Reflections From the Intersection of Health Professions Education and Clinical Practice: The State of the Science of Interprofessional Education and Collaborative Practice

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Abstract

This informed reflection, from the intersection of health professions education and clinical practice, takes stock of the state of the field of interprofessional education (IPE) and collaborative practice (CP) (together IPECP) by answering the following three questions: (1) As a field of study, where is IPECP? (2) As a research enterprise, what are the current analytical gaps? (3) Scientifically, what needs to be done going forward? While IPE and CP, as well as IPECP, have been areas of scholarly inquiry for nearly 50 years, they have collectively and individually had a limited sphere of influence. Analytical gaps identified include little research dealing with big picture health-related outcomes; mixed results on the effectiveness of health care teams; increasing recognition that additional IPECP competencies might be needed; a gap between the identification and application of educational best practices; and the need for sound, reliable, and validated tools for measuring IPECP. The authors outline the work of the National Center for Interprofessional Practice and Education at the University of Minnesota, which is focused on filling the identified analytical gaps by way of strategic actions organized around three domains—(1) developing an IPECP research agenda, (2) nurturing IPECP intervention research grounded in comparative effectiveness research study designs and the assumptions of critical realism, and (3) the creation of a sound informatics platform. The authors argue that filling these gaps is important because if the effectiveness of IPE on CP and of CP on health outcomes is ever to be ascertained, generalizable findings are paramount.

When a line of inquiry has been the focus of study for as long as interprofessional education (IPE) and collaborative practice (CP) (together IPECP; see below for individual definitions) has been, taking stock and reflecting on the state of the science is essential for assessing where the field is, identifying crucial gaps in analyses that need to be rectified, and mapping the future course of related scientific inquiry. (Although some may think using the term *science* in relation to the field of IPECP is a stretch, we offer that the reflection process we used is grounded in assessing the field using the criteria of scientific credibility.) At the National Center for Interprofessional Practice and Education at the University of Minnesota (hereafter the National Center),[1] we have undertaken this state of the science assessment for the purposes just noted. This Perspective provides an informed reflection, from the intersection of health professions education and clinical practice, that is organized around the following three questions: (1) As a field of study, where is IPECP? (2) As a research enterprise, what are the analytical gaps? (3) Scientifically, what needs to be done going forward?

When addressing the third question, we discuss the strategic actions undertaken by the National Center to try to fill the identified analytic gaps. These strategic actions are organized around the following three domains—(1) developing an IPECP research agenda; (2) nurturing IPECP intervention research grounded in comparative effectiveness research (CER) study designs[2] and the assumptions of critical realism[3]; and (3) the creation of a sound informatics platform to support the first two domains. The work of the National Center is focused on filling identified analytic gaps within these three domains.

Where Are We?

IPE and CP are distinct yet interrelated and may overlap.[4,5] The first (IPE), many hope, will lead to the second (CP) which will, in turn, inform the first over time.[4] IPE "occurs when two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes."[6] Whereas CP "happens when multiple health-related workers from different professional backgrounds work together with patients, families, care givers, and communities to deliver the highest quality of care."[7] John Gilbert[8] has written that one of the most frequently asked questions regarding IPE (and we would extend this to include CP) is: "Does [it] make a difference to health care?" He quotes the best response to that question as "interprofessional education is a great truth awaiting scientific confirmation."[8]

Although IPE and CP, as well as IPECP, have been areas of scholarly inquiry for

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nearly 50 years, they have collectively and individually had a limited sphere of influence.[8–12] We make this claim despite the wide range and current proliferation of peer-reviewed articles covering some dimension of IPE and/or CP.[4,13] For instance, many academic health centers are still not offering IPE as an integrated dimension of their curricula, and many clinical practices are not engaging in CP. We believe this limited sphere of influence has occurred, in large measure, because few research efforts have focused on producing evidence regarding the impact of IPE and/or CP on health-specific outcomes, such as those known as the triple aim (i.e., improving the patient experience of care, improving population health, and reducing the per capita cost of health care).[14] Despite this scarcity of effort, there has been a cyclical resurgence of interest in the spectrum of IPECP efforts with interest ebbing and flowing. But, no matter how thin the evidence is, there nevertheless is existing evidence of the promise of interprofessional health care teams practicing collaboratively to make significant and meaningful contributions to improving individual patients' and population groups' health outcomes, and to redesign the U.S. health care delivery system,[6,15,16] which is under constant scrutiny accompanied by demands for reform largely because it is more expensive and produces poorer outcomes than most health care systems in other developed nations.[17]

