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Interprofessional Education: Principles and Application.

An Update from the American College of Clinical Pharmacy

American College of Clinical Pharmacy

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Running Head: IPE: Principles and Application

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Abstract

Implementation of interprofessional education (IPE) across health care disciplines continues to anchor the coordination and integration of a multidisciplinary approach to clinical care. Since publication of the ACCP white paper on IPE in 2009, IPE has received increased attention among health care professional organizations and accrediting bodies and has been the focus of hundreds of new publications. Notable advances include the updated core competencies from the Interprofessional Education Collaborative (IPEC), the addition of 14 health care professional organizations representing many different health care professional disciplines to the original six that formed IPEC, and the increased attention given to IPE in the accrediting standards of many health care professions. The present white paper serves as an update to the 2009 ACCP white paper addressing IPE implementation, assessment, barriers, sample practices, and resources. It also proposes several efforts that ACCP could pursue to further promote and implement IPE.

Key Words: clinical pharmacy, education, interdisciplinary, interprofessional, interprofessional education, multidisciplinary, pharmacy practice, teamwork.

Introduction

Interprofessional education (IPE) initiatives have received increasing attention since publication of the American College of Clinical Pharmacy (ACCP) white paper on IPE in 2009.[1] ACCP's 2017 Educational Affairs Committee was charged to update this important document to reflect developments since that article. Notable advances include the updated core competencies from the Interprofessional Education Collaborative (IPEC),[2] the addition of 14 health care professional organizations representing many different health care professional disciplines to the original six that formed IPEC, the hundreds of new publications focused on IPE and interprofessional collaborative practice (ICP), and the increased attention given to IPE in the accrediting standards of many health care professions.

This update will focus on changes in IPE initiatives since the 2009 ACCP white paper, which will serve as a core reference. The two documents should be considered as a whole to understand the present implications of IPE on the health care professions and patient care.

Updates in Supporting Evidence for IPE

Supporting evidence for IPE has increased several-fold since the 2009 ACCP white paper. A recent PubMed search on "Interprofessional Education and Pharmacy" yielded 392 publications in the past 5 years compared with 748 overall. Thus, 52.4% of all articles on IPE and pharmacy found in the search had been published quite recently and 73.7% within the past 10 years. In the first retrievable article on the topic published in 1965, "Pharmacists' Participation in Team Teaching Program," the author references team teaching as a "new concept in the educational structure of many institutions throughout the country."[3] The shifting

accreditation standards since then have undoubtedly sparked increased scholarly activity in this realm.

Colleges and schools of pharmacy have increasingly embraced IPE, both out of an appreciation for its importance and because of its inclusion in the 2015 Accreditation Council for Pharmacy Education (ACPE) standards.[4] Moreover, pharmacy authors have both actively contributed to the IPE literature and participated in developing new IPE programs and activities. For example, 56 research posters on topics related to IPE were presented at the 2017 American Association of Colleges of Pharmacy (AACP) annual meeting.[5]

IPE Promotion and Implementation

As demonstrated by the tremendous increase in IPE publications in pharmacy as well as other health care disciplines since 2009, IPE has increasingly been promoted and implemented, resulting in evolving applicability and additional resources. For example, following the ACCP 2009 white paper on IPE, IPEC was formed to promote efforts to develop and sustain collaborative learning to enhance team-based care. IPEC then partnered with the U.S. Bureau of Health Professions and the U.S. Health Resources & Services Administration (HRSA) in 2011 to hold a conference on developing team-based competencies in health care professional educational programs.[6] Originally composed of six health care professional organizations (AACP, American Association of Colleges of Nursing [AACN], American Association of Colleges of Osteopathic Medicine, Association of American Medical Colleges, American Dental Education Association, and Association of Schools & Programs of Public Health), IPEC now includes 20 health care professional organizations. This expands IPEC's potential reach to include, among others, academic health science librarians, chiropractors, dietitians, podiatrists,

public health workers, allied health care professionals, social workers, and veterinary medicine professionals. IPEC's website serves as a resource on established IPE centers and provides links to major conferences and national and international initiatives on the topic.[7]

Moreover, since 2009, traditional journals in the health care professions have increasingly published papers on IPE and ICP, with specific journals formed to target these issues (e.g., *Journal of Interprofessional Education & Practice*, *Journal of Research in Interprofessional Practice and Education*, *Journal of Interprofessional Care*, *Health and Interprofessional Practice*).

In 2010, the World Health Organization (WHO) – a specialized agency of the United Nations that promotes international public health, bringing together a diverse community of health care professionals, patients, governments, and organizations to affect the lives of millions of people – appointed a study group on Interprofessional Education and Collaborative Practice. This group produced a major report, "Framework for Action on Interprofessional Education & Collaborative Practice," with the premise that students from different health care professional disciplines should learn "about, from, and with each other" to foster ICP and improve patient care outcomes.[8]

Private foundations have also recognized the importance of IPE and ICP as a means to improve patient care. In 2012, the Josiah Macy Jr. Foundation (JMJF), the Robert Wood Johnson Foundation (RWJF), the Gordon and Betty Moore Foundation, and the John A. Hartford Foundation joined with the University of Minnesota through a cooperative agreement with the U.S. Department of Health and Human Services (HHS) and HRSA to form the University of Minnesota's National Center for Interprofessional Practice and Education (Nexus).[9] Nexus, the result of a private-public partnership, is charged to "provide the leadership, evidence and

resources needed to guide the nation on the use of interprofessional education and collaborative practice as a way to enhance the experience of health care, improve population health, and reduce the overall cost of health care." In addition to offering educational programming for faculty and students, Nexus provides grants to accelerate the advancement of interprofessional, community-based education and practice. Two Nexus sponsors, JMJF and RWJF, have in turn implemented complementary initiatives. For example, JMJF hosted a conference in January 2013 titled "Transforming Patient Care: Aligning Interprofessional Education with Clinical Practice Design."[10] Similarly, RWJF produced a 2015 white paper, "Lessons from the Field: Promising Interprofessional Collaboration Practices," which highlights seven models of interprofessional practices in the United States.[11]

