

Creating a community of innovation

Annotated bibliography

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This annotated bibliography is a compilation of scholarly work published by the schools of the American Medical Association Accelerating Change in Medical Education Consortium related to the innovations being implemented through consortium grants.

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Ayala N, MacDonnell CP, Dumenco L, Dollase R, George P. [A cross-sectional analysis of perceptions of interprofessional education in medical students](#). *Ann Behav Sci Med Educ*. 2014;20:6-9.

This article describes a longitudinal study examining medical students' attitudes toward other health professions and interprofessional collaboration throughout their four years of medical school training. Medical students in this study participated in two required interprofessional education activities prior to graduation. One workshop occurred early in their second year. The second occurred in the beginning of their third year. The study also included first year medical students as a control group since they had not yet participated in an interprofessional workshop. The Readiness for Interprofessional Learning Scale (RIPLS) was used to measure students' perceptions toward interprofessional education. There was a statistically significant difference on the total RIPLS score between the Year 1 mean and the Year 4 mean. However, the difference disappeared when the Year 2 mean was compared with the Year 4 mean. This article informs efforts made by schools working to better integrate interprofessional education into their curricula by demonstrating that both formal and informal opportunities improve student attitudes toward interprofessional collaboration.

Banerjee R, George P, Priebe C, Alper E. [Medical student awareness of and interest in clinical informatics](#). *J AM Med Inform Assoc*. 2015;22:e42-e47.

This article describes a study about medical students' attitudes toward clinical informatics (CI) training and careers. A web-based survey was distributed to the students at four allopathic medical schools. The survey provided definitions and examples of CI electives for medical students, CI electives during residency, and CI academic fellowships. The survey then asked students to rate their previous awareness and their potential interest in each of these opportunities. Five hundred and fifty-seven medical students responded. Thirty percent of the student respondents expressed at least some interest in a CI-related career, but they were no more aware of training opportunities than their peers who did not express such an interest. This article informs the work of medical educators interested in improving CI training by identifying a need for CI training and mentoring opportunities that may positively influence the size and skill set of the future CI workforce.

Baxley EG, Lawson L, Garrison HG, et al. [The teachers of quality academy: A learning community approach to preparing faculty to teach health systems science](#). *Acad Med*. 2016;91:1655-1660.

This article describes the Teachers of Quality Academy (TQA) program established by Brody School of Medicine at East Carolina University in January 2014. The program had a dual goal of preparing faculty to lead frontline clinical transformation while becoming proficient in pedagogy and curriculum design necessary to prepare students for developing health systems science (HSS) competencies. The

TQA included the completion of the Institute for Healthcare Improvement Open School Basic Certificate in Quality and Safety; participation in six two-day learning sessions on key HSS topics; completion of a quality improvement (QI) project; and participation in three online graduate courses. Twenty-seven faculty members from four health science programs completed the program. All completed their QI projects. Nineteen (70%) have been formally engaged in the design and delivery of the medical student curriculum in HSS. This article informs faculty development programs in health professions education by outlining a faculty development curriculum for improving knowledge and skills in HSS as an educational initiative for faculty.

NEW

Borkan JM, Paul G, Tunkel AR. [Curricular transformation: The case against global change.](#) *Acad Med.* Jan. 30, 2018. [Epub ahead of print]

In this commentary, the authors make the case for medical schools to pursue more circumscribed solutions to curricular redesign for undergraduate medical education rather than whole system changes—at least as first steps and perhaps as ultimate solutions. While they focus primarily on the experience at the Warren Alpert Medical School (AMS) of Brown University, they believe the insights gleaned from their experiences are generalizable to other innovations and other medical schools. The authors describe the implementation of the Primary Care – Population Medicine track at AMS as a working example of implementing circumscribed rather than global change, and

they discuss the advantages and disadvantages of such an approach to curriculum transformation. This article documents the experience of one consortium school with changing their curriculum and can inform the efforts at other medical schools making significant changes.

Brown DR, Warren JB, Hyderi A, et al. [Finding a path to entrustment in undergraduate medical education: A progress report from the AAMC Core Entrustable Professional Activities for Entering Residency Entrustment Concept Group.](#) *Acad Med.* 2017;92:774-779.

This paper describes the progress of schools piloting the 13 core entrustable professional activities (EPA) for Entering Residency, which were created to address gaps between medical school and residency, and better prepare medical students to meet the expectations of their residency program directors. The core EPAs provide a framework for supervisors to be able to utilize assessments and provide feedback to students about their ability to perform in workplace settings. Ten medical schools are piloting the implementation and evaluation of the core EPAs to better understand how to entrust students to perform specified activities. Within the pilot, one work group focused on the concept of entrustment and developed guiding principles for entrustment based on discussions and a literature review. This group discussed the entrustment process in the context of perceived trust of the learner, a supervisor's overall workplace-based assessment of a learner, and the summative decisions made for each core EPA. Entrustment was defined at the

point that students have the required knowledge, skills, and attitudes, as well as at the point of demonstrating elements of trustworthiness which indicate student entrustment of performing a core EPA without supervision. In addition, the workgroup recommends guiding principles for making summative decisions to make this process more transparent for students and faculty. This workgroup created a developmental framework of trustworthiness, which is comprised of three distinct dimensions: discernment of limitations, truthfulness, and conscientiousness. Various elements of this framework will be tested in the next phase of the pilot including the validity of the scale and various approaches used by each school. Furthermore, the group will continue to evaluate and discuss facilitators and barriers to implementing the guiding principles within each school. The future work of this group in evaluating the entrustment process and piloting different approaches to compiling evidence of trustworthiness will help inform medical schools' efforts in implementing a deliberate approach to assessment that bridges the gap between medical school and residency.

Bumsted T, Schneider BN, Deiorio NM.
Considerations for medical students and
advisors after an unsuccessful match.
***Acad Med.* 2017;92:918-922.**

This perspective article discusses issues related to unmatched medical students, as well as options that they may consider with their advisors and medical schools through this difficult experience. First, students and faculty need to familiarize themselves with

their school's policy for delaying graduation. Many schools do not include matching as a requirement for graduating. While delaying graduation may assist students in improving clinical skills and procuring stronger letters of recommendation, this may not be allowed at some institutions. Some schools do not allow this option once students have met graduation requirements to avoid jeopardizing a student's ability to graduate if they are already in good standing, increased indebtedness, and clinical site capacity. Second, it is unclear if adding more information to the Dean's Letter will increase the likelihood that a student will match in subsequent cycles. However, the authors recommend an addendum describing experiences not covered in the previous Dean's Letter. Additional information about experiences in advanced clinical rotations may be an important factor for program directors seeking more clinical performance evaluations. If an unmatched student is unable to obtain a residency position during the SOAP process, they generally have three options: seeking a position immediately following the SOAP but before residency begins; obtaining a position the year following residency due to a vacancy; reapplying the next year, whether to the same specialty or a different one. The authors also identified the 10 out of 33 factors program directors consider in applicants can be improved on after the initial match process. Alternative avenues for unmatched students to strengthen their application include paid employment, volunteer work, or obtaining an additional degree or certification, while others may

decide to pursue a nonclinical career. Lastly, the authors offer guidelines to faculty members on advising unmatched students. This perspective assists medical schools in creating deliberate strategies for advising unmatched students, particularly at a time in which medical schools are actively working toward decreasing the shortage of primary care physicians.

Burk-Rafel J, Mullan PB, Wagenschutz H, Pulst-Korenberg A, Skye E, Davis MM. [Scholarly concentration program development: A generalizable, data-driven approach.](#) *Acad Med.* 2016;91:S16-S23.

This article describes an approach that medical schools can use to develop scholarly concentration programs based on student preferences and existing expertise. First the authors thematically analyzed the internet content of scholarly concentration programs at top research or primary care United States medical schools. Next, the authors conducted a survey to understand which scholarly concentrations were of interest to students at their institution. Exploratory factor analysis was used to examine the relationships between topics which were rated by students on the survey, and an optimization algorithm was created to understand logistical approaches to increasing the number of students able to participate in their first or second choice of concentration. The factor analysis indicated eight pathway preferences that medical schools could implement. The algorithm determined that offering six pathways would allow 95% of a 171 student first-year class to participate in their first or second choice.

This article informs medical schools exploring implementation of scholarly concentrations to provide more learner-focused opportunities.

Cangiarella J, Fancher T, Jones B, et al. [Three-year MD programs: Perspectives from the Consortium of Accelerated Medical Pathway Programs \(CAMPP\).](#) *Acad Med.* 2017;92:483-490.

This article describes the three-year medical degree programs of medical schools that are members of the Consortium of Accelerated Medical Pathway Programs (CAMPP), which is supported by the Josiah Macy Jr. Foundation. The goal of the consortium is to provide networking support and collaboration opportunities for medical schools with existing accelerated programs, as well as provide information regarding scalable, replicable, and portable models for medical schools considering implementing an accelerated program. This article describes each program's specialty focus, mission, financial support, and student selection process among other relevant descriptive information. In addition, the authors address concerns with regard to students in accelerated programs learning the same content as their peers in traditional programs, as well as regulatory requirements and the implications of different options regarding the residency match. Lastly, the authors describe lessons they have learned through implementing an accelerated program. The work of the CAMPP helps medical schools understand how to improve the continuum from undergraduate medical education to graduate medical education, particularly as it relates to implementing

competency-based education programs which may accelerate a student's progress toward graduation.

Carney PA, Haedinger LA, Kahl LE, Deiorio NM, Bonura EM, Kraakevik JA. [The association between assigned independent learning schedule and medical student performance on examinations.](#) *Med Sci Educ.* **2017;27:253-257.**

This article explores the experiences of one medical school with a schedule structure that provides students with independent learning time throughout the week with weekly examinations occurring on Friday. Independent learning times are available on Monday afternoons, Tuesday mornings, and Thursday afternoons. Students assigned to Monday and Tuesday times were concerned that they were at a disadvantage because they had less study time just prior to the examination. In response, the school conducted a study with one class of medical students (second class to participate in the new curriculum and structure). There was no statistical difference in weekly test scores based on when students were assigned to an independent learning time. As medical schools begin to reform their curriculum and structure, it is important to develop an evidence base for new concerns that may arise. This awareness will lead learners and researchers to explore other ways to improve examination performance and will inform the work of other medical schools implementing curricular reform.

Chen HC, McNamara M, Teherani A, ten Cate O, O'Sullivan P. [Developing entrustable professional activities for entry into clerkship.](#) *Acad Med.* **2016;91:247-255.**

This article describes a multistep process for developing and appraising content validity evidence for entrustable professional activities (EPA) for clerkship entry. The process started with a study of student-run clinics, the results of which were confirmed with preceptor interviews and student focus groups. To ensure the relevance and adequacy of the EPA content domains derived from this process, they were mapped to existing competency frameworks to establish credibility with stakeholders and provide a framework for observation and assessment. Next, with the assistance of experts, the content of each EPA was expanded on beyond its content domain to include a detailed delineation of the expected observable behaviors and the context for those behaviors. These EPAs were further refined three times with the help of local, national, and international medical educators through meetings and conferences. A final review was conducted with an EPA expert and local stakeholders to ensure adherence to EPA principles and the appropriateness and alignment of the EPA content with curricular objectives. The EPAs developed, as well as the multistep process utilized to develop them, informs both local and national efforts in developing or improving competency frameworks for new content areas.

Chertoff J, Wright A, Novak M, et al.
[Status of portfolios in undergraduate medical education in the LCME accredited US medical school.](#) *Med Teach.* 2016;38:886-896.

This article describes the results of a survey to investigate the number of medical schools accredited by the Liaison Committee on Medical Education utilizing portfolios, the format of portfolios, information technology (IT) innovations, purpose of portfolios, and their ability to engage faculty and students. The majority of schools that responded and identified themselves as portfolio-users, utilized electronic longitudinal competency-based portfolios with a minority utilizing visual tracking of student progress over time. Less than half of respondents reported that portfolios were used for formative and/or summative purposes. Respondents also described faculty development as the most important barrier to implementing portfolios, which may lead to poor faculty engagement. Likewise, respondents identified dedicated mentorship for the students as the most important facilitator of portfolio success. Another barrier to implementing portfolios is student resistance due to limited experience and lack of engagement in reflective learning. Lastly, IT and administrative support was identified as a facilitator to implementing portfolios, particularly with IT support that is responsive to user input. This study informs efforts made by medical education programs by identifying education technology needs for medical schools, as well as by describing factors that can facilitate and hinder IT implementation within a specific locale.