These promising possible impacts are undoubtedly what compelled the advancement of health care teams in the Affordable Care Act,[16] which is currently driving U.S. health care reform. Moreover, in 2014, these promises were, in part, the impetus for the Institute of Medicine convening the Committee on Measuring the Impact of Interprofessional Education on Collaborative Practice and Patient Outcomes, and charging the committee with analyzing available data and information to ascertain the best methods for measuring the impact of IPE on health care delivery and the functioning of health care systems.[4]

With such a long history, a plethora of reviews have been conducted on the status of IPE, CP, and IPECP research from numerous perspectives. Among the commonly identified issues regarding this array of research is the lack of common definitions and shared terminology to provide guidance in performing research.[9,10,18,19] Beyond issues with common definitions and shared terminology, some have problematized shared *understandings*, pointing out that "over the last 50 years, the term 'interprofessional collaboration' has not signified the same thing to all who use and apply the term."[5(p3)] While focusing on CP and not IPE, Haddara and Lingard[5] noted that there are multiple discourses in the CP literature; it is not a stretch to make the same observation regarding IPE.

In early 2014, National Center staff conducted and published an extensive scoping review[18] of the IPECP literature from 2008 (the year Berwick et al[14] disseminated their triple aim paper focused on reforming U.S. health care delivery) through 2013. The purpose of the scoping review[18] was to assess the state of IPECP science, in light of the triple aim; it yielded the following results:

- very little IPECP research has dealt with big picture health-related outcomes;
- the literature on the effectiveness of health care teams has yielded mixed results;
- IPECP competencies have been defined and partially adopted in health professions education, but there is increasing recognition that additional competencies might be needed;
- a gap remains between the identification and subsequent application of educational (pre- and postlicensure) best practices; and
- despite the availability of a number of IPECP measurement instruments, sound, reliable, and validated tools for measuring IPECP are in short supply.

What Are the Analytic Gaps?

Literature on effectiveness of teams has yielded mixed results

There is some research literature regarding improved quality outcomes with the use of health care teams. Early results from this literature demonstrate the success of teams in the health care delivery system[20,21] and patient-centered medical home models,[22–24] adding credence to the notion that IPE and/or CP could be of significant value in the shift to focusing on outcomes-based health systems. Other research, however, has demonstrated that achieving a positive impact from IPE is not consistent and can often be context specific,[25] presenting difficulties in terms of generalizability outside of the original setting. Nevertheless, there is also the danger of overemphasizing the importance of the local context, thereby eschewing what could be generalizable principles or knowledge. For instance, Bodenheimer et al[23] identified 10 building blocks of high-performing primary care that they believe are essential for achieving triple aim outcomes, one of which is team-based care. Primary care teams have also been associated with reduced clinician exhaustion.[24] To identify the possible connections between IPE and CP, one strategy (currently absent) would be to work backward from successful CP[23,24] to develop IPE interventions.

Increasing recognition that additional IPECP competencies might be needed and the gap remaining between identification and application of educational best practices

The Interprofessional Education Collaborative has defined competencies for IPECP.[26] Overall, these competencies have been recognized and accepted by health care professions accrediting bodies in the United States and encompass the domains of values and ethics; roles and responsibilities; interprofessional communications; and teams and teamwork. However, additional competencies—such as population health; health and medical informatics; evidence-based patient-centered care; quality improvement processes and related technology (such as electronic health records); and cost-effective health care practice models—may be needed to move IPECP work forward.

Moreover, the adoption of IPECP competencies has led to a demand for answers to the question: How do we do IPECP? Answering this question remains a challenge because currently absent from the literature is a sound evidence base regarding what the specific education and training requirements for learners (students and practitioners alike) should be.[27,28]

Short supply of sound, reliable, and validated tools for measuring IPECP

There are few tools for assessing clinical site readiness for IPECP, for measuring

what should be learned, or for measuring what meaningful interprofessional team dynamics and interactions look like.[20,21] Further, exactly how health care teams should be constituted to achieve desired health-related outcomes also requires more clarification. This clarification is only possible with rigorous outcomes-focused research.

