SPECIAL ARTICLES

Geriatric Pharmacy Education: A Strategic Plan for the Future

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The aging of the US population will have a major effect on the future practice of pharmacy. By 2030, 20% of Americans will be aged 65 years and older, an increase from 12.4% in 2000.¹ A challenge to colleges and schools of pharmacy in the 21st century is to prepare students and practitioners to meet the growing pharmaceutical care needs of the older adult population and to meet these needs in a variety of care settings. This paper reviews the present state of geriatric pharmacy education and training, including strategies for ensuring that practicing pharmacists will have adequate knowledge, skills, attitudes, and values to provide this care. Secondly, this report provides strategic directions and recommendations for successfully implementing geriatrics curricula at an institutional level

INTRODUCTION: THE IMPORTANCE OF GERIATRIC THERAPY COMPETENCY

Imagine you are 75 years old. You are looking up from your hospital bed at one of your former pharmacy students who has appeared in your room announcing that he/she is the pharmacist caring for you. Would you be confident that this pharmacist was adequately prepared while in pharmacy school to manage your unique needs as an older adult?

The aging of the US population will have a major effect on the future practice of pharmacy. By 2030, 20% of Americans will be aged 65 years and older, an increase from 12.4% in 2000.¹ In 2003, approximately 3.4 billion prescriptions were dispensed in the United States.¹ According to data published in *Families USA* by the Kaiser Family Foundation, 34% of all prescription medications are used by older adults.² Overall utilization of prescription medication in the United States will continue to rise by approximately 10% per year. This increase in the older adult population and increasing utilization of medications will pose new demands for expertise in the area of medication therapy management for this population. There will be more opportunities to prevent medication-related problems in older adults. The Medicare

Modernization Act of 2003 facilitated prescription drug coverage and the possibility of medication therapy management services (MTMS) for Medicare beneficiaries.³ MTMS efforts focus on reduction of polypharmacy and optimization of complex medication regimens, both of which are knowledge and skill areas included in geriatric pharmacy education. This underscores the need for generalist pharmacy practitioners who can competently address this challenge. Given the enormous shift that is occurring in population demographics, pharmacy practitioners with the education and training necessary to provide expertise in clinical geriatrics will be in demand to assist with MTMS and assure safe and effective medication therapy for older adults in the coming years.

A challenge to colleges and schools of pharmacy in the 21st century is to prepare students and practitioners to meet the growing pharmaceutical care needs of our older adult population and to meet these needs in a variety of care settings. Colleges and schools of pharmacy must recognize that (1) care of the older person is an essential component of the education of all pharmacists; (2) geriatrics curricular content should include the knowledge, skills, attitudes, and values for caring for older adults; (3) geriatrics faculty members who provide the classroom and clinical teaching, research, and administrative base for geriatrics content are essential to assuring the quality of geriatrics education and for promoting its future development at all levels; and

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(4) pharmacy students need to be prepared to work effectively within interprofessional health care teams.

This paper reviews the present state of geriatric pharmacy education. It is intended to provide a strategic framework for action and to be an institutional resource for developing curricular initiatives to ensure that future pharmacists will have adequate knowledge, skills, attitudes, and values to provide care for older adults.

STATE OF GERIATRIC EDUCATION IN PHARMACY SCHOOL CURRICULA

Background and History

In 1975, the report of the Millis Commission, *Pharmacists for the Future*, recognized the growing older adult population and the increased role of skilled nursing facilities and home care for managing health care for the aged.⁴ The report emphasized the need for the pharmacy profession to evolve to meet the challenges presented by the changing health care environment.

In 1979, the Center for Human Services, Bureau of Health Professions, issued a report entitled *Pharmacy and the Elderly* that addressed geriatric pharmacy education.⁵ The report concluded that although several colleges and schools included aging-related information, no comprehensive program existed at any college or school of pharmacy. The report recommended that colleges and schools of pharmacy: (1) educate and train all of their graduates in the basic knowledge, skills, and attitudes identified as needed to meet the pharmaceutical needs of older adults; (2) conduct assessments of their curricula to determine the extent to which course offerings are addressing the needs of older adults and corresponding functions of pharmacists; (3) plan a systematic approach to integrate aspects of aging and care of older adults into existing courses in the pharmacy curricula at the undergraduate and continuing education levels; and (4) pursue methods other than the traditional methods of teaching or even the newly developed methods of clinical teaching in order to implement an integrated curriculum that includes geriatrics and gerontology.

Federal initiatives during the late 1970s and the 1980s facilitated the growth of geriatric education in the health professions and pharmacy played a major role in many of these initiatives. The Administration on Aging (AoA) at that time sponsored curriculum and training grants with the objective of developing gerontology and geriatrics curricula in health professions schools. With funding from the AoA, the University of Washington established an interdisciplinary gerontology training program in 1979 that included faculty members and students from all 6 health sciences schools. Training sites were a nursing home, a home health agency, and an acute care hospital (written communication, July 31, 2006).