NEW

Cirigliano MM, Guthrie C, Pusic MV, et al. [“Yes, and ...” Exploring the future of learning analytics in medical education.](#) *Teach Learn Med.* 2017;29(4):368-372.

The article explores the future possibilities of learning analytics in medical education, including advancements in interaction metrics and the use of interactivity analysis to deepen understanding of perceptual, cognitive, and social learning and transfer processes. Learning analytics is a multidisciplinary endeavor that uses data collected from learner interactions with technology to uncover the relation between learner activity online and subsequent performance in order to reveal important information about effective learning and study approaches. Analyses of this nature have the potential to improve theoretical understanding of knowledge and skill acquisition by elucidating the mechanisms of action whereby learning occurs. The sophistication of interaction metrics and performance assessment measures is limited only by the creativity (and budget) of those who design and develop technology-enhanced learning. Deriving deeper understanding from learning analytics requires equally sophisticated data collection strategies that enable investigation of context, validation of interaction metrics, and evaluation of practical application. This article informs the consortium’s work on improving assessment, particularly with regard to competency-based education and technology enhanced learning in medical education.

Clay AS, Chudgar SM, Turner KM, et al. [How prepared are medical and nursing students to identify common hazards in the intensive care unit?](#) *Ann Am Thorac Soc.* 2017;14:543-549.

This study explores how often nursing and medical students identify patient safety issues in hospital settings, as well as the differences in individual and team performance. Ninety-three fourth-year medical students and 51 accelerated Bachelor of Science in Nursing students participated in the “Room of Horrors” simulation as a mandatory component of their coursework. These sessions occurred in a high-fidelity simulation room. Each student completed an individual simulation and an interprofessional team simulation. These sessions occurred in a hospital setting and included hazards specific to infection control, hospital-acquired infections, skin breakdown, and delirium. Assessment data from the individual simulations informed a patient safety discussion that occurred one week later, which was followed by the team-based simulation. A mixed-methods approach was used to identify how often students identified patient safety issues and to understand differences in individual and team performance. Overall, hazard identification was low, and there were interprofessional differences. While medical students were more likely to identify indications for several therapies, nursing students were more likely to identify improper use or incorrect functioning of medical equipment. Although interprofessional teams of students performed better than individuals, teams missed many patient safety hazards that are

specific to the intensive care unit. A majority of students who completed an evaluation for the activity indicated that the “Room of Horrors” should be used again and provided examples for why they were able to identify more hazards as an interprofessional team. This study informs health professions education programs implementing patient safety and interprofessional practice assessments. This simulation can be administered to students, faculty, and practitioners and can inform health systems of gaps in their patient safety practices.

Clyne B, Rapoza B, George P. [Leadership in undergraduate medical education: Training future physician leaders.](#) *R I Med J.* 2015;98:36-40.

This article describes the design and implementation of a leadership curriculum at the Warren Alpert Medical School of Brown University (AMS) for students in the primary care-population medicine program with the goal of engaging students with leadership topics starting early in the preclinical stages of training. The “Leadership in Health Care” (LHC) course was designed based on multiple needs assessments, interviews with physician leaders, and consideration of a wide range of leadership theories relevant to health care and appropriate to student curriculum. Each LHC session focuses on one core topic using techniques that address the needs of adult learners. They are designed to be goal-oriented, related to prior experiences, practical, and interactive. Lastly, a critical component of the LHC course is the leadership action project, which is a

longitudinal, experiential learning, team activity that allows students to apply lessons learned in class to their leadership development. This article informs medical schools seeking to offer evidence-based leadership experiences at their institutions.

Cook D, Triola M. [Educational technologies in health professions education: Current state and future directions](#). *Josiah Macy Jr Foundation Conference on Enhancing Health Professions Education through Technology*. 2015:71-111.

This paper, commissioned by the Josiah Macy Jr. Foundation, explores the various technologies currently available for health professions education (HPE), the extent to which technologies have delivered on promised transformations, and how faculty in HPE may maximize the value of educational technologies. Educational technologies (ET) are defined as materials and devices created or adapted to solve practical problems related to training, learner assessment, or education administration. Specific educational technology trends in HPE are discussed. While computer-based technology can facilitate the transmission of information and the collection and analysis of data, technology itself will not transform how students learn and educators must continue to focus on the fundamental principles of learning. In addition, due to the variation of institutional needs, it may be impossible to mandate any specific technological infrastructure other than access to human expertise in developing and implementing needed solutions. As such, administrators

need to develop both depth and diversity in local teaching expertise, and the community at large needs to develop a culture of sharing. Lastly, the authors call for increased scholarly efforts directed to developing an evidence base of ET that ask questions pertaining to the design and effective implementation of future courses, rather than comparisons of the past. This paper informs the broader health professions education community on the necessary next steps for better implementing and integrating ET within educational experiences.

Cunningham PRG, Baxley EG, Garrison HG. [Transforming medical education is key to meeting North Carolina's physician workforce needs](#). *NCMJ*. 2016;77:115-120.

This article discusses the role of Brody School of Medicine's model of preparing a primary care physician workforce for meeting North Carolina's (NC) future physician workforce needs. Brody's success in meeting its mission of increasing the supply of primary care physicians in NC can be attributed to recruiting students only from NC, conducting a holistic review of applicants, providing a primary care-focused educational process, and maintaining low tuition rates so specialty choice is not significantly influenced by student debt. To address continuing issues of disparities within NC, Brody is focusing on improving the competency of its graduates in health systems science and preparing its faculty to institute a curricular emphasis on health systems science. In addition, Brody is reemphasizing its original mission to

continue addressing the racial and ethnic diversity of NC's current health care professionals by ensuring that as much as one-fifth of each medical school class is comprised of minority students (compared to a national mean of 6%). Moving forward, the ongoing decline in the number of primary care physicians who choose to practice in NC needs to be addressed, and NC must find ways to increase residency positions in the state and create more opportunities for medical school graduates to do at least part of their residency training in rural areas of NC. Lastly, NC must create policies, mechanisms, and incentives that will help them meet the health care needs of the future. This article validates the continued need for innovation in both undergraduate and graduate medical education to address the needs of disparate populations in the United States.

Cutrer WB, Miller B, Pusic MV, et al.
[Fostering the development of master adaptive learners: A conceptual model to guide skill acquisition in medical education.](#) *Acad Med.* 2017;92:70-75.

This article introduces and discusses the conceptual model of a master adaptive learner (MAL), which will provide future physicians with strategies for learning within and adapting to a changing health care environment more effectively. The concept of a MAL describes a metacognitive approach for learning based on self-regulation that can foster the development and use of adaptive expertise in practice. Specific behaviors related to preparation for future learning, such as asking pertinent questions, using resources that lead to

practice change, and strategically seeking feedback are the foundation of a MAL who functions effectively, balancing routine and adaptive expertise. In addition, the MAL model was informed by the Practice-Based Learning and Improvement competency domain of the Accreditation Council for Graduate Medical Education and the American Board of Medical Specialties, as well as the plan-do-study-act cycle used for continuous quality improvement. The major components of the MAL process are planning, learning, assessing, and adjusting. The process for moving among these phases is meant to be iterative, based on existing issues that are resolved and new questions that emerge. The MAL model and this article informs the health professions education community's understanding of components related to student development, outcomes, and the impact of the learning environment.

Daniel M, Fleming A, Grochowski CO, et al. [Why not wait? Eight institutions share their experiences moving United States Medical Licensing Examination Step 1 after core clinical clerkships.](#) *Acad Med.* 2017; 92:1515-1524.

This perspective article explores the experiences of eight medical schools that made curricular changes facilitating students' completion of the United States Medical Licensing Examination (USMLE) Step 1 examination after they complete the core clerkships. Currently, there is no consensus on this topic, and studies examining basic science retention after completion of the USMLE Step 1 have some inconsistencies. Medical schools that have

made this change have done so with the goals of improving retention of basic science content, integration of basic science content within clinical settings, and student preparation for the USMLE Step 1 as the vignettes used within the examination have become longer, more complicated, and more clinically focused. The authors described logistical details of moving the USMLE Step 1, including issues related to timing and relevant curricular features. Among these eight schools, there was not one way of implementing this change, and some schools are flexible with the amount of time they allow for studying and completing the examination. In addition, schools incorporated a variation of learning platforms and activities to facilitate student retention of basic science knowledge. All schools that have already made this change and those that have USMLE Step 1 score data for students who completed the examination before and after the core clerkships reported some increase in aggregate scores, though these differences may not be statistically significant and are not generalizable. An unanticipated outcome experienced by schools that are flexible in when students can take the USMLE Step 1 reported that allowing students' independence in choosing when they take the examination caused students anxiety with the lack of available data to inform their decision. Additional empirical studies need to be conducted to understand examination score differences for students who completed the examination before and after the core clerkships. Specific attention needs to be given to both low and high performing students, as well as both class

and individual differences in the context of each school's curriculum. This article fills a gap in informing medical schools of the facilitators and barriers to making this change, as more educators are advocating for individualized experiences and competency-based curricula.

Deiorio NM, Carney PA, Kahl LE, Bonura EM, Juve AM. [Coaching: A new model for academic and career achievement](#). *Med Educ Online*. 2016;21:33480.

This article discusses the need for definitions and constructs for academic coaching in medical education, in order to accurately assess the coaching relationship and processes. The purposes of the article are to (1) define the concept of coaching and create a conceptual framework applied to medical education and (2) identify and define constructs for measurement. As medical knowledge continues to expand, physicians must become skilled in identifying gaps in knowledge and skills and continually embark on cycles of self-improvement. Coaching is emerging as a potential approach to facilitate this process, and it represents a shift from traditional advising and mentoring. With these proposed definitions and constructs further research should be conducted to examine how to measure the coaching relationship and process and its effects on learning outcomes, lifelong self-directed learning, and overall academic development at varying skill levels. This article informs the work of health professions education programs seeking to implement or improve coaching programs.

Deiorio N, Juvel AM. [Developing an academic coaching program](#). *MedEdPublish*. 2016.

This article presents recommendations for building a coaching program through review of the literature and the authors' own experiences. A clear definition of academic coaching as a developmental longitudinal relationship distinct from advising, mentoring, and teaching is the foundation on which this concept should be introduced to faculty and learners. In addition, faculty with the right skills, not content expertise, should be selected as academic coaches, as learners also need to be developed to be coached. Likewise, coaches also need to be prepared to help learners navigate their academic experience. It is also helpful to keep a regular schedule for both meetings between the coach and learner, as well as for faculty development to provide coaches with evidence-based resources and feedback on their coaching. With regard to assessment data, electronic portfolios can be used to as a tool to make assessment information readily available and transparent to coaches. However, in this capacity it is not recommended that coaches also act as assessors. Lastly, it is necessary to acknowledge faculty members as coaches and support them through creating an environment in which they can learn from each other, as well as other coaching programs. One way to sustain a coaching program's growth is through a deliberate evaluation process that measures progress on high-level outcomes. These recommendations contextualize academic coaching within health professions education, creating a framework that

institutions can use when implementing and developing new coaching programs.

Denny JC, Spickard A, Speltz PJ, Porier R, Rosenstiel DE, Powers JS. [Using natural language processing to provide personalized learning opportunities from trainee clinical notes](#). *J Biomed Inform*. 2015;56:292-299.

