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Interprofessional Education: Principles and Application. A Framework for Clinical Pharmacy

American College of Clinical Pharmacy

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Abstract:

With the increasing prevalence of chronic diseases, advancements in health care technology, and growing complexity of health care delivery, the need for coordination and integration of clinical care through a multidisciplinary approach has become essential. To address this issue, the Institute of Medicine has called for a redesign of the health professional education process to provide health care professionals, both in the academic setting and in practice, the knowledge, skills, and attitudes to work effectively in a multidisciplinary environment. Such programmatic redesign warrants the implementation of interprofessional education (IPE) across health care disciplines. Pharmacists play a critical role not only in the provision of patient care on multidisciplinary teams but also in the delivery of IPE. National pharmacy organizations have endorsed IPE, and several have articulated specific policies and/or initiatives supporting IPE. However, IPE has not yet been implemented effectively or consistently; moreover, the inability to effectively deliver IPE in the classroom and clinic has been correlated with a decrease in the quality of patient care provided. In addition, the incorporation of interprofessional patient care into daily practice has been compromised by workforce shortages within respective health care fields. This white paper from the American College of Clinical Pharmacy (ACCP) addresses terminology, levels of evidence, environment-specific models, assessment methods, funding sources, and other important implications and barriers as they apply to IPE and clinical pharmacy. Current instruments that have been tested and validated in the assessment of IPE are reviewed, including the Readiness for Interprofessional Learning Scale, the Interdisciplinary Education Perception Scale, and the Attitudes Toward Health Care Teams Scale. Finally, strategies are suggested that ACCP might pursue to assist in the promotion and implementation of IPE both within and outside the pharmacy profession.

Background

Advances in health care have made it virtually impossible for a clinician practicing alone to maintain the knowledge and skills necessary to provide optimal care. This fact, coupled with the increased prevalence of many chronic diseases, which require coordination of treatment involving multiple health care professionals and clinical settings, has led to an appreciation of the need for an interdisciplinary approach to provide appropriate patient-centered care. Both the Pew Commission report, “Critical Challenges: Revitalizing the Health Professions for the Twenty-first Century,”¹ and the Institute of Medicine (IOM) report, “Crossing the Quality Chasm: A New Health System for the 21st Century,”² recognize this problem and call for a drastic restructuring of our current health care system. Part of this restructuring will require the coordination and integration of clinical care. One way to accomplish this is the provision of care through interdisciplinary teams. Unfortunately, however, many current practitioners are trained in educational programs isolated from other health care professionals. This isolation may negatively affect practitioners’ beliefs and values regarding other health care professionals and their contributions to patient care. To address this issue, the IOM report on “Health Professions Education” recommends a redesign of the health professional education process to provide health care professionals, both in the academic setting and in practice, the knowledge, skills, and attitudes to work effectively in a multidisciplinary environment. Such programmatic redesign will require health profession academic programs to train students in an interdisciplinary environment.³

When evaluating, interpreting, and applying interprofessional theory, the conceptual framework can seem overwhelming. This white paper addresses the terminology, levels of evidence, environment-specific models, assessment methods, funding sources, and other important implications and potential barriers as they apply to IPE and clinical pharmacy. This

white paper should be used to assist in the promotion and implementation of IPE both within and outside the pharmacy profession. Furthermore, it is our hope that the paper will facilitate the development of a future vision for applying IPE to clinical pharmacy practice, research, and education.

Definitions and Terminology

Interpretations of the terms *multidisciplinary*, *interdisciplinary*, and *interprofessional* with respect to clinical practice and education vary in the literature. Table 1 identifies definitions of the terms used in this paper.^{4,5} Although *interdisciplinary* and *interprofessional* are often used interchangeably, either term can be used when referring to health professions education and practice; however, the former term may be preferred when individuals such as nursing assistants are included on teams such as in the nursing home care setting. Nonetheless, distinctions between *multidisciplinary* and *interprofessional* are important. Whereas a multidisciplinary approach is simply additive and not integrative, an interprofessional approach requires integration and collaboration to incorporate the perspectives of several disciplines to gain unique insights and foster innovative health care solutions.⁷⁻⁹ The provision of true interprofessional patient-centered care, and ultimately transdisciplinary care, will require practitioners and students to learn skills that make them productive in this setting. In addition to clinical competence, communication, and conflict resolution skills, an understanding of group dynamics and a respect for the knowledge and contribution of other health care professions are important for success. This combination of knowledge, skills and attitudes should be taught by interdisciplinary teams in mixed settings and will thus require a reexamination of clinical curricula, educational funding, and faculty preparation.^{2,3,10} With this in mind, *IPE*, for *interprofessional education*, will be used throughout this paper.

Supporting Evidence for IPE

Many articles have been published addressing the implementation of IPE. Although this approach to training health care professionals seems intuitive, strong evidence is lacking as to the actual effectiveness of such an approach on health care outcomes. The National Academies of Practice (NAP)¹¹ provides a bibliography of more than 100 articles published from 2000 to 2005 related to IPE on its Web site (http://www.napnet.us/files/Interdisc_Edufinal.pdf). Many of these manuscripts describe the development and implementation of IPE programs or use a subjective self-assessment of learning or attitudes in a pre- and posttest design. In addition, the NAP¹² provides a bibliography of more than 140 articles that address interdisciplinary practice (http://www.napnet.us/files/Interdisc_Practicefinal.pdf). In 2008, the authors of a meta-analysis on the effects of IPE on professional practice and health care outcomes identified more than 1000 studies in the literature that addressed IPE.¹³ However, the authors were unable to identify any studies that met a priori inclusion criteria for quality studies and thus found no evidence linking IPE to the desired clinical outcomes. A 2006 review of evidence for IPE identified 13 articles that met a priori inclusion criteria; however, the authors came to a similar conclusion: “There is little evidence from controlled trials related to interprofessional teams to guide rapidly changing educational models and clinical practice.”¹⁴ Despite their findings, these authors identified studies in which clinician attitudes, knowledge, skills, and behavior were changed after subjects were provided clinical training in combination with the acquisition of skills necessary for effective teamwork in an interprofessional environment.¹⁴ In 2007, Hammick and colleagues¹⁵ collated and analyzed the best available contemporary evidence from 21 of the strongest evaluations of IPE to assess whether learning together helps practitioners and agencies work better together. The authors found that IPE is well received and is a conduit for “enabling knowledge and skills necessary for collaborative working to be learnt.”¹⁵ However, they

concluded that IPE is less able “to positively influence attitudes and perceptions toward others in the service delivery team.”¹⁵

Although data documenting the effectiveness of *IPE* overall are unavailable, evidence does suggest that an *interprofessional approach to health care* improves the quality and decreases the cost of care; therefore, practitioners should develop the knowledge, skills, and attitudes to provide effective interprofessional care.³ In 2007, the American Association of Colleges of Pharmacy (AACP) Professional Affairs Committee advocated that “all colleges and schools of pharmacy provide faculty and students meaningful opportunities to engage in education, practice, and research in interprofessional environments to better meet the health needs of society.”¹⁶ In addition, the requirement for IPE is embedded in the Accreditation Council for Pharmacy Education 2007 Accreditation Guidelines.¹⁷ As IPE is implemented more widely, a rigorous evaluation will be needed to fully assess its effects on outcomes in professional practice.¹³