In the mid-1980s, the Bureau of Health Professions began funding Geriatric Education Centers (GECs) in health sciences schools in order to develop and expand geriatrics clinical training. A pharmacy practice component was present in 2 of the first 4 GECs. One of those GECs produced a model geriatric pharmacy curriculum.^{6,7} A GEC awarded to a university medical center in the mid 1980s led to the development of a comprehensive certificate program in geriatric pharmacy practice. The certificate program inaugurated in 1986 is still active today.⁸ Furthermore, 2 schools of pharmacy have hosted GECs: the University of New Mexico from 1987 to 1993 and the University of Montana from 2002 to present (written communication, July 25, 2006).⁹

Over the last 2 decades, the availability of Federal funding has provided financial support for colleges and schools of pharmacy to develop didactic and experiential courses in geriatrics. Certificate programs in gerontology and/or geriatrics expanded opportunities beyond the standard professional curriculum. A model geriatrics curriculum for pharmacy students was developed during this period and published as a textbook: *Pharmacy Practice for the Geriatric Patient*.^{10,11}

Several surveys to identify the extent of geriatrics curricula in colleges and schools of pharmacy have been conducted.¹²⁻¹⁷ In the first, a survey instrument/questionnaire (1980) was sent to all 72 accredited colleges and schools of pharmacy. Seventy-two colleges and schools (100%) responded to the survey and of these, 43% reported offering at least 1 geriatrics course, while 22% did not offer any geriatrics coursework.¹² In 35% of colleges and schools, some geriatrics information had been integrated into other courses.¹² Available courses typically had a clinical emphasis and were more likely associated with the offering of a doctor of pharmacy (PharmD) degree; the presence of a gerontology program or center within the college's or school's university system did not significantly influence the availability of geriatric pharmacy coursework.¹² By 1986, 92% of programs offered at least some geriatric pharmacy coursework.¹³ In 1995, Kirschenbaum and Rosenberg published the results of a survey sent to 75 accredited US colleges and schools of pharmacy. The response rate for the survey was 95% (71 of 75). Most colleges and schools offered an elective didactic or experiential geriatrics course, but required courses were few in number. The authors stated that "any school which does not offer a required course in geriatrics should examine its curriculum carefully and determine if students are receiving sufficient exposure in this area."¹⁵ In another survey (2001), conducted by the American Society of Consultant Pharmacists (ASCP) Council on Educational Affairs, information was solicited

from 86 accredited colleges and schools of pharmacy in the United States and Canada.¹⁶ In contrast to the earlier surveys that received a response approaching 100%, the ASCP survey received responses from only 55% of the colleges and schools. As in previous surveys, the availability of geriatric pharmacy coursework varied widely. An encouraging finding was a significant increase in experiential offerings; 96% of respondent colleges or schools offered advanced pharmacy practice experiences (APPE) and approximately 75% offered introductory pharmacy practice experiences (IPPE) in geriatrics. Almost half of respondent programs integrated geriatric pharmacotherapeutics into their curricula. Full-time geriatrics faculty members were present in 38 colleges and schools; 21 reported having at least 1 part-time geriatrics faculty member. It is not known whether this pattern is true for non-respondent colleges and schools. In 1999, Graber et al published the findings of a survey of all curriculum directors of AACP member colleges and schools.¹⁷ The directors were asked to rank 33 generalist curriculum topics in order of importance. Care of older adults ranked sixth.

In a 2006 survey of the 89 US colleges and schools of pharmacy (42% response rate, n = 37) conducted by the American Association of Colleges of Pharmacy Geriatrics Special Interest Group (SIG), 43% (16 of the 37 respondents) reported that they had 2 full-time geriatric faculty members and 97% of all geriatrics faculty members were in pharmacy practice. The majority of the colleges and schools reported reliance on part-time faculty members to teach geriatrics. Most survey respondents (92%) agreed that geriatrics should be incorporated into the curriculum. Despite this overwhelming support for geriatrics content, only 43% of the respondents offered a standalone geriatrics course. In contrast to that finding, all colleges and schools provided an advanced pharmacy practice experience in geriatrics or long-term care.¹⁸

Professional organizations have contributed significantly to the development of geriatric pharmacy education. The American Association of Colleges of Pharmacy (AACP) in collaboration with the American Society of Consultant Pharmacists (ASCP) produced *Geriatric Curricular Resources* in 1997.¹⁹ This guide included an extensive list of geriatric subject areas, learning objectives for those subjects, literature citations with accompanying abstracts, and reviews of textbooks published prior to 1997. In 2002, a *Geriatric Pharmacy Curriculum Guide* was published by ASCP.²⁰ This curriculum guide created a framework for geriatrics education to assist faculty members in the development of a standardized gerontology and geriatrics curriculum. This guide is undergoing revision with anticipated publication in May 2007.