This article describes a novel electronic adviser system using natural language processing (NLP) to identify two geriatric medicine competencies from medical student clinical notes in the electronic health record (EHR). Clinical notes from third year medical students were processed using a general-purpose NLP system to identify biomedical concepts and their section context. The system analyzed these notes for relevance to the competencies and generated custom email alerts to students with embedded supplemental learning material customized to their notes. In total, 393 emails were sent to 54 students (82% enrolled), including 270 for one competency and 123 for the other. The system selected and emailed links to 260 unique documents from the medical school curriculum in the 393 adviser emails sent to students, with some documents being included by design. Students accessed educational links 34 times from the 393 email alerts. Although the system had a small effect in changing behavior, the advantage of this assessment is that it is measuring real clinical change in documentation. Given the low cost and burden of such a system, these education advisers may be a useful adjunct to other forms of instruction. This article provides an example of how NLP has been used within

an EHR-based intervention to provide students feedback outside of the potentially time-pressured clinical environment. As some schools are considering new information that can be integrated into EHRs for teaching and practice, this article provides an example of how competencies may be evaluated using NLP in EHR-based interventions.

NEW

Ecker DJ, Milan FB, Cassese T, et al. [Step up—not on—the Step 2 Clinical Skills Exam: Directors of Clinical Skills Courses \(DOCS\) oppose ending Step 2 CS.](#) *Acad Med.* 2017 Aug 22. [Epub ahead of print]

This article explores the student-initiated movement to end the United States Medical Licensing Examination Step 2 Clinical Skills and the Comprehensive Osteopathic Medical Licensing Examination Level 2-Performance Evaluation and makes recommendations to improve their usefulness to students, medical schools, and key stakeholders. The authors, elected representatives of the Directors of Clinical Skills Courses, an organization comprising clinical skills educators in the United States and beyond, believe abolishing the national clinical skills examinations would have a major negative impact on the clinical skills training of medical students, and that forfeiting a national clinical skills competency standard has the potential to diminish the quality of care provided to patients. The proposed transfer of responsibility for clinical skills examinations to medical schools also raises significant concerns about local assessment quality,

rigor, reliability, validity, and security. The authors recommend reducing the costs for students, exploring alternatives, increasing the value and transparency of the current examinations, recognizing and enhancing the strengths of the current examinations, and engaging in a national dialogue about the issue. This article explores one aspect of assessment that can have an impact on medical education transformation.

Elks ML, Herbert-Carter J, Smith M, Klement B, Knight BB, Anachebe NF. [Shifting the curve: Fostering academic Success in a diverse student body.](#) *Acad Med.* 2018; 93: 66-70.

This article describes a process that resulted in a high level of academic success for a diverse student body at the Morehouse School of Medicine (MSM), a historically black medical school. On average, about 75% of matriculating students are African-American and 5% are from other underrepresented groups in medicine. Their entering grade point averages (GPA) and Medical College Admission Test (MCAT) scores are similar to those reported nationally by race/ethnicity, but their United States Licensing Examination (USMLE) Step 1 scores are higher than expected based on their MCAT. To understand which factors contribute to their success on the USMLE Step 1 the authors first compared their students' MCAT scores to the national average for each cohort. Next, the authors determined scores from the students' first attempt at the USMLE Step 1 and calculated correlation coefficients comparing the MCAT scores to the USMLE Step 1 scores for each class. Next, they used a formula

from the literature to predict students' USMLE Step 1 scores based on their GPA and MCAT scores, and their students' scores were 22.6 points higher than the calculations predicted. Lastly, they collected data from course evaluations, an annual questionnaire, and interviews and focus groups with faculty members and students to understand which factors influenced these outcomes. Based on their qualitative analysis, the authors believe this success can be attributed to the milieu and mentoring at the school, structure and content of the curriculum, and monitoring. At MSM, faculty and peer supports are offered through longitudinal learning communities that begin in the students' first year of medical school. In addition, MSM has several mechanisms in place to provide feedback to students and continuous quality improvement for faculty. Several mixed methods studies are underway to more closely examine the factors identified. This report, and future studies, will help other educational programs facilitate environments that lead to successful outcomes for a diverse student body.

Ellaway RH, Pusic MV, Galbraith RM, Cameron T. [Developing the role of big data and analytics in health professional education](#). *Med Teach*. 2014;36:216-222.

This article reviews the potential of educational analytics and big data in health professional education and makes recommendations for how these techniques can be developed to serve all stakeholders. Big data involves the aggregation of large and heterogeneous datasets. A few examples of how big data can be used are increasing personalized competency data at the

individual learner level; a longitudinal capture of data from a single institution from multiple sources, times, and cohorts; parallel capture of data across different institutions at a single time point; combining longitudinal and cross-sectional data; and combining data from educational and clinical information repositories. Likewise, educational analytics are used to look for patterns in educational practice or performance, although it is unclear how big data should be used to guide both learners and institutions in making decisions. Additionally, it is important to remember that big data is open to bias and misinterpretation no less than traditional methods of research, evaluation, or assessment. This article informs the health professions educators' efforts in developing large data sets to measure the impact of innovations over time. As the researchers and evaluators build datasets, it is important to be cognizant of the purpose, methods, and challenges articulated in this article.

Ehrenfeld JM, Spickard WA, Cutrer WB. [Medical student contributions in the workplace: Can we put a value on priceless?](#) *J Med Syst*. 2016;40:128

This article discusses the need for a series of research projects to assess the value of medical student contributions in patient care and health care settings in which they train and participate. A few challenges to measuring value are a lack of a shared understanding of how to define either value or contributions and understanding the contributions of a single team member. This article proposes that it would be helpful to define nomenclature around medical student

contributions. This article sets a foundation in medical education to enable stakeholders to quantify contributions across settings and roles. This work would solidify faculty expectations of students and inform appropriate assessments of their contributions.

Epstein-Lubow G, Cineas S, Yess J, Anthony D, Fagan M, George P. [Development of a longitudinal integrated clerkship at the Warren Alpert Medical School of Brown University](#). *R I Med J*. 2015;98:27-31.

This article describes the introduction of a longitudinal integrated clerkship (LIC) by the Warren Alpert Medical School of Brown University. The LIC is a method of clinical medical education in which traditional specialty-specific block rotations lasting several weeks and occurring sequentially are replaced by longitudinal experiences for all core specialties occurring concurrently over many months and largely in the outpatient setting. The LIC is for third year students in the primary care-population medicine program. In developing the LIC, program faculty incorporated a historical perspective of medical education, modern knowledge about students' development of clinical skills, and educational science as it relates to faculty development and learner evaluation. The clerkship is being tailored to fit the Brown University system as it will be unique in its attention to population medicine, including exposure of students to several distinct health care systems within a single geographic region, and integration of clinical training with completion of a Master in Population Medicine. The goals are to

gain longitudinal experience in each of six core clerkships; promote continuity with patients and their care environments; integrate population health with clinical medicine; longitudinally follow and participate in treatments of patients across specialties; and complete a quality improvement and/or patient safety project focused on population medicine. For the 2015-2016 academic year the LIC was a pilot and was the required core clinical education for medical training for eight selected students. Based on assessments of the program and students' performance, the LIC will be adjusted to better aid student learning and overall functioning of the LIC program within affiliated health care systems. This article informs medical schools interested in implementing a LIC while deliberately integrating topics related to population medicine.

Erlich M, Blake R, Dumenco L, White J, Dollase RH, George P. [Health disparity curriculum at the Warren Alpert Medical School of Brown University](#). *R I Med J*. 2014;97:22-25.

This article discusses the health disparity curriculum that has been implemented at Warren Alpert Medical School of Brown University. In addition to acquiring knowledge of basic sciences and clinical skills, medical students must gain an understanding of health disparities and develop a defined skill set to address these inequalities. Using Kern's six-step approach to curriculum development along with principles of experiential and active learning, student champions and the office of medical education developed a

multimodal health disparities curriculum. This curriculum includes required experiences for medical students in the first, second and third years, along with elective experiences throughout medical school. Students are examined on their knowledge, skills and attitudes toward health disparities prior to graduation. The goal of this curriculum is to empower students with the knowledge, skills and attitudes to help patients navigate the socio-economic and cultural issues that may affect their health. This article describes the challenges moving forward in creating a broader interest in health disparities to strike the appropriate balance between providing students with a strong biomedical foundation of knowledge and gaining deep understanding of social influences that often drive health outcomes. This article informs the consortium's work on understanding this balance, as well as providing additional strategies for teaching health disparities.

Farrell SE, Hopson LR, Wolff M, Hemphill RR, Santen SA. [What's the evidence: A review of the one-minute preceptor model of clinical teaching and implications for teaching in the emergency department](#). *J Emerg Med*. 2016;51:278-283.

This article reviews the evidence for the effectiveness of the one-minute preceptor (OMP) teaching method and provides suggestions for its use in emergency medicine. The OMP was first introduced in the family medicine literature as a method to simultaneously teach clinical skills and provide patient care. Existing experimental studies support faculty and resident

educators in using OMP as an effective clinical teaching method with multiple benefits. In utilizing the OMP, teachers are able to identify gaps in the student's learning, engage the learner in higher level clinical thinking, contextualize learning about specific issues, improve the level of feedback given to the learner, as well as address the patient's needs. Lastly, the authors use a case to illustrate how the OMP method may be applied in emergency medicine. This article articulates the potential for OMP to be used in a new clinical setting and context. This article informs medical education programs that seek to incorporate new assessment methods by demonstrating the use of the OMP in settings that are not common for this assessment method.

Favreau MA, Tewksbury L, Lupi C, et al. [Constructing a shared mental model for faculty development for the Core Entrustable Professional Activities for Entering Residency](#). *Acad Med*. 2017;92:759-764.

This article provides an analysis of the current literature on entrustable professional activities (EPA) and entrustment to determine a framework for developing faculty to make entrustment decisions. The authors determined that such a framework is composed of four dimensions. First, observation skills in authentic work environments should be developed in order for assessment and entrustment to occur as a partnership between the faculty and learner in order to facilitate the learner's development. Second, feedback and coaching skills should be included as part of

faculty development programs to assist faculty in creating longitudinal coaching relationships in which the faculty and learner reciprocate trust. Third, faculty development should include opportunities to continuously improve their understanding and ability to self-assess and reflect in order to demonstrate these behaviors and skills to learners throughout the entrustment process. Lastly, it is necessary to create a community of practice in which all individuals involved in the entrustment process are given opportunities to learn from other faculty through a collaborative process fostering optimal contributions from faculty and an EPA culture. In addition, the authors describe factors related to organizational structure that make it more difficult to establish such a culture within a medical school environment compared to residency. Medical schools may use the suggestions and framework described in this article to develop an EPA culture at their institution by focusing on faculty development efforts that are necessary for successful implementation.

Fenton JJ, Fiscella K, Jerant AF, et al.
[Reducing medical school admissions disparities in an era of legal restrictions: Adjusting for applicant socioeconomic disadvantage.](#) *J Health Care Poor Underserved.* 2016;27:22-34.

This article discusses the need for a diverse physician workforce in order to increase access to care for underserved populations. Medical schools have compelling reasons for achieving class diversity. First, student diversity enhances the education of all students. Second, in workforce analyses,

non-white students are more likely than white students to provide care in underserved communities after medical training. Third, a diverse physician workforce may help address racial/ethnic and socioeconomic disparities in health status, health care quality, and in patient recruitment for health research. Lastly, medical students value diversity. The authors also discuss the legal restrictions that constrain the extent to which medical schools may use race/ethnicity in admissions decisions and outlines simulations conducted using academic metrics and socioeconomic data from applicants to a California public medical school from 2011 to 2013. These results indicated socioeconomic and under-represented minority disparities in admissions could be eliminated while maintaining academic readiness. Adjusting applicant academic metrics using socioeconomic information on medical school applications may be a race-neutral means of increasing the socioeconomic and racial/ethnic diversity of the physician workforce. This article offers an approach that other medical schools may use to mitigate disparities in admissions.

NEW

Gay SE, Santen SA, Mangrulkar RS, Sisson TH, Ross PT, Bibler Zaidi NL. [The influence of MCAT and GPA preadmission academic metrics on interview scores.](#) *Adv in Health Sci Educ Theory Pract.* 2018;23(1):151-158.