IPE Initiatives Within the Pharmacy Profession

Many pharmacy organizations have endorsed the concept of IPE. The AACP 2004 Strategic Plan included a goal to provide leadership for the development of interprofessional and multidisciplinary educational, research, and patient care opportunities for all colleges and schools of pharmacy. In 2005, AACP’s Council of Faculties task force analyzed the opportunities and challenges of using IPE throughout the doctor of pharmacy (Pharm.D.) curriculum regardless of the type of academic institution. Core definitions and competencies were also set forth. The 2007 Professional Affairs Committee of AACP addressed IPE in its report titled, “Getting to Solutions in Interprofessional Education.” The committee stressed that IPE should occur in settings other than the classroom, such as laboratories and introductory and advanced practice experiences. They recommend that students demonstrate interprofessional

competencies through sharing a common language among health care professionals, understanding the value of each health care profession, learning to work effectively as a team, and promoting the interprofessional delivery of health care in all practice settings. The committee's report endorsed the IOM's competencies for health professions education, urged all pharmacy schools and colleges to provide IPE, and provided a series of specific recommendations for AACP's consideration.¹⁶

In addition, AACP participates in the Institute for Healthcare Improvement Health Professions Education Collaborative (HPEC).¹⁸ Eighteen U.S. medical schools and their local schools of nursing, pharmacy, and health care administration programs are involved in this initiative. The AACP is collaborating with the HPEC in areas where schools of pharmacy are co-located to advance IPE opportunities.

The Standards and Guidelines for Accreditation for the Pharm.D. degree that went into effect in 2007 include a curriculum goal in agreement with the IOM report, affirming that "all health professionals should be educated to deliver patient-centered care as members of an interdisciplinary team, emphasizing evidence-based practice, quality improvement approaches, and informatics."^{2,17} The new standards list interprofessional teamwork as an area of emphasis in the revision process. It is an integral learning experience to be promoted in a college's or school's mission, curriculum, and administration.¹⁷ These changes are in accordance with the Accreditation Council for Graduate Medical Education's newly adopted General Competencies, which expect medical residents to work in interprofessional teams to enhance patient safety and improve patient and/or population-based care.¹⁹

It is not enough for pharmacy education alone to advocate for IPE. Practicing pharmacists should promote interprofessional practice models and continuing education. To that end, the

American Society of Health-Systems Pharmacists endorses IPE in a specific position policy. The key elements of the policy call for the following actions:

- To encourage colleges of pharmacy and other health professions schools to teach students the skills necessary for working with other health care professionals and health care executives to provide patient care; further,
- To encourage the Accreditation Council for Pharmacy Education to include interdisciplinary patient care in its standards and guidelines for accreditation of Pharm.D. programs; further,
- To encourage and support pharmacists' collaboration with other health professionals and health care executives in the development of interdisciplinary practice models; further,
- To urge colleges of pharmacy and other health professions schools to include instruction, in an interdisciplinary fashion, about the principles of performance improvement and patient safety and to train students how to apply these principles in practice; further,
- To foster the documentation and dissemination of the outcomes achieved because of the interdisciplinary education of health care professionals.²⁰

IPE Promotion and Implementation

Historical Perspective

An understanding of the history of IPE is important to promote, implement, and, most importantly, sustain this approach. Although IPE and practice may be considered a new concept or solely in response to the recent IOM report, multiple distinct phases have existed for over 50 years, with development beginning in the late 1940s. The second phase was linked to the rise of the health center movement in which improving primary care within the community was the focus in the 1960s. During the 1970s, federal funding spurred the development of 20 interdisciplinary programs around the country and fostered early initiatives in team training.

After federal funding waned, many interdisciplinary programs ended unless they had been incorporated into the culture of the educational institution. In the 1980s, recognition within the Veterans Administration (VA) medical system that older adults with complex medical needs required a more comprehensive approach stimulated the development of the Interdisciplinary Team Training in Geriatrics program.²¹ In the fifth and sixth phases, the emphasis of federal programs has shifted to include students from disciplines other than medicine and to increase collaboration with existing programs such as Area Health Education Centers and Health Career Opportunity Programs. In addition, the Robert Wood Johnson Foundation and Hartford Foundation, as well as other organizations, have emphasized the need for the interdisciplinary education of students in the health professions.^{21,22}

Core Characteristics of an Ideal IPE Model

The development of the ideal model for IPE must begin with the recognition that this is just the first step toward the ultimate goal of improving patient-centered care. An interprofessional approach may better facilitate students from one discipline learning from other disciplines, both to specifically develop new skills that will enhance their own discipline-specific skills and to better work together in an integrated team environment. As a result, students, practitioners, and faculty in the health disciplines must be socialized to their own discipline as well as to the team environment. In addition, given the inconsistent history of IPE implementation, a commitment must be made to institutionalize interprofessional learning within the curricula of all health care programs to ensure its long-term continued existence.

Student Perspective

The first issue in defining the core characteristics of the ideal IPE model is to consider which health disciplines are “essential” to the educational process and intended outcomes. Recognition that the pharmacist has not always been considered an essential team participant is

important, especially when the potential contributions of other professions are evaluated in developing the respective model. At a minimum, an IPE team of students should include medicine, nursing, pharmacy, clinical social work, and dietetics/nutrition. Depending on the specific focus of the IPE program, students from other health disciplines may be essential. For example, if the program focuses on improving the care of individuals who have mental health issues or who are frail older adults, clinical psychologists or physical therapists may be needed.

The stage of socialization and other developments of the respective discipline's students must also be given careful consideration. Socialization of students in the health professions has been defined as "the acquisition of the knowledge, skills, values, roles, and attitudes associated with the practice of a particular profession." Among the manifestations of professional socialization are the language, behavior, and demeanor characteristic of the profession.^{22,23} A traditional concern with IPE models is that a student might lose his or her professional identity. In addition, student teams must be carefully balanced with respect to their stage of professional socialization and education. A fourth-year medical student teamed with a first-year undergraduate nursing student or Pharm.D. student may inhibit effective learning if the medical student has already been prepared to assume the leadership role.

Finally, although much of the literature has focused on IPE in the classroom, the theory of IPE transcends all aspects of the educational environment from the classroom to the patient care setting. The IPE model may be tailored to fit the needs of a specific learning environment.⁶

Instructor Perspective

Clinical faculty and other practitioners with extensive experience in interprofessional practices serve in critical roles as mentors and role models. Active and engaged clinicians from diverse disciplines are essential in IPE models, and these individuals must be fully committed to sharing patient care roles and responsibilities because bringing different viewpoints will likely

improve patient care. In addition, the informal interactions and active listening between clinicians who respect one another and who have worked together effectively may be just as educational for students and residents as formal instructional programs.

