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## Geriatric Content in U.S. Doctor of Pharmacy Degree Curricula

### Abstract

This study was a quantitative, non-experimental, cross-sectional survey to examine geriatric content in U.S. Doctor of Pharmacy degree curricula. This study, guided by Avedis Donabedian's structure process outcome (SPO) model for health care quality, examined the current state of geriatric content in Pharm. D. curricula and compared findings to a 2003 study (Dutta, Daftary, Oke, Mims, Hailemeskel, & Sangsiry, 2005). One geriatric pharmacy faculty member from each of the 124 U.S. pharmacy schools was invited to participate in a web-based survey to answer questions relating to geriatric content in their school's curriculum. The existing, online, self-administered questionnaire consisting of demographic, course content, faculty capacity, and practice experience questions was modified and used to collect data. A comparative analysis was conducted using descriptive statistics, frequency distributions, and narratives. Findings suggested that while most schools are still offering geriatric content in some form and content has improved, more focus on the extent to which schools are integrating content in pharmacy education is still needed to catch up to the growing number of people 65 and older who need pharmaceutical and patient care in this country.

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Dianne Cooney Miner

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James E. Schwartz

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Geriatric Content in U.S. Doctor of Pharmacy Degree Curricula

By

Sherry Jimenez

Submitted in partial fulfillment  
of the requirements for the degree  
Ed.D. in Executive Leadership

Supervised by

Dr. Dianne Cooney Miner

Committee Member

Dr. James E. Schwartz

Ralph C. Wilson, Jr. School of Education

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## **Dedication**

This dissertation is dedicated first to the Father, Son, and Holy Spirit, who made this journey possible. I dedicate this dissertation to my husband, Luis. I am so very thankful for a husband and best friend who tirelessly provided me love, prayer, encouragement, and the space I needed to successfully complete my work. This dissertation is also dedicated to my children, Nicolas, Taryn, and Owen; may you find the love for life-long learning that I have, and to my family, who listened, supported, and cheered me on throughout this study. Thank you. I love you.

“Trust in the LORD with all thine heart; and lean not unto thine own understanding. In all thy ways acknowledge him, and he shall direct thy paths.” Proverbs 3:5-6

I would also like to thank:

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### **Biographical Sketch**

Sherry Jimenez has been the Experiential Education Coordinator at St. John Fisher College's Wegmans School of Pharmacy since August 2008. Dr. Jimenez attended Rochester Institute of Technology and graduated with a Bachelor of Science degree in Finance/Economics in 1989. She attended Nazareth College from 2008 to 2010 and graduated with a Master of Science in Management. She was also awarded the "Excellence in Management" award by her Master's program faculty. Dr. Jimenez began doctoral studies in the Ed.D. Program in Executive Leadership at St. John Fisher College in 2010. She pursued her research in geriatric content in U.S. Doctor of Pharmacy Degree curricula under the direction of Dr. Dianne Cooney-Miner, Dissertation Committee Chair, and Dr. James E. Schwartz, Dissertation Committee Member.

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## **Abstract**

This study was a quantitative, non-experimental, cross-sectional survey to examine geriatric content in U.S. Doctor of Pharmacy degree curricula. This study, guided by Avedis Donabedian's structure process outcome (SPO) model for health care quality, examined the current state of geriatric content in Pharm. D. curricula and compared findings to a 2003 study (Dutta, Daftary, Oke, Mims, Hailemeskel, & Sansgiry, 2005). One geriatric pharmacy faculty member from each of the 124 U.S. pharmacy schools was invited to participate in a web-based survey to answer questions relating to geriatric content in their school's curriculum. The existing, online, self-administered questionnaire consisting of demographic, course content, faculty capacity, and practice experience questions was modified and used to collect data. A comparative analysis was conducted using descriptive statistics, frequency distributions, and narratives. Findings suggested that while most schools are still offering geriatric content in some form and content has improved, more focus on the extent to which schools are integrating content in pharmacy education is still needed to catch up to the growing number of people 65 and older who need pharmaceutical and patient care in this country.



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## **Chapter 1: Introduction**

### **Introduction**

This dissertation study sought to broadly examine the current state of geriatric content in U.S. Doctor of Pharmacy (Pharm. D.) degree curricula. The study was based on responses elicited from geriatric faculty or other appropriate representatives using a quantitative approach. This first chapter of the dissertation will provide background of the study, including a statement of the problem, theoretical rationale, purpose, and significance of the study. A preview of subsequent chapters will also be summarized.

### **Problem Statement**

Geriatric content in pharmacy education may still be disproportionate with the continued increase of people 65 and older in the United States as has been the case with many other healthcare programs in nursing, medical and dental schools, and schools of social work (Eleazer, McRae, & Kneble, 2000; Kirschenbaum & Rosenberg, 1995; Lubben, Damron-Rodriquez, & Beck, 1992; Mohammad, Preshaw, & Ettinger, 2003; Pratt, Simonson, & Boehne, 1987; Rosenfeld, Bottrell, Fulmer, & Mezey, 1999). For almost three decades, this disparity has remained unchanged with evidence of a potential regression in pharmacy school geriatric content from studies conducted from 1994 to 2003 (Delafuente, Mort, & Wizwer, 2006; Dutta, Daftary, Oke, Mims, Hailemeskel, & Sansgiry, 2005). While the Accreditation Council for Pharmacy Education (ACPE) notes that certain content areas as set forth by the Center for Advancement of Pharmacy Education (CAPE) be included in pharmacy curriculum (2006), it is not known to what

extent geriatric-specific content is being included today in an effort to adjust pharmacy education to keep pace with the broadened scope of pharmacy practice and growing population of older adults in America.

The evolution of the pharmacy field brought with it a shift in curriculum from product focused; that is, drug dispensing, to a more patient-focused model. In 1967, the concept of *Drug-Use Control* was introduced in a study defining the need for drug safety education in pharmacy. The study emphasized not only the practical application of pharmacy skills but also a focused importance on the patient being treated (Brodie, 1967). Referred to as *patient-oriented practice* in the 60s (Hepler & Strand, 1990) and today as patient-centered care, the provision of drugs resulting in positive outcomes and quality of life for patients is a key component of the ACPE guidelines for Pharm. D curriculum and practice (2006).

In 1992, the American Association of Colleges of Pharmacy's (AACP) house delegates voted in support of a 6-year Pharm. D. program that would lead exclusively to pharmacy licensure. In 1997, ACPE adopted this stance and instituted new guidelines to phase out the bachelor's degree in favor of the Pharm. D. (Remington, 2006). While entry requirements differ from school to school today, two years of undergraduate education must be completed before applying to an accredited US pharmacy school. Exceptions are the pharmacy schools (also accredited), called *0-6*, that accept students directly from high school for two years of pre-pharmacy followed by four academic or three calendar years of professional study (American Association of Colleges of Pharmacy website).



The ACPE requires that two thirds of the Pharm. D. curriculum consist of didactic courses, while the other one third focuses on introductory pharmacy practice experiences (IPPE) and advanced pharmacy practice experiences (APPE). The IPPEs require 300 hours of professional practice experience where students can apply what they have learned in the classroom at community and hospital pharmacies to which they are assigned. The APPEs require 1440 hours of advanced experiences where students are exposed to various pharmacy settings and can build on knowledge gained in the formative years of classroom training and IPPEs.

Guideline 12.1 of the *Accreditation Standards and Guidelines for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree* calls for pharmacy school graduates to possess the knowledge, skills, attitudes, and values to provide patient-centered and population-based care enabling them to promote optimal medication therapy, wellness, and disease prevention in patients (2006). The ACPE Standard 14 underscores the importance of reinforcing these competencies and outcomes via the pharmacy practice experience portion of the curriculum. Furthermore, Appendix B of the standards mentions geriatrics as a special population to consider in pharmacist-provided care, but training in this area is not expressly emphasized. “A well-informed pharmacist is an important ‘care of the elderly’ team member and educational resource for physicians, health professionals, caregivers and the elderly themselves” (Misiaszek, Borrie, Grymonpre, Brymer, Crilly & Viana, 2001, p. 231). Since the care of older adults is complicated by the significantly large number of medications they take to manage various chronic and acute conditions, a focus on geriatric specialized training in the Pharm. D. curriculum is an appropriate consideration. Concerns about whether pharmacy

students are able to extrapolate and apply information they are taught about the general population to specific ones, such as the elderly, without specific training have been raised (Odegard, Breslow, Koronkowski, Williams, & Hudgins, 2007).

In 2010, over 40 million Americans were 65 or older, a number that is expected to exceed 72 million by 2030 and 88 million by 2050 (Statistical Abstract, 2011). No health care profession trains the adequate number of geriatric specialists needed to satisfy the current provider-to-patient ratio in the U.S. (Institute of Medicine, 2008). Pharmacy is no exception. A disparity exists between the number of geriatric trained pharmacists and the number of people 65 and older in the U.S. The Bureau of Labor Statistics (BLS) reported 232,000 employed pharmacists in 2003, over 268,00 in 2010, and a projected 316,000 by 2018 ([www.bls.gov](http://www.bls.gov)). Per capita this would equate to one pharmacist for every 148 and 150 people 65 and older in 2003 and 2010, respectively. The Alliance for Aging Research (AAR) reported that of approximately 200,000 U.S. pharmacists, only 720 reported having geriatric certification (Butler, Perry, & Steffens, 2002). The Certified Geriatric Pharmacist (GCP) qualification is the most common geriatric credential a pharmacist wishing to specialize in geriatrics can attain (<http://www.ccgp.org/index.htm>). Pharmacists can also complete an accredited geriatric residency through the Association of Health System Pharmacists (ASHP); however, only 12 programs currently exist (<http://www.ashp.org/Import/ACCREDITATION/ResidencyAccreditation.aspx>). While pharmacists are not required to earn geriatric certification, this places the number of pharmacists who actually specialize in the care of the older adults into perspective.

Patient care for the elderly is unique because the 65 and older population experience an increase in poor health, chronic disease, and adverse drug reactions

(Delafuente, 2009). In 1999, 26% of the 65 and older population reported poor or fair health, and those 75 and older reported an average of three chronic health conditions (Alliance for Aging Research, 2002). This increase in chronic health conditions results in a higher rate of prescription drug use, medication-related problems, and poly-pharmacy in the elderly. Poly-pharmacy is defined as “the use of multiple drugs administered to the same patient, most commonly seen in elderly patients...” (Segen, 1992, p. 565).

In 2002, the Center on an Aging Society reported 87% of people 65 and older filled an average of 20 prescriptions per year, and 91% of those ages 80 and older filled an average of 22 annually (Center on an Aging Society, 2002). Adverse drug reactions (ADRs) have become a growing concern in the elderly population as a result. The American Society of Health-System Pharmacy (ASHP) defines an adverse drug-reaction as “any undesirable or unexpected event that requires discontinuing a drug, modifying a dose, prolonging hospitalization, or administering supportive treatment (modifications expand on the above definitions in order to include drug overdoses and drug interactions)” (www.ashp.org). Moreover, the elderly are more susceptible to ADRs as a result of decreased organ function due to age (Oberg, 1999). An in-depth understanding of how drugs enter, travel, react, breakdown, and leave the body is required when complicated with the deteriorating health and multiple medication regimens of older adults (Delafuente, 2009).

Training pharmacy students to manage the complexities of a multiple medication regimen in elderly people serves as one example of a geriatric-specific skill that can be taught in Pharm. D. curricula to address the growing number of ADRs for this group. Over nine million ADRs are reported annually in the elderly with 200,000 resulting in

hospitalization (Dutta et al., 2005). Medication therapy management or medication regimen review is described as "...provision, information, and recommendations to physicians regarding medications or the prescription of incompatible medications, and collaboration with the medical director and other staff to develop proper protocols for response to adverse events" (Institute of Medicine, 2008, p. 146). A study conducted in 2005 revealed that while students are becoming more familiar with ADRs in pharmacy school, greater exposure is needed (Sears & Generali, 2005). Whether the gap is closing between the continued growth of the 65 and older population experiencing the conditions mentioned and inclusion of geriatric-specific training in U.S. Pharmacy school curriculum is not currently known. This study examined the state of geriatric education (structure, process, and outcomes) in proportion to the population of older adults compared today with the state of geriatric education in proportion to the population of older adults in 2003 (Dutta et al.).

### **Theoretical Rationale**

This study was guided by Avedis Donabedian's structure process outcome (SPO) model for health care quality. In his book, *Introduction to Quality Assurance in Healthcare* published posthumously in 2003, Donabedian encapsulated the SPO model into his larger quality monitoring cycle and presented it as the first step in the cycle. To understand the current status and performance of the system being assessed, structure, process, and outcome must be understood before continuing the quality monitoring cycle (Donabedian, 1988). This model guided the researcher in categorizing and reporting on the data collected as structure, process, or outcome. These components are interdependent in that each is impacted by its predecessor. In other words "good

structure increases the likelihood of good process, and good process increases the likelihood of good outcome” (Donabedian, 1988, p. 1147). This theory can be applied to many aspects of healthcare, including pharmacy education. To determine the extent of geriatric content in U.S. Pharm. D. curricula, information was needed about the setting (structure) where pharmacy education takes place, the process used to deliver it, and what has occurred (outcome) as a result. A detailed explanation of structure, process, and outcome will follow. Each component will be defined in terms of pharmacy education.

Structure refers to how the system is set up. Donabedian believed that setting has a direct effect on how the system will behave (2003). Structure includes detailed attributes of the system, in this case pharmacy education or more specifically the Pharm. D. curricula. Attributes of the system refer to the people, facilities, equipment, and materials that make up the system. Some examples of structure in the pharmacy education system would be geriatric-trained faculty, school administration, curriculum committee chairs, and pharmacy students. Those stakeholders involved with the curriculum planning and development, such as pharmacy preceptors working with students during the experiential component of their education, would also be included here. Additionally, all aspects of the schools’ facilities such as building, classroom, labs, lab equipment, textbooks, and technology are all attributes of the system’s structure. Material attributes refer to the curricula, syllabi, and manuals associated with didactic and experiential curriculum, as well as the written accreditation standards.

Process signifies what is actually being done to provide pharmacy education. In this case, it includes the manner in which curriculum is delivered in the classroom and during practice experiences. Three examples are the number of credit hours associated

with programmatic coursework, course classification, (e.g., required or elective), and whether certain content is deemed stand alone or integrated within another course.

Outcome represents any data collected that is a result of pharmacy education provided by the structure and process identified. Examples of outcomes in pharmacy education are U.S. pharmacy school graduation rates, North American Pharmacist Licensure Examination (NAPLEX) pass rates, and Geriatric pharmacy certification data. Additional outcome data that was collected during this study was the number of pharmacy students exposed to geriatric content prior to graduation. Following is background on the structure, process, and outcomes associated with pharmacy education in 2003.

Dutta et al. reported variations in structure from school to school in their study of geriatric content in U.S schools of pharmacy, but all responding schools offered some form of geriatric course material (2005). This was a 26% increase from a similar study conducted in 1985-86 (Pratt, Simonson, & Boehne, 1987). It was also revealed that of the faculty members responsible for teaching geriatrics, 57% had post graduate training in geriatrics and 32% were board certified geriatric practitioners. This study was limited, however, to its low response rate of 50%.

From a process standpoint as described above, only 14% of responding U.S. schools of pharmacy required a course in geriatrics in their Pharm. D. curriculum. One responding school offered a specialty track in geriatric pharmacy. Schools were offering geriatric content for an average of seven years either as an elective or as integrated into core curriculum. (Dutta et al., 2005).

Outcome data from 2003 that can be correlated to the structure and process described herein are the number of students successfully completing the Doctor of Pharmacy degree program at that time. The AACP reported that 7544 students graduated with a Pharm. D. in 2003. The potential number of graduates who actually received geriatric pharmacy training, based on what is known about program content at that time, was not proportional to the aging population at that time. Given the growing number of older adults who existed in 2003, Dutta et al. (2005) reported a concern for the low presence of geriatric content in U.S. pharmacy education at that time. This study, guided by Donabedian's SPO model, described the current structure, process, and outcomes of pharmacy education and made comparisons to the structure, process, and outcomes present in 2003 to determine whether a progression, regression, or unchanged result was evident relative to geriatric content in U.S. Pharm. D. curricula.

### **Statement of Purpose**

The purpose of this study was to describe the current state of geriatric content in U.S. Doctor of Pharmacy Degree curricula. Findings were compared to data collected in a 2003 study (Dutta et al., 2005). Data was also obtained to analyze the presence of specific geriatric content areas broadly identified as attitudes and values (Odegard, et al., 2007). Recommendations for curricular improvements associated with geriatric content were also collected.

### **Research Questions**

1. How does the state of geriatric education (structure, process, and outcomes) in proportion to the population of older adults compare today with the state of geriatric education in proportion to the population of older adults in 2003?

2. What recommendations to improve curricula and competencies related to the special needs of geriatric populations in pharmacy education programs have been provided by experts?

### **Significance of the Study**

The research findings from this study provided insight into the current state of U.S. Pharm. D. curricula as it relates to geriatric content. Specific contributions were (a) a comparative analysis using the study performed by Dutta et al. (2005) as a baseline, (b) discovery of specific geriatric content including topics related to attitudes and values (Odegard, et. al, 2007), and (c) recommended methods for including geriatric content in Pharm. D. curricula.

Since a study of this kind had not been conducted in more than eight years (Dutta et al., 2005), a current picture of how U.S. pharmacy schools are educating students to care for older adults was essential. This study will serve as a tool for school administrators, faculty, and ACPE to gauge whether geriatric, content-specific improvements to curricula are needed to better prepare students to care for the growing number of people 65 and older in America.

### **Definitions of Terms**

*Geriatrics.* Healthcare for older adults  
([http://www.americangeriatrics.org/about\\_us](http://www.americangeriatrics.org/about_us)).

*Older adults.* Persons 65 or older (Administration on Aging, 2011).

*Professional (pharmacy) practice experience.* Clinical rotations that take place throughout the Doctor of Pharmacy degree curriculum to provide students the



opportunity to reinforce and apply knowledge gained in the classroom to various real-world pharmacy settings.

*Preceptor.* A full-time, part-time, or volunteer faculty or practitioner (usually a pharmacist) who serves as a practitioner-educator and oversees students in pharmacy practice experiences within the curriculum (ACPE, 2006).

### **Chapter Summary**

This chapter provided the introduction, background, research questions, significance, theoretical rationale, and purpose of this study. Chapter 2 presents a review of the literature related to this study. Chapter 3 provides the research design methodology used to collect and analyze the data for this study. Chapter 4 reports the findings of this study and findings from the 2003 study (Dutta et al., 2005) in relation to the research questions. Chapter 5 discusses and further compares the findings from chapter 4, and provides limitations and recommendations for further research.