This article analyzes whether preadmission academic metrics such as the Medical College Admission Test (MCAT) scores and undergraduate grade point averages (uGPA)

on interview scores significantly influence interviewers' scores in a holistic admissions process. The authors examined academic and demographic predictors of interview scores for two applicant cohorts at the University of Michigan Medical School. In 2012, interviewers were provided applicants' uGPA and MCAT scores; in 2013, these academic metrics were withheld from interviewers' files. Hierarchical regression analysis was conducted to examine the influence of academic and demographic variables on overall cohort interview scores. When interviewers were provided uGPA and MCAT scores, academic metrics explained more variation in interview scores (7.9%) than when interviewers were blinded to these metrics (4.1%). Further analysis showed a statistically significant interaction between cohort and uGPA, indicating that the association between uGPA and interview scores was significantly stronger for the 2012 unblinded cohort compared to the 2013 blinded cohort ($\beta = .573, P < .05$). By contrast, MCAT scores had no interactive effects on interviewer scores. While MCAT scores accounted for some variation in interview scores for both cohorts, only access to uGPA significantly influenced interviewers' scores when looking at interaction effects. These results suggest that interviewers' access to academic metrics may influence the interview scores they assign—scores which are meant to reflect the assessment of nonacademic characteristics. Withholding these metrics from interviewers' files may lead to a more balanced, holistic review. This article analyzes the impact of admissions metrics at

a consortium school and may help inform the work of other schools working to improve the holistic admissions process and increase diversity in the medical student body.

George P, Tunkel AR, Dollase R, et al.
[The primary care-population medicine program at the Warren Alpert Medical School of Brown University.](#) *R I Med J.* 2015;98:16-21.

This article discusses the primary care-population medicine (PC-PM) program developed by the Warren Alpert Medical School of Brown University. The program builds upon the traditional curriculum with major integrated curricular innovations. The first innovation is the Master of Science in Population Medicine that requires students to take nine additional courses over four years, complete a thesis project focused on an area of population medicine, and take part in significant leadership training. The second is the development of the longitudinal integrated clerkship (LIC) during the third year of medical school in which the students complete a longitudinal outpatient experience with the same preceptors and patients. During the LIC the students follow a panel of patients wherever care is provided, while focusing on population health and health care delivery issues, in addition to medical topics throughout their clinical and didactic experiences. The PC-PM pilot began August 2015 with a class of 24 students. This article describes an approach to advance primary care and population medicine education that may be adapted by other medical schools.

NEW

Gonzalo JD, Ahluwalia A, Hamilton M, Wolf H, Wolpaw DR, Thompson BM.

[Aligning education with health care transformation: Identifying a shared mental model of “new” faculty competencies for academic faculty.](#) *Acad Med.* 2018;93(2):256-264.

This article outlines the development of a potential competency framework for faculty development programs aligned with the needs of faculty in academic health centers (AHCs). In 2014 and 2015, the authors interviewed 23 health system leaders and analyzed transcripts using constant comparative and thematic analysis. They coded competencies and curricular concepts into subcategories. Lead investigators reviewed drafts of the categorization themes and subthemes related to gaps in faculty knowledge and skills, collapsed and combined competency domains, and resolved disagreements via discussion. Through analysis, the authors identified four themes. The first was core functional competencies and curricular domains for conceptual learning, including patient-centered care, health care processes, clinical informatics, population and public health, policy and payment, value-based care, and health system improvement. The second was the need for foundational competency domains, including systems thinking, change agency/management, teaming, and leadership. The third theme was paradigm shifts in how academic faculty should approach health care, categorized into four areas: delivery, transformation, provider characteristics and skills, and education. The

fourth theme was the need for faculty to be aware of challenges in the culture of AHCs as an influential context for change. This article outlines a strategy to better align faculty education with the real-time needs of health systems and can be used to inform local, national, and international faculty development efforts to further enhance undergraduate, graduate and continuing medical education programs in health systems science.

Gonzalo JD, Baxley E, Borkan J, et al.
[Priority areas and potential solutions for successful integration and sustainment of health systems science in undergraduate medical education.](#) *Acad Med.* 2017;92:63-69.

This article discusses the call for significant reform to undergraduate medical education (UME) and graduate medical education (GME) programs to meet the evolving needs of the health care system. Nationally, several schools have initiated innovative curricula to promote education in health systems science (HSS). However, the successful implementation of HSS curricula is challenged by issues of curriculum design, assessment, culture, and accreditation. The authors describe seven priority areas for the successful integration and sustainment of HSS in educational programs, associated challenges, and potential solutions. The authors identified these priority areas: partner with licensing, certifying, and accrediting bodies; develop comprehensive, standardized, and integrated curricula; develop standardize, and align assessments; improve the UME to GME transition; enhance faculty knowledge and skills, and

incentives; demonstrate value-added to the health system; and address the hidden curriculum. This article may serve as a blueprint for health professions education programs interested in developing HSS curricula locally, as well as for national efforts focused on promoting HSS-related knowledge, skills, and attitudes through national initiatives.

NEW

Gonzalo JD, Caverzagie KJ, Hawkins RE, Lawson L, Wolpaw DR, Chang A. [Concerns and responses for integrating health systems science into medical education.](#) *Acad Med.* 2017 Oct 24. [Epub ahead of print].

This article identifies several widely perceived challenges to integrating health systems science (HSS) into medical school curricula, responds to each concern and provides potential strategies to address these concerns, based on the authors' experiences with designing and integrating HSS curricula. The authors explored the limited uptake and adoption of HSS through meetings and conversations with educators, clinicians, scientists, health systems leaders, and journal reviewers, from about September 2013 to September 2016. This process identified two broad categories of concerns: the (1) relevance and importance of learning HSS—including the perception that there is inadequate urgency for change; HSS education is too complex and should occur in later years; early students would not be able to contribute, and the roles already exist; and the science is too nascent—and (2) logistics and practicality of teaching HSS—including limited curricular time,

scarcity of faculty educators with expertise, lack of support from accreditation agencies and licensing boards, and unpreparedness of evolving health care systems to partner with schools with HSS curricula. The authors recommend the initiation and continuation of discussions between educators, clinicians, basic science faculty, health system leaders, and accrediting and regulatory bodies about the goals and priorities of medical education, as well as about the need to collaborate on new methods of education to reach these goals. The resolution of potential and perceived challenges to integrating HSS into medical school curricula requires candid exploration of educational goals, competing priorities, and continuous reevaluation of current educational strategies. This article informs the work of the consortium on strategies to increase the implementation of HSS.

NEW

Gonzalo JD, Dekhtyar M, Hawkins RE, Wolpaw DR. [How can medical students add value? Identifying roles, barriers, and strategies to advance the value of undergraduate medical education to patient care and the health system.](#) *Acad Med.* 2017;92:1294-1301.

This article identifies potential stakeholders regarding the value of student work, and roles and tasks students could perform to add value to the health system, including key barriers and associated strategies to promote value-added roles in undergraduate medical education. In 2016, 32 U.S. medical schools in the Accelerating Change in Medical Education Consortium met for a two-day national meeting to explore value-

added medical education; 121 educators, systems leaders, clinical mentors, AMA staff leadership and advisory board members, and medical students were included. A thematic qualitative analysis of workshop discussions and written responses was performed, which extracted key themes. In current clinical roles, students can enhance value by performing detailed patient histories to identify social determinants of health and care barriers, providing evidence-based medicine contributions at the point-of-care, and undertaking health system research projects. Novel value-added roles include students serving as patient navigators/health coaches, care transition facilitators, population health managers, and quality improvement team extenders. Six priority areas for advancing value-added roles are student engagement, skills, and assessments; balance of service versus learning; resources, logistics, and supervision; productivity/billing pressures; current health systems design and culture; and faculty factors. This article provides a starting point for rigorous inquiry into the characteristics of successful interventions and the outcomes and impact of student value-added roles in clinical settings. Key barriers and strategies identified here can be used to promote the development and implementation of workplace models that can be probed and tested through current or evolving quality and value metrics.

Gonzalo JD, Dekhtyar M, Starr SR, et al.
[Health systems science curricula in undergraduate medical education: Identifying and defining a potential curricular framework.](#) *Acad Med.* 2017;92:123-131.

This article describes a review of 30 Accelerating Change in Medical Education full grant submissions and analysis of health systems science (HSS)-related curricula at 11 schools to develop a potential comprehensive HSS curricular framework with domains and subcategories. In phase 1 of this project, full grant submissions were analyzed and coded to identify domains. In phase 2, a detailed review of all existing and planned syllabi and curriculum documents at the grantee schools was performed. The final analysis yielded three types of domains: core, cross-cutting, and linking. Core domains included health care structures and processes; health care policy, economics, and management; clinical informatics and health information technology; population and public health; value-based care; and health system improvement. Cross-cutting domains included leadership and change agency; teamwork and interprofessional education; evidence based medicine and practice; professionalism and ethics; and scholarship. Systems thinking was identified as a linking domain. This article includes definitions, examples, and subdomains for each of the identified domains. This broad framework aims to build on the traditional definition of systems-based practice and highlight the need to better align education programs with the anticipated needs of the systems in which students will practice. This article informed the HSS textbook content and HSS examination blueprint. This framework may also serve as a guide for future identification and development of HSS curricula and faculty development opportunities and may

assist in helping educators understand gaps in assessment.

Gonzalo JD, Graaf D, Johannes B, Blatt B, Wolpaw DR. [Adding value to the health care system: Identifying value-added systems roles for medical students..](#) *Am J Med Qual.*2017;32:261-270.

This article identifies potential value-added roles for medical students within the health care delivery system, as well as the perceived value of medical students contributing in that capacity. Value-added roles are authentic experiences and opportunities for medical students to add value to the health system by contributing to patient care and improving patient outcomes, in turn helping them learn about health systems science. The research team identified over 30 clinical sites to accommodate more than 150 medical students. Participating clinical sites included inpatient and outpatient settings, clinics, and programs that were geographically distributed and included multiple specialty programs. Through site visits and key informant interviews, the authors identified potential system roles needed to improve patient outcomes, as well as perceived barriers that patients may experience. Potential systems tasks were identified as being either direct patient benefit activities or direct clinic benefit activities. This article provides a foundation to further explore experiential opportunities that add value to the health system and teach students about health systems science.

Gonzalo JD, Graaf D, Kass LE, Promes SB, Wolpaw DR, George DR. [Medical students as systems ethnographers: Exploring patient experiences and systems vulnerabilities in the emergency department.](#) *AEM Educ Train.*2017;1:225-233.

This article describes an ethnography experience for select first-year medical students in an Emergency Department (ED). The goal of this educational program was to design systems ethnography roles that could enhance learning about health systems and to identify strategies for other programs interested in implementing systems ethnography roles for medical students in clinical settings. Medical students attended a session on ethnography theory and methods and systems thinking prior to participating as ethnographers. Students were connected with patients, observed health care delivery for 12-15 total hours over a six-week period, and worked in teams to discuss barriers, facilitators, and ways to improve processes in the ED. At the end of the experience each student submitted a one- to two-page assignment discussing their observations, thoughts, and issues explored from the patient's perspective regarding ED processes. Notes were taken of discussions that occurred during report-outs at the debriefing session. Lastly, students completed a survey about their perceptions of the experience. A thematic analysis was conducted on assignments and notes collected using previously published frameworks in order to categorize systems vulnerabilities. The overarching theme identified was the dichotomy between the monotonous patient experience and the fast-

pace environment of the ED. In addition, the researchers identified four categories of systems vulnerabilities: patient experience; communication and collaboration; processes, physical space, and resources; and professionalism. Overall, students found the experience to be valuable and felt that their understanding of the patient experience increased. Lastly, qualitative analysis of open-ended questions showed that students had a larger appreciation for processes and issues that arise in the ED, and the analysis demonstrated the students' ethnography and systems thinking skills. This study demonstrates the value-add of first-year medical students in clinical settings to both educational and clinical missions. The authors also describe the approaches and challenges of accomplishing objectives, which may be useful to other programs interested in embedding students within clinical settings.

Gonzalo JD, Haidet P, Wolpaw DR. [Authentic clinical experiences and depth in systems: Toward a 21st century curriculum.](#) *Med Educ.* 2014;48:104-112.