Educational Environment

Models for IPE may be present in diverse learning environments in either the classroom or experiential setting. The key element is that activities reflect, as much as possible, a “real-world” experience. This may be accomplished using carefully constructed patient case studies or other simulations that encourage and support contributions from all disciplines and that are facilitated by experienced faculty. For students who are academically more advanced, the experiential setting is better at providing the real-life experiences they need to gain confidence with their own skills as well as their skills as part of a team.

Basic Process Considerations for IPE Models

A fundamental consideration in IPE is that students have a basic understanding of the knowledge and skills each profession brings to the team. Discussion and reflection on preexisting stereotypes regarding other professions is an essential first step because students may not be fully aware of the expertise and perspectives that other disciplines bring to patient care. Of note, clinical faculty and practitioners involved with IPE may not be fully aware of student or trainee hidden or subconscious beliefs about other professions.

Faculty and students must recognize that approaches to communication and conflict resolution can differ between professions and that these skills are essential to developing a cohesive IPE program. The professional “language” of different disciplines varies; this is best illustrated by the simple example of what to call the person who is to receive care. Is the individual a “patient,” “client,” or someone else? Moreover, conflict within teams is often

unavoidable, even on high-functioning teams, and students must recognize and develop an approach to addressing conflict before they can establish trusting and respectful relationships.

Discipline-Specific Issues

Students and faculty engaged in IPE and learning must recognize that health disciplines vary in their approach to clinical patient care issues. Clark described four major areas in which professions diverge in their methods for addressing clinical problems.^{22,23}

First, and perhaps most fundamental, health disciplines assess the nature and scope of clinical problems from different perspectives. Traditionally, medicine and pharmacy have a “rule-out” approach to a given patient’s problem such as insomnia, in which they focus on eliminating medical, dietary, and pharmacotherapy causes of the sleep disorder. Other professions, such as nursing and social work, have been described as having a broader “rule-in” approach that specifically considers the person, his or her family, and his or her environment in a more holistic manner. From this perspective, these health professionals give greater consideration, for example, to emotional and financial contributing factors that might be the source of the insomnia.

Second, health disciplines differ in how they determine when their “work” has been completed. Traditionally, medicine and pharmacy have followed a more acute care “medical” model with a diagnosis made and a treatment prescribed, with the emphasis essentially being on the patient to follow “the plan.” When the patient’s behavior varies from the prescribed plan, the individual is likely to be identified as “nonadherent” or “noncompliant.” In social epidemiology, this concept is referred to as the “sick role,” which has become an integral part of the foundations of medicine.²⁴ According to this concept, the sick role evokes a set of patterned expectations that define the norms and values appropriate to being sick, both for the individual and for others who interact with the person. In theory, the sick person is exempt from “normal social roles,” is not

responsible for his or her condition, should within his or her power try to get well, and must seek technically competent help and cooperate with his or her provider. Any deviation from these principles labels the patient as nonadherent.²⁴

In contrast, those who practice clinical social work or psychology characteristically continue their involvement with an individual or family for a prolonged period. For example, patients in this third health care model are viewed through the transtheoretical model of change.^{25,26} Based on this model, behavior change is a process, not an event. As a person attempts to change a behavior, he or she moves through the five stages of precontemplation, contemplation, preparation, action, and maintenance; relapse may occur at any point on this continuum. Patients at different points on the continuum have different informational needs and can benefit from interventions designed for their particular stage.^{25,26}

Finally, the locus of responsibility for clinical problems may also vary with students in medicine, traditionally taught to be the leaders or decision-makers compared with nursing, which emphasizes patients' self-determination and engagement in their own care. Although this concept may seem an unfair overgeneralization, the IOM has suggested that such a culture of medicine does exist and is deeply rooted, both by custom and training, in high standards of autonomous individual performance.²⁷

Multidisciplinary Education and Practice

In describing IPE and practice, attention must also be given to models that do not reflect this approach. Deployment of multidisciplinary "teams" in which professionals from different disciplines work essentially independently of one another is not an interprofessional approach. Clinicians must be aware of, value, and respect one another's contributions. Learning from other disciplines is essential to improving one's skills as well as enhancing the function and outcomes of team-based care.

Examples of Health Care IPE Models

Interprofessional Team Training and Development

As mentioned previously, an early model of IPE and practice was the Interprofessional Team Training in Geriatrics program that was funded in 1979 by the VA health system. The program was developed to educate clinical staff and students regarding the unique needs of aging veterans and to foster teamwork in geriatrics. Eventually, it was expanded under a new name, the Interprofessional Team Training and Development Program. During the ensuing years, 12 model programs were developed, which continue to train VA clinical staff.

Collaborative Interprofessional Team Education

The Collaborative Interprofessional Team Education (CITE) program is a 3-year managed care initiative of the University of Michigan Health System that is funded by the Partnerships for Quality Education. As part of a 4-hour weekly clinic, older patients who have at least two of the following conditions—diabetes, hypertension, or polypharmacy—are targeted for interventions by interprofessional students and their faculty mentors. A care plan is developed that includes specific interventions and identifies responsible team members and dates for review. The CITE program also includes didactic sessions on interdisciplinary geriatric assessment and care planning, as well as reviews of patients evaluated by the trainees.²⁸

Geriatrics Interdisciplinary Team Training Initiative

The Geriatric Interdisciplinary Team Training (GITT) program was originally funded by the John A. Hartford Foundation in 1995. The purpose was to support demonstration projects to develop and disseminate new national models for team training between 1997 and 1999. The models represent partnerships between real-world providers and educational institutions. Advanced practice nurses, social workers, and primary care medical residents were targeted

initially in the GITT program, although about 20% of trainees now come from 13 distinct disciplines, including pharmacy.²⁹

Geriatric Education Centers

Geriatric Education Centers (GECs) have been funded by the Bureau of Health Professions since 1995. Traditionally, each GEC varied in its specific area of concentration, with some following a more medically focused “geriatrics” model and others having a “gerontological” perspective with participants from a broader range of disciplines outside medicine. Until 2007, GECs were permitted to provide IPE only for individuals who were currently in practice, not to pre-licensure students in the health professions. This limitation was removed with the last round of GEC grant applications. The Bureau of Health Professions now expects a component of interdisciplinary training of students in the health professions.³⁰

Key Strategic, Cultural, and Technical Elements to Promote IPE Implementation

Strategic Elements

A key strategy for promoting IPE is to develop a common sense of purpose and clear understanding of the rationale for IPE.³¹ Team members must believe that collaboration ultimately results in improved patient care and tangible benefits to its members.³² Issues that should be addressed entail determining the goals sought by having students learn together and the best time to introduce IPE initiatives, as well as the best strategy of learning to accomplish these goals.