Academic institutions and professional organizations are stressing the importance of both educating students and faculty about IPE and accelerating the pace of change in health care professional curricula across the United States. At the University of Toronto Centre for Interprofessional Education, through a strategic partnership between the university and the Toronto Academic Health Science Network, more than 1600 students from 11 health care professional disciplines now advance annually through an IPE curriculum that includes a series of experiences that expose, immerse, and develop competencies in interprofessional patient care.[12] The university's IPE website (http://ipe.utoronto.ca) provides access to its curriculum and other resources.

In addition to the above, in 2011, AACN published a white paper, "Core Competencies for Interprofessional Collaborative Practice," stressing the importance of educating health care professional students to be practice-ready for team-based care.[13] In 2013, the Association for Prevention Teaching and Research (APTR) appointed a Healthy People Curriculum Task Force

that produced a "Curriculum Guide for Health Professions Faculty."[14] In 2014, the Advisory Committee on Interdisciplinary, Community-Based Linkages published its 13th Annual Report to the Secretary of the HHS and Congress.[15] This report emphasized the need to transform health care professional education to focus on IPE, which was viewed as a major strategy to improve patient care at a more reasonable cost. IPE was also a goal of the 2010 Affordable Care Act.

Updated Core Characteristics of an Ideal IPE Model

In the 2009 ACCP white paper, core characteristics of an ideal IPE model were presented from both the student's and the instructor's perspective. The authors pointed to the need to (1) define the health care professional disciplines essential to patient care and (2) provide the interprofessional classroom and direct patient care experiences necessary to facilitate interdisciplinary collaborations.[1] These steps, together with the focus on maintaining individual professional identity and responsibility while creating a new team identity and functionality, remain relevant today. Indeed, those interested in advancing IPE initiatives will find the existing models useful. To transition to the ideal IPE model, a 2016 viewpoint article proposes that IPE should move from a series of isolated events to an overarching strategic plan for IPE.[16] Such an approach could help clarify whether new options for IPE fit well with the desired outcomes from a strategic plan and whether current IPE offerings should ideally remain part of an institution's package of programs and courses on IPE.

Updates in IPE Terminology

The 2009 ACCP white paper defined key IPE-related terms. These definitions have changed very little but have been expanded to focus more on *interprofessional practice*, which is

increasingly termed *interprofessional collaborative practice* (*ICP*), emphasizing that the various professions must collaborate on behalf of their patients to be most effective and achieve the desired outcomes of IPE.

Process Considerations for Newer IPE Models

As in 2009, students participating in IPE today should have an understanding of the knowledge, skills, and attitudes each profession brings to the team. Developing these attributes can be accomplished in many ways. The 2009 ACCP white paper considered discussing and reflecting on existing professional stereotypes as one approach. Students learn through IPE that many patient care activities can be provided by physicians, nurses, and pharmacists, whereas others are specific to an individual profession. Moreover, at least one newer IPE program has students determine which professions can legally provide a range of services upon graduation.[17]

In addition, professional language, approaches to patient workup, and terminology can vary between professions. As the standard professional language, the pharmacy profession is now focused on the AACP "entrustable professional activities" (EPAs),[18] first published in 2016. A review of pharmacy's EPAs reveals activities that can be done by pharmacy alone and others that can be accomplished through interprofessional collaboration. The pharmacy profession has also coalesced around a comprehensive approach to patient care called comprehensive medication management (CMM). According to ACCP and the Patient-Centered Primary Care Collaborative (PCPCC), CMM is

> the standard of care that ensures each patient's medications (i.e., prescription, nonprescription, alternative, traditional, vitamins, or nutritional supplements) are individually assessed to determine that each medication is appropriate for the patient, effective for the medical condition, safe given the comorbidities and other medications being taken, and able to be taken by the patient as intended. CMM includes an individualized care plan that achieves the intended goals of therapy with appropriate

> follow-up to determine actual patient outcomes. This all occurs because the patient understands, agrees with, and actively participates in the treatment regimen, thus optimizing each patient's medication experience and clinical outcomes.[19]

CMM applies to all practice settings where qualified clinical pharmacists collaborate with other providers to provide direct patient care.[20] The main change since 2009 is that the pharmacist's role in patient care is now incomplete without interprofessional collaboration, as demonstrated by pharmacy's EPAs and the profession's comprehensive approach to all patient care with CMM.

Discipline-Specific Issues

The 2009 ACCP white paper noted that students and faculty engaged in IPE and learning should understand that the health care professional disciplines may vary in their approaches to patient care issues and that disciplines differ in assessing the nature and scope of clinical problems, determining when patient care interventions have been completed, and assigning the locus of responsibility for the care of the patient. Therefore, newer IPE models should continue to consider any views or approaches that differ among the professions to help students learn how best to work together and take advantage of these variations.

