medication management information and tools incorporated into the web site.

The analysis of focus group evaluation responses affirms the literature supported content and the theoretical foundation of the project and provides insight for conclusions and recommendations regarding the project.
Conclusions and Recommendations

The project evaluation process and analysis lead to conclusions and recommendations regarding the web site. Both the summary of effectiveness and limitations of the project contribute to the conclusions and recommendations.

The first conclusion is the project has design issues that could prevent future learners from fully accessing the information. The analysis of project limitations revealed weakness in the web site’s design, specifically format issues related to placement and visibility of important features on the page (Academic Technology, 2010). Preliminary informal user review of the web site, while the project was under construction, may have prevented this weakness from surviving the design process. Additional instruction in web site development for the author may have eliminated these design barriers. Recommendations for future researchers are the use of more in-depth assistance with web site design, and earlier informal evaluation by potential user groups.

Secondly, though limitations in the project content were revealed, the conclusion is that the project provides a research supported perspective of the themes developed in the four modules (Bergman-Evans, 2006; Chalmers & Coleman, 2006; Flora et al., 2011; Heller, 2010; Ince, 2009; MacLaughlin et al., 2005; Markley & Winbery, 2008; Marks & Sisirak, 2010; Naylor et al., 2011; Perkins, 2012; Peron & Ruby, 2011; Ruppar et al., 2008; Saxon et al., 2010; Schlenk et al., 2004; Yank et al., 2001). Because the topic of medication management for older adults is vast, the potential will continue to exist for individual learner experience and background to expose gaps in the project content. It is
recommended that the introduction of the project acknowledge this as well as encourage learners to pursue further research in areas they find absent or deficient.

Finally, the project research verifies the significance of interdisciplinary support of older adults to practice proper medication management and maintain their desired independence (Chalmers & Coleman, 2006; Coleman & Williams, 2007; Flora et al., 2011; Markley & Winbery, 2008). Though the focus group evaluation representing future users was limited in scale, the suggestion remains that the project is applicable across disciplines. Future research is recommended to explore the effectiveness of the project with entry-level professionals in fields that serve older adults, including social work, public health, health care administration, and recreation studies, for example.

**Conclusion**

The project began with the observation that poor medication management affects the health and independence of community dwelling older adults. The literature review established the importance of proper medication management for community dwelling older adults and supported the case for medication management education for gerontology students and entry-level professionals who work to sustain the independence of aging adults. A theoretical foundation was presented to create and utilize a web site to deliver the evidence- based information to the intended audience: gerontology students and entry-level professionals. The evaluation confirms the effectiveness of the project in accomplishing the aim to provide medication management education for gerontology students and entry-level professionals.
Appendix A

Web site Introduction and Module One screen shots

http://webpages.csus.edu/~fcc25

http://webpages.csus.edu/~fcc25/Module%201.htm
Appendix B

Module Two screen shot

http://webpages.csus.edu/~fcc25/Module%202.htm
Appendix C

Module Three screen shot

http://webpages.csus.edu/~fcc25/Module%203.htm
Appendix D

Module Four screen shot

http://webpages.csus.edu/~fcc25/Module%204.htm
Appendix E

Module Format Template

Module:

Overview/goal:

Learning Objectives:

Activities/Resources:

Additional Resources:

Evidence Based References (3-8):
Appendix F

Focus Group Flyer

STUDENTS NEEDED!

FOCUS GROUP

for

A Thesis Project Evaluation

Planning a future career in older adult services? If you are a gerontology (or related discipline) graduate or undergraduate student, then your assistance is needed to review and provide feedback regarding a graduate project. Participation will provide an opportunity to learn information about a subject that will affect any practice with older adults: medication management. Evaluation will involve answering a questionnaire and examining a web site.

<table>
<thead>
<tr>
<th>When:</th>
<th>Tuesday, October 9.2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time:</td>
<td>4:00 p.m. to 5:15 p.m.</td>
</tr>
<tr>
<td>Where:</td>
<td>Folsom Hall</td>
</tr>
<tr>
<td></td>
<td>Room 1047(computer lab)</td>
</tr>
</tbody>
</table>

To sign up, please contact: ____________________________

Indicate if you need a parking pass.

$10 Jamba Juice or $10 Starbucks gift card for first six participants who sign up, attend, and complete the evaluation
## Appendix G

Focus Group Demographics

### I. Pre evaluation questions

<table>
<thead>
<tr>
<th>Student status:</th>
<th>Field of study:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under graduate</td>
<td></td>
</tr>
<tr>
<td>Graduate</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years of work in aging services field:</th>
<th>Are you familiar with any medication management resources?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 years</td>
<td>Yes</td>
</tr>
<tr>
<td>5 to 10 years</td>
<td>No</td>
</tr>
<tr>
<td>More than 10 years</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Your age:</th>
<th>Your gender:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 20</td>
<td>Female</td>
</tr>
<tr>
<td>20 to 30</td>
<td>Male</td>
</tr>
<tr>
<td>31 to 40</td>
<td></td>
</tr>
<tr>
<td>41 to 50</td>
<td></td>
</tr>
<tr>
<td>51 to 60</td>
<td></td>
</tr>
</tbody>
</table>
Appendix H