This article describes a program that began in 1952 and introduced increased learner responsibility, an organ system-based curriculum, and early student engagement in patient care through a family clinic. This program linked medical students with pregnant women and created a meaningful mini-immersion for these pre-clerkship students. The students followed the women through pregnancy, delivery and postnatal care, and infants into early childhood. The students attended all appointments, made home visits, and often developed important

longitudinal relationships with mother, child and family, actively contributing to these patients' health care. Over time the program morphed into a more typical preceptorship, in which students gained the opportunity to practice clinical skills and see a greater number of patients, but without the depth afforded by the original program. This article discusses how the changes caused the program to lose the meaningful engagement that promotes learning and professional development. It also emphasizes the importance of systems-based experiences to student development. The author's focus on a new systems-based curriculum sets a foundation within the medical education literature for future study and adaptation of such curricula.

Gonzalo JD, Haidet P, Papp KK, et al. [Educating for the 21st-Century Health Care System: An interdependent framework basic, clinical, and systems sciences.](#) *Acad Med.* 2017;92:35-39.

This article examines the current state of medical education with respect to systems science. The framework proposed represents an educational shift from a two-pillar framework to a three-pillar framework where basic, clinical, and systems sciences are interdependent. In this new framework students not only learn the interconnectivity of the basic, clinical, and systems sciences but also uncover relevance and meaning in their education through authentic, value-added, and patient-centered roles as navigators within the health care system. This article discusses the implementation of the new curriculum at Pennsylvania State University College of Medicine, called the

Systems Navigation Curriculum (SyNC). This curriculum consists of conceptual and experiential components: (1) the Science of Health Systems course, and (2) patient navigator experiences. Both the course and the navigation experiences allow students to develop the knowledge, attitudes, and skills to function effectively amid the complexities of an evolving health care system. The Science of Health Systems Course spans the first seventeen months of the students' undergraduate experience and is simultaneous with course work in basic and clinical sciences. This article's proposal of the three-pillar framework and the SyNC curriculum informs ongoing work toward integrating health systems science as the third pillar of medical education.

Gonzalo JD, Haidet P, Blatt B, Wolpaw DR. [Exploring challenges in implementing a health systems science curriculum: A qualitative analysis of student perceptions.](#) *Med Educ.* 2016;50:523-531.

This article describes students' perceptions of learning health systems science in the context of an institution that implemented a 17-month course with an estimated 125 contact hours. This course included two primary components: classroom activities learning about systems-related topics not limited to insurance, cost, teamwork, and leadership, as well as an experiential patient navigation experience in which students were embedded within clinical sites. Focus groups were conducted with students in all four years of school. Researchers identified four categories of student-identified barriers, ranging from a lack of support for systems

education to the importance of basic science on medical licensing board examinations. Likewise, student-identified benefits of a systems curriculum included the acquisition of health systems science knowledge and skills, a better understanding of the patient experience, and improved learning and engagement in their patient navigator roles. However, the unifying challenge for medical students is negotiating two competing agendas—that of the medical education system placing importance on basic science and examinations and their own desire of being the best physician possible. This article provides a foundation for future research exploring the tensions described, and provides important insights about student perceptions of health systems science.

NEW

Gonzalo JD, Himes J, McGillen B, Shifflet V, Lehman E. [Interprofessional collaborative care characteristics and the occurrence of bedside interprofessional rounds: A cross-sectional analysis.](#) *BMC Health Serv Res.* 2016;16:459.

This article assesses the prevalence and characteristics of bedside interprofessional rounds at hospital-based clinical care units at an academic medical center. The authors carried out a prospective, cross-sectional assessment of data obtained from nursing audits. Bedside interprofessional rounds were defined as encounters including one attending-level physician and a nurse discussing the case at the patient's bedside. Logistic regression models were constructed with four covariate domains: (1) spatial characteristics (unit type, bed number,

square feet per bed), (2) staffing characteristics (nurse-to-patient ratios, admitting services to unit), (3) patient-level characteristics (length of stay, severity of illness), and (4) nursing perceptions of collegiality, staffing, and use of rounding scripts. Of 29,173 patients assessed during 1,241 audited unit-days, 21,493 patients received a bedside interprofessional round (74 %, range 35-97 %). Factors independently associated with increased occurrence of bedside interprofessional rounds were: intensive care unit (odds ratio 9.63, [CI 5.30-17.42]), intermediate care unit (odds ratio 2.84, [CI 1.37-5.87]), hospital length of stay 5-7 days (odds ratio 1.89, [CI, 1.05-3.38]) and >7 days (odds ratio 2.27, [CI, 1.28-4.02]), use of rounding script (odds ratio 2.20, [CI 1.15-4.23]), and perceived provider/leadership support (odds ratio 3.25, [CI 1.83-5.77]). Variation of bedside interprofessional rounds was more attributable to unit type and perceived support rather than spatial or relationship characteristics amongst providers. This article informs the work toward greater incorporation of interprofessional practice in the health system and interprofessional education in medical education.

Gonzalo JD, Lucey C, Wolpaw T, Chang A. [Value-added clinical systems learning roles for medical students that transform education and health: A guide for building partnerships between medical schools and health systems.](#) *Acad Med.* 2017;92:602-607.

This article discusses the large-scale efforts to develop novel required longitudinal, authentic health systems science curricula in

classrooms, in workplaces, and for all first-year students. The authors combined two models in an intersecting manner, using Kotter's change management and Kern's curriculum development steps. The three-pillar framework that emerged addresses the challenges of reform at the undergraduate medical education level in regards to physician readiness for practice and leadership in changing health systems and integrates the biomedical and clinical sciences with health systems science. Applying this framework can lead to value-added clinical systems learning roles for students, meaningful medical school-health system partnerships, and a generation of future physicians prepared to lead health systems change. This article provides a framework for medical schools working toward integrating medical students into authentic, value-added roles through increased collaboration with health systems.

Gonzalo JD, Thompson BM, Haidet P, Mann K, Wolpaw DR. [A constructive reframing of student roles and systems learning in medical education using a communities of practice lens.](#) *Acad Med.* 2017; 92:1687-1694

This article uses community of practice theory to understand the implications that value-added medical education, authentic student roles, and health systems science may have in changing educational practices and student experiences. Community of practice theory describes knowledge management within a community in which members with similar goals and barriers share experiences to improve their knowledge and skills. In improving student

role experiences for medical students within a community of practice, four questions need to be considered: who is within the community; in what context do students learn within the community; what domain of knowledge is being taught through experiences within the community; what opportunities exist for students to authentically contribute within the community? Communities of practice for physicians have traditionally been considered to consist of peers, residents, and senior physicians. However, health care system transformations have expanded the community to include interprofessional team members, patients, and populations. In the context of increasing student engagement, students may also enter this community to engage with and learn within a diverse collaborative setting. Health care stakeholders are identifying gaps in physicians' knowledge of health systems. As such, student involvement in this type of a community of practice would operationalize health systems science knowledge domains through their roles and experiences, which would begin as small tasks and gradually increase to full participation through their experience in becoming physicians. Additionally, the authors examine these factors of communities of practice within common student educational settings: clinical preceptorships, service learning experiences, student-run free clinics, and value-added clinical systems learning roles. They explain that value-added clinical systems roles may offer students the most legitimate experiences to develop a professional identity that aligns with the evolving physician expectations. However,

processes need to be created to continuously improve these experiences leading to student buy-in. This article provides an additional theoretical framework that may be used as a foundation for future research evaluating the utility of and student experiences within value-added roles in medical education.

Greer PJ, Brown DR, Brewster L, et al.
[Socially accountable medical education: An innovative approach at Florida International University Herbert Wertheim College of Medicine.](#) *Acad Med.* 2018; 93:60-65.

This report describes a service learning experience at the Herbert Wertheim College of Medicine Florida International University called the Green Family Foundation Neighborhood Health Education Learning Program, which aligns with the school's mission to create socially-accountable physicians. In this program, interprofessional teams of students and faculty are assigned to households with the goal of identifying and addressing their social determinants of health longitudinally. Community needs were determined based on the results of a door-to-door survey of 1,845 households. A network of academic-community partners was formed to create an infrastructure that facilitates all aspects of care for these households, from identifying their social determinants to advocating for their specific needs. Community capacity and trust is built through a community engagement processes in which staff work with the community to recruit, enroll, and better advocate for their needs. Household logistics, including scheduling and management of social determinants, is

maintained with the use of an electronic portal. After students develop rapport with a household they develop a care plan and are responsible for providing or referring household members to services, as well as following up on progress. In addition to the portal, household progress is tracked using an electronic medical record. Furthermore, these service learning experiences are integrated within the educational (curriculum) and social (learning communities) structures of the medical school and are sustained with funding, which allows these experiences to be an integral part of faculty members' teaching role. Household surveys indicated participants decreased emergency department visits and began to take on preventive health measures after the first two years of the program. In collaboration with law students and faculty, this program also assisted households in securing direct financial benefits. Next, the medical school aims to understand the development of entrustment for medical students working with interprofessional teams. They will also better integrate social accountability competencies and social determinants cases throughout the curriculum. Lastly, the medical school is developing a system to evaluate individual, household, program, and system level impact and is integrating informational technology systems to display social determinants information within the electronic medical records. Health professions education programs may use this service learning model to increase exposure to and the quality of interprofessional learning experiences.

NEW

Griffith M, Purkiss J, Santen SA, Burk-Rafel J. [Creating an evidence-based advising program for exams: A student-led 10-step approach](#). *Med Sci Educ*. 2017;27:877-880.

This article summarizes the student-led development of an evidence-based advising program for the United States Medical Licensing Examination (USMLE), designed to identify and promote effective study behaviors among students at the University of Michigan Medical School. The authors followed a dynamic 10-step process centered around a local needs assessment, literature review, multi-year study behaviors survey linked to meaningful score outcomes, and intentional dissemination of data to students. The authors involved diverse stakeholders. A student-led effort promoted a high response rate during data collection and facilitated effective communication of study findings and program goals. Directly querying students also avoided making assumptions about their concerns or study behaviors. This 10-step approach is generalizable to development of advising programs for any standardized medical examination.

Gruppen LD, Burkhardt JC, Fitzgerald JT, et al. [Competency-based education: Programme design and challenges to implementation](#). *Med Educ*. 2016;50:532-539.

This article describes the design of and challenges to implementing a competency-based education (CBE) program in the context of a Master of Health Professions

Education program at one medical school. The authors use an existing definition which identifies a focus on outcomes, an emphasis on abilities, a reduced emphasis on time-based training, and the promotion of learner centeredness as four distinct features of CBE. In addition, the program utilizes entrustable professional activities (EPA) for learning and assessment to support an individualized curriculum. A decreased emphasis on time-based training is identified as the facet of CBE programs that is slowest to be adopted, with most programs using competency-based assessment to validate student competence, rather than as a method of progression through a program. The program described in this paper follows the defined CBE model very closely by mapping EPAs to educational competencies to track learner assessment. Learner experiences are aligned with their professional roles and previous experience can be accounted for if demonstrating proper completion of an EPA. However, in implementing this CBE program challenges were encountered: feedback is more difficult to provide as students are used to assessment being a form of evaluation and not a guide to learning; the traditional university paradigm of administrative structures related to registration, tuition, etc., are not conducive a CBE program; individualization requires more time to collaboratively design a learning program; and community building within the program is harder to achieve because of the program's emphasis on asynchronous learning. This article informs education programs interested in implementing CBE. The program described in this article serves as an example of how a

CBE program in medical school could be structured.

Gruppen LD, Stansfield RB. [Individual and institutional components of the medical school educational environment](#). *Acad Med*. 2016;91:S53-S57

This study sought to understand the dynamic relationship between individual and institutional components to the learning environment as well as their relative contributions. The authors utilized data from the American Medical Association's Learning Environment Study, which included student perceptions of the learning environment through administration of the Medical School Learning Environment Scale (MSLES). Hierarchical linear models were used to estimate the variance of MSLES scores with both individual and institutional factors. In the models, individual-level factors included sex, minority status, and the amount of time between the students' completion of their undergraduate program and matriculation into medical school. Additionally, psychosocial factors were included, such as perceptions of clinical empathy, patient-centeredness, and tolerance of ambiguity scores that were all collected at matriculation. Institution-level factors in the model included the number of students enrolled, in-state tuition, average Medical College Admission Test scores, and percentage of applicants accepted. All institution-level information was found online. Overall, this study found that learning environment ratings were accounted for more by individual-level factors than institution-level factors.