A four-stage model to form interprofessional collaboration has been proposed that identifies collaborative perspectives from individual to individual, individual to organization, organization to organization, and collaboration to community.³³ This model facilitates an earlier identification of barriers to collaboration, such as agency or system challenges.³⁴ Strategies can then be implemented to strengthen collaborative ties at each level. An example of individual-to-

individual collaboration is the evaluation of an IPE module for medical, nursing, and dental students, which reported that some students linked differences in entry qualifications with perceptions of inequality between professions and retained a low opinion of other students' academic abilities.³⁵ Negative perceptions occurred among students who had more extensive educational experiences. These negative perceptions may impair students' ability to enhance their own learning from other disciplines, thereby affecting collaboration from individual to individual. A potential solution is to introduce IPE earlier in the students' curriculum, at the preprofessional level, thus lessening the influence of stereotypical attitudes reached by their professional years.³⁶ Opponents of this argument believe that individuals need to be secure in their professional roles before they can function effectively as team members and that IPE should therefore be introduced later in the learner's education. Regardless, for effective interactive learning, the learning group must be balanced by assembling an equal mix of professionals per group. Faculty facilitators play a key role in creating an environment supportive of IPE. As discussed previously, they act as role models and, as such, need to be cognizant of the potential consequences of expressing negative opinions about other health professionals.³⁷⁻³⁹

An example of an individual-to-organization issue is the manner by which IPE is implemented. Offering relevant learning experiences creates a more favorable reaction to IPE if a direct correlation is realized between educational experiences and current or future practice. Hence, many IPE initiatives use approaches that are based in clinical practice or that use problem-based learning.^{40,41} Group size also affects the quality of learning. Most literature supports limiting small group learning sizes to 10 learners.⁴² Another controversial issue is whether to mandate IPE courses or offer them instead as electives. An elective course may send the message that IPE is not essential for health professionals. Others argue that a choice should

be given to participate in IPE activities because those involved may be more committed and interested.⁴¹

An example of organization-to-organization, as well as organization-to-community, collaboration is service-learning through community partnerships. Health professionals are exposed to service-learning activities early in their curriculum based on a community-service model. Service-learning meets the demands of both the community and the student through the provision of structured learning opportunities that promote IPE. The community benefits by an increased awareness and treatment of a multitude of health conditions.⁴³

Cultural Elements

Factors that promote a culture that welcomes IPE include role socialization, clarification, and valuing, as well as the development of trusting relationships and power sharing.⁴⁴ As discussed, professional socialization involves acquiring the knowledge, skills, values, roles, and attitudes specific to a particular profession; in essence, it is that profession's culture. In an interprofessional setting, role socialization, or "re-socialization," should be expanded to include collaboration with other health care professionals in a manner that respects differences in values and beliefs.⁴⁴ Role clarification enhances socialization and builds confidence by attaining a clear understanding of roles and expertise, recognizing professional boundaries, and promoting commitment to the values and ethics of one's own profession. Role valuing encourages a show of respect and requires an understanding of each profession's unique contributions to patient care. Trusting relationships among an interprofessional group create a synergistic environment that fosters a tolerance of assertiveness and shared decision-making. Implicit in power sharing is the notion that group consensus need not be unanimous but that an opportunity should exist for each member to influence the outcome.

Technical Elements

Implementing IPE often requires the enthusiasm and expertise of thought leaders in this area. These “champions” play a key role in effecting change; they are usually well-established, highly visible individuals within their academic institutions or communities and in positions of leadership.⁴⁵ Although these leaders are passionate in spearheading IPE initiatives, with little or no funding, they cannot act alone to sustain new programs. External support is desirable, especially from academic institutions and government, accreditation, and other regulatory bodies. However, understanding the history of IPE underscores the importance of having the higher administration commit to “institutionalizing” IPE programs into the culture of the educational and/or health care institutions. In addition, governmental funding priorities are cyclical and, regardless of the political parties involved, federal legislative and executive perspectives focus on the actual outcomes associated with any educational initiatives requiring funding. Potential funding sources will be described later in this paper.

Examples of Potential Assessment Instruments for IPE

Assessment instruments should be designed to measure the desired outcomes of a learning experience objectively. More importantly, the assessment of IPE should mirror the competencies of teamwork (Table 2).⁴⁶ Examples of possible outcomes related to IPE include attitudes toward other disciplines, communication skills, acquisition of knowledge, and group behaviors. The specific outcomes adopted at any given institution likely stem from governing bodies, accreditation criteria, mission statements, and programmatic goals. One of the most important outcomes to measure in medical education is the impact on patient care.^{40,41} Although a common set of outcomes has not been universally adopted for IPE, many systematic reviews use a similar classification of IPE outcomes (Table 3).^{4,47,48} Typical measures used to evaluate pre-licensure IPE (i.e., university-based) outcomes focus on learners’ reactions, attitudes, perceptions, knowledge, and skills. Typical measures used to evaluate the outcomes of post-

licensure IPE (e.g., professional development programs, continuous quality initiatives [CQIs]) focus more on behavioral change, organizational change, and patient benefit.⁴⁸ With outcome measures ranging from changes in perceptions to improvements in patient care, selecting or developing a psychometrically sound assessment instrument that matches the desired outcomes becomes challenging.

Several systematic reviews of the literature have been conducted to identify valid and reliable evaluative studies of IPE. Many, particularly those with robust methodology, have indicated that the evidence documenting the effect of IPE on outcomes is limited.^{13,14} Most published articles on IPE are descriptive and do not include objective outcome measures. Consequently, few validated IPE assessment tools have been described in the literature. Studies that have documented outcomes typically used quasi-experimental designs, most of which involve the administration of a non-validated pre- and postsurvey of students' attitudes and perceptions toward the IPE intervention. A more robust assessment strategy would measure higher-level outcomes using a control group, although identifying control groups is among the many challenges encountered in developing high-quality assessment tools for IPE.^{14,49}

Examples of assessment tools that have been tested and validated in more than one study population and that can be administered to more than one group of learners are described below.

Readiness for Interprofessional Learning Scale

The Readiness for Interprofessional Learning Scale (RIPLS) is a 19-item questionnaire first reported by Parsell and Bligh⁵⁰ in 1999 (Table 4) that uses a 5-point Likert-like scale (1 = strongly disagree, 5 = strongly agree) designed to measure attitudes toward interprofessional teams and readiness for IPE experiences. The measure consists of three subscales: teamwork and collaboration (items 1–9), professional identity (items 10–16), and roles and responsibilities (items 17–19). The measure was originally tested and validated in 120 undergraduate students

representing eight health care professions. Since then, other researchers have used the questionnaire in a variety of populations, including both undergraduate and graduate students as well as practicing professionals.⁵¹⁻⁵⁶

Interdisciplinary Education Perception Scale

The Interdisciplinary Education Perception Scale (IEPS) is an 18-item self-report of attitudes toward interprofessional teamwork that was developed by Luecht and colleagues.⁵⁷ The IEPS uses a 6-point Likert-like scale (1 = strongly disagree, 6 = strongly agree) and contains four subscale measures: competence and autonomy, perceived need for cooperation, actual cooperation, and understanding others' value (Table 5). The IEPS was tested in a sample of 143 trainees, and content validity and internal consistency were reported by the authors. Since then, the IEPS has been used in the evaluation of different IPE programs, and participants have consisted of medical, nursing, pharmacy, social work, occupational therapy, physical therapy, physician assistant, chiropractic, osteopathy, and podiatry students.^{47,58-60}

Attitudes Toward Health Care Teams Scale

The development and validation of the Attitudes Toward Health Care Teams Scale was reported by Heinemann and colleagues in 1999.⁶¹ This is a 21-item self-report designed to enable comparisons of attitudes of different members of health care teams (Table 6).⁶² The scale's reliability and validity were tested in a national sample of 973 health care professionals comprising 111 geriatric health care teams in the VA health system. This assessment tool can be divided into two subscales: the 14-item Quality of Care/Process subscale, designed to measure "team members' perceptions of the quality of care delivered by health care teams and the quality of teamwork to accomplish this," and the 6-item Physician Centrality subscale, designed to measure "team members' attitudes toward physicians' authority in teams and their control over information about patients."⁶¹ The two subscales can be scored separately, and the authors note

that scores for the Physician Centrality subscale should be expected to decrease over time and that scores for the Quality of Care/Process subscale should increase over time when used to evaluate IPE programs.