Very little IPECP research has dealt with big picture health-related outcomes

Systematic reviews of the research literature regarding the impact of IPE on CP and of CP on health-related outcomes reveal that much of this line of inquiry has been focused on examining three levels of impact: (1) individual level (immediate or short-term changes on learners' knowledge, skills, and attitudes); (2) practice level (changes to practice-based processes, but not outcomes); and (3) organizational level (changes to health system processes).[9,18,19] Currently absent from the literature are research results that explicitly map IPE and CP interventions to the outcomes of improved population health, reduced health care costs, and better linkage between health professions education and clinical practice.[18]

Overall, the absence of a sound evidence base exists as a direct result of most research questions in the field being focused on evaluating IPE efforts which were undertaken to impact a small number of students and used metrics regarding changes in knowledge, attitudes, and professed skill.[18] Ultimately, the evidence gap has been produced by the research questions asked, not by the availability of research methods or the appropriateness of study designs. The significance of this should not be underestimated. Recent attention to CER[4] approaches underscores how a diverse array of research methodologies and analysis strategies can be used to produce evidence to answer research questions regarding health-related outcomes from interventions. Moreover, Brandt et al[18] noted that a higher proportion (55.2%) of the IPECP peer-reviewed papers included in their review had sample sizes of < 50, while only 15.1% had sample sizes of ≥ 300. With such small sample sizes, answering questions focused on increased patient satisfaction with health care received, reductions in health care costs, and improved population health is simply not feasible.

At the very least, large-N studies are necessary if generalizable findings about IPE, CP, and IPECP are to be generated. If, and once, generalizable findings that provide guidance in performing research are established, then systematic reviews combining the results from smaller, independent studies could be undertaken to obtain quantitative estimates of the overall effects that IPECP interventions or variables have on outcomes or dependent variables.

What Needs to Be Done Going Forward?

As noted earlier, among a number of stakeholders (including health professional educational institutions, health care delivery systems, payers, policy makers, and regulators), there is a new, and renewed, enthusiasm for IPECP and the promise it holds for the redesign of the U.S. health care system writ large. To sustain this enthusiasm, definitive evidence of the following is needed: (1) the effectiveness of IPE in leading to CP,[29] (2) the return on investment for IPE and CP efforts both together and separately, (3) identification of what the most effective team models are, (4) the essential factors needed for sustainable IPECP change, (5) how IPECP might engage patients and communities, and (6) how IPECP might impact population health.[30]

To produce the evidence necessary for sustaining the current interest in IPECP and to move the science forward, a research agenda is essential.[31,32] This research agenda needs to provide direction for the production of a relevant and scientifically sound evidentiary base examining whether IPECP leads to health care and health professions education outcomes improvement. Such an agenda demands the redirection of current research from a program- or project-process-specific level evaluating such things as changes in knowledge, skills, and attitudes, to the assessment of the IPECP's impact on triple-aim-derived outcomes (see Figure 1). Redirecting IPECP research questions is one of the only realistic pathways to the creation of new evidence that could establish what the impact of IPECP is, if there is one.[28,31–33]

Research also needs to focus on the health care and health professions education outcomes that exist at the intersection of IPE and CP (or the intersection of health professions education and clinical practice—what the National Center refers to as the nexus). Few researchers have studied either this nexus[25,29] or its connection with triple aim outcomes.[18] The time is right for just such a focus. Crucial first steps toward this focus include (1) developing a consensus about IPECP concepts, (2) a systematic integration of the Interprofessional Education Collaborative's inter-professional CP core competencies framework, and (3) consensus on how to measure IPECP concepts.[31]

Accompanying the need for an IPECP research agenda is the need to nurture IPECP intervention research grounded in CER study designs[2] and the assumptions of critical realism.[3,32,34] Interventions are purposive change strategies that can be tested, and the intervention-based research needed to move the field of IPECP forward should use an array of CER study designs rather than valorizing randomized controlled trials (one of many CER approaches) as the single preferred method for knowledge creation as some recent Cochrane reports have done.[28,33] CER comprises a constellation of methods that can be used to design empirical research studies,[34] and we should use as many as possible to study IPECP interventions. For example, quasi-experimental interventions with clear outcomes and control groups can produce information that can lead to meaningful action.