Although some individual differences are due to perceptions, others reflect the different environments that may occur within a single school. Although empathy was found to have a strong relationship with MSLES scores in this study, it is evident through this model that many other individual characteristics influencing perceptions of the environment have yet to be identified. This article extends the medical education community's understanding of the learning environment and gives direction for additional research needed to understand this complex, multi-faceted construct.

Hauer KE, Boscardin C, Fulton TB, Lucey C, Oza S, Teherani A. [Using a curricular vision to define entrustable professional activities for medical student assessment](#). *J Gen Intern Med*. 2015;30:1344-1348.

This article describes the process that the University of California, San Francisco, School of Medicine set in motion to design entrustable professional activities (EPAs) for assessment in a new curriculum and to gather evidence of content validity. This project included the participation of nineteen medical educators, in which fourteen completed both rounds of a Delphi survey. The article discusses the five steps for defining EPAs and assessment strategies; defining competencies and milestones; and mapping milestones to EPAs. A Q-sort activity and Delphi survey involving local medical educators established consensus and prioritization for milestones for each EPA. For four EPAs, most milestones had content validity indices (CVIs) of at least 78%. For

two EPAs, two to four milestones did not achieve CVIs of 78%. The article describes a stepwise procedure for developing EPAs that capture essential physician work activities defined by curricular vision, as well as structured procedures for soliciting faculty feedback and mapping milestones to EPAs that provide content validity. This article informs health professions educators interested in developing and improving EPAs, milestones, and competencies.

NEW

Havyer RD, Norby SM, Leep Hunderfund AN, et al. [Science of health care delivery milestones for undergraduate medical education](#). *BMC Med Educ*. 2017;17(1):145.

This article describes the development of a set of milestones for the science of health care delivery (SHCD) based on published Accreditation Council for Graduate Medical Education (ACGME) milestones and corresponding to Association of American Medical Colleges (AAMC) EPAs (entrustable professional activities) for use by medical schools to determine students' competence in SHCD. The authors reviewed all ACGME milestones for 25 specialties available in September 2013 and used an iterative, qualitative process to group the ACGME milestones into SHCD content domains, from which SHCD milestones were derived. The SHCD milestones were categorized within the current ACGME core competencies and were also mapped to AAMC's EPAs. Fifteen SHCD sub-competencies and corresponding milestones were developed, grouped within ACGME core competencies, and mapped to multiple

AAMC EPAs. The article informs the consortium's work to integrate SHCD—also known as health systems science—into medical education. A common set of SHCD milestones may help facilitate the successful preparation of medical students for residency and twenty-first century clinical practice.

Hawkins RE, Welcher CM, Holmboe ES, et al. [Implementation of competency-based medical education: Are we addressing the concerns and challenges?](#) *Med Educ.* 2015;49:1086-1102.

This article discusses competency-based medical education (CBE) emerging as a core strategy to educate and assess the next generation of physicians. The advantages of CBE include a focus on outcomes and learner achievement; requirements for multifaceted assessments that embrace formative and summative approaches; support of a flexible, time-independent trajectory through the curriculum; and increased accountability to stakeholders with a shared set of expectations and a common language for education, assessment and regulation. Despite the advantages of CBE, numerous concerns and challenges have been described such as increased administrative requirements; the need for faculty development; the lack of models for flexible curricula; and inconsistencies in terms and definitions. The article summarizes responses from the education community regarding the CBE concerns and challenges. The issues with implementation of CBE have begun to be addressed by the education community. Models and guidance exist to inform implementation strategies

across the continuum of education and focus on the more efficient use of resources and technology as well as the use of milestones and entrustable professional activities-based frameworks. CBE definitions and frameworks remain a significant obstacle. Much work remains to bring rigor and quality to workplace based assessment. The article's focus on CBE implementation informs gaps in the health professions education literature.

Hersh WR, Gorman PN, Biagioli FE, Mohan V, Gold JA, Mejicano GC. [Beyond information retrieval and electronic health record use: Competencies in clinical informatics for medical education.](#) *Acad Med.* 2014;5:205-212.

This article describes an expanded curriculum at one medical school that includes a comprehensive set of 13 medical informatics competencies. A broad set of competencies was developed using an exploratory qualitative methodology. A set of learning objectives was developed for each competency. A time in the curriculum at which each concept should be taught was assigned, and each learning objective was mapped to an Accreditation Council for Graduate Medical Education competency. In addition, designations were made of where specific learning activities would take place during specific parts of the curriculum from the first to the last year of medical school. Future needs for sustaining an integrated medical informatics curriculum include the development of evaluation tools for the competencies and activities, collaboration between informatics specialists and clinical

educators to design and implement learning experiences, and a longitudinal evaluation of the implementation of medical informatics competencies described in this article. This article informs medical education programs by providing a foundation of medical informatics competencies that may be integrated within a clinical and health systems science curriculum.

Hortsch M, Mangrulkar RS. [When students struggle with gross anatomy and histology: A strategy for monitoring, reviewing, and promoting student academic success in an integrated preclinical medical curriculum](#). *Anat Sci Educ*. 2015;8:478-483.

This article discusses barriers and strategies to teaching anatomy and histology within an integrated curriculum at one medical school. Medical school curricula are changing to make preclinical coursework relevant to the clinical experience, which may present new challenges to students. Although some schools have established strategies to improve student performance, there is not one clear method for student remediation. Furthermore, anatomy and histology have unique barriers for learners that may also vary based on the learner's strengths. Specifically, it may be more difficult to identify struggling students early in their education within an integrated curriculum where these content areas are dispersed longitudinally. At the University of Michigan Medical School students receive lectures and are regularly assessed on their ability to apply what they have learned in their organ-based sequences as it relates to anatomy and histology. Images used on the

examinations are not ones that students have seen before, requiring increased analytical ability to interpret images and apply them to facts and processes. Students struggling in anatomy have similar difficulties in other aspects of their academic learning, but most students will find helpful strategies to learn this material and develop these skills. At this school, struggling students are typically identified through a Basic Science Academic Review Board, program directors, or a learning support team. Directors of individual sequences may have trouble identifying struggling students because each sequence only lasts a few weeks. Struggling students are typically advised to: utilize learning objectives to focus their learning; deliberately plan how to use available resources; attend lectures in person rather than listening to the audio or attending virtually; better prepare for lab sessions; and improve test taking skills for each subject. However, it may still take a few months for a review board to synthesize early assessment information to identify struggling students, and, at that point, other issues may arise or the student may be hesitant to seek help, delaying the improvement process for students who require assistance.

House J, Sun JK, Sullivan A, Ross P. [Introduction to interprofessional education using health professionals](#). *Med Educ*. 2016;50:564-591.

This article describes the characteristics and outcomes of an interprofessional education program with the goal of preparing students to work within a care team. Students completed a quiz at the beginning of the first

year prior to attending small-group sessions with various health care professionals (not limited to social worker, dietician, respiratory therapist), and the discussions were based on the results of the quizzes. To give context to the discussions, health professionals showed a video depicting an emergency department visit and students learned about their different roles. The students and health professionals involved felt that this was a valuable opportunity for medical schools to engage and learn about the roles and education of other professionals in the health care setting. Similar programs at health professions institutions may be developed to address curricular gaps in interprofessional education.

Leep Hunderfund AN, Dyrbye LN, Starr SR, et al. [Role modeling and regional health care intensity: U.S. medical student attitudes toward and experiences with cost-conscious care](#). *Acad Med*.2017;92:694-702.

This article describes a survey distributed to students at 10 different medical schools to examine their attitudes toward cost-conscious care and whether regional health care intensity is associated with reported exposure to physician role-modeling behaviors related to cost-conscious care. Regional health care intensity was measured using Dartmouth Atlas End-of-Life Chronic Illness Care data, ratio of physician visits per decedent compared with the U.S. average, ratio of specialty to primary care physician visits per decedent, and hospital care intensity index. In adjusted linear regression analyses, students in higher-

health-care-intensity regions reported observing significantly fewer cost-conscious role-modeling behaviors. For each one-unit increase in the three health care intensity measures, scores on the 21-point cost conscious role-modeling scale decreased. The results from the survey concluded that medical students encounter conflicting role-modeling behaviors, which are related to regional health care intensity. This article informs medical educators by providing insight to how enhancing role modeling in the learning environment may help prepare future physicians to address health care costs.

Leep Hunderfund AN, Reed DA, Starr SR, Havyer RD, Lang TR, Norby SM. [Ways to write a milestone: Approaches to operationalizing the development of competence in graduate medical education](#). *Acad Med*. 2017; 92:1328-1334.

This study examines approaches to articulating competence within the Accreditation Council for Graduate Medical Education's (ACGME) milestones across different core competencies. ACGME milestone project documents were used in this analysis, and each subcompetency was examined to understand the development of competence within the milestones. The authors conducted an inductive analysis of the milestones to identify different approaches. When no new approaches were identified, different methods were compared across the core competencies. Fifteen approaches were identified through this analysis and grouped into four categories to depict whether the methods used focused on the learner, the context, social interactions,

or the supervisor. Focus on the learner was the largest category identified, and approaches in this group described the learner's ability to perform different tasks that became increasingly difficult, to improve performance or speed of a task, progression from performing parts of a task to the whole task, consistent demonstration of a behavior or skill, attitudes toward certain activities, or the progression of knowledge or ability. Furthermore, approaches focusing on context were described in terms of the type of situation that the learner is presented with. Additionally, approaches focused on social interactions identified progressions of the learner's ability to teach, lead, role model, or consult. Lastly, the approach focused on the supervisor described the learner's increasing ability to perform independently. This study also identifies how multiple approaches were utilized within milestones that describe a subcompetency, as well as specific methods that were common among each core competency. An understanding of different conceptual frameworks and approaches used to develop milestones may assist in improving future milestones, as well as guide educators in developing new milestones for emerging content areas.

Lewis JH, Whelihan K, Navarro I, Boyle KR, and SDH Card Study Implementation Team. [Community health center provider ability to identify, treat and account for the social determinants of health: A card study.](#) *BMC Fam Pract.* 2016;17:121.

This study examines community health center provider perceptions of the impact of

social determinant of health (SDH) factors on their patients, as well as the providers' capacity to address and code for services that focus on SDH. This research utilized a card study approach to collect real-time data about patient care. Practitioners complete these cards during their patient encounters. The cards included 16 SDH that are not commonly collected as part of a routine social history. All centers used as the settings for this study were Federally Qualified Health Centers, which were rural in California and urban in Illinois and New York. Providers' perceptions of their understanding and ability to identify SDH, perceptions of the importance of SDH, and perceptions of community health center resources, and rate of referral was assessed using a 5-item pre-study survey. After the survey, providers received a lecture on SDH and training on how to complete the card. Qualitative data regarding the providers' ability to identify and address SDH, as well as their perceptions of specific SDH were collected on the cards. Pre-study surveys were completed by 43 providers, and results indicated that they were familiar with and viewed SDH as important factors that affect their patients' health. Although they indicated that they often refer their patients to resources, they also indicated neutrality regarding availability of resources. Out of 747 patient encounters, only 34 patients did not have any SDH factors identified. Factors identified per patient ranged from 1 to 12 with an average of approximately 2 factors per encounter with a total of 1584 factors identified. Out of the 1584 identified factors, 493 had associated counseling and intervention strategies, 108 included

diagnosis codes, and 20 included billing codes. Educational limitations, language barriers, and family care demands were the most identified factors. This study also examines the amount of services provided for each SDH, as well as which SDH were provided with diagnostic and/or billing codes. Lastly, the authors examine differences in the card study between \ health centers in each state. Although providers understand the importance of SDH, they were not able to provide resources or associate codes for treating SDH. This study articulates the need for an increased focus on preparing medical students to identify and address SDH in practice, which may include educating students how to include SDH in the electronic health record.