## **Chapter 2: Review of the Literature**

### **Introduction and Purpose**

This chapter provides an empirical review of literature on the topic of geriatric content in U.S. Doctor of Pharmacy (Pharm. D.) degree programs. Databases used to search for studies pertinent to the topic were ProQuest, Educational Research Complete, Academic Search Complete, JSTOR, Oxford Journals, and ERIC. Searchable words used were pharmacy education, nursing education, medical schools, dental schools, and schools of social work along with geriatrics or geriatric pharmacy and curriculum. The review revealed pertinent studies in three areas:

1. A literature review in trends in geriatric curriculum: United States and abroad
2. A literature review of geriatric content innovations
3. A literature review of the studies associated with the structure process outcome (SPO) model first used to assess quality in healthcare (Donabedian, 2003)

### **Trends in Geriatric Curriculum: United States and Abroad**

**Pharmacy schools.** In 1982, a survey was conducted to ascertain the extent to which U.S. pharmacy schools were incorporating geriatric content in curriculum (Simonson & Pratt, 1982). This was in response to the growing number of elderly in this country, the health complications associated with their consuming more than one-third of drugs, and the specialized knowledge a pharmacist needs to provide appropriate care as a result. Possessing knowledge of how drugs enter, travel, leave, react, and break down in

the body of an elderly person is precursory to providing sound geriatric care. All 72 accredited schools of pharmacy received a survey addressed to the dean asking that it be completed or forwarded to the appropriate faculty member. Seventy-one surveys were completed and returned. Findings indicated that the type, required or elective, and amount of content per course offered at responding schools varied considerably. Most common among the schools was a required course containing an average of 11% geriatric content and an elective course containing primarily geriatric content, typically accompanied by a clinical rotation. Twelve of the sixteen schools that did not offer geriatric coursework were not developing such material at the time of the study. Based on this study, a disparity existed between pharmacy schools requiring a course devoted to geriatrics and the growing number of elderly in the United States. A positive relationship was noted between geriatric content and the presence of a Doctor of Pharmacy program. Simonson and Pratt concluded that a geriatric course requirement in U.S. pharmacy schools could ensure students gain knowledge in areas that help address issues in the elderly such as age-related health changes, multiple medication regimens, and adverse drug reactions.

Pratt, Simonson, and Boehne (1987) conducted a similar study of geriatric content. They again cited concerns for the growing elderly population, the more than 30% of all medications they consume, and the important role pharmacists can play in caring for the elderly if they possess geriatric pharmacy knowledge. The purpose of the study was to quantify the number of geriatric courses offered and identify associated characteristics of the coursework. A survey was sent to deans of all 72 schools of pharmacy. The response rate was 100%. Data was collected on the percentage of

schools that offered courses with primary ( $\geq 50\%$ ) and partial ( $\leq 49\%$ ) geriatric content. Additional data was gathered to ascertain the percentage of required geriatric courses and courses that included a clinical rotation. Study results revealed a significant correlation between partial geriatric content and required courses for some ( $X^2 = 4.79$ ,  $df = 1$ ,  $p < .01$ ) or all ( $X^2 = 39.07$ ,  $df = 1$ ,  $p < .01$ ) pharmacy students. Pratt et al. found again that most common among schools was required courses with an average of 16% of geriatric content and elective courses primarily containing geriatrics. More than 50% of pharmacy schools offered primary and partial geriatric courses, while 8% of schools offered none. All but 26% of schools required a geriatric-specific course, primary or partial in nature. Thirty percent of the partial content courses included a clinical component, but there was no statistical significance between primary or partial content and a clinical component ( $X^2 = 1.01$ ,  $df = 1$ , ns). It was recommended that a required course in geriatrics be considered by all pharmacy schools to ensure students gain knowledge to equip them for successful care of the growing elderly population in the U.S.

Approximately nine years later, in April 1994, Kirschenbaum and Rosenberg (1995) initiated another study on geriatric content to gain an understanding of courses either offered or in development for offering over the following two years. Contributing to the growing number of elderly people in the United States was the increase in life expectancy from just over 50 years old in 1900 to 79 and 72 years old in women and men, respectively in 1990 (Bureau of the Census, 1993). Concern continued for the drug-related issues that put the elderly at risk due to decreased organ function and multiple medication regimens accompanied by chronic disease. The need to increase geriatric

knowledge in health care professions, including pharmacy, to address these factors was echoed by the researchers. A 31-question survey was mailed to 75 accredited schools of pharmacy in the United States. Seventy-one responded (94.67% response rate). The study found that an emphasis was placed on offering elective courses in geriatrics, while entry-level and post-BS Pharm. D. geriatric course requirements among schools were minimal. A large number of schools had no plans to institute a geriatric course requirement in the future. Kirschenbaum and Rosenberg offered budget constraints, lack of geriatric trained faculty, and lack of appropriate training sites as possible reasons for the lag in geriatric course development in pharmacy schools.

A more recent cross-sectional study on the status of geriatric content in pharmacy school curriculum was conducted by Dutta, Daftary, Oke, Mims, Hailemeskel, and Sansgiry in May of 2003 (2005). The purpose was to identify the *structure, resources, and activities* of geriatric courses offered at the 84 accredited pharmacy schools in the U.S. A 25-question survey was e-mailed to the clinical pharmacy academic department chairs or geriatric pharmacy practice heads. Forty-two out of 84 schools responded to the survey (50% response rate). Dutta et al. observed that geriatric education in pharmacy is structured quite differently across schools. The data collected did not reflect any marked change in geriatric offerings from that of Pratt et al.'s 1985-1986 study. Although all responding schools offered some form of geriatric content in their coursework, Dutta et al. considered the comparative analysis to reflect a potential regression in geriatric focus. For example, while 9% of schools (N=72) required a primary course in geriatrics ( $\geq 50\%$  geriatric content) in Pratt et al.'s study (1987), only 7% of responding schools (N= 42) required a course devoted to geriatrics in Dutta et al.'s study. However, 54 and 6% of

responding schools provided a geriatric clerkship as elective and required, respectively. One school reported the presence of a specialization track in geriatrics. Table 2.1 is a summation of data collected with regard to specific geriatric content areas.

Table 2.1.

*Geriatric Course Content Taught at U.S. Schools of Pharmacy (N=42)*

Content area	Number of schools (%)
Pharmacokinetic and pharmacodynamic consideration in the elderly; adverse drug events	26 (62)
Drug use in the elderly	27 (64)
Demographics of aging	24 (57)
Aging organ system	23 (55)
Osteoporosis in the elderly	22 (52)
Genito-urinary disorders	19 (45)
Nutritional disorders	17 (40)
Arthritis, ischemic heart disease, cardiovascular disease in the elderly	16 (38)
Hypertension, arthritis in the elderly	15 (36)
Asthma and chronic obstructive pulmonary disease	12 (29)

*Note.* Reprinted with permission from Dutta, Daftary, Oke, Mims, Hailemeskel, & Sangiry, 2005.

Ultimately, Dutta et al. (2005) found that geriatric content in U.S. pharmacy schools is disproportionate compared with the geriatric population growth. The researchers reported that the demand for geriatric pharmacists will increase as the number of elderly in the United States increases; therefore, a required geriatrics course in all accredited U.S. pharmacy schools should be given more consideration.

Most recently, a survey of U.S. pharmacy schools was e-mailed to 89 deans to quantify the number of geriatric trained faculty members at each school (Delafuente, Mort, & Wizwer, 2006). Additional data was collected on deans' perceptions of the need for a geriatric course requirement and whether geriatric content should be integrated into other coursework or offered as a stand-alone course. All 37 responding deans reported providing an advanced practice experience clerkship in geriatrics. Three of the 37 schools required the clerkship. Barriers to hiring geriatric faculty were also collected. Of the 42% of school deans who responded, 30%, 40%, and 19% had one, two, and three full-time geriatric faculty members, respectively. Many deans felt that geriatrics should be integrated into other courses. Only two of the responding schools required a course in geriatrics. While all schools offered an advanced pharmacy practice experience (APPE) in geriatrics or long-term care, only three schools required it. The barrier cited by most deans to hiring geriatric faculty was the shortage of properly trained geriatric faculty candidates. Delafuente et al. concluded that a shortage of geriatric trained faculty exists and is an impediment to providing geriatric education in pharmacy schools.

Canada estimates that by 2026, one in five people will have reached the age of 65 compared with one in eight in 2001 (Health Canada, 2002). While few studies have been published on geriatric pharmacy curriculum outside the U.S., a study of Canadian

pharmacy schools was documented in 2001. The status of geriatric content taught to Canadian undergraduate pharmacy students had not been well defined until the study that took place in 1999 (Misiaszek et al., 2001). The purpose of the study was to identify specific content present in Canadian pharmacy school undergraduate programs. All nine deans were asked to name a faculty member possessing knowledge of geriatric content in the school's curriculum. In March and April of 1999, a 35-question survey instrument was faxed and e-mailed to each faculty member identified. The response rate was 100%. Three of the nine schools reported having a course devoted expressly to geriatrics, but it was only required at one. All nine schools had geriatrics integrated into other courses. Six out of nine schools offered clinical rotations in geriatrics with one school making it a requirement. Eight of the nine schools offered, but did not mandate, geriatric rotations at geriatric rehabilitation units (GRU) or geriatric assessment units (GAU). The data suggested that more geriatric content should be taught before students embark on clinical rotations. Misiaszek et al. also suggested that more schools consider assessing their curriculum for whether incorporating a geriatric elective course might be warranted.

The United Kingdom has projected a rapidly aging population from 10 million in 2007 to 15.5 and 19 million adults over the age of 65 by 2030 and 2050, respectively (Cracknell, 2007). An article addressing the status of pharmacy education in the United Kingdom (UK) was published in 2008 (Sosabowski & Gard). While a formal study was not conducted with specific regard to geriatric content, the structure described the master of pharmacy program as requiring a supplemental certification in specialty areas, such as gerontology, oncology, or renal medicine. The supplemental requirement was to remain



in place until curriculum could be assessed and modified to include content to address these specialty areas.

**Nursing schools.** As geriatric courses develop in response to the growing elderly population in the U.S., the question of whether nursing programs are preparing students with basic geriatric competencies also emerges. In 1997, a national study of baccalaureate programs was undertaken to cover a range of educational topics including curriculum content (Rosenfeld, Bottrell, Fulmer, & Mezey, 1999). The purpose of the study was to report on data collected from 598 baccalaureate programs. The response rate was 80.3% (480). The modified and panel-reviewed survey collected data in four categories: gerontological content in curriculum, barriers to inclusion, faculty characteristics, and institutional characteristics.

An appropriate gerontological faculty member was identified in each program to which the survey was sent and was credited for the high response rate. Sixty-three percent of programs reported integrated gerontological content in one or more of the program courses. The other 37% offered stand-alone courses. Of the stand-alone courses offered, 23% and 14% were required and elective, respectively. Most of the programs with stand-alone courses offered integrated content in other courses as well. Sixty-six percent of respondents cited curriculum overload as the number one barrier to integrating gerontological content in baccalaureate nursing programs. Researchers concluded that the amount of content found in baccalaureate nursing programs was not commensurate with the amount of care nurses need to provide the elderly population. It was suggested that nursing programs, licensing agencies, and professional organizations collaborate in an effort to enhance the presence of gerontological content in nursing programs.

Another national survey was conducted to assess changes and identify issues in geriatric and gerontological nursing programs emergent since the American Association of College of Nursing's (AACN) development of *Older Adults: Recommended Baccalaureate Competencies and Curricular Guidelines for Geriatric Nursing Care* (Gilje, Lacey, & Moore, 2007). The purpose of the study was to investigate gerontology and geriatric courses in baccalaureate nursing curriculum. A questionnaire was developed and an expert panel of undergraduate and graduate nursing faculty reviewed the questionnaire. It consisted of itemized responses and open-ended questions. Five hundred and fifty-four deans or administrators were mailed the survey. A follow-up reminder postcard was mailed three weeks later. The response rate was 36% (222). Sixteen percent of respondents reported having a graduate program that offered a gerontology/geriatric specialization. Fifty-one percent offered a course in gerontology and geriatrics while 49% integrated the content into other coursework. Of the 51% who offered a dedicated geriatrics course, 56% made it a requirement at the junior level (76%) and some at the senior level (44%). Results also reflected more emphasis on integrating AACN competencies in the curriculum versus developing stand-alone courses, but more research is needed to understand this paradigm. Similar studies were found in the medical education literature that describes the status of geriatric content inclusion in medical school curricula in the U.S. and Europe.

**Medical schools.** A national survey of medical and osteopathic schools was conducted in 2000 (Eleazer, Doshi, Wieland, Boland, & Hirth, 2005). The last survey conducted of this kind was in 1970 (Freeman, 1971). The focus of the 2000 study was to assess geriatric content in curriculum. The questionnaire gathered data on geriatric

content areas using the *Areas of Basic Competencies for the Care of Older Patients for Medical and Osteopathic Schools* recommended by the American Geriatric Society as a guide (Eleazer, McRae, & Kneble, 2000). As a result, the questionnaire was divided into three sections: knowledge, attitudes, and skills. The instrument was sent in two waves encompassing a total of 120 medical schools and 19 osteopathic schools. Data was analyzed using Statistical Package for the Social Sciences (SPSS) 10.0. Sixty-seven percent (93) schools responded to the survey. Thirty-seven percent (7) of the schools were osteopathic and 72% (86) were medical schools. Eighty-nine percent of responding schools reported geriatric content in curriculum; 64% reported having geriatric-specific learning objectives contained in their curriculum. The knowledge section of the questionnaire reflected 94% of responding schools teaching content addressing conditions and diseases characteristic of the elderly. Most schools contained topics addressing students' attitudes toward elders and the care of elders as well. Ninety percent taught content that covered physical diagnostic skills relating to the elderly. The overarching theme of the data collected was that medical schools have responded to the need to increase geriatric curriculum in an effort to prepare students for elderly patient care.

A study of medical school geriatric program structures was performed in March 2001 (Warshaw, Bragg, Shaul, & Lindsell, 2002). One purpose of the study was to calculate the number of schools offering a geriatric structure of some kind. This study was also interested in, but not limited to, geriatric program focus and barriers to achieving program objectives. Directors of 144 medical school geriatric academic programs were identified and sent a 24-question instrument. The survey was also

provided electronically via e-mail. The response rate for this survey was 84% (105/121). Eighty-seven percent of schools reported some form of geriatric program structure at their school, and 67% were developed after 1984. Clinical practice was the main focus (40%) of the programs, and a shortage of senior research faculty was reported by 71% as the main obstacle to implementing the program. Progress made by medical schools to incorporate geriatric programs at schools in the U.S. was termed considerable.

Concern about whether medical schools were keeping pace with the rapid growth of the elderly population in the way of geriatric content in medical education prompted a similar study by some of the same researchers a few years later (Warshaw, Bragg, Brewer, Meganathan, & Ho, 2007). The study focused on comparing data longitudinally with 2001 findings (Warshaw et al., 2002). The cross-sectional survey was again sent to directors of geriatric academic programs at 145 medical schools. The same survey instrument was used and provided electronically. Ninety-nine out of 145 schools responded to the survey (68%). Only 8% of schools did not report the presence of some form of geriatric structure in their medical school program. Seventy-four percent of responding schools reported poor clinical reimbursement for patient care as the main obstacle to reaching program objectives. Some progress has been made in preparing medical students to properly care for the elderly as doctors, but medical schools are still not ahead of the growing number of baby boomers who will turn 65 or older by 2030 (Warshaw et al., 2007).

In Europe, it is estimated that people 80 to 90 years old will reach 187 million (one quarter of the population) by 2050 (Michel, Huber, & Cruz-Jentoft, 2008). Similar interest in assessing medical schools for geriatric content has arisen overseas as a result.

Efforts were made to identify an appropriate person in each of the 47 countries in Europe. Thirty-three were found and became the target participants for a study conducted in 2006. A questionnaire was sent to representatives of all 33 countries to complete on behalf of the medical schools in their respective countries. Two countries did not respond: Portugal and Romania. The resulting response rate was 94%. Twenty-five of the responding countries acknowledged geriatric medicine as a specialty or sub-specialty, and six did not. Eighty-one percent of the countries surveyed reported geriatric content in undergraduate programs, but the extent to which it was incorporated varied greatly. This could be due to many countries developing curriculum independent of other schools. Nine countries mandated geriatric content in medical schools, and of the 16 countries offering clerkships, 11 required them. Data collected was compared to a similar study conducted in 1991 and reflected positive progression toward inclusion of geriatrics in European medical schools. Students are receiving more exposure to geriatric medical education compared to 1991. However, the researchers felt strongly that more emphasis is needed to better prepare students to care for the aging population of Europe.

The United Kingdom conducted a study of geriatric medical training in undergraduate medical schools in 2003 and found, among other things, that inclusion appeared to be in a regressive state compared to previous studies (Bartram et al., 2006). Questionnaires were sent to heads of all medical schools, British Geriatrics Society Education and Training Committee members, and geriatric medicine department chairs or faculty. A total of 72 people (31 medical schools) were contacted. Emergent themes were documented for open-ended questions, and calculated percentages were obtained for all questions requiring categorical answers. Forty-six out of 72 people responded to the

survey (64%) resulting in a school-wide response rate of 74%. While 22 out of 23 medical schools taught geriatrics, 21 taught to all attending students. Only two schools taught it as a separate course. Sixty-seven percent of respondents (86 committee members and professors) felt geriatrics should be taught as a separate course as opposed to integrating the material. Previous studies indicated that the number of schools that taught geriatrics was higher and taught as a separate course in the 1980s compared to new data. Given the increasing number of elderly, regression in content and structure of geriatrics in UK medical schools was of concern. Making geriatric courses elective versus required in curriculum was suggested as a potential barrier to student exposure to the material, and schools of social work concur.

**Dental schools.** In 2003, a study was conducted to ascertain the status of pre-doctoral geriatric education in U.S. dental schools (Mohammad, Preshaw, & Ettinger, 2003). The study was precipitated by the development of dentistry programs to include geriatric content in response to the growing number of older adults in the U.S. at that time. An online survey of check boxes and some open-ended questions was sent via e-mail containing a hyperlink. The e-mail was sent to all 54 schools of dentistry in the U.S. and received a 100% response rate. This was accomplished in large part due to repeat e-mails and phone calls to non-responding schools.

Sixty-three percent of schools had a geriatric program director or chair, and all schools taught some form of geriatric dentistry. Ninety-eight percent of schools with required didactic curricula reported geriatric content, and 67% of schools reported having a geriatric clinical component. Only 77% of schools required the clinical component. More than one-third of the dental schools intended to expand the teaching of geriatric

dentistry in the future. Compared to previous studies on this topic, more schools have didactic courses and clinical rotations devoted to geriatrics, but clinical rotations have not kept pace.