Moving forward requires asking questions about the impact of IPECP in new ways, which calls for data collection and generation that allow for the examination of as-yet untested associations and pathways between and among the domains of health professions education, practice, health care delivery, health outcomes, and health care costs.[35] We would argue that the nexus (see above) is an innovative framework for tackling these complex issues. In the nexus, clinical practice and health professions education join forces to ensure sustainable change. Moreover, a changing paradigm for health care research, such as the 5R perspective or the framework of critical realism,[3] will be needed for this work. The 5R perspective[36–38] advocates that intervention-based health care research

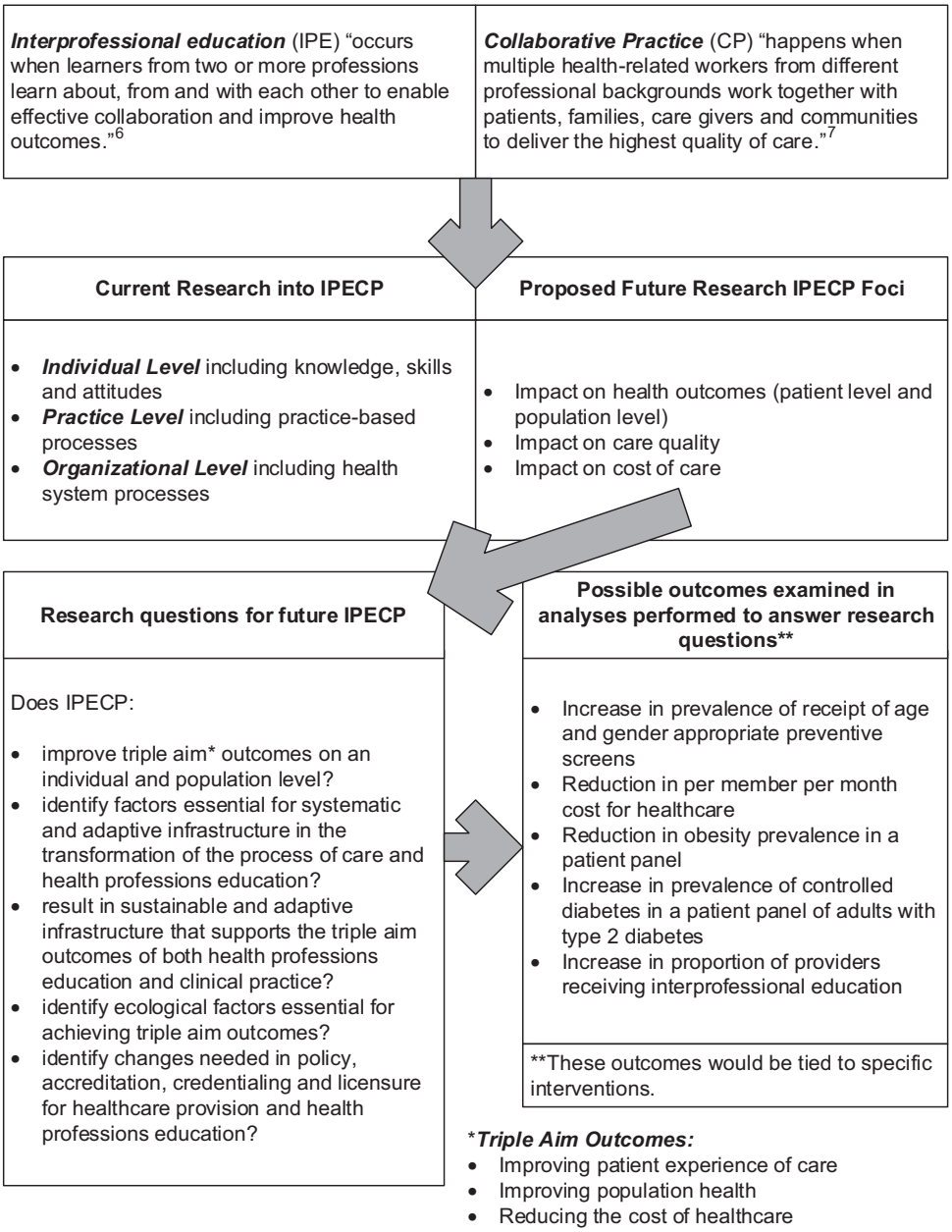

Figure 1 The current state of the science of interprofessional education (IPE) and collaborative practice (CP) (together IPECP) and the future foci for the IPECP research agenda as proposed by the National Center for Interprofessional Practice and Education at the University of Minnesota.

should (1) be relevant to stakeholders, (2) be rapid and recursive, (3) redefine rigor while maintaining scientific integrity, (4) report on required resources needed to implement interventions, and (5) be replicable.[28] Critical realism,[3] which is compatible with the 5R perspective,[36–38] prioritizes empirical observation with the goal of finding regularities from those observations that can be generalized.

