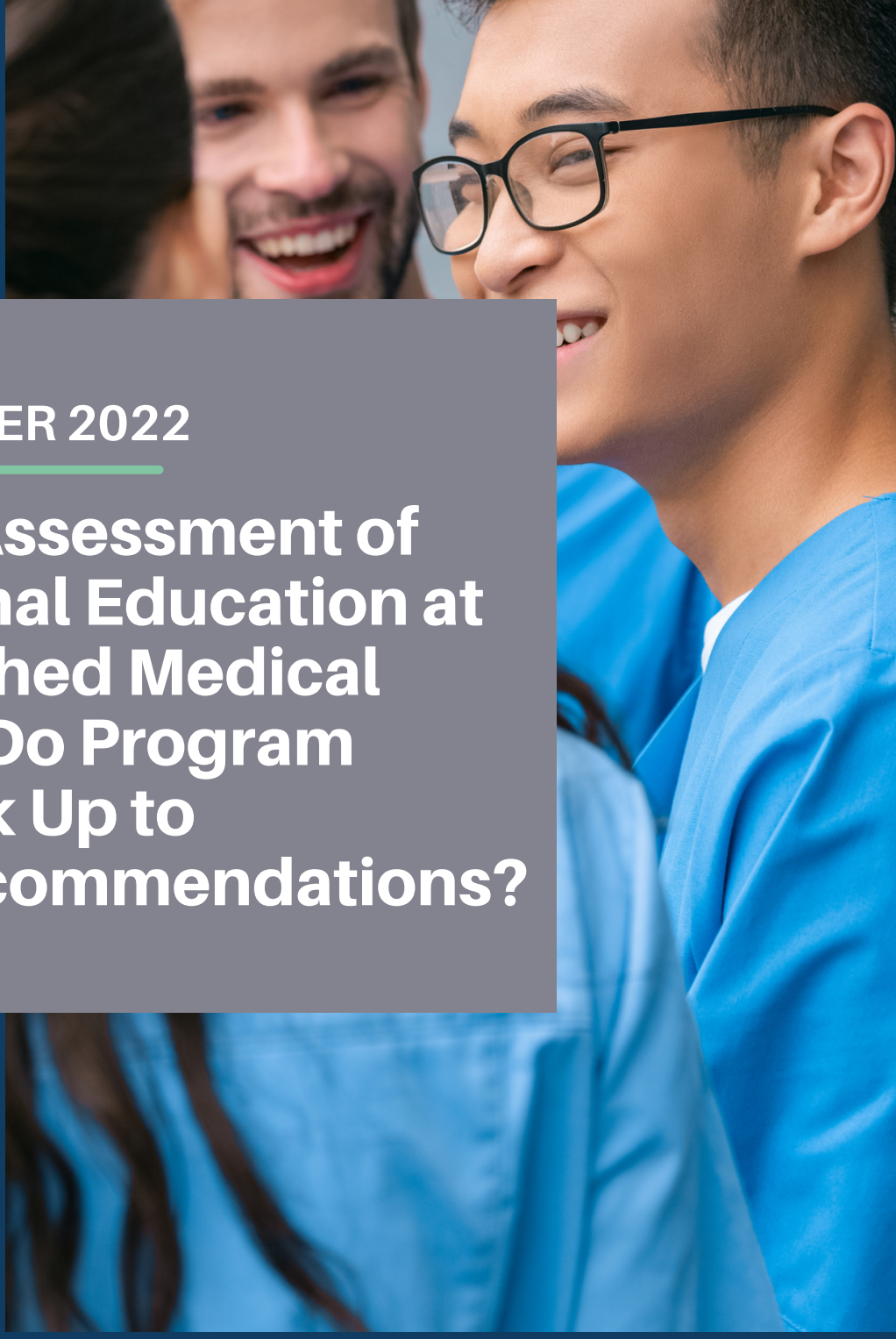

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A Web-based Assessment of Interprofessional Education at Newly Established Medical Schools: How Do Program Offerings Stack Up to Consensus Recommendations?