**Schools of social work.** The first national survey of both undergraduate and graduate programs on geriatric content in schools of social work was conducted in 1988 (Lubben, Damron-Rodriquez, & Beck, 1992). The purpose of the study was to ascertain courses and concentrations offered, faculty credentials, and an interest in aging among students. Due to some schools offering both Bachelor's and Master's of Social Work Programs (100 and 372, respectively), a total of 472 questionnaires were sent to 373 accredited social work program deans or directors unless an aging concentration chair was identified. Questions asked whether schools offered concentrations and for concentration names. Content analysis was performed to identify whether an aging concentration was present. The resulting response rate was 71% (96% graduate and 63% undergraduate response). Thirty-four and nine percent of aging concentrations were identified in graduate and undergraduate programs, respectively. Aside from the schools offering a concentration, 33% of graduate and 11% of undergraduate programs offered at least one course on aging. Thirteen percent of students who were offered an aging concentration chose it as a concentration. A low percentage of students in graduate or undergraduate programs elected to take aging courses but were more likely to do so in programs where a concentration was offered. Ninety-seven percent of schools surveyed rated the importance of aging curriculum as important or very important. The top two barriers to including an aging curriculum in schools of social work were lack of trained faculty and curriculum overload. These findings suggest that merely having an aging

concentration available in curriculum might encourage student participation. Methods of training existing faculty or finding faculty who specialize in geriatrics should be investigated as well as innovative ways to develop concentrations in schools of social work where there are none..

An aim of a later study provides an update to Lubben et al.'s data and a status on whether progress has been made in the area of geriatric content in school of social work graduate programs (Lee, 2002). One hundred and forty accredited Master's of Social Work (MSW) program deans or directors were mailed a questionnaire. Eighty-seven self-reported responses were returned (62%). Eighty-one point six percent of schools offered courses on aging at the master's level compared to 74% in 1992 (Lubben et al.). Aging concentrations were offered by 24% of schools. Doctoral programs were reported at 51.7% of schools. Eight percent offered courses on aging, and 6.7% offered aging concentrations. While geriatric inclusion in programs has progressed in schools of social work, the rate has been slow with only one-quarter of schools offering a concentration. Compared with the growing number of elderly in the U.S., social work education's response to educating students on caring for the elderly has been minimal.

### **Geriatric Content Innovations**

In addition to surveys of geriatric content that have taken place in schools of pharmacy, studies assessing innovative ways to include geriatrics in the program have been conducted (Haddad, Coover, Bramble, & White, 2004; Keys, O'Neil, & Maher, 2004; Oliver et al., 1995). Improving pharmacy students' knowledge, attitudes, and values necessary to provide pharmaceutical and patient care to the elderly have been presented and assessed in didactic courses, clerkships, and concentrations for more than a



decade. Similar attempts have been studied in schools of medicine and social work (Dorfman, Murty, Ingram, & Li, 2007; Goldenhar & Kues, 2006).

The Geriatric Medication Game is one such innovation implemented for a professional communications course at the St. Louis College of Pharmacy to increase student awareness of challenges faced by the elderly (Oliver et al., 1995). Adapted from the *Aging Game* or *Into Aging* used in medical schools, the simulation takes students through three phases that provide them with a patient profile to adopt along with three personal characteristics, medication issues, and fees. Throughout the simulation, students experienced some challenges provided by the facilitators, such as long waits, rudeness, and adverse drug reaction cards containing various conditions. In phase three, students were debriefed on their experiences and asked to discuss stereotyping, emotions experienced, and suggestions for overcoming obstacles encountered. The first part of the questionnaire, a 9-question survey, used a six-point differential scale for each question; for example, healthy to sick or happy to sad. The second part asked specific questions about disabilities, medication name recall, medication instruction compliance, and financial issues using a Likert scale (1=not at all difficult and 6=extremely difficult). Pharmacy students who completed the instrument before and after the course were included in the study. Forty-eight students who fit the criteria and participated in the game were chosen, as well as 15 (control) students who did not participate in the game. The control group did not receive age-related content during class in lieu of game participation. A *t*-test between cell means after the F-test revealed a statistically significant difference between the posttest game response condition and the other three conditions (Pretest-NO game, Pretest game, and Posttest-NO game). As evidenced by

the data, the game succeeded in improving student sensitivity toward the elderly and challenges they face.

In 2003, the St. Louis College of Pharmacy revised The Geriatric Medication Game (Evans, Lombardo, Belgeri, & Fontane, 2005). The original game was structured for students to interact with each other and healthcare providers to understand perceptions of the elderly. The updated game was modified with an emphasis on inter-professional patient care of the elderly and the difficulties older adults face navigating the healthcare system. The purpose of the game was to ascertain whether the game increased students' understanding, awareness, and empathy toward geriatric patients and the challenges they face with the healthcare system. The students again experienced three phases that provided them with a patient profile to adopt along with three personal characteristics, medication issues, and fees. Throughout the simulation, students experienced some health care related challenges provided by the facilitators. In phase three, students discussed their experiences and perspectives on the game. This phase was enhanced to elicit ways to aid older adults with improved medication use and navigating the healthcare system.

A pretest questionnaire was administered and consisted of 12 common perceptions of the elderly. Examples of some perceptions were, "understanding the needs of older adults will strengthen my professional relationship with geriatric patients" and "in general older patients have a difficult time taking their medications properly". Participants were asked to rate their level of agreement with the perceptions on a Likert scale of 1 to 5 (strongly disagree, disagree, neutral, agree, strongly agree). The posttest contained the same 12 perceptions to be rated. Participants were also asked on the

posttest to rate their emotional responses to the game using a 5 point Likert scale (from “very” = 5 to “not at all”=1; values 2, 3, and 4 were not assigned labels). Additional questions on the posttest questionnaire asked participants whether their awareness, empathy, and understanding of the difficulties geriatric patients experience in a pharmacy and healthcare setting had increased as a result of the game.

One hundred and two students played The Geriatric Medication Game as part of a required professional communications course in the first year of their 6-year Pharm. D. Program. Ninety-six students completed the pretest and posttest. All students completed the posttest questionnaire (N=102). Changes in 8 of the perceptions listed in the questionnaire from pre- to posttest were statistically significant for the 96 students who completed both. Seventy-five percent of students (N=102) reported that playing the game increased their awareness of problems older adults experience with the healthcare system. Seventy-five percent of students (N=102) who participated also reported an increased understanding of how they can help geriatric patients in a pharmacy and a healthcare setting.

The updated Geriatric Medication Game emphasized medication in the healthcare system while also underscoring the importance of the need for inter-professional collaboration among healthcare professionals to care for geriatric patients. Evans et al. concluded that the game increased student empathy and understanding of geriatric patients while also aiding in their realizing their responsibility to improve medication use in the elderly.

A modified version of the Geriatric Medication Game was evaluated in October 2011 at Purdue University College of Pharmacy (Chen, Plake, Yehle, & Kiersma, 2011).

The game was incorporated into a pharmacy practice skills laboratory for first year students and administered over a 4-year period (N=625). During the 3-hour laboratory, students were given aged-related challenges, such as impaired vision or mobility and assigned a healthcare setting (e.g., pharmacy, physician's office). Students were asked to take on the role of an older adult with their assigned challenge and setting. After the game, students completed a 5-question reflection paper about their experiences and attitudes toward older adults as a result. The most predominant themes that emerged from the content analysis performed on all course reflections were students felt frustrated while playing the game (75.2%) because they lost the abilities they currently have (58.3%), had difficulty completing tasks required (38.5%), or had to wait at health care stations (34.6%). Students felt their attitudes toward older adults had improved (82.9%). As a result, researchers suggested that incorporating the Geriatric Medication Game into pharmacy curriculum could aid in students developing a better understanding of the challenges faced by older adults and improve a student's ability to care for them.

In 2002, the Auburn University Harrison School of Pharmacy (AUHSOP) Auburn, Alabama in collaboration with Nova Southeastern University College of Pharmacy (NSUCOP) Ft. Lauderdale, Florida incorporated the Age Game into their Geriatrics elective and Introduction to Geriatrics elective, respectively (Kennedy, Fanning, & Thornton, 2004). The Age Game was developed by combining elements of Simulation exercises for Aging and Disability (SEAD) to integrate social issues of the elderly (Clark, Foos, & Faucher, 1995) and *The Geriatric Medication Game* that emphasizes pharmaceutical care (Oliver et al., 1995). The goal of the study was to evaluate the effectiveness of incorporating the Age Game as an interactive tool to present

geriatric topics. A total of 47 students enrolled in the electives and completed a 10-question (Likert Scale: Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree) post course survey after playing the Age Game. Four open-ended questions and additional comments were also elicited. Eighty-seven percent of respondents agreed or strongly agreed that The Age Game helped them to learn the geriatric-related subject matter included in the course. Eighty-three percent agreed or strongly agreed that the Age Game challenged them to think critically about their approach to geriatric patients. Eighty-seven and eighty-five percent of respondents said the Age Game was a useful learning tool and that it should continue to be made available to future students, respectively. The study concluded that the game enhanced pharmacy students in the areas of critical thinking, learning, and geriatric patient counseling and that simulation games have utility as a supplement in pharmacy education to introduce geriatric-related topics.

The Mylan School of Pharmacy at Duquesne University introduced a geriatric program concentration in 2001 supplemental to their Doctor of Pharmacy Degree program (Keys et al., 2004). To complete the concentration, students needed to complete three electives in the fifth and sixth year of the program, complete one advanced geriatric clerkship, and pass an examination similar to the licensure exam provided by the Commission for Certification in Geriatric Pharmacy (CCGP). A 10-question Teaching Effectiveness Questionnaire (TEQ) consisting of 5-point Likert scale questions was provided to students who completed any of the electives and the clerkship during the 2001-2003 academic years. Completion of the evaluations was optional and evaluated teacher effectiveness. While course quality and utility was not assessed, student response to teacher effectiveness reflected positively. Responses for all courses and clerkship

averaged between 4.5 and 4.9 out of 5. Evaluation of geriatrics concentration in the Doctor of Pharmacy Degree Program at Duquesne received positive results. Assessment of program effectiveness will take place when more longitudinal data can be collected.

Overcoming existing stereotypes associated with the elderly has been suggested as an area of geriatric content that should be incorporated into pharmacy curriculum as well (Sauer, 2006). Possessing a better understanding and respect for the elderly can make for a more effective patient care provider. A longitudinal qualitative assessment of one such advanced experience was conducted in 2005. Pharmacy students at the University of California at San Francisco (UCSF) School of Pharmacy's Davis Program (UCD) are required to complete a community geriatrics rotation as partial fulfillment of their advanced practice experience requirements for graduation. Since 1997-1998, 117 pharmacy students have participated in this clerkship at the Greenfair Retirement Apartments practice setting. One purpose of the study was to assess whether the experience improved students' attitudes toward older adults. Blood pressure monitoring and medication counseling was provided to residents, and students were required to write pre- and post-experience essays to include their perceptions of the elderly as well as intended and actual learning experienced. Of the 117 students who participated, 107 had pre-and post-experience essays available for review. Essays were reviewed and coded using categorical themes predetermined by assessing 12 essays at random. While 20% of initial essays described the elderly in a negative light, 7% described them more positively. While intended learning was mostly identified as improved communication skills, confidence in their abilities, and increased knowledge of chronic disease states and drug therapy, students unintentionally discovered that older people were *physically*

*active, happy, sociable, cognitively intact, and engaged in life.* The Greenfair geriatric community clerkship aids students in improved attitudes toward caring for the elderly.

Consultant pharmacy focuses on geriatric pharmaceutical and patient services in a long-term care (LTC) setting. Pharmacy graduates must possess knowledge of geriatric pharmacotherapy concepts to properly care for the aged in this setting. Data gathered on pharmacy graduate knowledge in this area was collected to ascertain the extent to which schools are preparing students for this field (Haddad et al., 2004). A 37-item survey was given to three consecutive pharmacy classes (1998, 1999, and 2000). A segment of questions centered on geriatric pharmacotherapy. Seventy-nine students responded to the survey. Students' educational experiences were similar in that they were all required to partake in an LTC clerkship. Only 20% took the elective, *Consultant Pharmacy Practice in Long-Term Care Environments*, 8% took an additional LTC elective, and 2.7% took both the elective and clerkship. Of the seventy-nine respondents, 70.5% felt prepared to practice consultant pharmacy in an LTC setting. Test scores of students who took the required elective compared with those who took the additional elective course or clerkship were not statistically significant and revealed mean scores of 18.6, 18.1, and 20.0, respectively. Geriatric pharmacotherapy scores were highest for students who participated in the required clerkship as well as the elective and additional clerkship. These results suggest that integrating geriatric content in multiple aspects of curriculum may help to better prepare students to practice pharmaceutical and patient care specific to the 65 and older population.

One medical school's approach to supplementing their curriculum with geriatric content was to initiate a Geriatric Medical Student Scholars Program (GMSS) in 2003

(Goldenhar & Kues, 2006). The University of Cincinnati's College of Medicine implemented this 4-year longitudinal study with the purpose of providing medical students with additional exposure to classroom and experiential opportunities to heighten their awareness of the elderly and challenges they face physically, emotionally, and socially. Students applied for acceptance into the GMSS program at the beginning of the 2003-2004 school year, and 14 were selected to participate. One student discontinued his participation (N=13). All participants were required to do reflective journaling over a four-month period, which resulted in 98 viable journal entries for analysis. Two coders used the American Geriatric Society's (AGS) first- and second-year competencies for coding student journal entries. Thirty-nine of the 53 competencies (74%) were used. Neither coder used any of the skills-based competencies when coding. Inter-rater reliability between the two coders with reference to the 53 competencies chosen was .63 ( $P < .001$ ). The use of 74% of these competencies by both coders and their choosing not to include those that were skills based indicates that the GMSS program was successful in exposing medical students to competencies specific to understanding challenges faced by the elderly.

Schools of social work have also evaluated curriculum associated with infusing gerontological content. One such study took place at the University of Iowa over the course of two years (2002 and 2003) using a multi-method approach to research (Dorfman, Murty, Ingram, & Li, 2007). Participants in the study consisted of 70 undergraduate and 97 Masters of Social Work (MSW) students all enrolled in first-year core courses. Thirty of the participants also elected to partake in a service learning component working with older adults for one semester. Data was collected from this



experience as well. In addition to attitudinal scales used in the pre- and posttests, students were asked open-ended and rating-scale questions to capture the extent to which they felt content on aging was addressed in the social work curriculum during the school year. Service learning participants were asked to complete additional, separate pre- and posttest evaluations consisting of open-ended questions to obtain their feedback on content after the experience also. The (course) posttest mean response to whether students felt aging issues were covered in the curriculum was 2.67 on a scale of 1 to 4 (not at all to very well). Therefore, in reference to core courses, they felt aging was only moderately covered. The most common content reported was aging related to health and mental health issues (14%). Results of the open-ended questions associated with the service learning component reflected that experiential learning was valued the most. Challenges most reported by students from the experience was anxiety associated with discomfort with elders and concerns about their own mortality. Forty percent of students reported the service learning component as increasing their *knowledge and understanding of the aging population*. A majority of students said they would recommend a service learning component to other students and cited the increased knowledge about the elderly and experiential learning as their reasons for doing so.

### **Structure Process Outcome (SPO) Model Applications**

This section of the empirical literature review addresses studies associated with the structure process outcome (SPO) model first used to assess quality in healthcare (Donabedian, 2003). Since the introduction of the SPO model in 1966, it has been used extensively in the health care industry to assess the quality of care. Today, its use transcends healthcare to areas such as information technology and education. Following

are three examples of the SPO application, two in a healthcare setting and one in a physical education setting. All examples align with the appropriateness of using the structure, process, outcome (SPO) model while investigating geriatric content in U.S. Doctor of Pharmacy Degree programs.

In their study evaluating the effectiveness of a full-time trauma center, Cornwell III, Chang, Phillips, and Campbell asserted that using the SPO model would assist with a more thorough evaluation (2003). The structure for their study was a 24-hour trauma center at a university-affiliated level I trauma center. The structure contained in-house attending physician coverage at all times. The analysis consisted of an evaluation of process and outcome of 24-hour care compared with the previous model (no 24-hour care). Implementation of the 24-hour trauma center yielded favorable results for the new structure. There was an approximate 40% decrease in triage time for patients going to the operating room or intensive care unit, and the length of hospital stay decreased from an average of 4.3 days to 3.8 (Cornwell et al.). These outcomes confirm that the new structure is directly linked to a positive effect on processes in the trauma center.

Smitz-Naranjo and Kaimal (2011) built a model using Donabedian's SPO model as a framework to guide other facilities in understanding bariatric surgery accreditation requirements and to monitor quality progress toward this goal. Structure, process, and outcomes are specifically evaluated by accrediting bodies as it relates to the care of the bariatric patient (Smitz-Naranjo & Kaimal). To provide organizations seeking this accreditation with a *big-picture* approach to monitoring their bariatric accreditation progress, the researchers suggested being aware of certain components characteristic of facilities performing these surgeries.

Examples of some structural attributes in this case were the facility layout, number of licensed beds, equipment and supplies, full-time employees, staff qualifications, and type of facility. Processes considered were best practice guidelines, telephone triage procedures, and office policies and procedures. Outcomes were focused on pulmonary embolism, prolonged intubation, surgical site infection, and inpatient mortality to name a few. Components for this model were built based on areas evaluated by accrediting bodies to determine acceptance or non-acceptance of facilities applying for this status. The researcher contacted Dr. Smitz-Naranjo for information on the success or failure of this model. She responded that while data has not been collected on the use or success of the model by others, her organization has received accreditation. She credits the use of the SPO model for their success (L. L. Smitz-Naranjo, personal communication, February 24, 2011). Smitz-Naranjo and Kaimal suggest that comparing outcomes across organizations can be a catalyst for change (2011).

This final example moves away from healthcare delivery and demonstrates a more education-focused use of the SPO model similar to this study. Bevans, Fitzpatrick, Sanchez, Riley, and Forrest (2010) focused on identifying components of structure to use as indicators and test hypotheses about the quality of physical education (PE) programs in 26 elementary schools. Specifically, they sought to maximize opportunities for physical activity during PE time (Bevans, Fitzpatrick, Sanchez, Riley, & Forrest). Following is one example of how they identified structural components, collected data, and formulated conclusions.

By obtaining data on structural components such as the number of full-time equivalents (FTE) teaching PE and the number of students per school, the student/teacher

ratio was calculated. Additional information was collected about curricular, equipment, and facilities resources. Together with this preliminary structural data, an observational tool called System for Observing Fitness Instruction Time (SOFIT) was used to collect PE session time, and student activity levels, and outcomes associated with the quality of the PE class. Ultimately, it was found that students engaged in moderate to vigorous physical activity (MVPA) 45.3% of the lesson time, and 23.1% of the class time was devoted to class management (Smitz-Naranjo & Kaimal, 2011). It was concluded that less time could be spent on class management to increase the amount and quality of MVPA during PE classes in elementary schools.