Website Feedback Form

While reviewing the web site, please make note of the following:

<table>
<thead>
<tr>
<th>Missing information</th>
<th>Confusing information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What you liked best about the website</th>
<th>3 things you learned that could be applied to your practice with older adults</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Appendix I

Post Evaluation Survey

<table>
<thead>
<tr>
<th>1. It was easy to navigate through the web site</th>
<th>4. It was easy to navigate through the web site</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ Strongly Agree</td>
<td>○ Strongly Agree</td>
</tr>
<tr>
<td>○ Agree</td>
<td>○ Agree</td>
</tr>
<tr>
<td>○ Neutral</td>
<td>○ Neutral</td>
</tr>
<tr>
<td>○ Disagree</td>
<td>○ Disagree</td>
</tr>
<tr>
<td>○ Strongly Disagree</td>
<td>○ Strongly Disagree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. The objective of the web site was clearly stated</th>
<th>5. The objective of the web site was clearly stated</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ Strongly Agree</td>
<td>○ Strongly Agree</td>
</tr>
<tr>
<td>○ Agree</td>
<td>○ Agree</td>
</tr>
<tr>
<td>○ Neutral</td>
<td>○ Neutral</td>
</tr>
<tr>
<td>○ Disagree</td>
<td>○ Disagree</td>
</tr>
<tr>
<td>○ Strongly Disagree</td>
<td>○ Strongly Disagree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. The web site content is relevant</th>
<th>6. The web site content is relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ Strongly Agree</td>
<td>○ Strongly Agree</td>
</tr>
<tr>
<td>○ Agree</td>
<td>○ Agree</td>
</tr>
<tr>
<td>○ Neutral</td>
<td>○ Neutral</td>
</tr>
<tr>
<td>○ Disagree</td>
<td>○ Disagree</td>
</tr>
<tr>
<td>○ Strongly Disagree</td>
<td>○ Strongly Disagree</td>
</tr>
</tbody>
</table>
Appendix J

ADA 508 Compliance

HiSoftware® Cynthia Says™ - Web Content Accessibility Report
Powered by HiSoftware Content Quality Technology. If you have a question about this output please email support@hisoft.com

Verified File Name: http://webpages.csus.edu/~fcc25
Date and Time: 10/19/2012 6:42:12 PM
Passed Automated Verification

HiSoftware can help you meet all of your accessibility needs and more. Our industry leading enterprise content compliance solutions provide you with an automated, full-featured monitoring, auditing and testing solution to ensure your ever-changing Web content is always compliant with the latest standards for accessibility, privacy and confidentiality, site quality and data and information security. Visit www.hisoft.com to find out more about how HiSoftware solutions can help you meet your Web compliance goals and request a trial copy.

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The level of detail setting for the report is to show all detail.

Checkpoint Result Legend: Yes = Passed Automated Verification, No = Failed Automated Verification, Warning = Failed Automated Verification, however, configured not to cause page to fail (Priority 2 or 3 only), N/V = Not selected for verification, N/A = No related elements were found in document (Visual only), No Value = Visual Checkpoint

Report generated by the HiSoftware Company Cynthia Agent. Powered by the AccMonitor Compliance Server HiSoftware, Cynthia Says, AccMonitor Compliance Server, Cynthia Agent are all trademarks of HiSoftware Inc. (www.hisoft.com 603.578.1870 or 1.888.272.2484)
Appendix K

Focus Group Combined Feedback

Responses to Information Reviewers Thought Missing from Web Site

- Clarify the difference between misuse of medication and drug abuse
- Non-adherence in those diagnosed with mental illness
- Address board and care administrators
- Summary of second two medication guideline links (Module 1)

Responses to Information Reviewers Found Confusing on Web Site

- Would be easier to understand if the “Definition” terms were bold or different color, to note they are defined
- Right panel items, evaluation etc. should be organized to be more visible
- Icons at bottom of page - looks as though that’s where to start module
- How will learners use this with older adults? Will web site be for public access or as a teaching tool at school or work?

Responses to What Reviewers Liked Best about the Web Site

- Like the definitions and information in the sidebar
- Links to assessments and research supported criterion
- Key Points very effective (2)
- Bulleting easy to read
- Learner self evaluation after each segment
- Links to additional websites and references
- I care for my father and this had good information for me
- diagram illustrating pharmacokinetics, LADME was very helpful (2)
- The “My Health Passport” was great
Appendix L

Focus Group Combined Feedback

*Responses to 3 Things Reviewer Learned To Apply to Own Practice with Older Adults*

- Med use in late life and at end of life
- How much medication errors are a problem
- Where to refer older adults that have medication Qs and how to get those answers for them
- How to evaluate older adults for medication adherence issues (MMSE, etc)
- Words to Watch flier, Ask me 3
- 1/5 of Medicare patients are admitted to the hospital w/in 30 days
- Resources to involve caregivers in senior’s medication management in a way that benefits both
- A lot of good information about DD and resources
- What intellectual/developmental disabilities are by definition
References


http://dx.doi.org/10.1016/j.gerinurse.2006.03.003


http://dx.doi.org/10.1001/jama.2010.1482


http://dx.doi.org/10.1111/j.1532-5415.2012.03923.x