Issues for All Professions

As in 2009, professionals on the health care team today should work together to optimize patient health and outcomes using principles of patient-centered, evidence-based practice, coupled with information technology systems that facilitate efficient and effective communication among different health care professionals. More recently, in 2011, IPEC defined four core competencies of IPE and reaffirmed them in 2016 under the singular domain of

"Interprofessional Collaboration" to better integrate population health competencies: (1) values/ethics, (2) roles/responsibilities, (3) interprofessional communication, and (4) teams and teamwork (Table 1). IPEC also developed subcompetencies under each competency. According to IPEC, "these competencies and sub-competencies feature the following desired principles: patient and family centered; community and population oriented; relationship focused; process oriented; linked to learning activities, educational strategies, and behavioral assessments that are developmentally appropriate for the learner; able to be integrated across the learning continuum; sensitive to the systems context and applicable across practice settings; applicable across professions; stated in language common and meaningful across the professions; and outcome driven."[2]

Updates on Key Strategic, Cultural, and Technical Elements to Promote IPE

The strategic, cultural, and technical elements involved with IPE described in the 2009 ACCP white paper remain consistent today, where collaborations include individuals to individuals, individuals to an organization, and an organization to an organization. Within each area of potential collaboration, challenges in implementing IPE may also remain, reinforcing the need to stay focused on the primary characteristics previously highlighted. However, inconsistencies in the approaches used to address the strategic, cultural, and technical elements for successful IPE implementation emphasize the ongoing need for further education to help identify and expand IPE opportunities.[21-25] A 2013 article that focused on using a transtheoretical model (TTM) to assess readiness to act on a new behavior describes how to mobilize and institutionalize IPE and provides a framework and approach for IPE promotion and implementation.[21] The TTM approach addresses the ongoing cultural and technical challenges

with IPE development. The article emphasizes the benefit of using a "champion" to support IPE, the need for organizational support at all levels, and the importance of using dedicated resources to both initiate and maintain successful IPE collaborations. These strategies are critical as organizations focus on implementing, expanding, enhancing, and updating their current IPE offerings.

Updates in IPE Assessment Instruments

The impact of an IPE experience is measurable by many currently available tools. However, lower-level evaluations such as changes in participant attitudes, though still frequently assessed, have shifted toward assessments of more robust outcomes, including behaviors, organizational change, and patient benefits for both pre-licensure IPE (i.e., college program based) and post-licensure IPE (e.g., professional development programs, continuous quality improvement initiatives). The process of selecting and developing psychometrically sound assessment instruments that are well matched with outcome measures remains challenging. However, growing experience with assessment tools will likely help address this issue.

Common assessment tools were described in detail in the 2009 ACCP white paper. However, a 2010 publication noted that, at that time, the validity and use of validated and reliable tools was limited.[26] Because some of the tools mentioned in the 2009 ACCP white paper have not been well studied, they have since been replaced by more rigorously reviewed instruments. In a 2014 review of the literature, Nexus curated 26 tools for evaluating IPE and ICP, incorporating the instruments that were "readily available for viewing or used in at least two separate projects" into reports in a refereed journal.[27] Such tools help enhance the validity and reliability of study results. Nexus cautions that other reliable and valid instruments likely exist

that were not found in the literature search and allows researchers to submit instruments for review to add to the collection. A more complete description of the types of instruments available from Nexus is provided under "Updates in IPE Resources" below.

Updates in Implications of IPE

The implications of IPE on education, research, and patient care as described in the 2009 ACCP white paper remain applicable today. For example, the authors noted that "traditional 'silo' methods of learning result in students in the health professions entering the workforce poorly prepared for clinical practice and the inevitable teamwork in which they will be required to participate"; that "research is required to improve patient care interventions and document the outcomes of IPE"; and that, with IPE, "future practitioners learn to consult each other more often, thereby perceiving themselves as professionals working together, focused on the well-being of the patient." A recent "Perspective" paper in the *New England Journal of Medicine* (*NEJM*) suggests that although answers are still needed on the best ways to conduct IPE, it is now known that IPE provides essential foundations for new approaches to health care. The authors conclude that "IPE can train practitioners to work more effectively as teams and to deliver care that has a greater impact on patients."[28]

The potential granting agencies for IPE research that were described in the 2009 ACCP white paper also remain relevant today. In addition, the Agency for Healthcare Research and Quality (AHRQ) now serves as a key resource for the patient-centered medical home (PCMH). The PCMH is a model for interprofessional collaboration that provides comprehensive, patient-centered, accessible, and coordinated care focused on quality and safety. The AHRQ website

provides ready access to the current literature, workshops, and competitive funding opportunities for research that place special emphasis on patient safety.[29]

Updates on IPE Barriers and Solutions

IPE programs have developed and continue to develop around the world. Experimentation with new approaches to delivering IPE continues as the health care professions strive to improve quality. However, despite advances in IPE, many barriers to IPE implementation persist, including organizational, operational, communicational, cultural, and attitudinal barriers.[1] Strategies to overcome these barriers to better prepare health care professional students and practitioners for ICP have been described in the literature. Table 2 addresses and updates many of the potential barriers to IPE listed in the 2009 ACCP white paper and offers possible solutions within academic and patient care settings, including programs at academic medical centers, programs with co-located health care professional schools, and programs that engage a broad coalition of professions.

Programs at Academic Medical Centers

Academic medical centers offer different professions on the same campus the opportunity to come together for interprofessional events. Examples of select programs at such centers are provided in Table 3.

Programs with Co-located Health Care Professional Schools

Co-location with respect to IPE means sharing a location or facility with another profession. For example, a pharmacy college may be located near (in the same city or

neighborhood), or share facilities with, a medical or nursing school that is not part of the same university. However, many of the issues that complicate the development of IPE programs within the same institution may be multiplied when working across institutions, with the possibility of additional culture issues. Other important challenges can occur when the number or type of other health care professional colleges/schools is limited. This is particularly important when professions that are key to many teams, like medicine and nursing, are not represented in the IPE. See Table 4 for examples.