Lomis K, Amiel JM, Ryan MS, et al.
[Implementing an entrustable professional activities framework in undergraduate medical education: Early lessons from the AAMC Core Entrustable Professional Activities for Entering Residency Pilot.](#)
Acad Med. 2017;92:765-770.

This article presents the structure and preliminary results of the core entrustable professional activities (EPA) pilot group to guide institutions planning to implement the core EPA framework. These pilot schools are designing and implementing educational systems that use the core EPA framework to develop tools for assessing student's readiness to perform the core EPAs. They are also sharing lessons learned facilitating adaptation of the core EPA framework at other medical schools. The early work of this group focused on defining a vision and

shared mental model of the EPA framework. After a review of the core EPA framework, several schools were assigned to each EPA. Each school will implement the core EPA framework as it best fits with their curriculum and will follow guiding principles, but implementation will differ between schools. As such, understanding how to best assess and report the core EPAs will be an iterative process. In addition to focusing on each EPA, teams are also focusing on formal entrustment, assessment, curriculum development, and faculty development. These groups have developed two manuals, one for curriculum developers mapping the core EPAs to domains of competence, and the other for faculty and learners describing the core EPA framework. The group has been focusing on developing additional frameworks in the aforementioned topic areas to assist other schools in implementing the core EPAs. Further work is needed to develop or identify multiple assessments necessary to facilitate summative entrustment decisions in the context of each school's curriculum. A systematic approach should include faculty development to facilitate coaching and feedback for student improvement. Entrustment decisions need to be standardized across schools to facilitate the educational handover from medical school to residency. Until this work is standardized, it should not be used formally across institutions; future work will include a learning community of educators external to the current pilot group. Efforts of the core EPA pilot schools will help inform the health professions education community on making entrustment decisions, which will

eventually help facilitate learners' transitions. This pilot group also provides an example of a multi-institutional collaborative approach to developing consensus on complex concepts in medical education.

Lomis KD, Russell RG, Davidson MA, et al. [Competency milestones for medical students: Design, implementation and analysis at one medical school](#). *Med Teach*. 2017;39:494-504.

This article outlines a continuous informed self-assessment process utilizing competency milestones at the Vanderbilt University School of Medicine. In this process, learners and coaches work together to understand gaps in learning and areas in which each learner needs to improve. A committee identifies behaviors that should be assessed over time. Identification of these behaviors is based on faculty perceptions of importance; priorities based on various different existing assessments; content on which students have struggled with in the past; areas that are assessable in the first year. Consensus on priority areas was developed through a modified Delphi process, and milestone writing guidelines were provided to workgroups based on specific content areas. Assessments were recorded in electronic portfolios, with a customized assessment developed for each course. Only competencies relevant to the specific course were used, but course directors were not allowed to change any of the language. Students were trained on using the competencies for peer review. Using a standardized set of competencies and milestones across courses provided multiple

points of assessment. The milestones were validated using an iterative approach focusing on content, variation in rater scores, and feedback on the pragmatic use of the milestones. Results of the analysis showed that the milestones discerned developmental differences amongst students, and the same students do not receive similar milestone scores across competencies. Generally, ratings amongst faculty and peers vary, and most did not have consistently high or low scores. Student and faculty perceptions of the milestones were mixed. Some found the process to be a burden, while others thought it was a useful way to give and receive feedback. Although some students were not sure how to use the feedback received, this may have been related to characteristics of the portfolio coach, student, or their interaction. Lastly, milestones were revised based on feedback received through focus groups and standing meetings. This article may provide guidance for health professions education programs interested in implementing a milestone-based assessment system at their institution.

McCoy L, Lewis JH, Benett T, Allgood JA, Bay C, Schwartz FN. [Fostering service orientation in medical students through a virtual community health center](#). *J Fam Med Community Health*. 2016;3:1078-1085.

This article describes a pilot of a virtual community health center with a focus on improving clinical reasoning, student engagement, collaboration, and understanding of primary care issues. In the first semester of their first year, student teams met with eight virtual families and

worked through clinical case activities, which included history-taking, testing, diagnosing, obtaining interprofessional consultations, and suggesting a treatment plan. This study incorporated pre-post quizzes, virtual patient simulation case-learning analytics, feedback, and case debrief notes. The exercises gave students an opportunity to improve their clinical skills with feedback, make team-based decisions, and discuss patient care. The study affirmed that students were engaged. Feedback from evaluation data were used to improve learning activities. This article describes how virtual families may be integrated in health professions curricula to teach students how to function in community-based health care systems.

McCoy, Lewis JH, Dalton D.
[Gamification and multimedia for medical education: A landscape review.](#) *J Am Osteopath Assoc.* 2016;116:22-34.

This article describes a review of gaming resources utilized in medical education and summarizes educational advantages and existing games, applications, and simulations. Gaming resources reviewed are ones that are available commercially or developed, piloted, and disseminated by medical educators. The authors describe the advantages of gamification and multimedia in medical education as they relate to learning outcomes, engagement, analytics, collaboration, practical application, clinical decision making, distance learning, and feedback. This review of gamification resources provides health professions education programs with examples of how

gamification may be integrated with curricula.

McCoy, Pettit RK, Lewis JH, Allgood JA, Bay C, Schwartz FN. [Evaluating medical student engagement during virtual patient simulations: A sequential, mixed methods study.](#) *BMC Med Educ.* 2016;16:1-15.

This article is a study of student engagement with clinical case practice using virtual patient simulation. In this study, engagement is measured as flow, relevance, and interest. Virtual patient simulation cases were developed to expose student teams to managing a patient encounter and formulating a general diagnosis. Evaluation measures included observation forms and analysis memos, classroom photographs, feedback forms, and exit surveys. The findings of this study suggest this activity fostered flow as evidenced by students' focus on the activity, but, while students were engaged, they did experience elements of cognitive overload. These activities are relevant to student goals of clinical case practice, exam preparation, and receiving feedback. This article informs the health professions education community's understanding of practical facilitators and barriers in utilizing virtual patient simulation.

NEW

Meeks L, Richards A, Chang A, van Schaik S. [Working with students with disabilities: Simulation-based faculty development.](#) *Med Educ.* 2017;51(11):1181-1182.

This article explores a training program for faculty members established to develop the skills they require to effectively address learner issues with students, including disability-related needs. The authors created a blended learning approach and combined online learning with an in-person skills session around a ‘simulated student’ case scenario. This was piloted as part of a six-station exercise with faculty staff recruited to a new student coaching program at one US medical school. A total of 24 physician coaches participated in the exercise and 20 (83%) completed a survey after the session on the usefulness of the session. All respondents rated the exercise as ‘extremely useful’ (5 on a scale of 1–5). In focus groups conducted 6 months later, coaches reiterated the value of this practice opportunity. This novel approach to faculty development is feasible and effective in preparing faculty members for their role in working with students with disabilities and serves as a proof of concept for this type of training in faculty development of student advisors and coaches. This article is an example of how a medical school can train faculty to work with an increasingly diverse student body.

Mello MJ, Feller E, George P, Borkan J. [Advancing the integration of population medicine into medical curricula at The Warren Alpert Medical School of Brown University: A new master’s degree program.](#) *R I Med J.* 2015;98:22-26.

This article describes a nine-course curriculum used at one medical school for students pursuing a Master of Science in Population Medicine in addition to a medical degree. This program incorporates

continuous threads of built-in goals for the completion of a thesis as well as accompanying coursework. The thesis projects are designed to be completed over the course of the four-year medical school curriculum. This program mitigates barriers to medical students conducting research by teaching research methodology, building in a required independent study course, providing mentorship along with library and statistical support, and including scientific writing sessions within the curriculum. This article gives an example of how medical education programs may implement adaptable curricula focused on a diverse range of health systems science topics including, health disparities, leadership, biostatistics, and the relationship between clinical and population medicine.

Morgan H, Skinner B, Marzano D, Fitzgerald J, Curran D, Hammoud M. [Improving the medical school-residency transition.](#) *Clin Teach.* 2016;13:1-4.

This article examines a four-week obstetrics and gynecology residency preparation course. On the first and last day of the elective, all 13 students completed the Association of Professors of Gynecology and Obstetrics (APGO) knowledge assessment. Students retook the exam before starting their residency. The exam is designed to assess incoming intern knowledge based on the Accreditation Council for Graduate Medical Education Medical Knowledge and Patient Care level-1 milestones. The authors found that there was a statistically significant improvement from the pre-test mean to the post-test mean. Moreover, the authors reported that eight of

the nine students who completed the APGO knowledge assessment immediately prior to the start of residency passed the exam. This article provides an example of how medical schools can improve the transition to residency by implementing and evaluating residency preparation courses.

Parent K, Jones K, Phillips L, Stojan JN, House JB. [Teaching patient- and family-centered care: Integrating shared humanity into medical education curricula](#). *Am Med Assoc J Ethics*. 2016;18:24-32.

This article discusses the implementation of patient- and family-centered care (PFCC) into two courses in the University of Michigan's new medical school curriculum. The authors and their volunteer patient-family advisers developed and implemented coursework for medical students that emphasize PFCC principles in classroom and home settings. PFCC was incorporated into two courses: "Doctoring: Caring for Patients, Families and Communities," a longitudinal course that includes patient-student partnerships and home visits to lay the foundation for thoughtful and skilled clinical practice, and "Initial Clinical Experience," a longitudinal clinical experience course organized around three aspects of health care: patients, teams and systems. The goal in each of these courses is to improve communication skills for both patients and the health care team, thereby improving the care of the patients within the health care system and recognizing the value of partnering with patients and family members. This article informs medical education programs interested in integrating

PFCC concepts into their medical school curriculum.

Paul T. ["Nothing about us without us": Toward patient- and family-centered care](#). *Am Med Assoc J Ethics*. 2016;18:3-5.

This article aims to define and contextualize patient- and family-centered care (PFCC). PFCC is built upon four fundamental principles: treating patients and families with respect and dignity, sharing information, encouraging patient and family participation in care and decision making, and fostering collaboration in care delivery and program design, implementation, and evaluation. PFCC is about including patients and families in all aspects of health care. As part of a broader movement toward participatory medicine that advocates for collaborative partnerships in health care, PFCC means developing partnerships with patients and their families. It involves recognizing their expertise by involving them as members of clinical care teams, advisory committees, and regulatory research boards; and promoting inclusion of patients and their loved ones in bedside and systems-level health care dialogues. This article informs the efforts of health professions education programs that are incorporating the patient and family perspective into their curricula.

Pettepher CC, Lomis KD, Osheroff N. [From theory to practice: Utilizing competency-based milestones to assess professional growth and development in the foundational science blocks of a pre-clerkship medical school curriculum](#). *Med Sci Educ*. 2016;26:491-497.

This article describes one medical school's approach to developing competency-based milestones for assessing foundational medical knowledge in the early stage of medical school. Milestones were mapped to 18 competencies, and students were assessed using an electronic form with six anchors within each competency describing specific behaviors. This curriculum was taught using a student-run, case-based format similar to problem-based learning, in which students rotated between groups and interacted with new students at each rotation. Facilitators and students were trained in milestone-based assessment and were given opportunities to provide feedback on the process. A process of peer-assessment was included. The milestone-based assessments were integrated with quantitative assessments (e.g., quizzes, essays) to make passing decisions, and students needed to receive adequate scores in all domains to pass (i.e., excellent performance in three domains and deficiency in one domain did not warrant a passing grade). This article extends the health professions education literature on competency-based education and provides an example of implementation at one medical school.

Pinelli V, Stuckey HL, Gonzalo JD.
[Exploring challenges in the patient's discharge process from the internal medicine service: A qualitative study of patients' and providers' perceptions.](#) *J Interprof Care.* 2017; 566-574.