Other health professions and related organizations such as the American Geriatrics Society (AGS),²¹ the American Association of Colleges of Nursing (AACN),²² and the Institute of Medicine (IOM),²³ have issued statements on the need to incorporate geriatrics and gerontology into the curricula of health professions education and training programs.²¹⁻²³ The AGS and AACN have also outlined competencies for geriatrics education which closely parallel the ASCP curriculum guide.²¹⁻²²

In 2005, the American College of Clinical Pharmacy (ACCP) published a white paper addressing the pharmacy practice, research, education, and advocacy needs targeted at the competent care of older adults. This position paper outlined the risks of medication use in older adults and highlighted the importance of the appropriate training and education to assure safe and effective drug therapy for this population.²⁴

Current Requirements for Geriatrics Training and Education

Standard 12 of the new *Accreditation Standards and Guidelines for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree* adopted in 2006 by the Accreditation Council for Pharmacy Education (ACPE) states that graduates of the pharmacy professional degree curriculum should have the ability to “provide patient care in cooperation with patients, prescribers, and other members of an interprofessional health care team based upon sound therapeutic principles and evidence-based data, taking into account relevant legal, ethical, social, cultural, economic, and professional issues, emerging social/behavioral/administrative, and clinical sciences that may impact therapeutic outcomes.”²⁵ This standard infers that geriatrics should be a part of the curriculum, but does not explicitly promote its inclusion. Despite this fact, appendix B of the report specifies that the science foundation of the pharmacy curriculum must include the pathophysiologic and pharmacotherapy alterations for special populations such as geriatric patients for prescription and nonprescription medications. To further cement the importance of geriatrics in the curriculum, in the “Roadmap to 2015” report by the Argus Commission and the AACP Academic, Professional, Research, and Graduate Affairs Committees, the aging of America is identified as a “key societal change.” The report goes on to stipulate that pharmacists must be “knowledgeable about geriatric therapeutics.”²⁶

CORE PHARMACIST COMPETENCIES IN GERIATRICS

Several core competencies for geriatrics have been identified and provide guidance for curriculum

development. The *Geriatric Pharmacy Curriculum Guide*, published by ASCP in 2002, provides an excellent tool for development of geriatrics curriculum content in pharmacy.²⁰ This document underscores the assertion that the level of responsibilities of pharmacists caring for older adults may differ when comparing clinical practice expectations for general practice pharmacists to specialists in geriatrics.²⁰

Regardless, a baseline minimum competency in geriatrics is a requirement for all pharmacists to assure provision of effective pharmaceutical care to this growing population. The competency areas outlined by the ASCP, as well as those outlined by other health professions including the AGS and the AACN, can be broadly divided into 3 categories: knowledge, skills, and attitudes (refer to Table 1 and Table 2).

While ACPE includes geriatrics as a suggested content area of the curriculum, specific competencies in geriatrics are not delineated or noted in the educational outcomes developed by the Center for the Advancement of Pharmaceutical Education (CAPE).²⁷ The most recent

CAPE educational outcomes, published in May 2004, employ organization and language structures that are similar to competency and outcomes documents developed by other health professions, and are representative of the practice of pharmacy.²⁷ The key domains are (1) pharmaceutical care, (2) systems management, and (3) public health. The structural change in the CAPE outcomes document has not altered the central philosophy that curricula must incorporate professional practice-based and ability-based outcomes. These 2 primary educational areas imply competency needs for several aspects of pharmaceutical care related to the care of older adults including communication, optimizing drug therapy, interpreting patient response including physical and chemical data, promoting public health, providing education, understanding systems of care, and valuing the ethical and social context of the patient. Achievement of the CAPE outcomes will be difficult for a college or school of pharmacy if the competencies outlined by CAPE cannot be applied to the care of prevalent patient populations such as older adults. To effectively meet the needs of the older adult population as a generalist practitioner, pharmacists should possess competence in the knowledge and application of pharmaceutical care for older adults as well as the attitude, values, and sensitivity required to work with this population.

INTEGRATING GERIATRICS INTO PHARMACY CURRICULA

Background

The notion that geriatrics content is under represented in pharmacy school curricula raises 4 fundamental questions: (1) What constitutes geriatrics content? (2) If geriatrics content is added to existing courses, what material must be eliminated or changed to make room for it? (3) If a school or college adds a required geriatrics course, what course will need to be eliminated? and, (4) What other options exist to satisfy ACPE curriculum standards and to meet the needs of the aging American population?

Geriatrics education and training can be incorporated into a curriculum on multiple levels. It may be as simple as inserting a few slides into a lecture or reviewing a case, or as complicated as developing an entire course on aging.²⁸ Three traditional approaches for integrating content into curricula are employed by colleges and schools of pharmacy: (1) a required course(s) with didactic and or experiential content (2) an elective course(s) with didactic and or experiential content; and/or (3) the discrete integration of content throughout the entire curriculum. Within these global approaches, there are a variety of instructional methods used to meet programmatic goals and objectives and to satisfy the competencies outlined in the educational outcomes.²⁸

Table 1. Categories for Classroom/Laboratory Competency in Geriatrics

Attitudes and Values

- Awareness of the myths and stereotypes about older adults
- Ability to view people as individuals
- Understanding of the ethical issues in the care of older adults
- Appreciation for the cultural influences of age
- Compassion for frailty and its influences on illness
- Appreciation of the roles and contributions of other professionals in the care of older adults