Programs That Engage a Broad Coalition of Professions in Large Events

Many universities have implemented an annual IPE day (or days) that brings together many health care professions. See Table 5 for two examples.

Updates in Implementing IPE in Professional Degree Programs

As previously stated, in IPE, students from two or more professions learn from and with one another, which results in effective collaborations and improved patient health outcomes. Unfortunately, however, also as described earlier, health care professional schools encounter many barriers when implementing IPE. Lack of resources, scheduling difficulties, lack of perceived value in IPE, curricular differences, and differences among specialties may all affect a student's IPE experience. To overcome these barriers, health care professional schools must fully embrace IPE and recognize its value in improving patient health care outcomes.

Students at Virginia Commonwealth University (VCU) fully embraced IPE by establishing the Inter Health Professionals Alliance (IHPA) in 2010 to improve the multidimensional health of underserved populations within the community setting and enhance

the use of IPE among health care professional students.[39] IHPA consists of several schools, including medicine, nursing, dentistry, pharmacy, social work, allied health dietetics, and biomedical engineering. During various health events, each profession contributes educational opportunities while recognizing their shared knowledge and skills. VCU's IHPA organization highlights the importance of focusing on a common goal that centers on optimizing the quality and effectiveness of care in order to have a successful interprofessional team.

IPE often occurs during a pharmacy student's final-year clinical rotations. The University of Kansas School of Medicine in Wichita, Kansas, studied the impact of integrating pharmacy students into a family medicine residency clinic on medical resident and student attitudes toward IPE and resident satisfaction.[40] Students worked closely with the residents in the clinic to review medications and discuss various pharmacotherapy recommendations. Surveys were collected pre- and post-integration of students within the clinic using the Scale of Attitudes Toward Physician-Pharmacist Collaboration. Pharmacy students recognized pharmacists' integral role within the clinic setting as related to drug policy decisions, type and dosage of medication decisions, and function. Both medical resident and student surveys showed positive attitudes toward pharmacist-physician collaboration.

As health care professions have increasingly recognized the value of IPE, national competencies have emerged to facilitate the role of IPE within health care curricula. Creating a sustainable IPE curriculum that provides multiple opportunities for IPE activities will enhance the usefulness of IPE.[41-43] In addition, longitudinal IPE experiences are considered a model for success by allowing continued growth and learning from one another.[42] The South Carolina College of Pharmacy on the Medical University of South Carolina campus in Charleston integrated IPE into its curriculum during a required semester-long clinical assessment course.[44]

This course included nine IPE activities, including the situation, background, assessment, and recommendation (SBAR) method; code blue techniques; and Team Strategies & Tools to Enhance Performance and Patient Safety (TeamSTEPPS) training. During these activities, pharmacy students collaborated with students in medicine, nursing, and physician assistant programs. Pharmacy student perceptions regarding interprofessional collaboration were assessed pre- and post-course using the 18-item Interdisciplinary Education Perception Scale questionnaire. After course completion, pharmacy student scores had improved on 16 of 18 survey items measuring interprofessional collaboration.[44] Longitudinal IPE experiences improve interprofessional collaborations by allowing pharmacy students to build relationships with other health care professional students. In addition, longitudinal experiences simulate future practice roles and provide ongoing collaboration with other health care professionals to improve patient health care outcomes.

Peer-led instruction may also facilitate IPE experiences by engaging students and overcoming the potential barrier of insufficient interdisciplinary faculty. Lehrer and colleagues describe peer-led problem-based learning in the IPE of health care professional students.[45] The University of the Sciences in Philadelphia implemented peer-led basic life support as a co-curricular IPE program in which pharmacy, physician assistant, and occupational therapy students certified as American Heart Association instructors taught other health care professional students.[46]

Developing and implementing IPE activities throughout the pharmacy curriculum will further enhance students' perceived value of IPE as well as their shared knowledge and skills. In the *NEJM* IPE article cited earlier, the authors open with a fourth-year medical student's quote, "This might be the most important thing I did in medical school. It felt like we had an impact."[28]

Similarly, integrating IPE into the curriculum early on will allow pharmacy students the opportunity to benefit from longitudinal IPE experiences. Exercising strategies to overcome the foreseeable barriers and challenges of IPE that currently exist will facilitate continued student growth and enable better health outcomes for patients.

Updates in IPE During Residency Training

Although many IPE experiences focus on students, it is also vital to incorporate the interprofessional experiences of residents, including pharmacy residents, into training programs. The American Society of Health-System Pharmacists (ASHP) Commission on Credentialing (COC) standards, competency areas, goals, and objectives for postgraduate year one pharmacy residencies provide guidance on pharmacy resident collaborations with other health care professionals.[47] Competency area R1 focuses on collaborations with the health care team to provide patient care. In competency area R4, the COC sets the goal of providing medication and practice education to patients, health care professionals, health care students, and the public. To foster continued resident growth, as much IPE and ICP should be incorporated into pharmacy and medical residency programs as into student programs.

One example of ICP efforts related to residents at the Mayo Clinic Hospital in Rochester, Minnesota, involves an innovative IPE experience developed between pharmacy residents and medical students during students' first and second years in which the pharmacy residents serve as preceptors, provide constructive feedback, and lead topic discussions.[48] This experience provides medical students with a contemporary perspective on clinical pharmacists' roles and responsibilities. Experience in the program also helps develop collaborative relationships early in professional careers and directly addresses ASHP COC competency area R4.[47]

Taking advantage of unique opportunities to become involved in educating other health care professional students (e.g., nurse practitioner, medical, physician assistant) or other training programs (e.g., medical resident programs) can foster stronger interprofessional relationships during pharmacy residency training. Moreover, pharmacist-led education as part of the training of other health care professionals can result in a better understanding of the clinical pharmacist's depth of knowledge and experience as a member of the health care team and help advance the pharmacotherapy knowledge of other health care professionals.