Along with defining a research agenda and nurturing IPECP intervention research grounded in CER study designs[2] and the assumptions of critical realism,[3] a sound informatics platform focused on generating, collecting, and storing data is essential, as data can become information and, once analyzed, information can produce knowledge to inform purposive action. The National Center is working on one such informatics platform called the National Center Data Repository.[32,34,39] This repository is built on a comprehensive relational database with a user-friendly data input mechanism, and supports performing analyses. The National Center has also forged partnerships with multiple IPE, CP, and IPECP interventions throughout the country; each intervention has sound scientific work plans, well-defined research questions, and clearly identified outcomes.[32,34,39] From these partnerships, multiple levels of data are being collected, including deidentified individual-level data from patients, providers, and learners, and, whenever possible, standardized data are collected. In addition, health professions education institutional-level data on IPE programs, cost-of-care data, and intervention-outcome-specific data are being collected. While data collection is ongoing at present, the proof of concept is well under way as analyses of these data have already begun.[32,34,39]

Chart 1

The Three National Center Strategies, Each Strategy's Components, and the Analytic Gaps Being Rectified by the Strategy, as Well as the Projected Outcomes of the Intertwined Strategies

National Center strategies	Components of strategy	Analytic gaps being rectified by strategy	Projected outcomes of the intertwined strategies
Developing a research agenda for IPECP	• Research questions • Outcomes for assessment • Methodological approaches	• Elevation of outcomes • Focus on IPECP impact at multiple levels	• Generalizable findings from rigorous research and data analysis from large-N studies • Data analysis testing associations and/or causal pathways with triple aim outcomes as dependent variables with dimensions of IPE and CP interventions as independent variables and demographic and ecological variables as covariates • High-quality qualitative research documenting context-specific IPECP experiences with possible implications for other settings
Nurturing IPECP intervention research grounded in CER study designs[2] and the assumptions of critical realism[3]	• Interventions are purposive change strategies for testing • Using an array of CER study designs • Clearly identified outcome and control groups	• Testing models of IPECP at the intersection of IPE and CP (the nexus)	
Creation of a sound informatics platform	• Data generation, collection, and storage • Information for analysis • Knowledge for purposive action	• Providing or creating big data to rigorously examine and ascertain IPECP impact	

Abbreviations: National Center indicates National Center for Interprofessional Practice and Education; IPECP, interprofessional education and collaborative practice; CER, comparative effectiveness research; IPE, interprofessional education; CP, collaborative practice.

To rectify the analytic gaps identified (see above) and their consequences for the field of IPECP, the National Center has set a course to actively pursue three strategies identified as necessary to move the field of IPECP forward—(1) developing a research agenda for IPECP,[32] (2) nurturing IPECP intervention research grounded in CER study designs[2] and the assumptions of critical realism,[3] and (3) creating a sound informatics platform to support the first two strategies.[32,34,39] Chart 1 displays the three National Center strategies, each strategy's components, and the analytic gaps being rectified by the strategy, as well as the projected outcome of the intertwined strategies. Ultimately, we expect that these three strategies will produce generalizable findings that will facilitate the assessment of IPECP's effectiveness, allowing for an examination of the return on investment for IPECP efforts, helping to identify effective interprofessional care team models, and assisting with ascertaining how and/or if IPECP impacts population health.

Conclusions

If the effectiveness of IPE on CP and of CP on health outcomes is ever to be ascertained, generalizable findings are paramount. For findings to be generalizable, they must come from rigorous research and data analysis from large-N studies. Data analysis must test associations that have as of yet not been examined. Among the untested associations and/or causal pathways we foresee are those that posit and develop triple aim outcomes as dependent variables and data collected on multiple dimensions of IPE and CP interventions as independent variables, with demographic and ecological variables as additional covariates. High-quality qualitative research that documents the context-specific IPECP experiences with possible implications for other settings is equally important. Moreover, a concerted effort must be made to work from the intersection of health professions education and clinical practice (i.e., the nexus), ensuring that each informs the other to identify and maximize evidence-derived best practices. Generating and collecting these data will require a serious commitment. The ultimate value of understanding the extent to which—and in what ways—IPECP may affect the achievement of triple aim outcomes will make the commitment of time and research funding worthwhile.

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