Knowledge

- Basic sciences – distinguish the influences of aging on drug therapy
 - Pharmacokinetic
 - Pharmacodynamic
- Clinical sciences - distinguish the presentation and response to therapy posed by both normal aging and by illnesses more commonly present in older adults
 - General medical illness
 - Common geriatric syndromes

Skills

- Perform basic elements of geriatric pharmacotherapy assessments
 - Interpret physical, laboratory, and diagnostic tests results in accordance with age-related changes
 - Provide appropriate drug therapy monitoring for elderly or aged adults
 - Provide medication and wellness counseling and education for patients and for health professionals
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Table 2. Categories for Experiential Competency in Geriatrics

Attitudes and Values
Minimal or no stereotyping of older people.
Minimal or no ageist attitudes towards older people.
Compassion and understanding of the problems of older people.
Ability to view each older person as an individual.
Respect for the autonomy of the older individual.
Skill in involving the older person and the family in plans for care.
Ability to function and contribute in interdisciplinary care of older people.
A focus on improving and optimizing function in older people.
Knowledge
Application of basic knowledge about aging, including:
Demography and epidemiology of aging
Theories of aging
Normal aging versus disease state changes
Pharmacokinetic and pharmacodynamic changes in aging
Common geriatric syndrome and conditions, including causes, signs, symptoms, treatment, and prevention:
Diseases and disorders that are more common in older people, including causes, signs and symptoms, treatment and prevention.
Psychosocial and economic problems and issues of aging
Ethical issues in geriatric care
Cultural aspects of aging
Skills
Conduct appropriate physical assessments in older people including screening assessments.
Communicate with older people to obtain medication histories and other pertinent information.
Prioritize a patient's problems
Design, implement, monitor, evaluate, and adjust patient specific care plans.
Retrieve, analyze and interpret appropriate literature to provide drug information to older people, prescribers and other health care providers.
Communicate with prescribers and with other health care providers regarding drug therapy of older people.
Manage chronic medication therapies in conjunction with the prescriber.
Educate the older person on his or her drug therapy.
Educate other health care providers on the use of drugs in older people.
Manage medication systems in health care environments for older people.
Comply with federal, state, and local regulations that govern the use of medications by older people.

Ideally, each college or school would have a geriatrics content champion, ie, one or more faculty members who recognize that action is needed and who are willing to begin a dialogue about the extent and nature of such content within their college or school. Ideally faculty members who are already teaching geriatrics content could take the lead in this undertaking. If a college or school does not have a faculty member who has a concentration specializing in geriatrics there may be an interested faculty member who is willing to step forward and spearhead a geriatrics initiative. In some colleges and schools, a member of the curriculum committee who recognizes the deficiency in geriatrics content in their curriculum could take the lead.

Before moving ahead with curriculum change, there must be an assessment of the type, quality, and quantity of geriatric content that currently exists in a given curriculum. Do instructors specifically say "older adults" or "seniors" or the "elderly" or "aging" and then introduce course material in this context? For example, when presenting the therapeutics of oral anticoagulant use, are age-related factors such as declining hepatic function, nutrition, drug interactions, risk of hemorrhage from falls, medication adherence, etc, clearly stated and discussed? In other words, do faculty members address older adult issues in a straightforward way, or is it assumed that students will independently figure out how the material may apply to a special population?

Curricular content is most easily assessed by faculty members who have content concentration in geriatrics and an understanding of the college's or school's curriculum. It is not unusual that individual faculty members have limited knowledge about the specific content that is included in the topics delivered by their colleagues. This barrier to curriculum modification can be addressed through content or curriculum mapping.^{29,30}

Conducting a formal or informal survey of faculty members within a college or school of pharmacy may be an initial necessary step to identify curricular gaps in geriatrics. A formal survey instrument would guide faculty members through a series of questions whereby qualitative and quantitative data about geriatrics curriculum content could be gathered and then analyzed. An informal survey instrument could be as simple as asking fellow faculty members if they relate any of their course/lecture content to geriatrics. To assure complete data, it may be necessary to meet with faculty members who do not return the survey instrument.

Resources for Geriatric Pharmacy Education and Training

Implementing geriatric training depends mainly on an institution's ability to recruit and retain qualified academic geriatrics faculty members, maintain adequate clinical training sites, and obtain adequate financial support. The difficulty in recruiting academic geriatrics pharmacy faculty members and the consequent lack of adequate numbers of faculty members to provide core geriatric training continues to be the most important resource constraint.¹⁸ The current capacity for training additional faculty members is limited.^{24,31} At present, there are only 16 ASHP-accredited specialty residencies in geriatrics, and this level of training may not be sufficient to prepare faculty members going into research-focused tenure-track positions.³² Fellowship training would facilitate adequate preparation for an academic position; however, there is only 1 fellowship training program currently available through the American College of Clinical Pharmacy in the area of geriatrics.³³ Efforts to promote postgraduate geriatric pharmacy education need to be enhanced to meet the projected didactic and experiential curriculum needs. Successful models of geriatric pharmacy residency and fellowship education have been created within colleges through direct funding and alliances with professional organizations, private and federal funding, and foundations. However, these typically have not been sustainable over time.