### **Methodological Review**

Over the last few decades, studies conducted to understand the state of geriatric content in U.S. and Canadian pharmacy school curriculum have been conducted using a quantitative methodological approach (Dutta et al., 2005; Misiaszek et al., 2001; Pratt, Simonson, & Boehne, 1987). The same can be said for literature found on U.S. schools of nursing, medicine, dentistry, and social work (Gilje, Lacey, & Moore, 2007; Lee, 2002; Mohammad, 2003; Warshaw et al., 2007). Studies were also found from the UK and Europe using a quantitative methodological approach to understanding the status of geriatric content offered at medical schools (Bartram et al., 2006; Michel, Huber, & Cruz-Jentoft, 2008).

Much of the data collected for the above studies was self-reported using a questionnaire format that included itemized responses, Likert-scale format, open-ended questions, or a combination. Most of the quantitative studies were descriptive in nature and analyzed percentages of stand-alone courses devoted expressly to geriatrics versus

other courses containing integrated geriatric content. Percentages of whether a stand-alone or course with integrated content was required or elective to the student were also gathered. Many studies also collected data on the barriers to geriatric content inclusion and percentage of geriatric-trained faculty. Lubben et al. (1992) also measured the percentage of geriatric-specific concentrations offered at schools of social work and the extent to which students chose this concentration. Mixed-method approaches using reflective journaling and focus groups were most evident in research literature where inclusion of geriatric content in courses or programs was investigated (Dorfman et al., 2007; Goldenhar & Kues, 2006; Haddad et al., 2004; Sauer, 2006). Studies investigating the efficacy of geriatric inclusion in U.S. pharmacy school curriculum were not found.

Few studies have been performed to ascertain the degree of geriatric content in U.S. Pharm. D. curricula. Although different methods have been used to study professional schools in the U.S. and similarly abroad, quantitative survey instruments were the primary tool used. This approach was suitable to the type of data analysis needed, but the most recent published study experienced a low response rate (Dutta et al., 2005). The presence of geriatric content specific to the Pharm. D. degree compared to specific geriatric concentrations or other tracks leading to post-graduate geriatric certification offered by U.S. schools of pharmacy have still not been broadly studied. Furthermore, while Dutta et al. collected data to identify specific content areas taught by schools of pharmacy, the list did not seem to contain items addressing student attitudes and values toward the elderly. Data on geriatric-specific student activities or assignments included in the Pharm. D. curriculum was also not gathered.

## **Chapter Summary**

Despite pharmacists' reports of not feeling adequately educated to practice geriatric pharmacy (Pratt, Simonson & Lloyd, 1982), studies performed over the last few decades reveal slow movement toward geriatric content inclusion in U.S Pharmacy school degree programs (Dutta et al., 2005; Kirschenbaum & Rosenberg, 1995; Pratt et al., 1987; Simonson & Pratt, 1982). Since there has not been a thorough study conducted in the last eight years, a new investigation was recommended with modifications for a more recent study and to obtain information not previously gathered. Since a positive relationship existed between geriatric coursework and the existence of a Doctor of Pharmacy program previously (Simonson & Pratt, 1982) and this degree is now required for pharmacy licensure today, exploring whether this trend has continued to be the focus of a new study. Furthermore, establishing the extent to which geriatric content exists in Pharm. D. curricula today must be ascertained before efficacy studies of geriatric content and courses of a broader nature can be undertaken.

Dutta et al.'s (2005) comparative analysis to Kirschenbaum and Rosenberg's (1995) study found geriatric content inclusion to be regressive over two decades. Another comparative study using data collected in 2003 and new 2011 data could identify whether this trend has continued or improved. Since little is known about geriatric concentrations or tracks offered in U.S. Pharm. D. curriculum that could better prepare students for this specialty and potential post-graduate geriatric pharmacy certification (CGP), future research in this area was also recommended.

It was not known whether programs that offer concentrations or specialty tracks in geriatrics experience a larger percentage of students choosing this option if any exist. It would be useful to compare schools whose programs contain a concentration to ascertain

whether, required or elective, the presence of such a program increases student attendance in the geriatric area of study. Since previous studies did not provide information on geriatric-specific student assignments and activities included in the Pharm. D. curricula, gathering this data would also add to the existing body of knowledge. Finally, expounding on the geriatric content list contained in Dutta et al.'s study to include topics associated with students' attitudes and values toward the elderly could provide a more detailed picture of the structure of geriatric content in Doctor of Pharmacy programs across the country. A more recent comparative analysis and the collection of new 2011 data associated with geriatric content may help schools with future curriculum planning efforts as well as gauge how they are keeping pace with preparing pharmacy students for the increasing elderly population in America and abroad.

Examples of research literature associated with the application of the SPO model demonstrate the appropriateness of using this framework to assess the current status and performance of a system or organization. In terms of pharmacy education, by understanding the structure and process of this system, collecting new data relating to geriatric content in curriculum helped create a renewed awareness of the current state and performance. It also allows us to draw conclusions from the data collected with outcomes such as graduation rates, North American Pharmacist Licensure Examination (NAPLEX) pass rates, geriatric pharmacy residencies, and geriatric pharmacy certification demographics. As a result, potential quality improvement recommendations may emerge.

This chapter summarized research literature associated with geriatric content in U.S schools of pharmacy and other healthcare education degree programs. The review of

the literature supports the need for a new study of the current state of geriatric content in U.S. Pharm. D. curricula specifically and provides justification for applying the SPO Model as a theoretical framework to do so.



## **Chapter 3: Research Design Methodology**

### **Introduction**

The number of people 65 and older in the U.S. continues to rise with geriatric training in healthcare professions struggling to keep pace (Institute of Medicine, 2008; Sauer, 2006). The 2000 Census reported 32.6 million people 65 and older in this country with an estimate of 35.2 million by 2005 (2011). Dutta, Daftary, Oke, Mims, Hailemeskel, and Sansgiry's (2005) 2003 study reported only 7% of responding pharmacy schools contained a required course in geriatrics, and 6% required a clinical rotation. Today, there are approximately 38.6 million people 65 and older in the U.S. (Census Bureau, 2011), reflecting an increase of 18.4% since 2000. Since the current structure of geriatric education in Doctor of Pharmacy (Pharm. D.) degree curricula is unknown and previous studies reported a potential regression in content compared to a 1986 study (Dutta et al.), a new study was warranted.

Quantitative research as described by Roberts (2004) is an inquiry based on a set of questions that can be answered by collecting numerical data in the form of surveys or experiments using a few variables to identify differences. Descriptive research is an example of a quantitative method and one that was employed for this study to compare geriatric content in Pharm. D. curricula over time. Using the structure, process, outcome (SPO) model as a theoretical framework, it is believed that setting has a direct affect on how a system will behave (Donabedian, 2003). To determine the extent of geriatric content in U.S. Pharm. D. curricula, information was needed about the setting where

pharmacy education takes place (structure), how content is delivered (process), and what has occurred (outcome) as a result.

The survey was designed using an existing instrument (Dutta et al., 2005) to collect information on program demographics, course content, professional practice experiences, and faculty capacity. Data collected in these areas, excluding demographics, was categorized into structure, process, and outcomes. Data external to the study was also categorized as outcomes, such as pharmacy school graduation rates and NAPLEX pass rates. The first research question focused on how the state of geriatric education (structure, process, and outcomes) in proportion to the population of older adults compare today with the state of geriatric education in proportion to the population of older adults in 2003 (Dutta et al.).

This research design was appropriate since it entailed a collection of new data on the current structure of U.S. Pharm. D. curricula, including recommendations for improvement, and allowed for a comparative study to be conducted using historical data collected in 2003.

### **Research Context**

U.S. pharmacy schools numbered 72, 75, and 84 in 1986, 1995, and 2003, respectively (Dutta et al., 2005). Since 2003, the number of schools has risen 48% to 124 schools of pharmacy in operation today (AACP, 2011). This study took place in the United States and surveyed the now 124 accredited pharmacy schools. These schools were identified through the American Association of Colleges of Pharmacy (AACP). This study was conducted during the 2011-12 academic school year.

### **Research Participants**

The research participants were geriatric pharmacy faculty representatives. A participant from each of the 124 U.S. schools of pharmacy was identified via the AACP website, which makes this information available to members such as the researcher. The web-based survey was emailed to participants with an accompanying letter of support from the AACP Geriatric Special Interest Group (SIG) Chairman (Appendix A.). An introduction was also provided in the beginning of the survey by the researcher. The survey introduction made participants aware of the voluntary nature of this study and that they could opt out at any time. Completion of the survey was used as respondent consent for participation and inclusion in this study. Respondents had the option to receive a \$10 gift card from Exxon/Mobil, Lowes, or Starbucks upon completion of the self-administered questionnaire. This respondent incentive was made possible by DHHS HRSA Grant No. IUB4HP192050100 from the Finger Lakes Geriatric Education Center (FLGEC), (Appendix B.). Although names and addresses were collected for distribution of the respondent incentive, all data was de-identified from the respondent names and name of the associated school of pharmacy to safeguard the rights of human subjects and ensure their anonymity and confidentiality.

### **Instruments to be Used in Data Collection**

The method of data collection for this study was a non-experimental, cross-sectional, web-based survey. This survey format yielded a “numeric description of trends, attitudes, or opinions of a population by studying a sample of that population” (Creswell, 2009, p. 12). Since a similar cross-sectional study was conducted in 2003 (Dutta et al., 2005), collecting data using the same format allowed for comparative

analysis. This researcher obtained permission to utilize and modify the instrument from the authors of the previous study (Appendix C.).

The existing instrument is a questionnaire that was designed to collect information about structure, resources, and activities associated with geriatrics in pharmacy school curricula (Dutta et al., 2005). The questionnaire is divided into three sections: demographics, course content, and professional practice experiences. Dutta et al. tested content validity of the questionnaire by administering the web-based survey to three experts whose suggested changes were incorporated into the final instrument.

The existing instrument was modified by this researcher to focus on specific topics, credentials of faculty teaching geriatrics, how geriatric content is delivered (e.g., required, elective, integrated into another course, or stand-alone geriatric course), and to obtain feedback on respondents' recommendations to improve Pharm. D. curricula and competencies related to the special needs of geriatric populations. These modifications were reviewed by two geriatric pharmacy faculty members and suggested changes were incorporated into the redesign. The modified, web-based survey was also completed by two pharmacy faculty to test survey completion time. Both faculty members successfully completed the survey in less than 15 minutes.

The 45-item survey (Appendix D.) contains questions that elicited information on the current state of Pharm. D. curricula in U.S. pharmacy schools. Demographic information was collected to identify the type (public or private) and location of respondent institutions. The course content section of the survey collected data on the amount and type of geriatric content present in respondent school Pharm. D. curricula as well as student population and faculty background. Additional information was collected

to assess the presence and type of professional practice experiences that include geriatric content. The presence of required and elective geriatric courses and professional practice experiences, whether stand alone or containing integrated content, was identified. Common barriers to geriatric content inclusion in Pharm. D. curricula were ranked. Information was gathered on the number of recent graduates enrolled in courses containing geriatric content. Schools offering concentrations/specialty tracks, residency, or fellowship programs in geriatrics were identified. The credentials and number of geriatric-trained faculty present at each school was also ascertained. A summary of findings was offered to all respondents as well as an option to redeem a respondent incentive.

### **Data Analysis**

Data imported into Statistical Package for the Social Sciences (SPSS®) was analyzed using the comparative method. Descriptive statistics and frequency distributions were used to describe the current state of geriatric content in the Pharm. D. curricula as well as to compare these findings to the historical data reported in the Dutta et al. (2005) study. This strategy was appropriate since all schools studied were colleges of pharmacy but differed in the extent to which geriatric content was present in each of their Pharm. D. curricula (Creswell, 2009). Additionally, these methods of analysis provided a useful illustration of how the state of geriatric education in the Pharm. D. program has changed since 2003 (Dutta et al.) and provided recommendations for geriatric curricular improvements from respondent schools. The data collected via the web-based survey was divided into four categories: demographics, structure, process, and outcomes for further analysis. Data such as graduation rates, NAPLEX pass rates, U.S.

geriatric pharmacy residency information, and geriatric pharmacy certification demographics, available from outside sources in the public domain, provided a platform for additional outcomes to apply the SPO model for further discussion.

While raw data from the 2003 study could not be obtained (A. Dutta, personal communication, July 25, 2011), direct comparisons were made from the statistical information published by Dutta et al. (2005) relating to structure, resources and activities. The structure and resource data collected was classified as structure to align with the SPO framework for this study and analyzed with new data containing the same classifications. Activities from the 2003 study were classified as process.

Comparisons of 2003 data to the new data collected from this study were made in terms of structure, process, and outcomes as guided by Donabedian's SPO Model for Quality in Healthcare, the framework used for this study (2003). The use of cross-tab frequency tables relationships between bivariate data were displayed. For example, to display the comparison of percentages associated with elective or required courses in geriatrics to courses with integrated geriatric content or stand-alone geriatric courses, this type of table was useful in displaying these relationships. Additional comparisons were made using cross-tab frequency tables to display results of univariate analysis. Examples are tables of data illustrating percentages from 2003 compared to 2011 relating to schools that offered geriatric content, specialty tracks in geriatrics, and geriatric topics presented. Estimated ratios of geriatric trained pharmacists to the older adult population for 2003 and 2010 were also computed and illustrated graphically. All other data collected was reported in narrative form.

This study posed minimal risk to all human subjects involved, safeguarding their rights and anonymity. Questions associated with recommendations and level of satisfaction, however, may have caused stress or discomfort to the respondents as they required personal opinions. Additionally, some respondents may have felt uncomfortable reporting geriatric-poor findings in their program and may have felt this placed their Pharm. D. program in jeopardy. None of the survey questions were required and could be skipped by the respondent for this reason, to remove any feelings of coercion. Respondents were also re-assured at the beginning of the survey that participation was voluntary, they could opt out at any time, and all information provided would remain confidential and disassociated with their specific school. Responses to the survey were de-identified from the participants as well as the individual schools.

### **Summary**

A proposal for this study was accepted by the St. John Fisher College Institutional Review Board (IRB) on November 15, 2011 (Appendix E.). Exempt status was granted since research posed minimal risk to human subjects and would be conducted in an accepted educational setting, using normal educational practices comparing institutional curricula (2006). Upon IRB approval, a cross-sectional, web-based survey using Qualtrics® was conducted to collect data.

A letter of support from the American Association of Colleges of Pharmacy (AACCP) Geriatric SIG Chairman was provided as an attachment to the web-based survey link that was e-mailed to participants. Information about the researcher, purpose, nature, and procedure for completing the study was explained. Additional information concerning confidentiality, respondent incentive, voluntary nature of the study, and

deadline was provided in the survey introduction. Participation in the survey was voluntary and all information provided kept confidential. The survey was open for an 85-day period using an e-mail request containing a survey link.

The respondent incentive for completing the web-based survey was a choice of \$10 Exxon/Mobil, Lowes, or Starbucks gift card. Reminders were sent automatically from Qualtrics® to non-responders every two weeks after the initial mailing and then again one week and two days prior to the end of the 85-day period. All respondent incentive choices were tallied and gift cards mailed within two weeks of the survey period close date. A thank-you message was included with each.

All data collected by the survey close period was exported from Qualtrics® into SPSS®, a statistical software application used for quantitative analysis. A summary of data findings was made available to those respondents who answered *yes* to the survey question offering this information. All data collected via Qualtrics® was propagated across several physical storage devices and backed up to an offsite location daily for security purposes.

The data was electronically archived after completion of this study and will be maintained for three years after when all submissions to journals and poster or podium presentations have been completed.



## **Chapter 4: Results**

### **Introduction**

The purpose of this study was to examine the current state of geriatric content in U.S. Doctor of Pharmacy (Pharm. D.) degree curricula. This quantitative study was a cross-sectional national survey. In November 2011, geriatric faculty or other appropriate representatives at U.S. accredited schools and colleges of pharmacy were sent an e-mail invitation to participate in an online survey.

This chapter reports the findings of the study and provides 2003 findings (Dutta, Daftary, Oke, Mims, Hailemeskel, & Sansgiry, 2005) from a previous study where applicable in relation to the research questions. Data from both studies were analyzed using descriptive statistics. This researcher performed quantitative data analysis on the new data collected using SPSS® 18.0.2 (SPSS Inc., Chicago, IL). U.S. Census data on 2000, 2010, and future projections of the 65 and older population were provided as a basis to further inform the research questions. Comparisons of the two studies are discussed in proportion to the corresponding older adult population trends in chapter 5.

### **Research Questions**

1. How does the state of geriatric education (structure, process, and outcomes) in proportion to the population of older adults compare today with the state of geriatric education in proportion to the population of older adults in 2003?

2. What recommendations to improve curricula and competencies related to the special needs of geriatric populations in pharmacy education programs have been provided by experts?

### **Response Rate**

The invitation to participate in this survey was e-mailed to geriatric faculty at the 124 U.S. accredited schools and colleges of pharmacy. Automated e-mail reminders were sent every two weeks requesting completion of the survey by January 15, 2012. The survey period was extended to February 8, 2012 to increase response rate. An automated e-mail reminder was sent one week before and on the morning of the survey close period. Fifty out of 124 U.S. pharmacy schools represented by geriatric faculty responded to the survey yielding a 40% response rate.

### **Data Analysis and Findings**

A similar survey conducted (Dutta et al., 2005) was sent to the 84 accredited U.S. pharmacy schools and received a response rate of 50% (N=42). The 2003 survey tool was modified and used with permission by this researcher to include questions that would elicit detailed information on geriatric course content types and topics covered. Additional questions were included to ascertain the types of attitudes and values taught with regard to aging and the elderly as well as to collect recommendations to improve curricula and competencies in Pharm. D. programs related to the special needs of geriatric populations. Comparison data from the 2003 study is provided in this chapter where appropriate. A summary of findings from the 2003 study can also be found in Appendices F, G, and H.

Fifty of the 124 U.S. schools of pharmacy invited to participate in this survey responded to some or all of the survey questions by February 8, 2012, resulting in a 40% response rate (N=50). All gift card incentives were mailed with a Thank you card one week after the survey close date.

Twenty-six (52%) and twenty-four (48%) responding schools (N=50) were public and private, respectively. The 2003 study yielded 31 (75%) public and 11 (25%) private school respondents (N=42). All respondents reported offering geriatric course material/content in the Pharm. D. curriculum in both studies. Seventeen (N=46, 34%) schools reported geriatric content as a requirement in the curriculum. Thirty-one (62%) responding schools reported geriatric content offered as an elective, and 42 (84%) schools reported integrating content within another course. This data is illustrated in Table 4.1 along with 2003 findings. Percentages do not sum to 100 because the responses offered were not mutually exclusive.