Many other instruments assessing team performance in health care have been reviewed by Heinemann and Zeiss.⁶² In their review, instruments are categorized into four groups (focused, middle range, broad spectrum, and full spectrum) based on the breadth of outcomes assessed. Each instrument is summarized and critiqued individually and compared with other instruments in its group. Summaries include the conceptual framework, description of measure, target group, psychometric testing, evaluation, and availability of each instrument. This text is an invaluable resource for anyone participating in IPE assessment.

These instruments are useful to assess outcomes related to perceptions and behaviors, and many also measure team performance and behavior changes; however, they do not assess the impact of IPE on patient care outcomes. Although the Cochrane Database systematic review of IPE literature showed that no studies had been published evaluating the effect of IPE on patient care outcomes, other systematic reviews, with the development and refinement of more comprehensive methodology, identify several studies that report changes in service delivery or patient care.^{15,48} These reviews illustrate that the instruments used to assess patient care outcomes are often simply clinical outcome audits. Such audits may detect the occurrence of clinical outcomes such as infection rates, clinical error rates, or length of patient stay. The most appropriate clinical outcomes to measure may be derived from position statements, clinical guidelines or standards, national mandates (e.g., Agency for Healthcare Research and Quality), or accrediting bodies such as the Joint Commission on Accreditation of Healthcare Organizations. For example, a diabetes self-management education team of nurses, dietitians, pharmacists, and physicians routinely participates in IPE initiatives. A logical assessment tool to

evaluate these IPE initiatives could come directly from the “Standards for Outcomes Measurement of Diabetes Self-Management Education” (DSME).⁶³ Two examples of IPE initiatives that have measured patient care outcomes are described below.

Crawford and colleagues⁶⁴ evaluated a series of 1-hour interprofessional workshops for doctors and nurses in a hospital accident and emergency workshop. The goal was to improve the care of deliberate self-harm patients presenting to the department. The authors audited patient notes before and after the educational workshops and found that the notes were completed in a more accurate and comprehensive fashion after the sessions.

Horbar and colleagues⁶⁵ conducted the Neonatal Intensive Care Collaborative Quality (NIC/Q) Project, a collaborative quality improvement project for very low birth weight infants. Interprofessional teams worked together for a 3-year period, receiving instruction on quality improvement, reviewing performance data, setting goals, and modifying practices. The outcome measured was the rate of infection after the third day of life with coagulase-negative staphylococcal or other bacterial pathogens. A control group of neonatal intensive care units (NICUs) that did not participate in the initiative was used for comparison. The study found that infection rates were lower in the NICUs participating in the initiative ($p=0.007$). Based on these data, the authors concluded that a multidisciplinary collaborative quality improvement approach has the potential to improve patient outcomes. Although the NIC/Q is considered a seminal study and a foundation for IPE, heterogeneity did exist between study groups ($p=0.04$), and without adequate matching, it is problematic to assume that the benefit is solely due to the application of IPE theory.⁶⁵

Currently, studies demonstrating a positive effect of IPE on patient care outcomes are in the post-licensure collaborative setting (e.g., CQI workgroups). The effects of pre-licensure IPE (i.e., university classroom setting) on patient care are still unknown.⁴⁹ Research in developing

high-quality assessment tools to evaluate patient care outcomes, particularly in the pre-licensure setting, is still needed.

Regardless of setting, the assessment plan and instrument chosen must match the purpose of the IPE initiative and should objectively measure desired outcomes. For example, if the IPE initiative is an introductory course for first-year pharmacy, nursing, and medical students designed to improve perceptions of the roles of different professions in patient care, then an instrument such as the RIPLS or the IEPS that assesses attitudes and perceptions would be an appropriate assessment tool. Ideally, the assessment tool would be administered to a participant group and a control group, but it could also be administered before and after the activity if a control group was not feasible. If the initiative is an IPE workshop series provided to a group of diabetes educators including nurses, pharmacists, and dieticians as part of a CQI initiative to improve the number of patients who receive dilated eye examinations each year, then the obvious assessment is the change in rate of eye examinations. This important patient care outcome would more likely be taken directly from the standards for outcomes measurements of the DSME than be developed specifically for the assessment of IPE.

Implications of IPE

Education

The provision of optimal patient care requires knowledge and contributions from many disciplines. Increasingly, the required body of knowledge may be borrowed from disciplines other than one's own, and some belongs to a common body of knowledge about a particular topic. Lines between these domains are difficult, if not impossible, to draw, emphasizing the necessity of incorporating IPE in the academic setting.³⁴ 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. Difficulties

encountered in working with multiple professions stem from a lack of knowledge of different roles and a relative absence of teamwork skills., Both of these deficits can be corrected through proper education (Table 1). Students participating in IPE report an easier transition from professional school to practice. In addition, their ensuing practices incorporate greater use of interdisciplinary treatment approaches and referral sources.³⁴

Research

Limited financial resources continue to plague health care facilities and educational institutions as they seek to fully achieve their missions. In addition to caring for more patients by working faster, better, and more efficiently, research is required to improve patient care interventions and document the outcomes of IPE.

One strategy to combat limited resources is to form research partnerships that include multiple professions. The benefits of this approach include a broader perspective when conducting research, the development of new or expanded clinical knowledge, professional collaborative activities in clinical and research areas, and a greater understanding and respect for the professional roles of others.⁶⁶ This tactic allows the research team to address more complex research questions using the unique areas of expertise of its members, enables the pooling of resources, and potentially leads to greater access to data collection and dissemination.

The National Institutes of Health (NIH) recognizes the importance of forming interprofessional research teams. This perspective stems from the realization that biomedical research is increasingly complex, requiring scientists to move beyond their own disciplines and explore new organizational models incorporating multiple areas of expertise.⁶⁷ Moreover, new discoveries must be translated from basic science to human studies and, eventually, to tests and treatments that improve patient care.⁶⁸ In the past 5–7 years, the NIH has been encouraging innovative approaches for combining skills and disciplines through the NIH Roadmap and

Clinical and Translational Science Award (CTSA) initiatives. These funding mechanisms support collaborative partnerships between academia and community centers and focus on clinical research.