The American Society of Consultant Pharmacists has established the Certification in Geriatrics Pharmacy (CGP) credential. For colleges or schools without spe-

cially trained geriatrics faculty members, the Self-Assessment Examination (SAE) for this credential may be a useful method for identifying faculty member and preceptor development needs in the area of geriatrics. The CGP credential would also provide a potential method for verifying competency of faculty members or preceptors when individuals without specialized geriatrics training are interested in taking the lead in this curricular area.³⁴ Another method for developing faculty members with content expertise in geriatrics would be the development of mentoring networks between colleges or schools of pharmacy or through faculty traineeships. Shared faculty positions are another option for facilitating adequate geriatrics expertise in several colleges and schools. This would allow faculty members with specialized training in geriatrics to provide guidance and leadership to other colleges and schools of pharmacy. Remuneration for this assistance or acknowledgement of their work (eg, adjunct or affiliate appointment, promotion recognition) would be important. Faculty traineeships could be developed through professional associations. Additionally, core slide sets or modules for coursework or curricular content in geriatrics could be developed and offered as resources by professional organizations.

Clinical training (ie, IPPEs and APPEs) and site development are other important considerations for colleges and schools of pharmacy when evaluating resources for geriatrics education and curricular support. Colleges and schools of pharmacy must nurture opportunities for IPPEs and APPEs in venues that may not fit the traditional model for geriatric care, ie, hospitals and nursing homes. Some colleges and schools have successfully initiated quality pharmacy practice experiences in community-based venues such as senior care clinics and assisted-living facilities. Another option would be to incorporate a sub-core curriculum of geriatrics learning objectives into a required general medicine acute care (hospital) APPE, which would assure exposure to the skills needed for geriatric competencies for all students.

To assist in the development of these clinical training sites, collaborative efforts with professional pharmacy and geriatrics organizations are encouraged. The ASCP Research and Education Foundation has developed a Senior Care Pharmacy Student Rotation Program with guidelines for preceptor and clinical practice site qualifications and with learning objectives and suggested activities designed to assist students in achieving these objectives. These guidelines can assist a college or school of pharmacy in implementing and evaluating its geriatric pharmacy practicums.³⁵ Another potential resource for geriatrics training are health care institutions. Key

accrediting bodies (eg, The Joint Commission) may require staff members to demonstrate age-related competency, thereby opening the door for collaboration between colleges and schools of pharmacy and healthcare institutions to produce on-site staff development and training opportunities in geriatrics, and competency assessment for pharmacy students.³⁶ Increased collaboration with acute care institutions to facilitate geriatrics training opportunities seems opportune given the increased age of inpatients who are too frail to be treated on an outpatient basis. In fact, some acute care institutions have implemented acute care for the elderly (ACE) services to improve care.³⁷

Textbooks can serve as a tremendous resource to faculty members and to the curriculum. Unfortunately, a recent investigation by Mort and colleagues determined that, for commonly used pharmacotherapy textbooks, there is insufficient depth and breadth of geriatrics content for some of the prevalent illnesses found in the older adult population.³⁸ In particular, less than half of the geriatric-related critical points about chronic obstructive pulmonary disease (COPD), heart failure, and diabetes mellitus (30.7%, 32.5%, and 45.7%, respectively) were addressed by the 3 major textbooks studied.³⁸ Consequently, there are limitations to using these textbooks as a resource for developing adequate competency in geriatric pharmacotherapy because their content may be more directed at general pharmacotherapeutics.

Fiscal resources must be considered. Budgetary shortfalls will plague curricular initiatives. Competition from private sector salaries will continue to exacerbate the insufficient number of qualified geriatrics faculty members, thereby limiting the number of content experts who can be the champions for curricular change and for developing quality clinical training sites.^{31,39}

Institutional and print-based resources that may assist with curriculum development include the National Institute on Aging Institute of Medicine reports; Veterans Health Administration initiatives (Geriatric Research, Education and Clinical Care Centers); and the Bureau of Health Professions' Geriatric Education Centers (GEC) program. Leadership and investment by the public sector and private foundations such as the Hartford and D.W. Reynolds foundations and the Duke Endowment, have supported the development of geriatric training programs and education.⁴⁰ Federal funding for GECs, eliminated from the Federal budget during the 2006 budget cycle, has been restored, at least for 2007, affecting this funding source for geriatric education. While a number of these resources do not specifically target pharmacy education, they do support multidisciplinary educational efforts to enhance geriatric training in order to improve

the quality of care for older persons. These funding sources should be considered innovative opportunities to foster geriatric pharmacy education.