Table 4.1

*Geriatric Course Material/Content Offered*

	2003 (N=42)	2011 (N=46)
Content type	No. of schools (%)	
Requirement	6 (14)	17 (34)
Elective	13 (31)	31 (62)
Integrated with another course	16 (38)	42 (84)

Respondents were asked to respond to questions associated with four types of geriatric content types in their Pharm. D. curriculum: (a) required geriatric stand-alone courses, (b) required courses with integrated geriatric content, (c) elective geriatric stand-alone courses, and (d) elective courses with integrated geriatric content.

Additional information about the course work was also elicited such as number of credit hours and students enrolled, length of time the course has been offered, importance rating, and geriatric topics covered. Information about faculty teaching geriatric content was also collected. Following are the details reported. Corresponding tables will also summarize 2003 data where applicable.

**Geriatric courses: required.** Forty-six schools (N=49, 94%) did not require a stand-alone geriatrics course, while one (2%) and two (4%) schools required one and two courses, respectively. Two pharmacy schools (N= 48, 4%) did not require a course with integrated geriatric content in their curriculum. Twelve schools (25%) required one course with integrated content, ten schools (21%) required two courses, six schools (13%) required three courses, and eighteen (38%) required four or more.

**Geriatric courses: elective.** Eighteen schools (N=49, 37%) did not offer a stand-alone geriatrics elective course. Twenty-two schools (45%) offered one stand-alone geriatric elective in the Pharm. D. curriculum. Thirty-three (N=46, 72%) schools reported not offering an elective course containing integrated geriatric content. Six schools (13%) reported offering one elective course with integrated geriatric content. Table 4.2 delineates the required and elective geriatric content course types offered at responding U.S. pharmacy schools.

Table 4.2

*Number of Required and Elective Courses by Geriatric Content Type*

Quantity	Geriatric stand-alone course (required) (N=49)	Geriatric stand-alone course (elective) (N=49)	Course containing integrated content (required) (N=48)	Course containing integrated content (elective) (N=46)
	No. of schools			
0	46 (94)	18 (37)	2 (4)	33 (72)
1	1 (2)	22 (45)	12 (25)	6 (13)
2	2 (4)	6 (12)	10 (21)	2 (4)
3	0 (0)	2 (4)	6 (13)	1 (2)
4 or more	0 (0)	1 (2)	18 (38)	4 (9)

**Additional course attributes.** Table 4.3 depicts the four geriatric content course types and time range in years they have been offered at responding schools. Three pharmacy schools (N=3, 100%) reported offering a required stand-alone geriatric course in the Pharm. D. curriculum for up to 10 years. Twenty-one (N=29) schools of pharmacy (N=29, 72%) reported offering stand alone geriatric electives for up to 10 years. The number of responding pharmacy schools (N=36) that reported the length of time they had been offering a required course containing integrated geriatric content were closely dispersed across time ranges. Ten pharmacy schools (N=12, 83%) reported offering an elective course containing integrated geriatric content for up to 10 years. Dutta et al.'s (2005) 2003 findings indicated that schools (N=42) offered geriatric courses for the past seven years on average either as electives or integrated with core courses.

Table 4.3

*Offering Lengths of Geriatric Course Types (Years)*

Years	Geriatric stand-alone course (required) (N=3)	Geriatric stand-alone course (elective) (N=29)	Course containing integrated content (required) (N=36)	Course containing integrated content (elective) (N=12)
	No. of schools			
0 to 5	2	13	9	8
6 to 10	1	8	10	2
11 to 16	0	4	10	1
17+	0	4	7	1

Table 4.4 delineates the number of credit hours reported being associated with the four geriatric course content types. Required stand-alone geriatric courses were reported as being primarily three and four or more credit hour courses (N=3, 100%). Stand-alone geriatric elective courses were offered primarily as three- and four-credit hour courses (N=30, 80%). Required courses containing integrated geriatric content were reported as being primarily four or more credit hours (N=37, 70%). Most schools reported two and three credit hours associated with an elective course containing integrated geriatric content (N= 13, 7%). In 2003, respondents (N=42) reported devoting an average of two credit hours on geriatric material (Dutta et al., 2005).

Table 4.4

*Credit Hours Associated with Geriatric Course Types*

Credit hours	Geriatric stand-alone course (required) (N=4)	Geriatric stand-alone course (elective) (N=30)	Course containing integrated content (required) (N=37)	Course containing integrated content (elective) (N=13)
No. of schools				
1	0	4	3	2
2	0	14	5	7
3	1	10	3	3
4+	3	2	26	1

Respondents were asked to report the number of students enrolled in each of the four geriatric course types present in their corresponding Pharm. D. programs during the 2010-2011 academic school year. Table 4.5 summarizes medians and ranges reported for each type. When asked approximately how many students graduate each year with exposure to geriatrics from U.S. Pharm. D. programs on average, a median of 138 students was produced (N=12, Range 292).

Table 4.5

*Number of Students Enrolled by Geriatric Course Type*

Description	Geriatric stand-alone course (required) (N=2)	Geriatric stand-alone course (elective) (N=22)	Course containing integrated content (required) (N= 40)	Course containing integrated content (elective) (N=11)
Median	47	25	150	30
Range	37	115	697	87

Respondents (N=45) rated the importance of each of the four geriatric course content types on a 1 (least important) to 5 (most important) scale. The descriptive statistics are displayed in Table 4.6. The most highly rated course types were a required course containing integrated geriatric content (Mean 4.33, SD 1.19) and a stand-alone geriatric elective (Mean 3.51, SD 1.01), respectively.

Table 4.6

*Geriatric Course Importance Rankings*

Content delivery type (N=45)	Mean	Standard deviation
Geriatric Stand-alone Course (REQUIRED)	2.71	1.10
Geriatric Stand-alone Course (ELECTIVE)	3.51	1.01
Course Containing Integrated Content (REQUIRED)	4.33	1.19
Course Containing Integrated Content (ELECTIVE)	2.76	0.86
*Other	1.69	1.36

*Note.* \*Other Course types reported in the "Other" category were APPE electives, combined courses, and multidisciplinary events.



**Geriatric topics taught.** Table 4.7 illustrates geriatric content areas that were reported as being taught by responding schools (N=43) in the Doctor of Pharmacy Degree curriculum, whether required or elective, and the percentage of responding schools teaching each topic. Topics are displayed in order of prevalence. The most predominant topic areas covered were adverse drug events (98%), dementia (95%), Parkinson's disease (93%), drug abuse in the elderly (91%), and pharmacokinetic and pharmacodynamic considerations in the elderly (91%). More than 80% of schools covered aging organ systems (86%), pain and palliative care for the elderly (86%), falls and fall prevention (86%), and the demographics of aging (84%). More than half of reporting schools also taught topics specifically affecting the elderly: hypertension, diabetes, heart failure, arthritis, sleep disorders, and nutritional considerations.

Table 4.7

*Geriatric Course Topics Taught in U.S. Pharm. D. Programs (N = 43)*

Content areas addressed for the elderly	No. of schools (%)
Adverse drug events	42 (98)
Dementia	41 (95)
Parkinson's Disease	40 (93)
Drug use	39 (91)
PK and PD considerations	39 (91)
Aging organ systems	37 (86)
Pain and palliative care	37 (86)
Falls and fall prevention	37 (86)
Demographics of aging	36 (84)
Genito-urinary disorders	33 (77)
Osteoporosis	32 (74)
Immunizations	30 (70)
Hypertension	28 (65)
Diabetes	28 (65)
Heart failure	27 (63)
Arthritis	27 (63)
Sleep disorders	26 (60)
Nutritional considerations	24 (56)
Ischemic heart disease	21 (49)
Peripheral and cerebrovascular diseases	21 (49)
Asthma and COPD	21 (49)
Gastrointestinal disorders	19 (44)
Pneumonia	16 (37)
Thyroid disease	15 (35)
Regulatory issues	14 (33)
Anti-aging and natural product use	13 (30)
Dermatology	8 (19)
Oncology drugs	7 (16)
AIDS	3 ( 7)

Dutta et al. (2005) reported (N=42) 26 (62%) schools taught pharmacokinetic and pharmacodynamic considerations in the elderly (adverse drug reactions) and 27 (64%) taught drug reactions in the elderly most predominantly in their curricula in either required or elective courses. Schools also taught demographics of aging (57%), aging organ systems (55%), and osteoporosis in the elderly (52%). Appendix F contains a complete list of the most predominant topics schools reported teaching in the 2003 study. Dutta et al. reported that very few schools taught the following topics related to the elderly: thyroid disease, dermatology, dementia, Parkinson's Disease, pain death/dying and hospice care, AIDS in older patients, oncology drugs in the elderly, anti-aging and natural product use in the elderly, pressure ulcers, and tube feeding and long term care. Specific percentages were not provided.

Table 4.8 delineates geriatric-specific attitudes and values taught in the Pharm. D. curriculum by responding schools (N=42) and the percentage of schools teaching each topic. Topics are displayed in order of prevalence. Ninety-five percent of responding schools reported teaching compassion and understanding of the problems of older adults, and 90% covered the ability to view each older adult as an individual. Eighty-eight percent of schools taught both respect for the autonomy of the older adult and a focus on improving and optimizing function in older adults. Eighty-one, seventy-four, and sixty-seven percent taught ability to function and contribute in interdisciplinary care of older adults, stereotyping/ageist attitudes toward older adults, and skill in involving the older adult and the family in plans for care, respectively. The 2003 study did not explore attitudes and values taught in U.S. Pharm. D. programs.

Table 4.8

*Attitudes and Values Taught in U.S. Pharm. D. Programs (N=42)*

Attitudes and values	No. of schools (%)
Compassion and understanding of the problems of older adults	40 (95)
Ability to view each older adult as an individual	38 (90)
Respect for the autonomy of the older adult	37 (88)
A focus on improving and optimizing function in older adults	37 (88)
Ability to function and contribute in interdisciplinary care of older adults	34 (81)
Stereotyping/ageist attitudes toward older adults	31 (74)
Skill in involving the older adult and the family in plans for care	28 (67)

Table 4.9 depicts geriatric-specific activities/assignments that responding schools (N=42) reported requiring students to complete in the didactic portion of the Pharm. D. curriculum. Assignment types are displayed in order of prevalence. Eighty-eight percent (37) of schools required exams in the Pharm. D. curriculum, and more than half of responding schools required quizzes, medication therapy management exercises, and case presentations. Less than a third of schools required papers, self-reflections, intervention and medication error assignments, journal clubs, and community presentations. Examinations were reported in 2003 (N=42, 37%) to be used primarily in the classroom. Reading (19%), case presentations (9%), and term papers (8%) were also required.

Table 4.9

*Classroom Assignments Required in U.S. Pharm. D. Programs (N=42)*

Assignments	No. of schools (%)
Exams	37 (88)
Quizzes	29. (69)
Medication Therapy Management Exercise	26 .(62)
Case Presentations	25 .(60)
Clinical Case Write-up	16 .(38)
Adverse Drug Reactions (ADR)	14 .(33)
Group Project	13 .(31)
Paper	12 .(29)
Self-reflections	11 .(26)
Interventions	9 (21)
Medication Errors	9 (21)
Journal Club	8 (19)
Community Presentations	6 (14)

**Geriatric faculty attributes.** Table 4.10 illustrates the number of faculty teaching geriatric coursework at responding pharmacy schools (N=41). Eighty-eight percent (36) schools reported having between 1 and 9 faculty involved in teaching geriatric coursework, while twelve percent (5) of schools reported 10 or more. Data on the number of faculty involved in teaching geriatric coursework was not elicited in 2003.

Table 4.10

*Number of Faculty Involved in Teaching Geriatric Coursework (N=41)*

Faculty	No. of schools
1 to 4	25
5 to 9	11
10 to 14	1
15 to 19	2
20 to 24	1
25+	1

Table 4.11 shows schools that reported the highest level of education of the faculty who teach geriatric coursework in both the 2003 and 2011 study. Education levels are displayed in order of prevalence. In 2003 (N=42, 40%) and 2011 (N=40, 98%), schools reported faculty having a Pharm. D. degree primarily followed by a Ph.D. 23% and 21%, respectively.

Sixty seven percent of schools (N= 43) affirmed that faculty teaching geriatric coursework had completed post graduate training in geriatrics in 2011. In 2003, fifty-seven percent (N=42) reported having postgraduate training in geriatrics and 32% were board certified practitioners. Table 4.12 displays the types of geriatric training or certifications responding schools (N=28) reported faculty completed in order of prevalence. Percentages do not sum to 100 because the responses offered were not mutually exclusive. Eighty percent of schools reported that geriatric faculty completed a geriatric residency. Seventy-one, fifty, and thirty-six percent were Certified Geriatric

Pharmacists (GCP), Consultant Pharmacists (CP), and Senior Care Pharmacists, respectively. Fourteen percent reported other training and certifications such as a Geriatric Scholar Program and a family medicine residency consisting of rounding at nursing homes.

Table 4.11

*Highest Level of Education of Faculty Teaching Geriatrics (N=42)*

	(N=42)	(N=40)
Degree type	No. of schools (%)	
Pharm. D.	17 (40)	41 (98)
Ph.D.	10 (23)	9 (21)
Master's Degree	3 (6)	3 (7)
Bachelor's Degree	2 (5)	3 (7)

Table 4.12

*Post Graduate Training and Certifications of Geriatric Faculty (N=28)*

Type	No. of schools (%)
Residency	22 (79)
Certified Geriatric Pharmacist (GCP)	20 (71)
Consultant Pharmacist	14 (50)
Senior Care Pharmacist	10 (36)
Fellowship	9 (32)
Other	4 (14)

**Experiential education.** In the 2011, study 95% of responding schools (N=42) reported offering professional practice clerkships (IPPE or APPE) in geriatrics and/or long-term care. Dutta et al. (2005) reported 39 out of 42 schools (N=42, 93%) offered these types of clerkships also; fifty-three and six percent offered them as elective and a requirement, respectively. Table 4.13 summarizes the 2011 findings from schools that reported offering geriatrics and/or long-term care clerkships in the Pharm. D. curriculum. Data are delineated by IPPE and APPE electives or requirements in order of prevalence. Percentages do not sum to 100 because the responses offered were not mutually exclusive.

Most schools reported offering an APPE elective. One respondent who reported the clerkship as *other* indicated that an extracurricular program in geriatrics was offered.

Table 4.13

*Clerkship Types Offered by U.S. Schools of Pharmacy (N=41)*

Clerkship type	No. of schools (%)
APPE Elective	36 (88)
IPPE	14 (34)
APPE Required	8 (20)
Other (Please explain)	5 (12)



Table 4.14 depicts geriatric-specific activities/assignments that responding schools (N=40) required students to complete in the experiential portion of the Pharm. D. curriculum. Activities/assignments are displayed in order of prevalence. Case presentations, interventions, and Adverse Drug Reactions (ADRs) assignments were required by 90, 78, and 75 percent of schools, respectively. Twenty-five percent or less of responding schools required projects, papers, exams, and quizzes during clerkships. The 2003 study did not elicit detailed information about geriatric-specific activities/assignments required in the U.S. Pharm. D. curricula.

When asked whether schools offered residencies or fellowships with a focus in geriatrics/long term care, Dutta et al. (2005) reported 71% (N=42) of schools did not. The 2011 study reported 88% of reporting schools (N=42) did not. Table 4.15 summarizes the 2011 data.

Table 4.14

*Clerkship Assignments Required in U.S. Pharm. D. Programs (N=40)*

Assignments	No. of schools (%)
Case Presentations	36 (90)
Interventions	31 (78)
Adverse Drug Reactions (ADR)	30 (75)
Journal Club	26 (65)
Medication Therapy Management Exercise	25 (63)
Clinical Case Write-Up	25 (63)
Self-reflections	18 (45)
Medication Errors	16 (40)
Community Presentations	16 (40)
Group Project	10 (25)
Paper	9 (23)
Exams	8 (20)
Quizzes	6 (15)

Table 4.15

*Residencies and Fellowships Offered at U.S. Pharmacy Schools (N=42)*

Description	No. of schools (%)
None	37 (88)
Residency with focus in geriatrics/long-term care	4 (10)
Fellowship with focus in geriatrics/long-term care	1 ( 2)

Respondents (N=43) from the 2011 study rated the importance of each of the four geriatric clerkship content types on a 1 (least important) to 5 (most important) scale. The descriptive statistics are displayed in Table 4.16. The most highly rated clerkship types were a geriatric, stand-alone elective clerkship (Mean 3.86, SD 1.08) followed by a required clerkship containing integrated geriatric content (Mean 3.67, SD 1.19). An importance rating of clerkship types was not requested in the 2003 study.

Table 4.16

*Geriatric Clerkship Importance Rankings (N=43)*

Content delivery type	Mean	Standard deviation
Geriatric Stand-alone Clerkship (REQUIRED)	2.79	1.30
Geriatric Stand-alone Clerkship (ELECTIVE)	3.86	1.08
Clerkship Containing Integrated Content (REQUIRED)	3.67	1.19
Clerkship Containing Integrated Content (ELECTIVE)	2.93	0.86
*Other	1.74	1.53

*Note.* \*Other clerkship types reported in the Other category were geriatric ambulatory care and consultant pharmacy.

**Additional program information.** Respondents were asked approximately what percentage of most recent Pharm. D. graduates took advantage of geriatric elective offerings at their corresponding schools (N=27). Fourteen (52%) schools reported between 5 and 15% of graduates took advantage of geriatric elective offerings. This information was not collected in 2003. Table 4.17 displays data collected on students who took advantage of geriatric electives in their Pharm. D. program.

Table 4.17

*Students Who Took Advantage of Geriatric Electives (N=27)*

Range (%)	No. of schools (%)
5 to 15	14 (52)
16 to 26	6 (22)
27 to 37	3 (11)
38 to 48	2 ( 7)
49 to 60	2 ( 7)

As depicted in Table 4.18, five (N=42, 12%) US pharmacy schools reported offering a concentration in geriatrics. In the 2003 study, one school (N=42, 2%) reported offering a concentration in geriatrics.

Table 4.18

*Geriatric Concentration Offered at U.S. Pharmacy Schools*

	2003 (N=42)	2011 (N=42)
	No. Schools (%)	
Yes	1 ( 2)	5 (12)
No	41 (98)	37 (88)

This study asked respondents (N=43) to rate barriers to incorporating geriatrics into their school’s Pharm. D. curriculum on a 1 (lowest) to 5 (highest) scale. The descriptive statistics are displayed in Table 4.19. Curriculum overload was rated the top

barrier by 64% of responding schools (Mean 4.30, SD 1.70) followed by 14% who ranked insufficient number of geriatric trained faculty as the second largest barrier (Mean 3.30, SD 1.08).