Another example of pharmacy resident ICP activities is at the University of Pittsburgh Medical Center (UPMC) St. Margaret pharmacy residency program in collaboration with the UPMC St. Margaret Department of Family Medicine, where residents participate in a faculty development fellowship.[49] The goal of the fellowship is to provide participants with the knowledge and skills to be effective faculty and teachers. Family physician fellows and pharmacy residents participate in the program together. As part of the program, participants co-lead and co-teach weekly medical decision-making presentations and facilitate evidence-based discussions about patient care. Pharmacist graduates of this program find that participating in this interdisciplinary program significantly improves their professional development and careers.

Providing additional opportunities to implement IPE and ICP into a pharmacy residency training year can increase collaborations with other health care professionals in providing patient care, showcase the clinical pharmacist's role in delivering patient care, and provide a positive environment for mutual learning.

Updates in IPE Resources

Many organizations, centers, and collaboratives have been developed to advance IPE and ICP, several of which offer extensive resources to help foster the creation and enhancement of IPE events and practice. Table 6 describes the organizations, centers, and collaboratives and provides examples of their offerings.

Updates in IPE Requirements in Accreditation Standards

IPE is increasingly included in the education of health care professionals. Most accreditation standards from the related accrediting bodies of many health care professional academic degree programs include requirements for IPE within the curriculum.

Although students and faculty from different health care professions vary in their approach to patient care, as noted earlier, recommendations for IPE within the accreditation standards of different professions are similar. However, all health professions focus on the universal themes of understanding roles and responsibilities, respecting values and ethics, and learning to communicate and work effectively as a team for the benefit of patient care. The ACPE accreditation standards,[4] Center for the Advancement of Pharmacy Education (CAPE) outcomes,[71] and AACP EPAs[18,72] are consistent with these recommendations.

For example, the ACPE standards have extensive language regarding IPE, specifying that IPE must occur in didactic and experiential settings and that some, but not all, IPE experiences may be accomplished using simulations. In addition, interprofessional interactions must include prescribers; this is the only accreditation standard that specifies particular health care professionals for IPE. The CAPE outcomes simply define interprofessional as "two or more professions working together collaboratively," which is consistent with definitions in other professions' accreditation standards. Although the ACPE standards have more specifics for how

IPE should be accomplished, the overall intent is similar, ensuring that students learn to work collaboratively with other health care professionals in providing optimal patient care.

Using Technology for IPE and ICP – Current and Future Opportunities

Technology[73-75] can be used to help overcome the barriers to IPE noted in the 2009 ACCP white paper such as academic calendars, geographic separation, and logistics.[1] Examples of such technologies include simulated/virtual scenarios,[76] virtual clinics,[76] mock web-based electronic health care records, videoconferencing, social media, telehealth, mobile health, and web-based learning. Opportunities for students to connect electronically or virtually help diminish the impact of geographic separation and offer more flexibility in the scheduling of activities. Technology not only facilitates IPE learning experiences, but also provides an opportunity to expose students to technology in health care.

Use of high-fidelity simulations[77] and standardized patient simulations[78] is also cited in the literature. Although these activities may be challenging to schedule and organize, they offer the advantage of simulating ICP and preparing students for ICP during introductory and advanced practice experiences.

Technology in health care and health care education will continue to create new opportunities for IPE and ICP. Methods for connecting with patients outside face-to-face encounters are continually advancing. These technologies can connect not only patients, but also providers and students from different professions to facilitate patient-centered IPE and ICP.

Updates in Patient- and Family-Centered Approaches in IPE and ICP

To provide interprofessional patient-centered practice, patient-centered practice that transcends all health care professions must be defined. Authors of a recent study that found that small differences among health care professionals in the practice of patient-centered care suggested that IPE approaches should address and clarify these differences.[79]

Moreover, IPE standards/competencies should be reviewed to ensure the inclusion of patients and their families as part of the team, rather than simply external stakeholders. Tools for measuring the effectiveness of IPE should also assess the involvement of patients and their families.

In addition, IPE activities should begin focusing on patient-centered care early in the curriculum, especially given that initial IPE activities such as team-building exercises often do not involve patient care. Including people from the community in these activities can provide the patient's perspective and help facilitate learning on how to incorporate patients and their families into the various planning processes.

Potential Future Roles for ACCP

ACCP can further its mission "to improve human health by extending the frontiers of clinical pharmacy" by considering several steps toward promoting and implementing IPE and ICP within the pharmacy profession:

- Engage the National Student Network Advisory Committee to help identify and develop ACCP meeting programming and educational materials specifically addressing the role of pharmacy students in facilitating, promoting, and implementing IPE in the classroom and the experiential learning environment.
- Continue to educate pharmacy practitioners, residents, and educators on the theory and

application of IPE through the ACCP Academy Teaching and Learning Program and/or Leadership and Management Program.