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Introduction

Health professions education plays a crucial role in preparing the future health workforce for interprofessional collaborative practice, a key element of patient-centered care that has been shown to improve patient outcomes.[1-3] In undergraduate medical education (UME) the accreditation bodies for allopathic and osteopathic medical schools have included interprofessional education (IPE) in accreditation standards, stipulating that a school's core curriculum must prepare students to function collaboratively on health care teams with other health professions.[4,5] There is evidence that these standards and other efforts to elevate IPE in health professions education are having an impact. Survey data show that IPE in allopathic UME programs has increased by 50% over the past decade,[6] and The National Center for Interprofessional Practice and Education identified 136 academic centers, programs and initiatives across the country that demonstrate a "focused commitment to IPE implementation".[7] Student responses to IPE have been widely reported as positive, revealing strong student interest in, positive perceptions toward, and demand for IPE collaborative opportunities.[8-10]

Despite the spotlight that has been shed on IPE in health professions education, barriers to its implementation exist. These include scheduling and logistical challenges, insufficient faculty training, and a lack of financial support.[11,12] Newer allopathic and osteopathic medical schools may be better positioned to plan for these challenges and cultivate strong IPE programs, due to the flexibility and malleability that come along with creating a program from scratch.[13] One could argue that these schools have an opportunity to build IPE inclusive programs from the bottom-up, rather than having to retrofit IPE into an existing curriculum. No studies have explored IPE program characteristics associated with the subset of medical schools that have emerged in the 2000's, a time of widespread calls for its inclusion in health professions education.

Several consensus-based guidance documents, recommendations, and frameworks have been published to support schools in IPE planning and implementation.[1,2,14] Collectively, they recommend IPE that is required, longitudinal, provides learning opportunities with other health professions students or professionals and involves experiential learning in relevant patient-care settings. The most explicit of these consensus resources, developed by the Health Professions Accreditors Collaborative (HPAC),[14] also recommends the adoption of IPE core competencies[15] and a demonstrated institutional commitment to IPE. These recommendations guided our study approach.

IPE research is heavily focused on interventions within a single institution. Broader analyses of IPE in medical education are limited to allopathic medical schools and based on self-report survey data[6,11]; objective assessments of allopathic and osteopathic IPE programming based on publicly available data could serve as an additional indicator of the IPE landscape in UME. Medical schools' websites and concomitant course catalogs may represent an accessible and innovate data source for these assessments. In addition to the reliance prospective students and other stakeholders place on educational program websites for curricular and program information,[16,17] the inclusion of IPE in medical school curriculum accreditation standards supports a reasonable assumption that it should be represented in online content and course descriptions. The use of course catalogs and online program descriptions, though a novel method to assess educational programming, is not without precedent. Past studies have performed content analyses of course catalogs to compare required curricula to that recommended by

professional associations,[18] assess how medical fellowship website content aligns with areas prioritized by applicants,[16] and evaluate graduate program websites for diversity content.[19]

The objective of this exploratory study was to assess IPE at newly established medical schools within the context of consensus-based recommendations, based on publicly available information published on schools' websites.

Methods

We employed a mixed methods approach to review and analyze online content related to interprofessional education obtained from medical schools' websites.

Sample

A purposeful sampling strategy was employed to select US-based allopathic and osteopathic medical schools for inclusion in our study. Medical schools had to have been established in the year 2000 or later (we defined 'established' as the inaugural year of first cohort matriculation), matriculated the inaugural class no later than the fall of 2019, and provide online course catalogs or detailed descriptions of program curricula on the school website. Multiple branch campuses for a single medical school were regarded as a single institution when the same website was used for all locations and there was no variation in the core curriculum and course descriptions between sites.

Data sources

We aimed to assess web content that would be easily accessible for the average web visitor or prospective student. Therefore, qualitative data in the form of published content was obtained directly from medical schools' websites. Web page content from MD and DO program pages, as well as concomitant documents (e.g., course catalogs, schedules, strategic plans, syllabi) available directly from the school's website were eligible for content review. Data sources were restricted to current content and resources; when curricula or course descriptions for multiple years was available on a school's website, coders were instructed to use that pertaining to the 2019-2020 academic year. With the exception of web pages providing institutional content necessary for coding (e.g., medical school "Home" or "About Us" pages), web content published outside of the MD/DO program pages was omitted from review, unless a link to it was provided directly from the eligible web pages.