Table 4.19

*Ranking of Barriers to Incorporating Geriatric Content into Pharm. D. Curriculum*  
(N=43)

Barrier	Mean	Standard deviation
Curriculum overload	4.30	1.17
Lack of interest among faculty	2.60	0.93
Insufficient number of geriatric-trained faculty	3.30	1.08
Lack of clinical sites	3.23	1.04
*Other	1.56	1.26

*Note. \*No barrier types were reported for this category.*

Respondents (N= 43) were also asked how satisfied they were with the current state of geriatric content in their schools' Pharm. D. curriculum (very satisfied, satisfied, neutral, dissatisfied, very dissatisfied). Table 4.20 summarizes the data collected for this question. Forty-six percent of responding schools reported being satisfied (37%) or very satisfied (9%) with the current state of geriatric content in their schools' Pharm. D. curriculum. Thirty-five percent reported being dissatisfied (30%) or very dissatisfied (5%).

Table 4.20

*Satisfaction with Current State of Geriatric Content in Pharm. D. Curriculum (N=43)*

Answer	No. of schools (%)
Very Satisfied	4 ( 9)
Satisfied	16 (37)
Neutral	8 (19)
Dissatisfied	13 (30)
Very Dissatisfied	2 (5)
Total	43 (100)

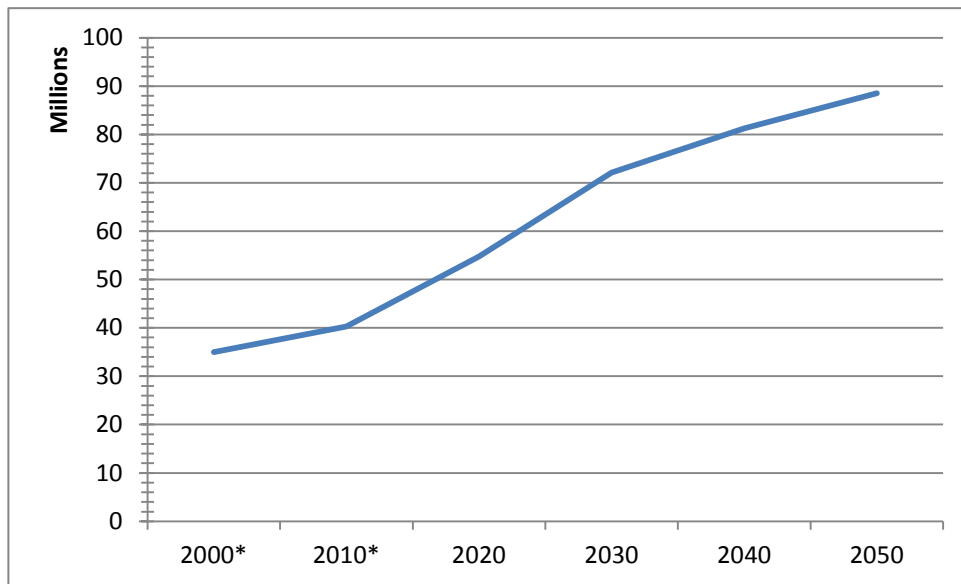
**Recommendations.** Respondents (N = 14) were asked to provide recommendations to improve curricula and competencies in Pharm. D. programs related to the special needs of geriatric populations. The 14 responses received were grouped into categories based on similarity of recommendation. The following five categories emerged: (a) increase in overall geriatric content or focus in the Pharm. D. curriculum, (b) require a geriatric advanced pharmacy practice (APPE) rotation, (c) offer a geriatric elective course, (d) offer a geriatric specialty track or interprofessional projects, and (e) conduct an internal audit of faculty for geriatric content.

### **Older Adults**

To further inform the first research question, “How does the state of geriatric education (structure, process, and outcomes) in proportion to the population of older adults compare today with the state of geriatric education in proportion to the population

of older adults in 2003?”, the following external data on older adults is provided as background for further discussion in chapter 5.

Since 2000, the 65 and older population has increased 15.1% from 35 million to over 40 million in 2010 (Statistical Abstract, 2011). Based on this rate of increase, one can estimate that in 2003 there were approximately 36.5 million people 65 and older in the U.S. The Census Bureau has projected this number to reach close to 90 million by 2050 (Figure 4.1).



*Figure 4.1.* Sixty-five and older population census data (actual and projected). This figure illustrates known population numbers and projected numbers for later years. 2000 and 2010 numbers are U.S. Census reported numbers. All other numbers are U.S. Census projections.

### **Summary of Results**

This chapter provided data collected on the current state of geriatric content in U.S. Pharm. D. Degree programs from a Qualtrics® survey conducted in November 2011 and analyzed using SPSS®. Descriptive statistics were reported using frequency tables



containing medians, means, standard deviations, ranges, and percentages. Data from a 2003 (Dutta et al., 2005) study were also provided where applicable, as well as U.S. Census data on trends and projections of the 65 and older population. In Chapter 5, data from this study will be discussed further in proportion to the current population of older adults and compared to the findings of the 2003 study (Dutta, et. al) in proportion to the 2003 older adult population.

## **Chapter 5: Discussion**

### **Introduction**

The purpose of this study was to describe the current state of geriatric content in U.S. Doctor of Pharmacy Degree curricula. By comparing these findings to data reported in a previous study (Dutta, Daftary, Oke, Mims, Hailemeskel & Sansgiry, 2005), and in proportion to the growing older adult population in the U.S., some insight may be provided on how pharmacy education is keeping pace with training pharmacy students to care for older adults. Data were also obtained to analyze the presence of specific geriatric content areas broadly identified as attitudes and values (Odegard, Breslow, Koronkowski, Williams, & Hudgins, 2007), and recommendations for curricular improvements associated with geriatric content were elicited.

Chapter 1 provided the conceptual framework and rationale for this study. In Chapter 2, an empirical review of literature was presented on the topic of geriatric content in U.S Doctor of Pharmacy (Pharm. D.) degree programs. Trends in U.S. and non-U.S. geriatric curriculum and content innovations were explored. Relevant studies associated with the structure process outcome (SPO) model first used to assess quality in healthcare (Donabedian, 2003) were also presented. Chapter 3 provided the researcher's design methodology to elicit data from geriatric faculty representatives from the 124 U.S. schools of pharmacy in 2011. Chapter 4 reported the results to inform the research questions. This chapter restates the research problem, purpose of the study, methodology

used in the study, and discusses implications and findings, limitations, and recommendations resulting from this study.

### **Discussion of Findings**

Geriatric content in pharmacy education may still be disproportionate with the continued increase of people 65 and older in the United States as has been the case with many other healthcare programs in nursing, medical and dental schools, and schools of social work (Eleazer, McRae, & Kneble, 2000; Kirschenbaum & Rosenberg, 1995; Lubben, Damron-Rodriquez, & Beck, 1992; Mohammad, Preshaw, & Ettinger, 2003; Pratt, Simonson, & Boehne., 1987; Rosenfeld, Bottrell, Fulmer, & Mezey, 1999). This disparity has remained unchanged for almost 30 years, and previous research showed evidence of a potential regression in pharmacy school geriatric content from 1994 to 2003 (Delafuente, Mort, & Wizwer, 2006; Dutta et al., 2005). While the Accreditation Council for Pharmacy Education (ACPE) notes that certain special populations, such as geriatric, be considered when training pharmacy students (2006), it was not known to what extent geriatric-specific content is being included in Pharm. D. curricula today to keep pace with the broadened scope of pharmacy practice and the growing population of older adults in America.

This study was guided by Avedis Donabedian's structure process outcome (SPO) model for health care quality. To understand the current status and performance of the system being assessed, pharmacy education structure, process, and outcome must be understood before quality monitoring can ensue (Donabedian, 1988). These components are interdependent in that each is impacted by its predecessor. To determine the extent of geriatric content in U.S. Pharm. D. curricula, information was needed about the resources

where pharmacy education takes place, the process used to deliver it, and what has occurred (outcome) as a result. The SPO model will guide the following discussion by categorizing findings according to this framework.

**Structure.** Structure refers to how the system is set up. Donabedian believed that setting has a direct effect on how the system will behave (2003). Structure includes detailed attributes of the system, in this case, pharmacy education or more specifically the Pharm. D. curricula. Examples of structure in the pharmacy education system explored in this study and compared to Dutta et al.'s study (2005) are the Pharm. D. curricula, geriatric-trained faculty, and pharmacy students.

Respondents from this study were asked whether geriatric course material was offered in their respective Pharm. D. curriculums. All schools (N=50) reported their curriculum included geriatric content in some form. Evidence from this study reflects a consistent trend since the Dutta et al. study (2005) in that 100% of respondents offered some form of geriatric material in the curricula. This trend seems to further indicate that the focus on geriatric education in pharmacy schools is no longer regressive as was suggested when Dutta et al. compared their findings to a study conducted in 1986 (Pratt et al., 1987).

Consistent with the Dutta et al. (2005) findings (N=42, 93%), this study reported evidence of almost all (N= 42, 95%) responding schools offering a geriatric or long-term care focused professional practice clerkship. Schools consistently included geriatrics for Pharm. D. students in the experiential portion of the curriculum over the last eight years.

The number of geriatric concentrations offered at U.S. pharmacy schools has increased from 1 in 2003 (2%, N=42) to 5 in 2011 (12%, N=42). This represents a 500%

increase in the emphasis placed on providing students opportunities for a specialized focus in geriatrics during their Pharm. D. program in preparation for post-graduate work and geriatric specialty certifications. Dutta et al. (2005) also reported that in 2003, 71% of responding schools (N=42) did not offer geriatric-specific residencies or fellowships. Surprisingly, this number has increased to 88% (N=42) not offering in 2011. This seems to imply that as the number of pharmacy schools has increased, less consideration is being given to geriatric residencies and fellowships.

With a similar number of respondents in 2003 and 2011 (N=42 and N=43, respectively), it is encouraging to see evidence of a 30% or more increase in the number of schools covering geriatric-related topics such as adverse drug events, pharmacokinetic and pharmacodynamic considerations in the elderly, aging organ systems, and drug use in the elderly. Topics covered by the least schools in 2003, were still not widely covered in 2011 such as AIDS in older patients (7%), oncology drugs in the elderly (16%), and dermatology in the elderly (19%). On the contrary, other topics covered by the fewest schools in 2003, were reported as being widely covered in 2011, such as dementia (95%), Parkinson's disease (93%), and pain and palliative care for the elderly (86%) (labeled pain death/dying and hospice care in 2003). New information on specific geriatric content areas broadly identified as attitudes and values (Odegard, Breslow, Koronkowski, Williams, & Hudgins, 2007) taught to pharmacy students was also collected during this 2011 study. In addition to the focus ACPE places on knowledge and practice in core curriculum, attitudes and values being integrated in classroom coursework and bridging to practice experience clerkships is also emphasized (*Accreditation Standards*, 2006). Close to 90% of responding schools (N=42) are incorporating at least 4 of the 7 attitudes

and values identified by Odegard et al. to date. Recently, ACPE amended the standards to include pre-advanced pharmacy practice performance domains; attitudes and values are emphasized therein for earlier inclusion in curriculum (*ACPE Standards Amended*, 2011). This information is timely in understanding the progress schools are making thus far in incorporating these components in the Pharm. D. curriculum.

New information collected on geriatric faculty in this study reflects 88% of respondents reported between 1 and 9 faculty involved in teaching geriatrics and the other 12% reporting 10 or more. What is not known is the geriatric faculty-to-student ratio at each U.S. pharmacy school, but clearly all schools have faculty who are involved in teaching geriatrics. The numbers of faculty teaching geriatrics that possess a Pharm. D. degree have more than doubled since the 2003 study. This is expected due to ACPE adopting American Association of Colleges of Pharmacy's (AACP's) stance to phase out the bachelor's degree in favor of the Pharm. D. degree as a prerequisite to pharmacy licensure (Remington, 2006). While the number of respondents differed slightly (N=42, 2003; N=40, 2011), the number of faculty possessing Ph.D.s, master's degrees, and bachelor's degrees has been consistent.

Information collected during this study on the types of post graduate training that faculty involved in teaching geriatric content possess, provides new insight on the extent to which they have sought to specialize in geriatrics. Seventy nine percent (N=28) completed a residency in geriatrics, 71% were Certified Geriatric Pharmacists (GCP), 50% were Consultant Pharmacists, and 36% were Senior Care Pharmacists.

The median number and range of students reported to have been enrolled in the four different geriatric course types varied considerably as did the response rate for each

of the four associated survey questions (required geriatric stand-alone course, elective geriatric stand-alone course, required course containing integrated geriatric content, and elective course containing integrated geriatric content). While Dutta et al. (2005) did not collect data on the percentage of students who took advantage of geriatric electives in 2003, it is concerning that 74% (N=27) of responding schools in 2011 only reported between 5 and 26% of students taking advantage of geriatric electives in U.S. Pharm. D. curricula. From a structural standpoint, this could be indicative of the need for a geriatric course requirement to ensure student exposure to this specialty area prior to graduation. Conversely, students may simply be opting out of a geriatric elective because they are receiving geriatric content in a required geriatric course or integrated content in another area of the curriculum.

**Process.** Process is determined by what is actually being done to provide pharmacy education. In this case, it includes the manner in which curriculum is delivered in the classroom and during clerkship or practice experiences. Examples are course classification, (i.e., required or elective), whether certain content is deemed stand alone or integrated within another course, the number of credit hours associated with programmatic coursework, and types of assignments administered.

While the number of respondents differed slightly (N=42, 2003; N=46, 2011), both sets reported a more than two-fold increase in the amount of geriatric course types offered in Pharm. D. curricula (Table 4.1). Geriatric required and elective courses as well as geriatric content integrated into another course appears to have more than doubled since the study conducted in 2003. Geriatric stand-alone electives and required courses containing integrated geriatric content were predominant as was the case in 2003. This

could be due to curriculum overload, a barrier to incorporating geriatric content that was ranked highest by respondents in this study (Mean 4.30, N=43). The lack of geriatric-trained faculty might also be attributed (Mean 3.30, N=43). It is difficult to ascertain the extent to which geriatric content has been integrated in coursework where this is the predominant method of delivery.

Consistent with the two predominant course types reported was the number of credit hours associated with these types. More credit hours were reported to have been allocated to these types of courses versus the other types. Twenty-four schools reported having 2 to 3 credit hours associated with geriatric stand alone elective courses (N=30), and 26 schools reported having 4 or more credit hours associated with courses containing integrated geriatric content (N=37); these data were not mutually exclusive. In 2003, schools reported devoting an average of two credit hours on geriatric material; required, elective, stand alone, or integrated was not delineated. With the exception of electives containing geriatric content, the number of credit hours devoted to geriatric content has increased.

Similar to the coursework data collected in this study, geriatric stand-alone elective clerkships and required clerkships containing integrated content were also reported as most prevalent in Pharm. D. curricula. While this level of detail was not collected, elective clerkships were the preferred method reported in the 2003 study whether stand alone or with integrated content (N=42, 54%). Only 6% of schools in 2003 required a geriatric or long-term care clerkship while this study found that 20% of schools require an advanced clerkship in geriatrics or long-term care, a three-fold increase in the last eight years. It is difficult to ascertain the extent to which geriatric



content has been integrated into clerkships where this is the predominant method of delivery, but since 74% of acute care patients are 60 years and older in the U.S. (www.asha.org), it would stand to reason that most clerkships would provide opportunity for pharmacy students to care for older adults during these practice experiences.

Upon further investigation of responding schools by U.S. Census region (Appendix I), this study found that 20% of reporting schools in the South region (N=9) required a stand-alone geriatrics course in the curriculum. All other regions of respondents reported no such course requirement. It can stand to reason that since such a large percentage (36%) of the 65 and older population reside in the south, pharmacy schools may place more emphasis on geriatric pharmacy education there to ensure they train students to care for the older adults they would most likely serve after graduation, (Census Bureau, 2011). A summary of geriatric course content type by U.S region is illustrated in table 5.1.

Table 5.1

*Course Content Types by U.S. Region*

Content type	Region			
	Northeast (9 schools)	Midwest (17 schools)	South (15 schools)	West (9 schools)
Geriatric Stand-alone Course (REQUIRED) (N=49)	0%	0%	20%	0%
Geriatric Stand-alone Course (ELECTIVE) (N=49)	67%	59%	50%	94%
Course Containing Integrated Content (REQUIRED) (N=48)	100%	94%	93%	100%
Course Containing Integrated Content (ELECTIVE) (N=46)	29%	35%	15%	33%

Upon further investigation, this study revealed that only 91% of pharmacy schools in the South offered a geriatric or long-term care clerkship, the lowest percentage reported by the four U.S. regions (Table 5.2). This could be attributed to the fact that with such a high percentage of people 65 and older living in the South region (Census Bureau, 2011) coupled with the large number of acute care patients that are 60 years and older, most clerkship settings in the South already expose students to caring for older adults. Less clerkships offered in geriatrics or long-term care in the South region could

also be attributed to more of an emphasis being placed on geriatric content in the required and/or integrated didactic portion of the curriculum.

Table 5.2

*Geriatric/Long-term Care Clerkships Offered by Region*

	Regions			
	Northeast	Midwest	South	West
Answer	(9 Schools)	(17 Schools)	(15 Schools)	(9 Schools)
Yes	100%	94%	91%	100%
No	0%	6%	9%	0%

A more than five-fold increase in the use of case presentations and papers was reported in 2011 (N=42) as compared to 2003 (N=42). Case presentations were reported by only 9% of schools in 2003 as compared to 60% in 2011. Papers were reported by 8% of responding schools in 2003 and 29% in 2011. Additional classroom assignments required in 2011 (not explored in 2003) were medication therapy management exercises, clinical case write-ups, adverse drug reactions (ADRs), and group projects, which implies evidence of more geriatric-focused activities for Pharm. D. students. Although not explored in 2003, the 2011 study yielded a high percentage of respondents (N=40) who reported requiring case presentations, interventions, ADRs, medication therapy management exercises, and clinical case write-ups during geriatric focused clerkships; this is also indicative of schools' due diligence in preparing pharmacy students for geriatric patient care.

**Outcome.** Outcomes represent any data collected that is a result of pharmacy education provided by the structure and process identified. Examples of outcomes in pharmacy education are U.S. pharmacy school graduation rates, North American Pharmacist Licensure Examination (NAPLEX) pass rates, and geriatric pharmacy certification (GCP) data. Additional outcome data collected during this study was the number of pharmacy students exposed to geriatric content prior to graduation. The most compelling result that can be extrapolated from these outcomes and the findings of this study to inform the research questions is the approximate proportion of geriatric-trained pharmacists to adults 65 and older in the U.S.