- Continue the joint delivery of ACCP educational sessions during national meetings with medicine and other health care disciplines (e.g., social workers, public health experts, and other nonphysician collaborators) to facilitate advocacy and communication.
- Encourage research by academic institutions and organizations to evaluate the value of specific IPE/ICP approaches or methods in achieving learning and practice outcomes.
- Offer an IPE meeting/conference that focuses on novel instructional approaches to IPE, how to implement ICP, how to measure its effectiveness, and how to expand existing ICP services.
- Recognize individuals or organizations that have made significant achievements in IPE or ICP with an ACCP award.
- Charge the National Resident Advisory Committee to identify high-functioning interprofessional teams and share best practices.
- Charge each PRN to identify IPE and ICP best practices.
- Include interprofessional research collaborations in the preceptor qualifications and fellowship experiences for the ACCP guidelines for clinical research fellowship training guidelines.[80]

Conclusion

Over the past 10 years, IPE and ICP have increasingly been identified as opportunities to improve patient outcomes in health care systems, particularly following the 2009 ACCP white paper on IPE. Notable advances include the updated core competencies from the

Interprofessional Education Collaborative (IPEC),[2] the addition of 14 health care professional organizations representing many different health care professional disciplines to the original six that formed IPEC, the hundreds of new publications focused on IPE and interprofessional collaborative practice (ICP), and the increased attention given to IPE in the accrediting standards of many health care professions.

Although considerable work remains in identifying best practices across the many ways health care is delivered, much has been accomplished in recent years. ACCP has the opportunity to take both collaborative and leadership roles in advancing IPE and ICP.

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Table 1. Core Competencies for IPE and ICP

Competency	**IPEC Definitions**
Values/ethics	Work with individuals of other professions to maintain a climate of mutual respect and shared values
Roles/responsibilities	Use the knowledge of one's own role and those of other professions to appropriately assess and address the health care needs of patients and to promote and advance the health of populations
Interprofessional communication	Communicate with patients, families, communities, and professionals in health and other fields in a responsive and responsible manner that supports a team approach to promoting and maintaining health and preventing and treating disease
Teams and teamwork	Apply relationship-building values and the principles of team dynamics to perform effectively in different team roles to plan, deliver, and evaluate patient/population-centered care and population health care programs and policies that are safe, timely, efficient, effective, and equitable

ICP = interprofessional collaborative practice; IPE = interprofessional education; IPEC = Interprofessional Education Collaborative.

Information from: Interprofessional Education Collaborative (IPEC). Core competencies for interprofessional collaborative practice: 2016 update. Available from https://nebula.wsimg.com/2f68a39520b03336b41038c370497473?AccessKeyId=DC06780E69ED19E2B3A5&disposition=0&alloworigin=1. Accessed April 2, 2018.

Table 2. Potential Barriers to IPE and Possible Solutions[a]

Potential Barriers	**Solutions and Alternatives**
Academic calendars and program structures	Integrate calendars across participating colleges/programs Develop organizational structures to support embedding IPE into health care professional curricula Create programs and courses that do not require, or that rarely require, meeting at specified class schedule times Effectively use communication technology with students on different schedules Schedule longitudinal activities over the length of the curriculum
Academic requirements	Select curricular topics that encourage critical thinking, self-assessment, and reflection and that incorporate the core competencies of the Institute of Medicine (now the National Academy of Medicine) and IPEC Integrate IPE activities into required courses, electives, and co-curricular programs Make IPE activities that occur outside specific courses count toward a grade to enhance student and faculty commitment
Administrative leadership	Top-down support is critical for long-term success; garner support at the upper-echelon administrative level Upper administration should prioritize IPE and ensure its success Make IPE a specifically stated part of university, college, and department mission/value/goal statements
Affiliations and other agreements	Include on-site IPE activities as part of contracts for clinical affiliations
Assessment	Use standardized and validated approaches to assessment that meet the needs of the institution and help faculty and administrators see program value
Clinical practice sites	Assess the current status of IPE and ICP at practice sites through student surveys Assess the education and infrastructure needs of preceptors to achieve IPE and ICP goals Establish minimum standards of IPE and ICP for preceptors, accompanied by sufficient support to meet the standards Ensure that all students do some or all introductory and advanced practice clerkships at sites where effective interprofessional approaches to health care delivery are commonplace
Communication issues	Routinely communicate the importance of IPE and market IPE programs among the schools/departments
Cost issues for students	Provide IPE courses at no additional cost to the student, regardless of where the courses are based

Disciplinary/professional	Devote significant implementation planning to faculty/staff communication and to development of traditions and cultures
Faculty disinterest	Share program successes with faculty (e.g., positive student ratings on value) Identify IPE faculty champions to promote program value among other faculty
Fiscal resources	Search for course/content overlap, create interprofessional classrooms to free up faculty time
Geographic separation and lack of needed professions	Identify university and off-site collaborators Make travel to other sites as easy as possible for IPE faculty (e.g., parking, transportation service) Ensure that full faculty time commitment (teaching time, class preparation time, and travel time) is recognized Effectively use communication technology with students at different locations
Limited number of trained faculty across professions	Identify IPE developmental needs of both the faculty members involved and those not yet involved Develop/offer training in IPE and facilitation skills Provide developmental materials and training programs that are easily accessed by busy faculty Use preceptors skilled in ICP from the practice community to assist in IPE teaching Train senior students and residents to serve as IPE preceptors for students in other health care professions Incorporate peer-led instruction and facilitation as appropriate
Logistics	To share the travel burden, rotate locations when feasible for geographically separated students and faculty Offer flexible schedules for face-to-face group sessions Establish an IPE curriculum committee to review and approve proposed courses Establish a committee/subcommittee for scheduling
Territory and power struggles	Establish equity in both IPE relationships and dialogues Model teamwork at all levels of IPE planning and delivery Acknowledge the value of all involved in IPE and ICP
Promotion/tenure and annual review	Develop specific language in department and college APT and annual review documents that acknowledges the importance of participating in IPE teaching and research activities
Recognition and reward	Establish teaching awards and other recognitions (e.g., financial rewards for exemplary efforts) for IPE faculty and staff participants
Recruitment/commitment	Create a center for IPE activities that is fully supported by upper administration; allocate faculty and staff FTEs to that organization Charge IPE faculty and staff to assist in recruitment Create a separate organizational entity for IPE activities that is supported by all deans of the affected colleges/schools