In addition, key components of the CTSA are graduate degree–granting programs and other postgraduate programs in clinical and translational science, designed to train individuals from multiple disciplines together (www.ncrr.nih.gov). This is yet another way to facilitate the formation of interprofessional research teams.

In 2004, the Association of Academic Health Centers⁶⁹ recommended that the federal government create new funding to research, test, and evaluate various models of IPE and practice. During the past decade, funding that addresses these critical issues has increased from both governmental and nongovernmental agencies. Depending on the focus of the project or research, Table 7 details potential funding opportunities.

Patient Care

Health disparities remain common in the United States. A known challenge is the limited number of health care workers who choose to work with patients from underserved communities. One way in which IPE can serve the community is through student-staffed free clinics in partnership with academic medical centers. These programs are mutually beneficial because students sharpen their clinical skills and have opportunities to work with different health professionals while providing health care services to populations with limited access to health care. Mobile interprofessional services using this model have also developed, with the goal of reaching underserved patients in rural areas.⁷⁰

Most students in the health professions are both passionate and compassionate, with a desire to serve society and make a difference in others' lives. They possess leadership skills, which they may have demonstrated even before entering their degree programs. The setting

described herein affords opportunities for these qualities to strengthen and thrive. A benefit to the patient is that his/her care setting often incorporates a multitude of clinical services such as case management, dental care, and mental health care. In addition, licensed clinical practitioners supervise the students who provide care in these settings.⁷¹ Studies evaluating the attitudes of students who participated in a free clinic elective found that they were more likely to acquire positive attitudes when working with the underserved and homeless compared with students who did not complete the elective. As previously discussed, these future practitioners learn to consult each other more often, thereby perceiving themselves as professionals working together, focused on the well-being of the patient. Future studies will assess the success of these learning environments in increasing the pool of practitioners who focus on treating underserved populations.

An important implication of IPE is that it can lead to the formation of more efficient patient care teams. This includes the incorporation of crucial health care services that can be neglected if students are not exposed to them during their training. Examples are services to older adult patients such as advanced care planning and end-of-life decision-making.⁷² Older adults are also more likely to have one or more chronic illnesses, necessitating the need for coordinated care. Although many members of the health care team are capable of discussing advance directives, patients identify social workers as the preferred professionals to discuss end-of-life family planning issues because of their specialized counseling skills. Social workers are often knowledgeable about and appreciative of diverse cultural norms, issues, and values and demonstrate this insight in their assessments of and interventions with culturally diverse populations.⁷³ An interprofessional team therefore benefits the patient by providing a more comprehensive service offered by clinicians who are trained for specific roles.

There is also merit to sharing roles within an interprofessional team. A nurse case manager, social worker, and pharmacist can work together to facilitate an effective discharge plan from the hospital. This team can link patients to community resources, educate them about the importance of medication adherence and provider follow-up after hospital discharge, assist them in identifying and locating a primary health provider, and ensure that their discharge medications are appropriate. Studies have shown that these strategies effectively decrease readmission rates, improve patient satisfaction with care, and save health care dollars.^{74,75} In the end, assessing the impact of IPE on patient care and outcomes requires data from rigorous randomized, controlled studies.¹³ This approach will need to be investigator initiated because the overall impact of IPE is hard to detect using current national statistics.²⁷

Barriers to IPE

Although IPE initiatives have been implemented during the past decade, many barriers have been identified.⁷⁶ These barriers exist on a variety of levels and can be organizational, operational, communicational, cultural, or attitudinal. It is crucial to overcome these barriers to better prepare health professional students and practitioners for collaborative practice within a changing health care system. Table 8 addresses potential barriers to IPE and their possible solutions within academic and patient care settings.

Potential Role of ACCP

Interprofessional education represents a common thread that connects the three dimensions of pharmacy—education, practice, and research. National pharmacy organizations endorse IPE, and several have articulated specific policies and/or initiatives supporting IPE. However, the inability to recognize the importance of IPE and to effectively deliver it within the classroom and clinic has been correlated with a decrease in the quality of patient care provided. In addition, the incorporation of interprofessional patient care into daily practice has been

compromised by workforce shortages within respective health care fields.^{13,69} From the data presented in this white paper, IPE appears to be a critical element in health system reform that has not been sufficiently addressed. The mission of ACCP is to advance human health and quality of life through fostering education, research, and clinical practice. The College can further this mission by pursuing several steps toward promoting and implementing IPE within the pharmacy profession. First, the National StuNet Advisory Committee should develop ACCP meeting programming and educational materials specifically addressing the role of pharmacy students in facilitating, promoting, and implementing IPE in the classroom and experiential learning environment. Second, to implement IPE in practice settings, pharmacy practitioners, residents, and educators should be trained in the theory and application of IPE. The ACCP Academy's Teaching and Learning Program and its Leadership and Management Development Program could address these issues in their respective curricula. Third, a major barrier to IPE is the lack of funding for well-designed IPE research. We suggest that the ACCP Research Institute support studies to test and evaluate various IPE models and assessment tools. Fourth, ACCP Focus Sessions during its national meetings could be delivered jointly with medicine and other health disciplines to facilitate advocacy and communication. Finally, the College should propose the formation of a joint commission by national pharmacy organizations to develop a consensus vision for the implementation of IPE across the pharmacy profession.

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Table 1. Definition of Terms⁴⁻⁶

Term	Definition
(Uni)Disciplinary	One provider working independently to care for a patient. There is little awareness or acknowledgment of practice outside one's own discipline. Practitioners may consult with other providers but retain independence
Multidisciplinary	Different aspects of a patient's care are handled independently by appropriate experts from different professions. The patient's problems are subdivided and treated separately, with each provider responsible for his/her own area
Interdisciplinary/interprofessional	The provision of health care by providers from different professions in a coordinated manner that addresses the needs of patients. Providers share mutual goals, resources, and responsibility for patient care. The term <i>interprofessional</i> is used to describe clinical practice, whereas the term <i>interdisciplinary</i> is often used to describe the educational process. Either term may be used when referring to health professions education and practice
Interdisciplinary/interprofessional education	An educational approach in which two or more disciplines collaborate in the teaching-learning process with the goal of fostering interdisciplinary/interprofessional interactions that enhance the practice of each discipline
Transdisciplinary	Requires each team member to become familiar enough with the concepts and approaches of his/her colleagues to "blur the lines" and enable the team to focus on the problem with collaborative analysis and decision-making