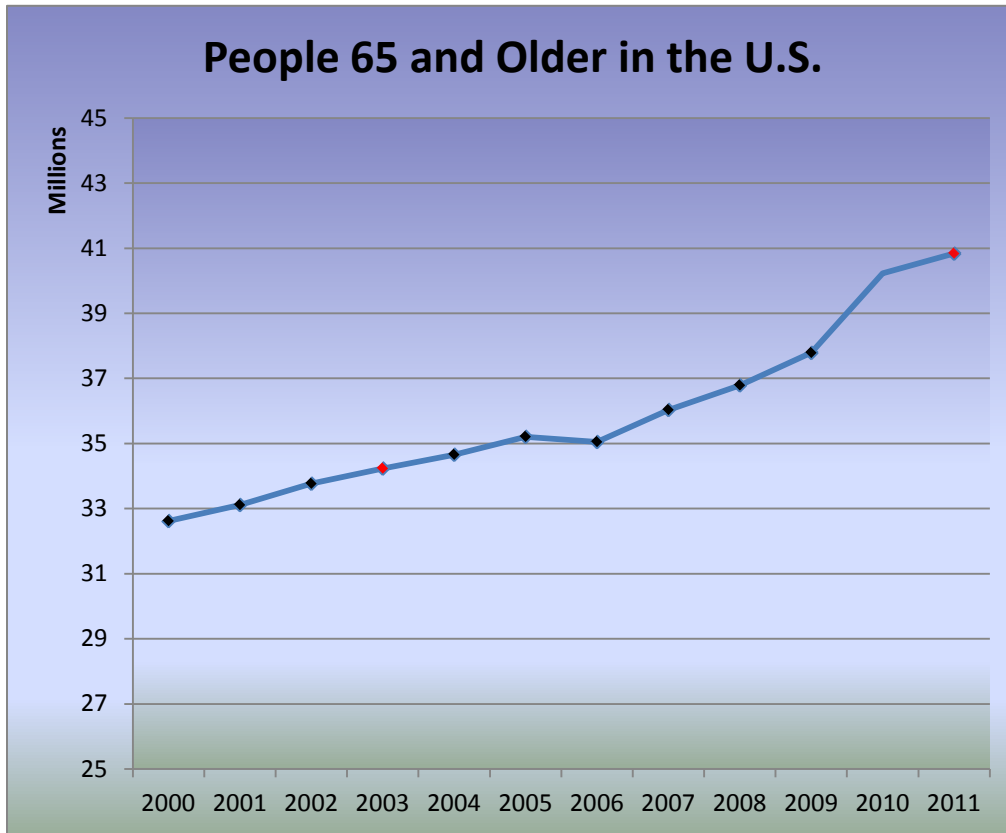
In 2003, the number of students who graduated with a Doctor of Pharmacy degree in the U.S. was 7544 (American Association of Colleges of Pharmacy [AACCP], 2010). The NAPLEX pass rate in 2003 was 94% adding 7091 new pharmacists to the practice that year (National Association of Boards of Pharmacy, 2011). With the number of people 65 and older being approximately 34 million at that time, one can estimate the availability of new geriatric-trained pharmacists to older adults in the U.S. to be 1 to 4795.

In 2011, the number of students who graduated with a Doctor of Pharmacy degree in the U.S. was 11,931 (Katie Owings – AACCP, personal communication, May 2, 2012). The NAPLEX pass rate in 2011 was 94% adding 11,215 new pharmacists to the practice that year (National Association of Boards of Pharmacy, 2011). With the number of people 65 and older being approximately 41 million today, one can estimate the availability of new geriatric-trained pharmacists to older adults in the U.S. to be 1 to 3656; a substantial improvement. Focusing on newly licensed pharmacists who were

required to complete a geriatric practice experience in their Pharm. D. Program (N= 41, 20%) (Table 4.13) places the number of pharmacists trained to provide patient care to older adults at a substantially lower number in 2011, 2,243 or proportionally, 1 to 18,279. Clearly, as more students graduate from pharmacy schools that are including geriatric content, the proportion of geriatric-trained pharmacists to people 65 and older is getting smaller. There has been a 24%<sup>i</sup> improvement in the ratio of geriatric-trained pharmacists to people 65 and older over the last 8 years. The extent to which each student has received geriatric pharmacy training also varies considerably based on the findings of this study. These proportions do not take into account the 215,030 and 272,320 pharmacists already in practice in 2003 and 2011, respectively, as the extent to which they have received geriatric pharmacy education is unknown (Bureau of Labor Statistics, 2012).

Other outcome data such as the number of geriatric certified pharmacists (GCP) already in practice in 2003 and 2011 provides an additional 1174 and 1700 pharmacists, respectively, trained to provide geriatric patient care (Carina Pascual – Commission for Certification in Geriatric Pharmacy, personal communication, May 3, 2012). The average annual growth rate of GCPs in the U.S. over the last eight years is 4.2%. The GCP data changes the ratios of geriatric-trained pharmacists to people 65 and older in 2003 and 2011 to 1 to 3942 and 1 to 3175, respectively. Compared to the 24% improvement in the ratio of geriatric-trained pharmacists to people 65 and older previously calculated, the result is a less than 20% improvement in the ratio of geriatric-trained pharmacists to people 65 and older over the last 8 years. It is unclear if at an average annual growth rate of 4.2%, the ratio of geriatric-trained pharmacists to people 65 and older will continue to decline since the number of pharmacists seeking GCP

licensure each year varies (Carina Pascual – Commission for Certification in Geriatric Pharmacy, personal communication, May 3, 2012). Table 5.1 depicts the growth of people 65 and older in the United States over the last eleven years.



*Figure 5.1.* People 65 and older in the U.S. by year. This figure illustrates reported numbers.

Overall satisfaction with the current state of geriatric content in each respondent's (N=43) Pharm. D. Degree curriculum reported in 2011 only differed by 12% between those who were satisfied or very satisfied and those who were satisfied or very dissatisfied (Table 4.20). It is possible that those reporting satisfaction are comfortable with the geriatric content structure of their respective programs and have been proactive to include geriatrics in response to the growing adult population and to prepare pharmacy

students for geriatric patient care. On the contrary, those who are dissatisfied may desire to review their structure or are already aware of the need for more geriatric content in their program. The 19% of respondents who reported satisfaction as neutral could be attributed to a lack of clarity with regard to the state of geriatric content in their respective curricula.

The most compelling recommendations that emerged in this study (N=14) were to (a) increase the overall geriatric content or focus in the Pharm. D. curriculum, (b) require a geriatric advanced pharmacy practice (APPE) rotation, (c) offer a geriatric elective course, (d) offer a geriatric specialty track or interprofessional projects, and (e) conduct an internal audit of faculty for geriatric course content.

### **Summary of Findings**

This study was a quantitative comparative analysis to ascertain the current state of geriatric content in U.S. Pharm. D. curricula in proportion to the U.S. population of people 65 and older to findings from a 2003 study in proportion to the U.S. population of people 65 and older at that time. An online survey was e-mailed to a geriatric faculty member at each of the 124 accredited pharmacy schools and yielded a 40% response rate (N=50). Findings show evidence of improvement in the state of geriatric content in Pharm. D. curriculum since 2003 and suggest an improvement in the ratio of geriatric-trained pharmacists to people 65 and older in the U.S. More needs to be understood about the extent to which pharmacy schools are integrating geriatric content in Pharm. D. curricula.

## **Implications of Findings**

The results of this study have implications for pharmacy education, practice, and executive leaders as it relates to the presence of geriatric content and the needs of the growing U.S. population of older adults. This study revealed that the number of schools that offer geriatric content of some kind in the didactic and/or experiential component of the Pharm. D. curricula has increased over the last eight years. New geriatric topics elicited and reported as a result of the modified survey instrument is further evidence that more geriatric content is being included in Pharm. D. curricula. This study also reveals that all geriatric content types offered have increased considerably. However, growth in geriatric content has not kept pace proportionately with the number of people 65 and older who currently reside in the U.S. Since the extent to which pharmacy schools are integrating geriatric content is unclear, the current state of pharmacy education still may lack the appropriate training of all pharmacy students to keep pace with this ever increasing population's need for pharmaceutical and patient care. In addition to the Institute of Medicine report citing a shortage of healthcare providers specializing in geriatrics including pharmacists (2008), it is unclear whether the ratio of 1 pharmacist to care for 3656 older adults is a manageable number. A generally accepted ratio of pharmacist to patients, or specifically older adult patients, has not been established to date.

## **Implications for Pharmacy Education**

Results from this study indicate that more pharmacy schools are structuring their curriculum to integrate geriatric content into required coursework in Pharm. D. curricula. The extent to which this is occurring in each school's curriculum is unknown but may



suggest more pharmacy students are being educated on how to care for older adults today. This finding coupled with curriculum overload being ranked as the highest barrier to including geriatric content also reveals a longitudinal pattern of the challenge U.S. pharmacy schools are facing in their attempt to infuse geriatrics into pharmacy education.

While elective geriatric-specific courses and clerkships were highly prevalent, half of the respondents reported only 5 to 15% of students take advantage of these offerings. This may suggest that a Pharm. D. Program structured without required content runs the risk of students graduating with minimal exposure to geriatric pharmacy education. On the other hand, this low percentage could be indicative of students opting out of a geriatric elective because their program has sufficiently exposed them to geriatric content already. Required geriatric content in the didactic and experiential portion of the curriculum would ensure that 100% of U.S. Pharm. D. graduates possess some knowledge of caring for older adults. Requiring these geriatric components could also translate to more students pursuing geriatric residencies, fellowships, and specialty certifications in the future. This could also offset the second highest barrier to geriatric content inclusion in the future; lack of geriatric faculty, as more geriatric trained graduates may take more of an interest in potentially pursuing geriatric faculty positions as a career.

Pharmacy schools should give more consideration to curriculum mapping, mapping of the components and contents of the curriculum to the expected competencies and outcomes, since ACPE calls for this in their Pharm. D. guidelines, (2006). Perhaps a new curriculum quality improvement initiative for schools to consider is to look at geriatric content. This could provide schools with more clarity on the geriatric topics

covered in their Pharm. D. curricula, in what classes, and the extent to which it is present to monitor the structure, process, and outcomes of geriatric content delivery. As a result, schools will be equipped to develop a plan for quality monitoring and potential curriculum modifications. As more geriatric content is infused in the Pharm. D. curricula, individual schools will need to take on their own initiatives to internally assess the extent to which geriatrics is present and achieving its desired results by potentially adopting a model such as SPO for long-term monitoring. In the meantime, while curriculum overload continues to be an issue, continued innovations by geriatric faculty such as the Geriatric Medication Game (Oliver et al., 1995; Evans, Lombardo, Belgeri, & Fontane, 2005) and other geriatric-focused service projects are recommended to present students with the opportunity to learn about pharmaceutical and patient care of older adults.

### **Implications for Pharmacy Practice**

Although findings from this study suggest a more than two-fold increase in schools that required geriatric coursework in their Pharm. D. Program curriculum (Table 4.1), more consideration should be given to continuing education for pharmacists already in practice to close the gap between those who graduated previously with little geriatric pharmacy education. Most states require pharmacists to complete approximately 15 hours of continuing education units (CEUs) each year to maintain licensure. This provides a perfect opportunity for pharmacists to participate in geriatric-specific education. Pharmacist organizations and organizations employing pharmacists should also emphasize and offer CEU opportunities with a geriatric focus. Continuing education in the area of geriatric pharmacy could be administered live or online via webinar, SKYPE®, or computer based training (CBT). This would ensure that students graduating without geriatric education as well as existing pharmacists in practice who do not possess

geriatric pharmacy training can better prepare themselves to provide pharmaceutical and patient care for older adults.

As more pharmacy school graduates and practicing pharmacists learn more about geriatric pharmacology, the potential may be stimulated for more to pursue a geriatric residency or seek certification as a Geriatric Certified Pharmacist (GCP), Senior Care Pharmacist, or Consultant Pharmacist. This suggests a better outcome ratio of geriatric trained pharmacists to Americans 65 and older in the future.

### **Implications for Pharmacy Executive**

Findings from this study suggest that methods of incorporating geriatric content in the Pharm. D. curriculum at U.S. schools and colleges of pharmacy vary considerably. Pharmacy school administrators across the country should consider collaborating to develop and streamline a model for incorporating and mapping geriatric content in curriculum. Pharmacy administrators in conjunction with geriatric special interest group members should also consider recommending modifications to the current accreditation standards that more closely reflect an express focus on geriatric content. More emphasis could be placed on geriatric pharmacy education by the pharmacy school accrediting body, ACPE, by forming a partnership with an organization such as the John A. Hartford Foundation. This could be similar to the American Association of Colleges of Nursing's (AACN) collaboration with the foundation to infuse geriatrics into all aspects of nursing education and to ensure that nursing students will be able to provide geriatric care to the nation's older adult population (American Association of Colleges of Nursing and The Hartford Institute for Geriatric Nursing, 2010).

Pharmacy schools establishing themselves as centers of excellence in geriatrics could provide themselves a competitive advantage that would not only attract students pursuing a pharmacy education that will ultimately set them apart from other pharmacists in the marketplace but also geriatric faculty desiring to teach at a pharmacy school that focuses on this specialty area. This competitive edge could also aid in offsetting the decline in the applicant pool experienced as a result of the nearly 50% increase in new pharmacy schools opening over the last eight years (ACCP, 2011; Dutta et al., 2005). Pharmacy schools that adopt a goal of excellence for quality in geriatric pharmacy education would graduate students best prepared to provide geriatric patient-centered care. This would provide graduates with the marketability they need and also provide them with more career options in the future as older adults begin to experience a need for special care, such as oncology or critical care. These are specialty areas where the pharmacist-to-patient ratio is known to be lower currently (Rough & Shane, 2009). Geriatrics will be a critical component of these specialty areas as Americans continues to age.

Other partnerships to consider in striving for geriatric pharmacy education excellence are the National Association of Geriatric Education Centers of America (NAGEC) and the American Association for Retired Persons (AARP). The NAGEC “plays a vital role in addressing the profound shortage of competently trained health professionals in all disciplines to care for the daunting needs of today's older adults and tomorrow's rapidly graying America” (<http://www.nagec.org>). They seek to form academic partnerships to provide geriatric training that will result in improvements in the quality of health care professionals who care for older adults, and they provide grant

support for those health profession schools and health care facilities interested in doing so. The AARP foundation is an affiliate of AARP that provides grant funding in support of programs that benefit struggling older adults (<http://www.aarp.org>). Pharmacy schools should explore and apply for funding opportunities that would support the creation of programs that provide pharmacy care to older adults by pharmacy students. These types of programs could be considered part of the experiential education portion of the Pharm. D. curriculum since they could be developed within the parameters of a school's introductory or advanced pharmacy practice experience clerkships. All three examples could be explored for opportunities to continuously improve existing curriculum that would ultimately train pharmacy students and benefit the recipients of geriatric pharmacy care, the aging population.

Pharmacists should take the initiative to complete geriatric-focused CEU training to not only better prepare themselves to care and counsel older adults but so they can precept pharmacy students during their introductory and advanced rotations, also, to infuse geriatric pharmacy education into the practice experience whenever possible.

### **Limitations**

This study has some limitations. The first limitation is the response rate of 40% (non-response bias of 60%) which did not provide a full picture of the current state of U.S. pharmacy education. Non-response bias makes it difficult to generalize across the entire population of U.S. pharmacy schools as there may be something inherently different between those who responded and those who did not (Finchman, 2008). For example the 40% who responded may have all had an interest in or the presence of geriatric content in curriculum versus those who did not respond.

Low response may have also been due to the survey period spanning the fall holiday season when schools and colleges are closed for break or due to respondents' hesitance or insufficient background to report on questions specific to both the didactic and experiential course content in terms of geriatrics. There may have been concerns with regard to the accuracy of the response provided as this may not have been information that was readily available. While generalizing for 124 U.S. schools of pharmacy was difficult due to the low response rate, the number of respondents from this study and the 2003 study were closely matched offering some ability to compare findings.

Another limitation is that points of comparison between the 2003 and 2011 study are confined to the modified design of the survey. The modified survey sought to elicit new and more detailed information of which no baseline was present for comparison.

### **Recommendations**

Replication of this study is recommended with the addition of questions that focus on curriculum mapping, specific courses containing geriatric content, and the extent to which it is present in each. This would provide more insight into the number of schools engaged in curriculum mapping to track geriatric-specific content quality of their Pharm. D. curriculum, which required courses are schools infusing geriatric content, and what percentage of geriatric topics are present in each. Working with the accrediting body to elicit information for periodic reporting from accredited programs is also recommended to continually monitor, assess, and improve the quality of Pharm. D. curricula and to ascertain the state of geriatric content in proportion to the 65 and older population longitudinally.

## **Conclusion**

This study examines the current state of geriatric content in U.S. Pharm. D. curricula in proportion to the U.S. population of people 65 and older and compared findings to a 2003 study in proportion to the U.S. population of people 65 and older at that time. Findings suggest that while most schools are still offering geriatric content in some form with an improvement in the amount and type of content, one-third of respondents are still dissatisfied or very dissatisfied with the current state of geriatric content in their school's Pharm. D. curriculum. This could be indicative of a need for more focus on the extent to which schools are integrating content in pharmacy education to catch up to the growing number of people 65 and older who need pharmaceutical and patient care in this country. A ratio of geriatric-trained pharmacists to people 65 and older will be needed to ascertain when this has been achieved. The review of the literature showed that many institutions of higher education that offer programs such as medicine, dentistry, nursing, and social work are also working through this challenge in the U.S. and abroad.

With breakthroughs in medicine resulting in greater life expectancy, a growing population of older adults threatened with one or more chronic disease resulting in multiple medication regimens will continue. It is encouraging to see evidence of an increase in geriatric content in U.S. pharmacy schools over the last eight years. The challenge of ensuring that pharmacy students are equipped to care for this specialized group of people will continue to be paramount if they are to fulfill their oath to relieve humanity's suffering, ensure optimal outcomes for patients, improve professional knowledge and competence, embrace and advocate for changes that improve patient care,

and use their skills and knowledge to prepare the next generation of pharmacists. As the number of people 65 and older continues to soar, there will most likely be more focus by pharmacy leaders on a quality curriculum and innovations for geriatric training of pharmacy students to prepare them to specialize in an area that includes multiple medication management, adverse drug reaction prevention, and promotion of sustainable quality of life for older adults.



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Albany College of Pharmacy  
AND HEALTH SCIENCES

## Appendix A

Letter of Support from the American Association of Colleges  
of Pharmacy (AACP) Geriatric Special Interest Group (SIG).