Descriptive data on institution type and established year were verified using Integrated Postsecondary Education Data System (IPEDS)[20] and medical school accrediting bodies.[21,22] We also reviewed the parent institutions' websites to determine whether other health professions training programs such as nursing, pharmacy, or public health programs were offered on the same campus.

Assessment Instrument

We used the consensus recommendations laid out in IPE guidance documents to inform development of a codebook for website assessment (Supplemental Digital Content, Appendix A). The codebook was divided into four domains that aimed to capture core elements of IPE recommended programming: institutional commitment; competencies; curricular design; and

experiential learning (IPE assessment areas). Additionally, institutional characteristics and website comprehensiveness were captured in our assessment.

IPE Assessment Areas

1. Institutional commitment: We used three indicators to assess a school's institutional commitment to IPE: inclusion of IPE terminology like "interprofessional collaboration or teamwork" in the school's mission statement; IPE as a priority area in the school's strategic plan; or infrastructure or resources showing a commitment to IPE, including IPE-dedicated faculty, IPE centers or departments, or intentional design of learning spaces to promote IPE.
2. Program Competencies: We reviewed MD and DO programs' stated core competencies for inclusion of IPEC's "Core Competencies for Interprofessional Collaborative Practice"[15] or other core competencies emphasizing interprofessional collaboration.
3. Curriculum: For purposes of our content review, we defined curriculum as all courses, clinical experiences, and learning activities that comprise the program's core pre-clinical and clinical curriculum (extra-curriculars and volunteer learning opportunities were purposefully omitted from this definition). Curricula were assessed based on whether IPE was: required; longitudinal (spanning multiple years of the curriculum including years one, year two, and clinical years; or explicitly identified as a longitudinal curricular theme spanning the length of the program); and inclusive of learning opportunities with students or professionals representing other health professions.
4. Experiential IPE: A school's experiential IPE offerings were determined from mentions of required non-didactic IPE, including: in class, interactive activities (e.g., small group discussions; interactive workshops); simulations; and clinical or community-based IPE activities. Furthermore, we coded required IPE experiential offerings as "robust, real-world" programming if: the experiential component exposed students to real-world or simulated interprofessional patient-care scenarios beyond the standard clerkship rotations that took place outside of the classroom (e.g. patient homes, community or clinical settings); included interprofessional collaboration between medical students and students or professionals from other health professions; was multi-session or longitudinal in nature; and explicitly mentioned a focus on IPE or interprofessional collaborative skills.

Documented institutional characteristics included: program type (MD or DO), institutional ownership (public or private), year established, and whether the medical school was located on the same campus or near other health professions schools (which served as a proxy for IPE access.) Additionally, websites were reviewed to determine content comprehensiveness based on whether: a course catalog or descriptions for all required courses and clinical rotations were available online (strong); descriptions for most courses and clinical rotations, but not all, were available online (moderate); the program website did not include any course descriptions, or the descriptions were so weak (e.g., course titles only) that they did not provide sufficient data for coding (weak) and therefore excluded.

The research team initially applied the codebook to a subset of schools to test internal reliability, and modifications were made to address ambiguous language or perceived duplicity of coding items.

Data Collection and Analysis

Three coders performed data collection and coding, with dual coding employed for each institution's website review. A primary and secondary coder independently reviewed each medical schools' websites and documented coding using a standardized codesheet. For each item coded, coders recorded the location of the data source (name of page or document and URL), as well as the actual text referenced for coding.

After performing independent website review, data collection, and coding, coders compared results and reconciled coding discrepancies until a 100% inter-coder agreement rate was reached, consulting a third coder when needed. The primary coder entered final coding for each school into a master data entry Microsoft Excel spreadsheet. Descriptive statistics for medical schools' IPE assessment areas and institutional characteristics were calculated using STATA 16® (StataCorp LLC, College Station, TX).