Potential Barriers to Curriculum Change and Improvement

Graber et al evaluated the barriers to curriculum change. Their study assessed the importance of 12 predetermined barriers to pharmacy school curriculum changes. The 6 factors most likely to be barriers include: (1) limited availability of clinical learning sites; (2) an already crowded curriculum; (3) inadequate funding; (4) professional turf issues; (5) faculty resistance; and (6) lack of faculty expertise.¹⁷ For any change in geriatrics content to occur and succeed, there must be faculty as well as administrative support. In fact, integrating geriatrics topics into the existing curriculum can be more cost effective and efficient than creating a separate course that will have to compete for curricular time with other courses and content.²⁸

To be successful with geriatrics content integration, sufficient time must be devoted in the curriculum and sufficient resources (eg, time and funding) must be a priority.^{40,41} Concerning medical student education in geriatrics, Medina-Walpole et al stated "funding alone does not create sustainability, but it can allow for development and implementation that leads to institutionalization of the curricular changes."²⁸ Furthermore, the lack of trained and/or interested faculty members can be an immediate impediment to curriculum change. With limited faculty resources, assigning new teaching and curriculum development responsibilities can be difficult.²⁸ Other potential barriers include access to older adult populations (important for experiential courses), inability to supplement didactic courses with clinical experiences, a general resistance to geriatrics training (ageism), and the lack of protected time to plan, administer, and teach the curriculum.^{28,42} There must also be a commitment by the college or school to facilitate professional development for non-geriatric faculty members who have an interest but not an expertise in geriatrics.⁴²

Strategies for Content Implementation

There are a variety of strategies for incorporating geriatrics into pharmacy curricula. As noted previously, these include a required course, weaving information throughout the curriculum by inserting geriatrics topics and distinctions into required or core courses, and the inclusion of elective courses to accomplish greater depth of learning for those anticipating a more focused role in senior care. Specialty courses, certificate programs, residencies, and fellowship training also provide methods for

enhancing programmatic coverage of geriatrics, although these affect fewer students than the general student population. Faculty in colleges and schools of pharmacy must be knowledgeable about the extent to which minimum geriatrics competencies are addressed by their own curriculum. In the short term, enhancement of the curriculum is possible by inserting age-related distinctions within individual courses. Faculty members with expertise in geriatrics may be helpful in providing ideas regarding content additions and educational updates for fellow faculty members. Ideally, curricular planning will lead to long-range development of geriatrics education as a core part of the curriculum.

Required Course. Proposing and implementing a required geriatrics-focused course may meet the greatest resistance within a college or school if this results in the displacement of another required course in an effort to maintain a neutral effect on core credit requirements. In order to make room for a required geriatrics course, it may be necessary for a college or school to evaluate its credit distribution policies. By decreasing the elective credits and increasing the required credits by a like number, there would be no net change in the number of credits required for the PharmD degree. Course placement or fit within a given curriculum would be influenced by a number of institution-specific variables such as teaching philosophy and pedagogy, course sequencing, and the extent of course integration. A required course may also have implications for faculty teaching assignments and other instructional resources. This could stretch faculty resources unless changes in other courses would free up instructional time that could be allocated to the new geriatrics course. The best-case scenario would be a required didactic course and a required experiential course. This would provide ample opportunity for teaching, learning, and assessment of the requisite knowledge, skills, attitudes, and values that should form the core competencies of geriatrics pharmacy education.

Elective Course. It is likely that an elective course would not impose on the core curriculum, and would therefore meet with less resistance than a required course. Communication and coordination with fellow faculty members in other courses would be essential to ensure integration and minimize redundancy of geriatrics content. Only offering an elective course would mean that some students would not be exposed to geriatrics content. However, if the course were well designed and well taught, the elective might be in high demand, with high enrollment numbers. This scenario creates the advantages of a required course without some of the barriers to implementation. In addition to the basic course, a college or school with adequate resources could implement addi-

tional elective courses that could eventually lead to the formation of a concentration in geriatric pharmacy.

Integration of Geriatrics Across the Curriculum.

Content integration must be differentiated from an integrated curriculum. In an integrated curriculum, learning can be organized horizontally or vertically. Horizontal integration occurs when several courses are organized into a single course so that students can better understand content interrelationships or concepts cut across several courses in a single semester or year. Vertical integration involves the inclusion of patient-focused clinical information, classroom activities, and direct patient contact earlier in the curriculum along with the foundation science courses, and then builds on this knowledge and clinical skill with increasing complexity throughout the professional program.⁴³ Integrating geriatrics content can be accomplished in either case but may exert pressure on some aspects of the curriculum. If time is taken to carefully evaluate the curriculum, content that is no longer relevant to contemporary pharmacy education may be identified and replaced by the additional geriatrics content, thus minimizing pressure on the existing curriculum.

Successful content integration may necessitate the introduction of innovative teaching methods to achieve this end. The willingness to embrace a particular teaching strategy is likely to be influenced by the teaching methods in current use at any given college or school and faculty members' familiarity with a particular teaching method. To meet content objectives, it may be necessary to implement a teaching method that is outside faculty members' experience.

Instructional Methods for Geriatrics Education

Five types of educational strategies are commonly employed in colleges and schools of pharmacy: (1) lecture-based learning; (2) small groups and skills laboratories; (3) student-centered learning; (4) experiential learning (IPPEs and APPEs); and (5) interprofessional learning. These 5 basic methods are enhanced by various specialized teaching techniques that are often innovative variations of these basic strategies. Table 3 lists these common teaching methods and highlights the potential applications, strengths, and limitations in geriatric education.