October 12, 2011

Dear Geriatric SIG Colleagues:

I am writing to ask for your assistance in completing the following survey conducted by a fellow SIG member Sherry Jimenez, who is a doctoral candidate in the Ed.D. Program in Executive Leadership at St. John Fisher College, and the Experiential Education Coordinator at the Wegmans School of Pharmacy in Rochester, New York. She is conducting a new quantitative study of geriatric content in U.S. Doctor of Pharmacy (Pharm. D.) curricula.

The study will examine the current state of Pharm. D. curricula in relationship to geriatric content and compare findings to a previous study conducted in 2003 (Dutta, A. P., Daftary, M. N., Oke, F., Mims, B., Hailemeskel, B., & Sansgiry, S. S., 2005). Data collected on demographic, course content, faculty, and professional practice experiences will assist with answering the following questions:

1. How does the state of geriatric education in proportion to the population of older adults compare today with the state of geriatric education in proportion to the population of older adults in 2003?
2. What recommendations to improve curricula and competencies related to the special needs of geriatric populations in pharmacy education programs have been provided by experts?

I realize that your time is precious but this study will yield valuable results that will help us advance geriatric pharmacy education. Thank you for your consideration.

Best regards,

Michael R. Brodeur, Pharm.D., CGP, FASCP  
Immediate Past Chair- AACP Geriatric Pharmacy Special Interest Group  
Associate Professor  
Department of Pharmacy Practice

[michael.brodeur@acphs.edu](mailto:michael.brodeur@acphs.edu)

## Appendix B

### Grant Award Letter

June 15, 2011

Sherry Jimenez, MS  
St. John Fisher College  
Doctorate Education Candidate  
Rochester, NY 14618

Dear Sherry,

We received your letter of June 7<sup>th</sup> requesting financial support in the amount of US\$1,500 for the execution of your doctoral dissertation. We are happy to tell you that your request has been granted. This funding is possible to a HRSA grant to the Finger Lakes Education Geriatric Center (FLEGC). Therefore, the publication of your work needs to acknowledge this fact by including the following statement:

"This investigation was supported by DHHS HRSA Grant No. IUB4HP192050100, to the Finger Lakes Geriatric Education Center (FLGEC)"

We look forward to the results of your study, which we see as a good effort to advance the pressing need to increase the exposure of our pharmacy students to geriatric issues in their curriculum, nationwide.

Congratulations!

Carlota Andrews, Ph.D., Pharm.D.  
, BCPS  
Associate Professor

Katherine Juba, Pharm.D.  
Assistant Professor

Pharmacy Practice  
Wegmans School of Pharmacy  
St. John Fisher College



3690 East Avenue  
Rochester, NY 14618  
Appendix C

Letter of Permission for Survey Use and Modification

From: arjundutta [arjundutta@yahoo.com] Sent: Mon 5/16/2011 1:39 PM  
To: Jimenez, Sherry  
Cc: Ph.D. Arjun Dutta  
Subject: Re: Dissertation on US Pharmacy School Geriatric Content  
Attachments:

Sure.. it will be a good way to test the instrument's validity etc. Since, I had co-authors on the article and they all contributed to the instrument, please make sure and acknowledge the source and all the co-authors for using the instrument in whole or a modified form.

Best

**Arjun Dutta, Ph.D.**  
Associate Dean for Academic Affairs  
Touro College of Pharmacy, New York  
230, West 125th St., NY 10027  
Tel: 646-981-4700  
Fax: 212-678-1780

**From:** "Jimenez, Sherry" <sjimenez@sjfc.edu>  
**To:** arjundutta <arjundutta@yahoo.com>  
**Sent:** Monday, May 16, 2011 1:21 PM  
**Subject:** RE: Dissertation on US Pharmacy School Geriatric Content

Hello, Dr. Dutta.

I hope this email finds you well. I have been reviewing your survey instrument in depth and would really like to use it for my study with a few modifications/additional questions that I would be more than happy to run by you. Would you be agreeable to my using the instrument for my dissertation study?

Thank you.

Sherry Jimenez, M.S.  
Experiential Education Coordinator  
Wegmans School of Pharmacy  
Ed.D. Candidate  
St. John Fisher College  
3690 East Avenue  
Rochester, NY 14618  
Phone: 585 385 7249  
Fax: 585 385 5295  
[sjimenez@sjfc.edu](mailto:sjimenez@sjfc.edu)

## **Appendix D**

### **Geriatric Content Survey**

My name is Sherry Jimenez. I am currently a doctoral candidate in the Ed.D. Program in Executive Leadership at St. John Fisher College and the Experiential Education Coordinator at the Wegmans School of Pharmacy in Rochester, New York.

This research study has been approved by the St. John Fisher College Institutional Review Board. Findings from this study will be published and reported in group percentages; individual schools and participants will not be disclosed. If you would like to receive a summary of findings individually, you may indicate this when prompted at the end of the survey.

While your participation will aid in a more comprehensive collection of data, you have the right to opt out of this survey or discontinue it at any time. If you wish to participate in this study please hit "Next" to begin. This will serve as your consent to participate.

The survey will take approximately 15-20 minutes. A respondent incentive will be offered at the end and will be your choice of \$10 Starbucks, Exxon/Mobil, or Lowes gift card. Thank you for your willingness to contribute to this study and pharmacy education as a whole.

Please direct all inquiries to:  
Sherry Jimenez, Ed.D. (Candidate)  
Experiential Education Coordinator  
St. John Fisher College  
Wegmans School of Pharmacy  
585 385 7249  
sjimenez@sjfc.edu

Q1 Name of School:

Q2 City, State:

Q3 The institution is:

- Public
- Private

Q4 Name and position of the faculty representative completing the survey:

Q5 Does your school offer any geriatric course material/content in the Doctor of Pharmacy (Pharm. D.) curriculum?

- Yes
- No

If No Is Selected, Then Skip To End of Block

Q6 Is the geriatric course material offered (Check all that apply):

- Requirement
- Elective
- Integrated with another course
- Other, please explain \_\_\_\_\_

Q7 How many stand-alone geriatric courses are REQUIRED in your Pharm. D. curriculum?

- 0
- 1
- 2
- 3
- 4 or more

If 0 Is Selected, Then Skip To How many stand alone geriatric ELECTI...

Q8 How many students were enrolled in the stand alone REQUIRED geriatrics course during the 2010-2011 academic year?

Q9 How long has the stand-alone REQUIRED geriatric course been offered?

Q10 How many credit hours are associated with the stand alone REQUIRED geriatric course offered?

Q11 How many stand-alone geriatric ELECTIVE courses are offered in your Pharm. D. curriculum?

- 0
- 1
- 2
- 3
- 4 or more

If 0 Is Selected, Then Skip To How many courses with integrated...

Q12 How long has the stand-alone geriatric ELECTIVE been offered?

Q13 How many credit hours are associated with the stand alone geriatric Elective course offered?

Q14 How many students were enrolled in the stand-alone geriatric ELECTIVE during the 2010-2011 academic school year?

Q15 How many courses with integrated geriatric content do you REQUIRE in the Pharm. D. curriculum?

- 0
- 1
- 2
- 3
- 4 or more

If 0 Is Selected, Then Skip To How many ELECTIVE courses containing ...

Q16 How long has the REQUIRED course containing integrated geriatric content been offered?

Q17 How many credit hours are associated with the REQUIRED course containing integrated geriatric content?

Q18 How many students were enrolled in the REQUIRED course containing integrated geriatric content during the 2010-2011 academic school year?

Q19 How many ELECTIVE courses containing integrated geriatric content do offer in the Pharm. D. curriculum?

- 0
- 1
- 2
- 3
- 4 or more

If 0 Is Selected, Then Skip To Please rank the following in order of...

Q20 How long has the ELECTIVE course with integrated geriatric content been offered?

Q21 How many credit hours are associated with the ELECTIVE course(s) containing integrated geriatric content?

Q22 How many students were enrolled in the ELECTIVE course containing integrated geriatric content during the 2010-2011 academic school year?

Q23 On average approximately how many students graduate from your school's Pharm. D. Program each year with exposure to geriatrics?

Q24 Please rank the following in order of importance in pharmacy school curriculum (1 = most important and 5 = least important)

- \_\_\_\_\_ Required Geriatric Stand Alone Course
- \_\_\_\_\_ Elective Geriatric Stand Alone Course
- \_\_\_\_\_ Required Course with Integrated Geriatric Content
- \_\_\_\_\_ Elective Course with Integrated Geriatric Content
- \_\_\_\_\_ Other

Q25 Which of the following geriatric content areas are covered in the Doctor of Pharmacy curriculum (Check all that apply)?

- Aging organ systems
- AIDS in older patients
- Anti-aging and natural product use in the elderly
- Adverse drug events
- Demographics of aging
- Drug use in the elderly
- Gastrointestinal disorders in the elderly
- Genito-urinary disorders in the elderly
- Hypertension in the elderly
- Ischemic heart disease in the elderly
- Heart failure in the elderly
- Peripheral and cerebrovascular diseases in the elderly
- PK and PD considerations in the elderly
- Nutritional considerations in the elderly
- Oncology drugs in the elderly
- Pneumonia in the elderly
- Pain and palliative care for the elderly
- Dermatology and the elderly
- Thyroid disease in the elderly
- Asthma and COPD in the elderly
- Osteoporosis in the elderly
- Arthritis in the elderly
- Regulatory issues

- Dementia
- Parkinson's Disease
- Sleep disorders in the elderly
- Immunizations in the elderly
- Diabetes in the elderly
- Falls and fall prevention

Q26 Which of the following attitudes and values are taught in the Pharm. D. curriculum (Check all that apply)?

- Stereotyping/ageist attitudes toward older adults
- Compassion and understanding of the problems of older adults
- Ability to view each older adult as an individual
- Respect for the autonomy of the older adult
- Skill in involving the older adult and the family in plans for care
- Ability to function and contribute in interdisciplinary care of older adults
- A focus on improving and optimizing function in older adults

Q27 Which of the following geriatric specific activities/assignments are students required to complete in the didactic portion of the Pharm. D. curriculum (Please check all that apply)?

- Case Presentations
- Paper
- Group Project
- Interventions
- Medication Therapy Management Exercise
- Exams
- Quizzes
- Self Reflections
- Journal Club
- Medication Errors
- Adverse Drug Reactions (ADR)
- Community Presentations
- Clinical Case Write-up

Q28 What is the total number of faculty members involved in teaching geriatric coursework at your school?

Q29 What is the highest level of education of the faculty who teach the geriatric coursework at your school (Check all that apply)?

- PhD
- Pharm. D.
- Masters
- BS Pharmacy
- Other \_\_\_\_\_

Q30 Do the faculty who teach the geriatric-specific coursework have any postgraduate training in geriatrics?

- Yes
- No

If No Is Selected, Then Skip To End of Block

Q31 Have the geriatric faculty completed any of the following training/certification in the area of geriatrics (Check all that apply)?

- Residency
- Fellowship
- Certified Geriatric Pharmacist (GCP)
- Consultant Pharmacist
- Senior Care Pharmacist
- Other \_\_\_\_\_

Q32 Does your school offer any professional practice clerkships (IPPE or APPE) in geriatrics and/or long-term care?

- Yes
- No

If No Is Selected, Then Skip To Does your school offer any of the fol...

Q33 Is this clerkship (Check all that apply)?

- IPPE
- APPE Elective
- APPE Required
- Other (Please explain) \_\_\_\_\_

Q34 Which of the following geriatric specific activities/assignments are students required to complete in the experiential education (clerkship/rotation) portion of the Pharm. D. curriculum (Check all that apply)?

- Case Presentations
- Paper
- Group Project
- Interventions
- Medication Therapy Management Exercise
- Exams
- Quizzes
- Self-Reflections
- Journal Club
- Medication Errors
- Adverse Drug Reactions (ADR)
- Community Presentations
- Clinical Case Write-Up

Q35 Does your school offer any of the following (check all that apply)?

- Residency with focus in geriatrics/Long-term care
- Fellowship with focus in geriatrics/Long-term care
- None

Q36 Please rank the following in order of importance in pharmacy school curriculum (1 = most important and 5 = least important)

- \_\_\_\_\_ Required Geriatric Clerkship/Rotation
- \_\_\_\_\_ Elective Geriatric Clerkship/Rotation
- \_\_\_\_\_ Required Clerkship/Rotation with Integrated Geriatric Content
- \_\_\_\_\_ Elective Clerkship/Rotation with Integrated Geriatric Content
- \_\_\_\_\_ Other

Q37 What percentage of your most recent Pharm. D. graduates took advantage of geriatric elective offerings at your school?

Q38 Does your school offer a concentration in geriatrics?

- Yes
- No



Q39 Please rank the following barriers to incorporating geriatrics into your school's Pharm. D. curriculum (1 = highest barrier):

- \_\_\_\_\_ Curriculum overload
- \_\_\_\_\_ Lack of interest among faculty
- \_\_\_\_\_ Insufficient number of geriatric-trained faculty
- \_\_\_\_\_ Lack of clinical sites
- \_\_\_\_\_ Other

Q40 How satisfied are you with the current state of geriatric content in your school's Pharm. D. degree curriculum?

- Very Satisfied
- Satisfied
- Neutral
- Dissatisfied
- Very Dissatisfied

Q41 Please use this space to provide recommendations to improve curricula and competencies in Pharm. D. programs related to the special needs of geriatric populations.

Q42 May I contact you if I have additional questions about your program?

- Yes
- No

Q43 Would you like to receive a summary of findings from this survey?

- Yes
- No

Q44 To receive your \$10 gift card, please indicate your choice below.

- Image:Star2
- Image:Lowes
- Image:Mobil

Q45 Please provide the name and address where you would like your gift card mailed.

## Appendix E



November 15, 2011

File No: 3038-111711-05

Sherry Jimenez  
Wegmans School of Pharmacy  
St. John Fisher College

Dear Ms. Jimenez:

Thank you for submitting your research proposal to the Institutional Review Board.

I am pleased to inform you that the Board has approved the proposal entitled, "Geriatric Content in U.S. Doctor of Pharmacy (Pharm.D.) Degree Curricula."

Following federal guidelines, research related records should be maintained in a secure area for three years following the completion of the project at which time they may be destroyed.

Should you have any questions about this process or your responsibilities, please contact me at 385-5262 or by e-mail to [emerges@sjfc.edu](mailto:emerges@sjfc.edu).

Sincerely,

Eileen M. Merges, Ph.D.  
Chair, Institutional Review Board

EM:jlm

Copy: OAA IRB  
IRB: Approve exempt.doc



## Appendix F

Data Summary: Study of Geriatric Education in U.S. Schools of Pharmacy: A

Snapshot (Dutta, Daftary, Oke, Mims, Hailemeskel, & Sansgiry, 2005)

### Summary of Findings

Description	# Schools	%
Response Rate (N=42)	42/84	50
Public/Private	31/11	75/25
Some form of geriatric course material offered	42	100
Geriatrics course mandatory in Pharm. D. curriculum	6	14
Geriatric material integrated in another required course	16	38
Geriatric material offered as an elective	13	31
Geriatric pharmacy practice pathway/concentration offered	1	2
Some form of geriatric/long-term care clerkship offered	39	93
Geriatric/long-term care elective clerkship	23	54
Geriatric/long-term care required clerkship	3	6
Residency or Fellowships with Focus in Geriatrics/Long-Term Care offered	12	29
Preferred forms of instruction:		
Examinations	16	37
Lectures	14	33
Reading	8	19
Case Studies	8	19
Discussion Groups	8	18
Case Presentations	4	9
Term Papers	3	8
Length of time geriatric offered (on average)	7 years	
Credit hours associated with geriatric courses (on average)	2	

## Appendix G

Data Summary of Course Content: Study of Geriatric Education in U.S. Schools of Pharmacy: A Snapshot (Dutta, Daftary, Oke, Mims, Hailemeskel, & Sansgiry, 2005)

Table 1. Geriatric Course Content Taught at U.S. Schools of Pharmacy (N = 42)

Content Area	No. of Schools (%)
Pharmacokinetic and pharmacodynamic considerations in the elderly; adverse drug events	26 (62)
Drug use in the elderly	27 (64)
Demographics of aging	24 (57)
Aging organ system	23 (55)
Osteoporosis in the elderly	22 (52)
Genito-urinary disorders	19 (45)
Nutritional disorders	17 (40)
Arthritis, ischemic heart disease, cardiovascular disease in the elderly	16 (38)
Hypertension, arthritis in the elderly	15 (36)
Asthma and chronic obstructive pulmonary disease	12 (29)

## Appendix H

Data Summary of Faculty Education: Study of Geriatric Education in U.S.

Schools of Pharmacy: A Snapshot (Dutta, Daftary, Oke, Mims, Hailemeskel, & Sansgiry,  
2005)

Highest Level of Education of Faculty Teaching Geriatric Lectures	% Schools (N =42)
Pharm. D.	40
Ph.D.	23
Master's Degree	6
Bachelor's Degree	5
Post Graduate Training	57
Board Certified Geriatric Practitioners	32

## Appendix I

### U.S. Census Bureau Regions

U.S. Census Bureau		
Census Bureau Regions and Divisions with State FIPS Codes		
<b>Region 1: Northeast</b>		
<b>Division 1: New England</b> Connecticut (09) Maine (23) Massachusetts (25) New Hampshire (33) Rhode Island (44) Vermont (50)	<b>Division 2: Middle Atlantic</b> New Jersey (34) New York (36) Pennsylvania (42)	
<b>Region 2: Midwest*</b>		
<b>Division 3: East North Central</b> Indiana (18) Illinois (17) Michigan (26) Ohio (39) Wisconsin (55)	<b>Division 4: West North Central</b> Iowa (19) Kansas (20) Minnesota (27) Missouri (29)	Nebraska (31) North Dakota (38) South Dakota (46)
<b>Region 3: South</b>		
<b>Division 5: South Atlantic</b> Delaware (10) District of Columbia (11) Florida (12) Georgia (13) Maryland (24) North Carolina (37) South Carolina (45) Virginia (51) West Virginia (54)	<b>Division 6: East South Central</b> Alabama (01) Kentucky (21) Mississippi (28) Tennessee (47)	<b>Division 7: West South Central</b> Arkansas (05) Louisiana (22) Oklahoma (40) Texas (48)
<b>Region 4: West</b>		
<b>Division 8: Mountain</b> Arizona (04) Colorado (08) Idaho (16) New Mexico (35)	Montana (30) Utah (49) Nevada (32) Wyoming (56)	<b>Division 9: Pacific</b> Alaska (02) California (06) Hawaii (15) Oregon (41) Washington (53)
<i>*Prior to June 1984, the Midwest Region was designated as the North Central Region.</i>		

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<sup>i</sup> The 24% rate of change was calculated using the ratio denominators of number of new geriatric-trained pharmacists to older adults in 2003 (4795) and 2011 (3656).