Results

Forty-six medical schools were included in the initial website review (Supplemental Digital Content, Appendix B). Three medical schools were excluded from final analysis due to website content being insufficient for purposes of content review and analysis (weak comprehensiveness), leaving a final sample size of 43 schools (Table 1).

Institutional Commitment

Overall, 23 schools (53%) demonstrated any institutional commitment to IPE based on available web content. This included individual indicators of presence of interprofessional values in a mission statement, having a strategic plan with IPE included as a priority area, and/or presence of IPE infrastructure such as dedicated faculty or staff, department or center, or other institutional structure. Examples of IPE titles encountered included "Director of Interprofessional Education and Research" and "IPE Program Director". Ten schools from our sample showed institutional commitment to IPE through more than one of these indicators.

Program Competencies

Of the 18 schools that promoted interprofessional collaboration as a core program competency, 10 incorporated the updated Core Competencies for Interprofessional Collaborative Practice developed by IPEC.

TABLE 1. Frequency of Interprofessional Education (IPE) Program Components and Institutional Characteristics Among Newly Established Allopathic and Osteopathic Medical Schools (N=43), 2019-20 Academic Year

IPE Assessment Area	Indicator	n (%)
Institutional commitment	**Institutional Commitment – ANY**	23 (53%)
	• *Mission Statement*	*5 (12%)*
	• *Strategic Plan*	*9 (20%)*
	IPE Infrastructure - ANY	21 (47%)
	• *IPE Faculty or Leadership*	*9 (20%)*
	• *IPE Center, Department, or other resource*	*10 (22%)*
	• *Intentional Design*	*4 (9%)*
Competencies	**Interprofessional program competency – ANY**	18 (42%)
	• *IPEC Competencies*	*10 (23%)*
IPE Curriculum	**Required IPE- ANY**	38 (88%)
	• *Pre-Clinical Yrs IPE*	*34 (79%)*
	• *Clinical Yrs IPE*	*31 (72%)*
	• *Clinical Yrs IPE outside of clerkships*	*15 (35%)*
	• *Longitudinal IPE*	*20 (47%)*
	• *IPE with other health professions (student or professional)*	*32 (74%)*
	• *Student-to-student IPE*	*19 (44%)*
	• *IPE w/other health professionals*	*22 (51%)*
Experiential IPE	**Required Experiential - ANY**	30 (70%)
	• *Experiential IPE during pre-clinical years*	*24 (56%)*
	• *Robust experiential IPE programming*	*17 (40%)*
Intuitional Characteristics		
UME Degree Program	• *MD*	*25 (58%)*
	• *DO*	*18 (42%)*
Website Comprehensiveness[a]	• *Strong*	*30 (70%)*
	• *Moderate*	*13 (30%)*
Other Health Professions Schools[b]	• *Yes*	*32 (74%)*
	• *No*	*11 (26%)*
Institution Type	• *Public*	*15 (35%)*
	• *Private*	*28 (65%)*
Year Established	• *< 2010*	*15 (35%)*
	• *2010/<*	*28 (65%)*

Abbreviations: IPEC = Interprofessional Education Collaborative; UME = Undergraduate medical education

[a] Strong = course catalog or descriptions for all required courses and clinical rotations available; Moderate = descriptions for most courses and clinical rotations, but not all, available

[b] Other health professions schools are located on the same or a shared campus with the medical school