Didactic education and its variations are commonly relied upon to provide initial, foundation-based development of competency. For example, education about the attitudinal influences on the care of older adults can be incorporated into lecture courses addressing the social and behavioral aspects of pharmacy care and into case discussions in drug therapy courses. Knowledge of the basic scientific principles of aging and their influence

Table 3. Teaching Techniques: Applications to Geriatrics Education^{30,41,44-54}

Instructional Format	Application to Geriatrics	Strengths	Limitations
Lecture-Based Learning	Helpful for conveying factual information such as age-related pharmacokinetic or pharmacodynamic changes; attitudes and values can be presented	Information can be provided directly by content expert; lecture notes can facilitate review of information	Traditional lecture tends to facilitate passive or one-way learning; discussions are limited given class size; lecture notes may promote class absence if students feel that notes replace the expertise of the lecturer.
Small Group or Skills Labs	Discussion of factual information; case review and application of material; practice of skills (eg, interviewing older adults or performing physical assessment)	Participation by all is possible through effective facilitation; individual learning and competency can be assessed	Time-intensive for faculty; requires multiple classroom or meeting spaces
Student-Centered Learning	Problem-based learning to facilitate drug-related problem identification and resolution, critical thinking, and prioritization of care (eg, polypharmacy review)	Facilitates problem solving and critical thinking; technology can be incorporated easily (eg, on-line chat for cases); promotes student responsibility and accountability for learning	Time-intensive preparation; may require faculty expertise if technology is used to facilitate problem solving
Experiential Learning	Clinical application of age-related concepts; skills application to care of older adults	Provides a bridge to practice so that students understand the application of their classroom learning; allows for role-modeling by pharmacy practitioners; facilitates understanding of concepts difficult to teach in the pharmacy curriculum (eg, ethics); facilitates professional growth	Time-intensive; may rely on non-School of Pharmacy-based faculty who are not as familiar with the curriculum; patient care is the site priority so students requiring more time-intensive precepting may feel left behind
Interprofessional Learning	Clinical practice on a team: Discussion of ethics of end-of-life care, aging and ageism; ability to practice interprofessional communication and advocate for the patient's drug therapy priorities and needs	Facilitates professional identity and growth; challenges students with real-world issues in health teams	May result in confusion of professional role of the pharmacist if the student is not made aware of the inter-relationship of various health disciplines.

on drug therapy can be incorporated directly into lecture material for courses such as medicinal chemistry, pharmacokinetics, pharmacology, and therapeutics. Skill-based competencies can be taught and assessed through the use of skills laboratories.

There are several teaching methods, techniques, and curricular approaches that can be incorporated to facilitate competency development including educational strategies such as classroom games that enhance knowl-

edge, stimulate learning, and sensitize students to challenges faced by older adults.⁴⁴⁻⁴⁹ Figures 1, 2, and 3 provide examples of established core competencies in geriatrics outlined in the *ASCP Foundation Geriatric Pharmacy Curriculum Guide* with reference to suggested teaching formats for addressing these educational areas in the curriculum. It is evident from the table that many core competencies can be taught in a wide range of curricular locations using a variety of instructional formats.

Competency Assessment

Contemporary pharmacy education appears to be moving toward performance-based (ability-based) assessment and this may be well-applied in geriatrics education where competent knowledge, skills, attitudes, and values are essential for care provision.⁵⁰ An ability-based outcome is a statement of student performance that describes what the student should be able to do or perform.⁵¹ Performance is defined as demonstration of the ability rather than response to proxy measures of ability.⁵² Assessment techniques must be employed that can operationalize this assessment philosophy for geriatrics content to assure effective integration within the curriculum.

In 1999, the AACP Academic Affairs Committee published a model and definitions for "assessment and evaluation across the curriculum."⁵¹ According to that model, assessment is defined as a "process of collecting, analyzing, and using information." The model seeks to align desired outcomes with previously established statements of mission, goals, and objectives and to use this process to guide improvement. While this model is targeted at curriculum assessment, it can also form the basis for student assessment.

In 1993, the Commission to Implement Change in Pharmaceutical Education published its perspective on the overarching professional competencies that define practice.⁵³⁻⁵⁵ The general competency domains identified by the Commission include: (1) solving problems and making decisions; (2) managing patients' drug therapies and pharmacists' practices; (3) learning skills; (4) communicating, teaching, educating, collaborating; and (5) participating in policy formation and professional governance. In its 1993 report, the Pew Health Professions Commission recommended, among other things, that pharmacy schools and colleges initiate curricular reform that engenders competencies essential to pharmaceutical care (critical thinking, communication, ethical behavior, teamwork, leadership, and caring).⁵⁶

The final and possibly most challenging step for geriatric curriculum development is to identify specific assessment techniques that reliably measure attainment of the desired competencies. Rethans et al argue that competency-based assessments are measures of how the individual performs in testing situations and that performance-based assessment measures what is done in practice.⁵⁷ Performance-based assessment for pharmacy students may be most effective if conducted in practice-based experiences throughout the curriculum to best assess "real world" decision making and ability.