	If appropriate, reimburse school/department for the faculty FTEs allocated to the IPE unit
Resistance to change	Provide grants to faculty for course/content development Reinforce the importance of teaching, including IPE teaching, in annual goal setting at college and department levels Bring in experts from highly effective IPE institutions to share successes and challenges with faculty and staff
Scholarship	IPE office/center and colleges/departments should promote the value of IPE research and assist faculty with grant and publishing opportunities associated with IPE
Varying levels of student preparation	Recognize variations in levels of preparation of the different professions and among individuals within a profession for given content or events Evaluate individual student readiness for IPE material and create preparatory materials for those not ready for individual courses or events

[a]Select barriers revised and retained from: Page RL II, Hume AL, Trujillo JM, et al. Interprofessional education: principles and application. A framework for clinical pharmacy. Pharmacotherapy 2009;29:145e–164e. Additional solutions and alternatives provided from: Poirier TI, Newman K. Advancing interprofessional education via strategic planning. Am J Pharm Educ 2016;80:Article 56; University of South Dakota (USD). Disaster preparedness training. Available from www.usd.edu/health-sciences/disaster-preparedness-training. Accessed March 28, 2018; VanderWielen LM, Vanderbilt AA, Dumke EK, et al. Improving public health through student-led interprofessional extracurricular education and collaboration: a conceptual framework. J Multidisc Healthcare 2014;7:105–10; Kostoff MD, Shin TR. Family medicine residency clinics. Fam Med 2016;48:805–8; Wayne DB, Siddall VJ, Butler J, et al. A longitudinal study of internal medicine residents' retention of advanced cardiac life support skills. Acad Med 2006;81(10 suppl):S9–S12; D'Eon M. A blueprint for interprofessional learning. J Interprof Care 2005;19:49–59; Thistlethwaite J. Interprofessional education: a review of context, learning and the research agenda. Med Educ 2012;46:58–70; Shrader S, Griggs C. Multiple interprofessional education activities delivered longitudinally within a required clinical assessment course. Am J Pharm Educ 2014;78:Article 14; Lehrer MD, Murray S, Benzar R, et al. Peer-led problem-based learning in interprofessional education of health professions students. Med Educ Online 2015;20:28851; and Priftanji P, Cawley MJ, Finn L, et al. Performance and retention of basic life support skills post-implementation of peer-led training and certification program. Poster presented at: American Association of Colleges of Pharmacy Annual Meeting; July 25, 2016; Anaheim, CA.

APT = advancement, promotion, and tenure; FTE = full-time employee.

Table 3. Examples of IPE Events at Academic Medical Centers

Institution	Professions	Tactic	Topics/Opportunities
University of Michigan Center for Interprofessional Education[30,31]	• Dentistry • Kinesiology • Medicine • Nursing • Pharmacy • Public health • Social work • Health care professional studies	• Courses • Extracurricular learning opportunities	• Service learning • Ethical dilemmas • Health care systems • Motivational interviewing • Social justice • Student-run free clinic • Interprofessional Health Student Organization • Institute for Healthcare Improvement Open School
Thomas Jefferson University – Health Mentors Program[32]	• Nursing • Pharmacy • Medicine • Occupational therapy • Physical therapy • Couples and family therapy	• Required curriculum • Small interprofessional teams	• Patient experience of living with chronic illnesses • Navigating the health care system • Teams obtain comprehensive health and life history of patients from the mentor • Perform home visits to conduct medication and home safety assessments • Evaluate psychosocial and behavioral change barriers • Discuss and reflect on concepts of interprofessionalism with advisers • Medical advice or treatments not provided
U.S. Department of Veterans Affairs[33]	Varies; typically includes: • Medical and pharmacy residents • Nurse practitioner • Pharmacy • Social work • Dietetics • Psychology students	Patient Aligned Care Team (PACT) – Similar to PCMH.[34] PACT "teamlet" includes primary care provider (physician, nurse practitioner, or physician assistant), nursing care manager, medical assistant, and clerical staff Support team includes psychologists, social workers, pharmacists,	• All veterans at seven medical centers are assigned to a PACT, and each medical center is affiliated with local health care professional colleges and schools • Goal is to prepare health care professional students and residents to provide patient-centered, team-based primary care by focusing on shared decision-making, sustained relationships, ICP, and performance improvement

		and other health care professionals as clinically indicated	

Table 4. Examples of IPE Events at Co-located Programs

Institutions	**Professions**	**Tactic**	**Topics/Opportunities**
University of Rhode Island colleges of pharmacy and nursing and Brown University School of Medicine[35]	Pharmacy Nursing Medicine	IPE laboratory modules Groups of three students (one from each profession)	• Clinical cases of asthma and chronic obstructive pulmonary disease • Students assessed on teamwork dynamics and roles, and students complete a self-report of their attitude toward IPE
University of Connecticut (UConn) and Quinnipiac University[36]	• Dental medicine • Medicine • Nursing • Pharmacy • Social work • Physician assistant	Interprofessional Urban Service Track curriculum	• Quarterly learning retreats (focus on introducing students to the health care needs of a vulnerable population and the unique challenges and opportunities in caring for the population) • Community outreach projects • Advocacy and professional development opportunities (e.g., research projects, national conferences)