IPE Curriculum

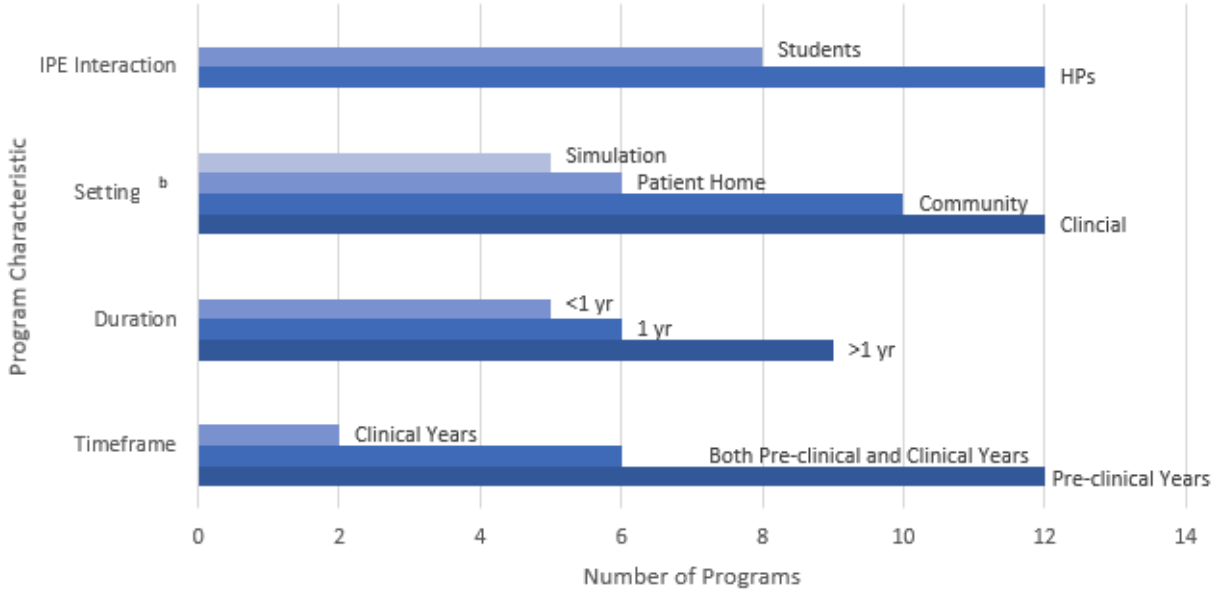
Approximately 90% of schools (n=38) explicitly required IPE in the core curriculum, with slightly more schools including required IPE in the pre-clinical years than in the clinical years. A more detailed assessment of IPE in clinical course descriptions revealed 35% (n=15) of sample

schools required IPE outside of clerkships. We found online evidence of longitudinal IPE across both the pre-clinical and clinical curriculum at about half of the schools (n=20) in our sample. While most schools (n=32) described interprofessional interactions with students or professionals from other health professions as part of the required curriculum, less than half of the schools in our sample explicitly mentioned student-to-student learning opportunities that brought medical and other health professions students together.

Experiential IPE

Thirty schools (70%) included required experiential IPE elements in the core curriculum, with over half requiring experiential IPE during at least one pre-clinical year. We identified 20 experiential programs (Figure 1) at 17 schools that met the criteria for "robust experiential IPE" programming (2 schools offered more than 1 program). Of these, most were integrated in the pre-clinical curriculum, with 6 programs starting in the pre-clinical years and extending into clinical years. Twelve programs exposed students to interprofessional experiences in a clinical environment; 10 in the community setting; 6 in patient homes, and 5 in simulations. Over half of the programs involved medical students working collaboratively with practitioners of other health professions or community members, while nine programs involved student-student interprofessional learning. A content analysis of the 17 robust programs further revealed that one-third (n=6) of them paired students with geriatric patients or those with chronic conditions. Refer to Table 2 for case examples of robust, real-world experiential program descriptions.

Figure 1. Characteristics of Robust, Real-World Experiential IPE Programs[a] (N=20) during Academic Year 2019-20 at 17 Newly Established Allopathic and Osteopathic Medical Schools



Abbreviations: HP = Health professionals

[a] Experiential programs that: exposed students to real-world or simulated interprofessional patient-care scenarios outside of the classroom; included interprofessional collaboration between medical students and students or professionals from other health professions; was multi-session or longitudinal in nature; and explicitly mentioned a

focus on IPE or interprofessional collaborative skills. Core clerkships and clinical rotations customary of the second half of medical school were excluded from this analysis.