The advanced pharmacy practice experiential year is a capstone year. It holds promise as an active and dynamic environment in which to test student competence as well

as evaluate performance in a patient care setting. Key factors will be preceptor knowledge and skills in geriatrics and the college's or school's ability to provide appropriate clinical sites and effective preceptor training for mentoring students in the care of older adults.

A criteria-based approach such as the American Society of Health-Systems Pharmacists' (ASHP) Residency Learning System (RLS) or assessment tools from ASHP accredited geriatrics specialty residencies could serve as a model for competency and performance assessment.⁵⁸ The RLS evaluates competency and performance with a check list of goals and objectives organized within the domains of (1) practice foundation skills, (2) practice care skills, and (3) practice management skills. Although the RLS may be best suited for experiential courses, it may be possible to make adaptations that would give rise to a useful tool for assessing geriatrics core knowledge learned in a didactic course. In fact, the RLS used for geriatric specialty residencies has adapted the parent model to address issues pertinent to this population. Using the RLS is most feasible if geriatrics content is clearly delineated in the curriculum. The RLS is quite lengthy and would not lend itself to efficient assessment of the competency of first-professional degree PharmD students without modification.

A student portfolio represents another avenue for student assessment. Portfolios usually consist of descriptive information and may present a challenge in evaluating competence and/or performance in many desired practice outcomes. Portfolios would need to be designed to be useful for evaluating the mastery of specific knowledge or assessing the mastery of human relations skills such as communication, empathy, and collaboration, or problem-solving skills.⁵⁹

The objective structured clinical examination (OSCE) is another method for measuring the development of professional competence.⁶⁰ One of the challenges for pharmacy students is medication management of the complex patient. The multiple disease states and drugs that are common in older adults can be overwhelming. By incorporating increasingly more complex stations or cases over a period of 2 to 3 years, faculty members can build on fundamental competencies while assessing more advanced competencies. Case-based or problem-based learning is another technique that lends itself well to student assessment and competency attainment. Going one step further, Karani et al implemented a combination of case-based learning and OSCEs in the training of medical residents.⁶¹ An unfolding case (one that evolves over time and is unpredictable to the learner), such as those employed in problem-based learning, was developed and presented to the residents. Following the completion

of the case, a multiple-station OSCE was administered to serve as a formative assessment of the knowledge and skills taught in the evolving case.⁶¹

Keys et al implemented a methodology in a geriatrics elective concentration sequence that provided lecture-specific, instructor-generated discussion questions to students at the start of each course segment.⁴⁴ Students submitted answers to specific questions prior to the relevant lecture. If faculties at colleges and schools of pharmacy decide to integrate geriatrics content throughout the curriculum, it would be conceivable for a group of faculty members to develop a series of questions that would be relevant to various courses and would assess geriatrics knowledge throughout the curriculum. There are tremendous opportunities for colleges and schools of pharmacy to collaborate and develop assessment models that can be adapted to meet varying needs and that will include measurable outcomes.

CONCLUSIONS AND RECOMMENDATIONS

Pharmaceutical education must keep pace with the changes in health care delivery, population demographics, and the need for patient-centered care. Pharmacy students require the knowledge, skills, attitudes, and values to meet the needs of the growing number of older adults in America. In pharmacy education, we cannot assume that students will extrapolate information about the general population and apply that material to special populations such as older adults. Ideally, pharmacy curricula would be designed to specifically facilitate competency in geriatrics. Any actions to rectify the deficiency in geriatrics content should be guided by the precept that the curriculum and content diversity among colleges and schools of pharmacy must be respected. It is not practical to attempt a cookie-cutter approach. For curriculum change to succeed, it may be necessary to take advantage of existing resources within the wider institution to capitalize on the strengths within the respective university or community.²⁸ It may also be efficient and practical to take advantage of resources among colleges and schools of pharmacy, such as cooperative faculty development of geriatric cases for use in the classroom.

Specific suggestions for implementing geriatrics into curricula include: (1) identify a geriatric content champion in each college or school of pharmacy, (2) develop a national consensus about minimum competencies in geriatric pharmacy, (3) take an evidence-based approach to geriatric content,⁶² (4) expose pharmacy students to geriatrics content and issues throughout the curriculum, (5) develop clearly stated learning objectives, (6) identify best practices in geriatrics education,⁶³ and (7) assess student competency of geriatrics-related knowledge,

skills, attitudes, and values. Colleges and schools of pharmacy must strive to provide enough skilled faculty members and practitioners with expertise in geriatrics to care for the nation's older population. Although the current state of geriatric pharmacy education and training has major deficiencies, considerable progress is being made. Changes in pharmacy education and health care delivery, focusing on improved geriatric education of pharmacists, is essential to future educational efforts. Future success will require a sustained commitment from academic geriatrics faculty members, colleges and schools of pharmacy, professional organizations, governmental agencies, and foundations.

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