Table 2. Competencies for IPE^{6,46}

Competency	Definition
KNOWLEDGE COMPETENCIES	
Cue/strategy associations	The linking of cues in the environment with appropriate coordination strategies
Shared task models/situation assessment	A shared understanding of the situation and appropriate strategies for coping with task demands
Teammate characteristics familiarity	An awareness of each teammate's task-related competencies, preferences, tendencies, strengths, and weaknesses
Knowledge of team mission, objectives, norms, and resources	A shared understanding of a specific goal(s) or objective(s) of the team as well as the human and material resources required and available to Achieve the objective; when change occurs, team members' knowledge must change to account for new task demands
Task-specific responsibilities	The distribution of labor, according to team members' individual strengths and task demands
SKILL COMPETENCIES	
Mutual performance monitoring	The tracking of fellow team members' efforts to ensure that the work is being accomplished as expected and that proper procedures are followed
Flexibility/adaptability	The ability to recognize and respond to deviations in the expected course of events or to the needs of other team members
Supporting/back-up behavior	The coaching and constructive criticism provided to a teammate, as a means of improving performance, when a lapse is detected or a team member is overloaded
Team leadership	The ability to direct/coordinate team members, assess team performance, allocate tasks, motivate subordinates, plan/organize, and maintain a positive team environment
Conflict resolution	The facility for resolving differences/disputes among teammates without creating hostility or defensiveness
Feedback	Observations, concerns, suggestions, and requests, communicated by team members in a clear and direct manner, without hostility or defensiveness
Closed-loop communication/information exchange	The initiation of a message by a sender, the receipt and acknowledgment of the message by the receiver, and the verification of the message by the initial sender
ATTITUDE COMPETENCIES	
Team orientation (morale)	The use of coordination, evaluation, support, and task inputs from other team members to enhance individual performance and promote group unity

Collective efficacy	The belief that the team can perform effectively as a unit when each member is assigned specific task demands
Shared vision	The mutually accepted and embraced attitude regarding the team's direction, goals, and mission

PRIMARY TEAMWORK COMPETENCIES

Team cohesion	The collective forces that influence members to remain part of a group; an attraction to the team concept as a strategy for improved efficiency
Mutual trust	The positive attitude that team members have for one another; the feeling, mood, or climate of the team's internal environment
Collective orientation	The common belief that a team approach is more conducive to problem solving than an individual approach
Importance of teamwork	The positive attitude that team members exhibit with reference to their work as a team

Table 3. Expected Outcomes for IPE^{4,47,48}

Level		Educational Outcome
1		Learners' views on the learning experience and its interprofessional nature
2a	Modification of attitudes and perceptions	Changes in reciprocal attitudes or perceptions between participant groups. Changes in perception or attitude toward the value and/or use of team approaches to caring for a specific client group
2b	Acquisition of knowledge and skills	Including knowledge and skills linked to interprofessional collaboration
3	Behavioral change	Identified individuals' transfer of interprofessional learning to their practice setting and their changed professional practice
4a	Change in organizational	Wider changes in the organization and delivery of care
4b	Benefits to patient and clients	Improvement in health or well-being of patients/clients

IPE = interprofessional education.

Table 4. Readiness for Interprofessional Learning Scale

1. Learning with other students will help me become a more effective member of a health care team	1	2	3	4	5
2. Patients would ultimately benefit if health care students worked together to solve patient problems	1	2	3	4	5
3. Shared learning with other health care students will increase my ability to understand clinical problems	1	2	3	4	5
4. Learning with health care students before qualification would improve relationships after qualification	1	2	3	4	5
5. Communication skills should be learned with other health care students	1	2	3	4	5
6. Shared learning will help me think positively about other professionals	1	2	3	4	5
7. For small group learning to work, students need to trust and respect each other	1	2	3	4	5
8. Team-working skills are essential for all health care students to learn	1	2	3	4	5
9. Shared learning will help me understand my own limitations	1	2	3	4	5
10. I don't want to waste my time learning with other health care students	1	2	3	4	5
11. It is not necessary for undergraduate health care students to learn together	1	2	3	4	5
12. Clinical problem-solving skills can only be learned with students from my own department	1	2	3	4	5
13. Shared learning with other health care students will help me communicate better with patients and other professionals	1	2	3	4	5
14. I would welcome the opportunity to work on small-group projects with other health care students	1	2	3	4	5
15. Shared learning will help clarify the nature of patient problems	1	2	3	4	5
16. Shared learning before qualification will help me become a better team worker	1	2	3	4	5
17. The function of nurses and therapists is mainly to provide support for doctors	1	2	3	4	5
18. I'm not sure what my professional role will be	1	2	3	4	5
19. I have to acquire much more knowledge and skills than other health care students	1	2	3	4	5

1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree.

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Table 5. Interdisciplinary Education Perception Scale and Subscale

	Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
1. Individuals in my profession are well trained.....	6	5	4	3	2	1
2. Individuals in my profession are able to work closely with individuals in other professions.	6	5	4	3	2	1
3. Individuals in my profession demonstrate a great deal of autonomy	6	5	4	3	2	1
4. Individuals in other professions respect the work done by my profession	6	5	4	3	2	1
5. Individuals in my profession are very positive about their goals and objectives	6	5	4	3	2	1
6. Individuals in my profession need to cooperate with other professions	6	5	4	3	2	1
7. Individuals in my profession are very positive about their contributions and accomplishments.....	6	5	4	3	2	1
8. Individuals in my profession must depend on the work of people in other professions..	6	5	4	3	2	1
9. Individuals in other professions think highly of my profession.....	6	5	4	3	2	1
10. Individuals in my profession trust each other's professional judgment.....	6	5	4	3	2	1
11. Individuals in my profession have a higher status than individuals in other professions..	6	5	4	3	2	1
12. Individuals in my profession make every effort to understand the capabilities and contributions of other professions.	6	5	4	3	2	1
13. Individuals in my profession are extremely competent..	6	5	4	3	2	1
14. Individuals in my profession are willing to share information and resources with other professionals..	6	5	4	3	2	1
15. Individuals in my profession have good relations with people in other professions.	6	5	4	3	2	1
16. Individuals in my profession think highly of other related professions..	6	5	4	3	2	1
17. Individuals in my profession work well with each other..	6	5	4	3	2	1
18. Individuals in other professions often seek the advice of people in my profession..	6	5	4	3	2	1

Subscale: Competence and autonomy (items 1, 3, 4, 5, 7, 9, 10, 13); perceived need for cooperation (items 6, 8); actual cooperation (items 2, 14, 15, 16, 17); understanding others' value (items 11, 12, 18).

Used with permission from: Luecht RM, Madsen MK, Taugher MP, Petterson BJ. Assessing professional perceptions: design and validation of an Interdisciplinary Education Perception Scale. J Allied Health 1990;19:181–91.