[b] Sum of program settings is greater than 20 due to multiple settings for 11 programs

All Recommended IPE Curriculum Components

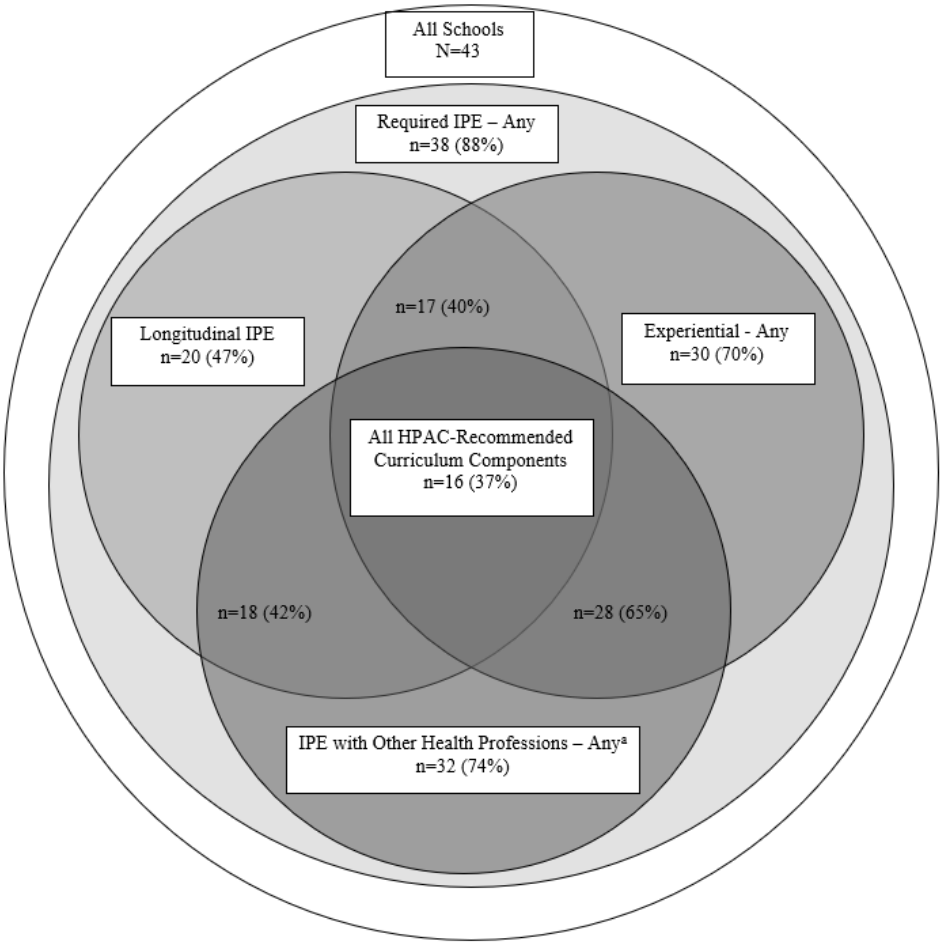
When IPE elements were examined collectively, online data sources revealed 37% of schools (n=16) integrated core curriculum IPE aligning with all of the consensus recommendations that guided our assessment, which were IPE that is: required, longitudinal, experiential, and inclusive of learning opportunities with students or professionals representing other health professions (Figure 2).

Table 2. Robust, Real-World Experiential IPE Programs[a]: Examples from the Field