Table 5. Examples of Large-Scale IPE Events

Institution(s)	Professions	Tactic	Topics/Opportunities
University of South Dakota (USD) School of Health Sciences Sanford School of Medicine and College of Arts & Sciences Beacom School of Business South Dakota State University College of Pharmacy[37]	• Clinical psychology • Dental hygiene • Medical laboratory science • Medicine • Nursing • Occupational therapy • Pharmacy • Physical therapy • Physician assistant • Social work • Health science majors[38]	Two IPE days with ~400 students from 15 health professions programs	• Day 1: Students work in teams to develop a care plan for two older adults with complex medical needs role-played by faculty, local physicians, and community members • Day 2: Disaster preparedness training
University of Arizona Center for Transformative Interprofessional Healthcare[17]	• Pharmacy • Medicine • Nursing • Public health • Law • Social work • Additional various professions	• Four major events (400+ students) • 2- to 3-hour events include required online pre/post-event work, live event activities, and evaluations	• Disabilities • Disaster preparedness • Teamwork in code settings • Professionalism • Other opportunities include co-curricular/ extracurricular activities like health fairs, research projects, philanthropy events, interprofessional conferences, and interprofessional competitions

Table 6. Offerings from Select Organizations, Centers, and Collaboratives

Organization	Offerings and Descriptions
National Academy of Medicine	• Pivotal publications, including the recent "Measuring the Impact of Interprofessional Education (IPE) on Collaborative Practice and Patient Outcomes"[50]
Interprofessional Education Collaborative[51]	• Core Competencies for Interprofessional Collaborative Practice: 2016 Update[2] defines key IPE/IPC terminology and four core competencies with related subcompetencies • Advancing Interprofessional Clinical Prevention and Population Health Education[52]: A "curriculum development guide for health professions faculty" that includes a case study that cross-links IPEC competencies with educational objectives and an appendix with a comprehensive list of health care professions accreditation standards that link to IPE and ICP
National Center for Interprofessional Practice and Education (NEXUS)[53]	• Extensive compendium of information related to IPE and ICP. The mission of NEXUS is to "offer and support evaluation, research, data, and evidence that ignites the field of interprofessional practice and education and leads to better care, added value, and healthier communities" • Streamlined website with searchable library of user-generated content, a professional directory, discussion boards, calendar of upcoming webinars and conferences, and personal experiences in "Stories from the Nexus" • Evaluating Interprofessional Education and Collaborative Practice: What Should I Consider When Selecting a Measurement Tool?[54]: A tool that provides useful information on measurement terms, importance of validity of an assessment tool, and factors to consider when selecting a tool to evaluate an interprofessional activity • Train-the-Trainer (T4) Interprofessional Faculty Development Program[55]: Three universities provide 3½-day workshops in various U.S. locations on a range of dates each year. These workshops help prepare health care professional faculty and clinicians to implement proven approaches to enhancing team-based care education • Preceptors in the Nexus Toolkit[56]: A series of online modules and group learning materials designed for preceptors from any health care profession. Participants build foundational knowledge and skills and progress to become effective champions for IPE and ICP
National Academies of Practice (NAP)[57]	• Policy papers developed by practitioners and scholars from 14 health care professions providing useful resources for issues related to IPE and ICP to circulate to members of Congress.[58] A 2011 policy paper, "Toward Interdisciplinary Team Development," offered recommendations for creating ICP and advancing IPE[58]
American Interprofessional	• Interprofessional Webinar Series[60]: A frequently updated library of webinars referenced and promoted by other IPE-promoting

Health Collaborative (AIHC)[59]	organizations. Users can sign up for e-mail updates and submit ideas for programming • Collaborating Across Borders conference series[61]: Biennial conferences of AIHC and the Canadian Interprofessional Health Collaborative to explore common and unique experiences in IPE and ICP • International Interprofessional Collaboration Competency Working Group[62]: Goal "is to articulate what interprofessional collaborative practice is composed of, including health professionals learning to practice it, educators needing to teach and measure its presence in learners, and provision of guidance to administrators to improve performance of it"
World Health Organization	A website hosting a variety of publications and guidance documents related to IPE and ICP that incorporates the expertise of international groups[63] • Framework for Action on Interprofessional Education & Collaborative Practice[8]: This foundational document argues that IPE and ICP can advance the goals of global health • Transformative Education for Health Professionals[64]: Guidelines on transforming and scaling up health care professional education and training. A moderated discussion section allows users to share professional insights[65] • WHO International Classification of Functioning, Disability and Health (ICF)[66]: A comprehensive framework for measuring health and disability at individual and population levels and to encourage a common language across health care professions to improve patient experiences and outcomes[67] • Integrating the Social Determinants of Health Approach into Health Workforce Education and Training[68]: An eBook that explores concepts extending beyond clinics and hospitals and innovative methods for incorporating them into education
All Together Better Health	• Biennial conference supported by global interprofessional networks[69]: Serves as a meeting place for health care professionals from around the world to share best practices and research findings related to IPE and ICP
Team Strategies & Tools to Enhance Performance and Patient Safety (TeamSTEPPS)	• TeamSTEPPS readiness assessment: An evidence-based framework for enhancing team-based patient care[70]; a toolkit promoted by the AHRQ for more than a decade. Individuals can complete a TeamSTEPPS readiness assessment and enroll online or in live training sessions that enable them to lead practice site IPE implementation[70] • *SBAR* – A TeamSTEPPS term for facilitating concise, actionable communication in hectic patient care environments