Table 6. Attitudes Toward Health Care Teams Scale

Attitudes Toward Health Care Teams Scale		Strongly Disagree			Strongly Agree		
1	Working in teams unnecessarily complicates things most of the time	1	2	3	4	5	6
2	The team approach improves the quality of care to patients	1	2	3	4	5	6
3	Team meetings foster communication among team members from different disciplines	1	2	3	4	5	6
4	Physicians have the right to alter patient care plans developed by the team	1	2	3	4	5	6
5	Patients receiving team care are more likely than other patients to be treated as whole persons	1	2	3	4	5	6
6	A team's primary purpose is to assist physicians in achieving treatment goals for the patient	1	2	3	4	5	6
7	Working on a team keeps most health professionals enthusiastic and interested in their jobs	1	2	3	4	5	6
8	Patients are less satisfied with their care when it is provided by a team	1	2	3	4	5	6
9	Developing a patient care plan with other team members avoids errors in delivering care	1	2	3	4	5	6
10	When developing interdisciplinary patient care plans, much time is wasted translating jargon from other disciplines	1	2	3	4	5	6
11	Health professionals working on teams are more responsive than others to the emotional and financial needs of patients	1	2	3	4	5	6
12	Developing an interdisciplinary patient care plan is excessively time-consuming	1	2	3	4	5	6
13	The physician should not always have the final word in decisions made by health care teams	1	2	3	4	5	6
14	The give-and-take among team members helps them make better patient care decisions	1	2	3	4	5	6
15	In most instances, the time required for team meetings could be better spent in other ways	1	2	3	4	5	6
16	The physician has the ultimate legal responsibility for decisions made by the team	1	2	3	4	5	6
17	Hospital patients who receive team care are better prepared for discharge than other patients	1	2	3	4	5	6
18	Physicians are natural team leaders	1	2	3	4	5	6
19	The team approach makes the delivery of care more efficient	1	2	3	4	5	6
20	The team approach permits health professionals to meet the needs of family caregivers as well as patients	1	2	3	4	5	6
21	Having to report observations to the team helps team members understand the work of other health professionals	1	2	3	4	5	6

Used with permission from: Heinemann GD, Schmitt MH, Farrell MP, Brallier SA. Development of attitudes toward health care teams scale. *Eval Health Prof* 1999;22:123–42; Heinemann GD, Zeiss AM. *Team performance in health care: assessment and development*. New York: Kluwer Academic/Plenum Publishers, 2002.

Table 7. Potential Granting Agencies and Foundations Funding IPE Research⁶

Source	Comments	Web site
Bill and Melinda Gates Foundation	The Gates Foundation provides funding for research that evaluates educational programs in the United States	www.gatesfoundation.org/UnitedStates/Education/ResearchAndEvaluation/default.htm
Department of Education	This governmental agency provides funding for projects that enrich and enhance education and its outcomes	http://www.ed.gov/index.jhtml
Health Resources and Services Administration Agency	This governmental agency provides funding opportunities for health professionals with particular emphasis on medically underserved areas	www.hrsa.gov/grants/
Josiah Macy, Jr. Foundation	The Macy Foundation provides funding for projects focused on the education of health care professionals in the United States	www.josiahmacyfoundation.org
Robert Wood Johnson Foundation	The Building Human Capital program provides funding opportunities that focus on the training of professionals	www.rwjf.org/applications/
W.K. Kellogg Foundation	Funding opportunities focus on education and general health	www.wkkf.org/default.aspx?LanguageID=0

Table 8. Potential Barriers to IPE and Possible Alternatives^{a,6}

Barriers	Solutions and Alternatives
Academic calendars	Integrate calendars (and catalogs) into one calendar (or, at most, two academic and professional) Schedule IPE courses and activities in the “core” months of a semester
Academic requirements	Develop a distinct grading system that would allow any school to use a conversion protocol to translate IPE grades to the grading system of the school
Academic reward structure	Recruit faculty to IPE activities whose primary distribution of effort is not directed toward promotion/tenure Particularly with junior faculty who would like to teach in this environment, ensure that IPE work is linked to his or her faculty development plan in his or her department Create a separate merit pool related to IPE activities Continue to promote efforts for APT committees to recognize the expanded view of scholarship, particularly as demonstrated in IPE activities
Clinical practice sites	Forge alliances with external organizations that use interdisciplinary approaches to health care delivery
Communication issues	Coordinate program communications among the schools/departments through IPE organizational units Coordinate program marketing among the schools through IPE organizational units
Cost issues for students	Add required IPE course at the expense of one elective course; devise a means of providing this course at no cost to the student
Disciplinary/departmental organization and structure	Create a separate organizational entity for IPE activities; allocate FTEs to that organization Reimburse school/department for faculty FTEs allocated to the IPE unit
Disciplinary and professional traditions and cultures	Devote significant implementation planning to faculty and staff communication and development Reinforce that a major goal of IPE is to mediate differences
Evaluation	Design a rigorous, programmatic evaluation plan for any IPE courses
Faculty development	Ensure that the IPE office collaborates with each school’s or department’s faculty/staff development efforts
Fiscal resources	Fiscal wherewithal probably lies within current operating budgets; thus, funds could be reallocated Assign IPE curriculum highest priority for state/institutional funds request Redeploy faculty or staff from current assignments
Geographic separation	Provide “universal parking privileges” for IPE faculty Ensure that faculty time agreement includes not only accommodation for teaching time, but also class preparation and travel time
Insufficient interdisciplinary faculty	Define competencies desired in IPE faculty and develop/offer training in those skills

	Recruit initially from PBL-trained faculty
	Seek preceptors from the practice community to assist in IPE teaching
	Use advanced-level students as facilitators
Leadership and administrative support	If leadership moves forward with planning for implementation of IPE activities, there should be support at the university, school, or institution administration levels Leadership within upper administration (e.g., deans) must work to ensure support at that level
Levels of student preparation and maturity	Categorize the courses, practicum, and rotations that are developed and implemented in terms of appropriate student readiness for that material Establish pre/post assessments and relate to student performance in year 1 and modify prerequisites if needed Monitor, during registration, class mix for student preparation and maturity of students' own advisers Establish all IPE courses as competency-based
Logistics	Hold classes at every academic building on campus Offer flexible schedules for group sessions including a variety of options such as monthly, weekly, weekends, early mornings, or late evenings Establish a faculty advisory board for the IPE curriculum Charge the IPE faculty with leadership of recruitment
Power dispositions and territorial imperatives	This will change only as IPE activity becomes more commonplace
Promotion and tenure considerations	Promote efforts for APT committees to recognize the scholarship of teaching as demonstrated in IPE activities Create an IPE career path and recruit junior faculty
Recognition and reward	Develop a means of recognizing the contributions of the faculty who participate in IPE, which includes both tangible and intangible rewards
Recruitment	Create a separate office for IPE activities; allocate faculty FTE on IPE efforts to that organization
Resistance to change	Create seed grants to faculty for the development of courses Continue leadership efforts to stimulate interest in teaching including faculty development plans
Reimbursement mechanisms and schedules for clinical positions	Include on-site IPE activities as part of negotiation and renegotiation of affiliation and other agreements
Scholarship	Influence state legislation regarding reimbursements of IPE teams for care Continue to promote efforts for APT committees to recognize the scholarship of teaching as demonstrated in IPE IPE office should be responsible for assisting faculty with grant opportunities/publishing associated with IPE activities
Time commitment	Create a separate organizational entity for IPE activities for bookkeeping purposes; allocate faculty FTEs to that organization

Reimburse school/departments for faculty FTEs allocated to IPE units

^aThese barriers are derived from the University of Texas Health Sciences Center: Interprofessional Education for Health Professions–SACS Accreditation Site Visit.

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