Medical School	Name of Program	Program Description
Florida International University Herbert Wertheim College of Medicine	NeighborhoodHELP	"This longitudinal program seeks to inculcate cultural competence and social accountability by immersing medical students in the community as members of interdisciplinary teams. Through this novel program, medical students are immersed in the community as members of interprofessional teams, which include nursing, social work, and physician assistant students, with education and law students available per each household's identified needs. During household visits —which continue over three years— students take comprehensive patient and household histories, develop care plans to improve the health and quality of life of household members."
University of South Caroline School of Medicine, Greenville	EMT Training	"Students begin their career in medical education as a vital, active member of an interprofessional healthcare team. The first in the country to do so, the UofSC School of Medicine Greenville requires first-year medical students to complete an emergency medical technician training course to certification. Students spend 12 hours each month serving the community as EMTs, who work in an environment requiring skills in communication, focused patient assessment, documentation and patient safety."
Edward Via College of Osteopathic Medicine	Inter-Professional Early Clinical Experience	"…this is an integrated course, taught throughout the second pre-clinical year and includes clinical experiences such as community health outreach programs (Appalachian medical mission, free clinics, and mini-med schools), inter-professional team clinical experiences, laboratory experiences, radiology, and geriatric rounds. The course offers the student an orientation to clinical medicine from ambulatory and hospital based perspective and prepares the student for the clinical environment."

[a] Experiential programs that: exposed students to real-world or simulated interprofessional patient-care scenarios outside of the classroom; included interprofessional collaboration between medical students and students or professionals from other health professions; was multi-session or longitudinal in nature; and explicitly mentioned a focus on IPE or interprofessional collaborative skills. Core clerkships and clinical rotations customary of the second half of medical school were excluded from this analysis.

Figure 2. Proportion of Newly Established Allopathic and Osteopathic Medical Schools (N=43) that Include Recommended IPE Components in the Core Curriculum, based on Online Program Content, 2019-20 Academic Year



Abbreviations: HPAC = Health Professions Accreditors Collaborative
[a] Students or professionals

Discussion

In reviewing available web content related to IPE requirements at new medical schools established since 2000, we find that the vast majority explicitly state IPE is part of the required curriculum. This finding is in line with data indicating that nearly all allopathic medical schools require IPE,[6] and would be expected based on Liaison Committee on Medical Education (LCME) and Commission on Osteopathic College Accreditation (COCA) IPE accreditation standards. However, only one third of the schools appear to offer IPE that fully adheres to HPAC and other leading bodies guidance that recommends IPE to be longitudinal, experiential and include interaction with other health professions students and professionals. Further, nearly half lack any evidence of recommended institutional commitment to IPE through designated resources or

adoption of IPE-supportive competencies. The wide variation in the breadth and scope of individual IPE offerings sheds light on both areas of strength and opportunities for improvement in adoption of recommended IPE program design elements.

Notably, we find that the minority of medical schools in our sample explicitly mention required IPE opportunities with other health professions students, a necessary element of IPE by definition.[1] This latter finding is at odds with reported data and accreditation language and could have several explanations. The Association of American Medical Colleges (AAMC) reports that nearly 100% of all allopathic medical schools include IPE with students from other health professions.[6] Further, both LCME and COCA explicitly mention interaction with other health professions students in accreditation standards. Therefore, we expected to find ubiquitous evidence of interprofessional student-to-student learning opportunities among our sample schools. There are several possible explanations for the discrepancy we note. The AAMC data is self-report, and respondents could have answered based on IPE activities more broadly (e.g., didactics, clerkships where students interact with other health professionals) as opposed to those specific to student-to-student learning. Second, both LCME and COCA accreditation standards dictate that IPE should bring students together with other health professions students *or professionals.* Given reported challenges of implementing IPE involving students from multiple health professions[11,12] and accreditors' broad language allowing for IPE standards to be met based on interactions with other health professionals (which could easily be incorporated in clinical experiences), we would find it surprising if nearly every MD program does, in fact, include required IPE with other health profession students in the curriculum. Conversely, our content review may not have captured individual elements of IPE, like student-to-student learning, embedded in the broader IPE programming descriptions. In other words,it is possible the element of student-to-student learning is included in IPE, just not explicitly mentioned in course descriptions. Given medical students' positive reactions to IPE with other health professions students, schools may want to more clearly promote this aspect in curricular descriptions.[8]

In addition to variation in IPE curricular offerings, we observed variation in the adoption of other recommended IPE program components at new schools. We were surprised that only a quarter of schools formally adopted and published IPEC competencies given the wide attention they have received in the scholarly and academic communities and the clear guidance, language, and rationale they provide schools to support their adoption.[15] Inclusion of IPEC competencies in an MD or DO program's stated competency goals may be one way schools can demonstrate accountability to IPE standards. Additionally, schools can demonstrate institutional commitment to IPE through their mission statements, strategic plans, and IPE infrastructure such as dedicated personnel. Our assessment revealed the latter to be the most common of these components. According to HPAC, formalizing IPE leadership roles can "help stimulate and/or drive the creation of a systematic IPE approach…" in schools.[14] We identified dedicated IPE faculty or leaders at about one-fifth of the schools in our sample. However, many schools in our sample had strong IPE programming without these designated IPE leaders in place, suggesting that institutions can still show a curricular commitment to IPE without necessarily needing to implement widespread infrastructure to achieve it.

Given that IPE typically involves interactions with other health professionals, students, and in some cases directly with patients in their homes or other settings, the potential

implications of COVID-19 on IPE in medical education are far reaching. Virtual learning, a model some medical schools are shifting to for pre-clinical students, will prevent in-person IPE between health professions students. When students do return to campus, physical distancing measures may still be in place, leading to decisions to reduce or eliminate opportunities for health professions students to interact. Experiential IPE that puts students in real-world patient care settings may also need to be reimagined. Our findings, representing programming in place pre-COVID-19, show that several of these programs in our sample exposed students to vulnerable populations like the elderly or people with chronic disease, and that many of them introduced students to patients' homes. In the wake of COVID-19, these program characteristics raise significant safety and feasibility concerns.

Despite these challenges, emerging literature presents interprofessional collaboration as even more critical in a COVID-19 and post-COVID-19 world due to changing workforce needs and unprecedented demands on health professionals and health systems, ushering in renewed calls to prioritize IPE in health professions education.[23-25] Leadership and faculty in academic medicine will need to think beyond the traditional classroom or clinically-based teaching modalities to explore innovative ways to deliver effective IPE and create communities of learning in online environments.[25] Simulated IPE, a relatively rare occurrence in the schools we examined, may need to be expanded as one strategy for minimizing risk. HPAC recognizes the need for context responsive IPE in their guidance, providing examples of effective alternate learning modalities including video conferences, simulations, and even interprofessional gaming. Further research and program evaluations will be crucial to understanding what works in IPE innovation and how to scale successful programs and strategies for broad implementation.

Whether or not medical schools' websites and their concomitant resources are valid indicators of on the ground programming is a question warranting further inquiry. It is possible that the gaps in IPE our study revealed may reflect a lack of detail in published content rather than the actual absence of these elements. However, nearly three-quarters of our sample schools' websites included descriptions of all core courses and clerkships (usually from the program's course catalog). When IPE elements are omitted from these descriptions, it indicates either that these opportunities are not offered, or that they are offered but not promoted. Either scenario presents an opportunity for medical schools to strengthen their commitment to IPE. For schools falling into the latter scenario, elevating IPE offerings on the program website and in promotional materials could be a light lift that would benefit prospective students who rely on schools' websites for program information as well as schools that want to meet students' demand for IPE opportunities. Finally, we recognize that valuable IPE opportunities can be obtained outside of the core curriculum, and in fact, are encouraged by HPAC and others. An assessment of IPE opportunities outside of the required curriculum, including electives, student run free clinics, and service learning and volunteer opportunities was beyond the scope of this study, representing another area for future examination.

Conclusion

Our content review of newly established medical schools' websites suggests integration of IPE as a required element of the core curriculum is nearly universal among this sample, but wide variation in the adoption of other recommended IPE components exists. While website content may not fully reflect the reality of IPE programming, this research contributes to a more

comprehensive picture of the IPE landscape in UME and represents the first analysis of medical school IPE based on consensus recommendations. Future research examining the associations between IPE program characteristics and outcomes of interest, such as collaborative practice readiness or likelihood of practicing in an underserved community or team-based care model is suggested. Additionally, research is needed to understand the extent to which school website content reflects real-world program implementation and how schools are preserving and adapting IPE programming in the wake of COVID-19.

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