This study explores barriers of the discharge process from the viewpoint of providers and patients. The authors employed a phenomenological approach interviewing 39

providers and seven patients, as well as conducting follow-up focus groups with an additional 41 providers to further understand particular areas recommended for improvement. Providers included any member of the interprofessional team involved in the discharge process. The researchers used an inductive approach in analyzing the data, which yielded five primary categories of barriers: systems insufficiencies; lack of understanding interprofessional provider roles; poor communication; patient-perspective issues; and a poor collaborative process. Systems issues were the most common barrier and included barriers without immediate solutions. A poor understanding of provider roles included both a lack of understanding of interprofessional roles and a misunderstanding of one's own role. In general, information communication, specifically discharge instructions were not efficient and written to the patient's level of understanding. Patient issues were specific to individual patients and included factors that may lead to adverse events. Lastly, one main contributor to poor collaboration was the absence of any team member on rounds. The patients' main issues were related to the perceived lack of communication between providers at the time of discharge. Additionally, the authors synthesized suggested strategies for improving the care transitions based on communication, collaboration, systems factors, and patient factors. The practice issues articulated in this article highlight the need for medical students to be further exposed to systems practices and taught health systems science concepts.

Rappaport L, Coleman N, Dumenco L, Tobin-Tyler E, Dollase RH, George P. [Future health disparity initiatives at the Warren Alpert Medical School of Brown University.](#) *R I Med J.* 2014;97:36-39.

This article highlights the need for medical schools to teach students about health disparities and social determinants of health in an evolving health care system. Additionally, it describes one medical school's plans to deliberately include these topics in the curriculum, in addition currently teaching them to first- and third-year students within existing integrated curriculum and clerkships. Future curriculum development efforts at this institution will include a master's degree program in primary care and population medicine, which will utilize the longitudinal integrated clerkship model and include additional courses focusing on the intersection of clinical medicine, population health, and health care policy, as well as opportunities to address these issues through scholarly projects. Lastly, students initiated a symposium to focus on health disparities issues and receive feedback from local stakeholders regarding key content areas that have yet to be addressed. This article provides a solution for further integrating health disparities and social determinants of health content within the medical school curriculum.

NEW

Robison D, Rajasekaran S, Berman N, et al. ["It feels like being a real doctor": The virtual family approach in medical education.](#) *MedEdPublish.* 2017.

This article is an introduction to the Virtual Family approach to case based instruction, a novel strategy for addressing social determinants of health in medical education. The authors present a theoretical framework along with practical considerations and challenges for the implementation of this approach at three Accelerating Change in Medical Education Consortium schools. Theoretical support for this approach is drawn on principles from modeling and simulation, effective story design, establishing a sense of human presence, serious gaming, visual design, identity leveraging, and flow theory. Measures of efficacy designed to match learning goals are proposed. The virtual family approach builds on the virtual patient approach that has been used for many years and is presented as practical, accessible, economical, and potentially powerful. This article documents how cases involving characters and families that students see longitudinally across the medical school curriculum can match authentic medical practice. Relatively simple tactics (story, intentional image design, careful planning of disease progressions) may significantly enhance student perceptions of personhood in case based instruction.

Santen SA, Seidelman JL, Miller CS, et al. [Milestones for internal medicine sub-interns.](#) *Am J Med.* 2015;128;7:790-798.

This article defines milestones for fourth-year medical students in an internal medicine sub-internship to obtain a better understanding of tasks that medical students can perform with indirect supervision. Surveys for medical students and attending

physicians were created based on a literature review and perceptions of faculty and students. The surveys contain the same content but are modified to fit their positions. The surveys were piloted, and validity evidence for content, response process, and internal structure was collected. A majority of faculty reported that behaviors they would sometimes or never supervise medical students on are reflected in a “reporter” level category and include the history and physical as well as data collection. Other behaviors that the majority of faculty reported they would always supervise medical students on are in the category of “interpreter” level and include significant physical examination findings and test results. Although there were many discrepancies between faculty and students in their perceptions of the level of supervision required for specific behaviors, faculty also noted that their level of trust is based on knowing the student. The results of this study complement national efforts in developing competency-based education programs for medical schools and residencies, and the methodology used in this article may inform medical education programs in identifying the level of entrustment placed upon students participating in systems-based activities.

NEW

Schiller JH, Stansfield RB, BelmonteDC, et al. [Medical students' use of different coping strategies and relationship with academic performance in preclinical and clinical years.](#) *Teach Learn Med.* 2018;30(1):15-21.

This article identifies the most common coping strategies used by medical students and correlates them to academic performance in the preclinical and clinical years. The authors explored differences in students' use of active, problem-solving strategies and emotional, inwardly directed approaches; the change in coping strategies used during medical school; and coping strategy impact on performance. A total of 183 students completed the Ways of Coping Scale at matriculation and end of the 2nd and 3rd years. Frequency of each of eight ways of coping, changes in coping strategy use over time, and relationship of coping method with preclinical and clinical scores were calculated. Students varied widely in use of coping mechanisms. Over time, students shifted to using emotional strategies more frequently while decreasing their use of active strategies. Coping strategies were unrelated to preclinical academic performance but were related to clinical performance with active coping associated with higher performance and emotional methods associated with lower performance. Students decreased use of active coping strategies and increased use of emotional coping strategies over time, but emotional strategies were associated with poorer clinical academic performance. These shifts in coping methods may be detrimental to student performance and learning. This article identifies potential strategies for medical schools seeking to improve student coping abilities and student performance.

Shenson JA, Adams RC, Ahmed ST, Spickard A. [Formation of a new entity to support effective use of technology in medical education: The student technology committee](#). *JMIR Med Educ*. 2015;1:e9.

This article presents the findings of a medical student-led and faculty-supported technology committee developed at Vanderbilt University School of Medicine to harness valuable input from students in a comprehensive fashion. A committee was established with cooperation of school administration, a faculty adviser with experience launching educational technologies, and a group of students passionate about this domain. The committee serves four key functions: acting as liaisons between students and administration; advising the development of institutional educational technologies; developing, piloting, and assessing new student-led educational technologies; and promoting biomedical and educational informatics within the school community. The committee's success hinges on member composition, school leadership buy-in, active involvement in institutional activities, and support for committee initiatives. At the conclusion of this committee's implementations students have integral roles in advancing medical education technology to improve training for 21st-century physicians. This student technology committee model provides framework for this integration, can be readily implemented at other institutions, and creates immediate value for students, faculty, information technology staff, and the school community.

Skochelak S, Swee D, Elliott V. [Building the medical school of the future: Working with the AMA Accelerating Change in Medical Education initiative](#). *MD Advis*. 2016;9:4-6.

This article summarizes the need for change within medical education and the current work of the American Medical Association Accelerating Change in Medical Education Consortium. Mainly, medical education has not kept up with changes in the health care system. This article describes aspects of the grant projects of the first cohort of the consortium and gives an example of how the projects of the consortium's second cohort complement and enhance this work. In addition, the authors give examples of how the consortium has interacted with the broader medical education community through conferences and publications.

Skochelak SE, Stack SJ. [Creating the medical schools of the future](#). *Acad Med*. 2017;92:16-19.

This article discusses the need for change within medical education. The gap continues to widen between how physicians are trained and the future needs of our health care system. The American Medical Association (AMA) is working to support innovative models through partnerships with medical schools, educators, professional organizations, and accreditors to create the medical school of the future. In 2013, the AMA designed an initiative to support rapid innovation among medical schools and disseminate the ideas being tested to additional medical schools. Awards of \$1 million were made to medical schools to redesign curricula for flexible,

individualized learning pathways, measure achievement of competencies, develop new assessment tools to test readiness for residency, and implement new models for clinical experiences within health care systems. Most of the schools have embarked on major curriculum revisions, replacing as much as 25% of the curriculum with new content in health systems science in all four years of training. In 2015, the AMA invited 21 additional schools to join the 11 founding schools in testing and disseminating innovations through the consortium and beyond. This article gives an overview of the American Medical Association Accelerating Change in Medical Education Consortium and the overall goals.

Sozener CB, Lybson ML, House JB, et al. [Reporting achievement of medical student milestones to residency program directors: An educational handover](#). *Acad Med*. 2016;91:676-684.

This article describes the use of a post-Match milestone-based medical student performance evaluation for assessing the competency of medical students entering emergency medicine residency programs to assist in the educational handover process. An ad hoc Emergency Medicine Medical Student Milestone Competency Committee was formed with the goals of developing such a performance evaluation, providing program directors with the results of these evaluations, and receiving feedback on the evaluation from program directors. This process was completed for seven students entering emergency medicine residencies at six distinct institutions, none of which were the same institution as their medical school.

Performance data in this evaluation included an emergency medicine clerkship assessment, the Comprehensive Clinical Exam, an emergency medicine boot camp elective, and other sources including USMLE scores. The committee mapped assessments to the emergency medicine milestones before generating evaluation results for each student, and each student reviewed their program director letters with no suggestions for revisions. Three milestones related to ultrasound utilization, observation/reassessment, and patient safety could not be assessed, and all students met level 1 or level 2 milestones. Out of five program directors who replied, all thought the evaluation provided information not traditionally available and could be useful for all residents. This article provides an example of how the medical school to residency continuum could be improved by providing program directors with additional assessment information regarding incoming interns.

Spickard A, Ahmed T, Lomis K, Johnson K, Miller B. [Changing medical school IT to support medical education transformation](#). *Teach Learn Med*. 2016;28:80-87.

This article describes the design and implementation of a learning management system (LMS) at one medical school implementing major curricular changes. After testing different methods, the medical school created a new educational portfolio platform by adapting existing open source software to their local systems. This new product filled a gap in their new curriculum and existing systems by creating a product

that supports active learning, longitudinal experiences, and competency-based assessment. Faculty and students use a single sign-on to access features of the portfolio that allow for the instruction of new educational pedagogies, communication and file sharing between all students and faculty, and the ability to support individual learning plans. In addition, learning plans allow coaches to track student's goals and receive alerts if learners are not on track. Success of the LMS has led to its adoption by some residencies at the same institution. This article provides an example of how educational IT can be used to complement the implementation of a new curriculum focused on active- and team-based learning and integrated workplace-based experiences, as well as progression through a competency-based curriculum.

Starr SR, Agrwal N, Bryan MJ. [Science of health care delivery: An innovation in undergraduate medical education to meet society's needs](#). *Mayo Clin Proc Inn Qual Out*. 2017; 1:117-129.

This article outlines Mayo Clinic School of Medicine's Science of Health Care Delivery (SHCD) curriculum. Six domains of knowledge are included in the framework including person-centered care; population-centered care; team-based care; high-value care; health care policy, economics, and technology; and leadership. The educational methods used in the curriculum include blended learning, simulation, and longitudinal curricular threads. The authors describe aspects of their student assessment and program evaluation which include standardized cases, a health systems science

examination, and surveys capturing perceptions of SHCD topics. All students who matriculate on or after 2015 earn the Certificate of Science in Health Care Delivery. Student perceptions about the program were identified as a challenge in implementing this new curriculum, primarily in regards to the curriculum having an inconsistent focus with their expectations. The authors suggest more transparency of the importance of a SHCD curriculum at the time of medical school interviews, as well as greater emphasis by residencies regarding the importance of a SHCD education. Second, faculty development is presented as a challenge in implementing the SHCD curriculum insofar as the faculty gained minimal to no formal education surrounding SHCD knowledge. These challenges are ongoing and continue to be addressed based on needs, gaps, and student feedback. This article presents an example of how a health care delivery curriculum framework may be integrated within a medical school curriculum to fit the needs of other medical education programs.

Starr SR, Reed DA, Essary A, et al. [Science of health care delivery as a first step to advance undergraduate medical education: A multi-institutional collaboration](#). *Healthc (Amst)*. 2017;5:98-104.

The article identifies a framework for the science of health care delivery (SHCD) through the collaboration of six institutions. The authors present various approaches to the SHCD curriculum from different medical schools. Shared challenges among the universities in implementing SHCD

curricula in undergraduate medical education include student engagement, faculty development, and curricular integration. To alleviate such challenges, first schools need clear and identifiable learning outcomes. Second, schools need to provide faculty development surrounding SHCD. Third, students need valid and authentic assessments. Lastly, a clear value must be established to align SHCD curriculum with clinical practice. This article informs medical education programs of different approaches to implementing SHCD curricula, as well as associated barriers and facilitators of implementing this curriculum.

Thayer EK, Rathkey D, Miller MF, et al. [Applying the institutional review board data repository approach to manage ethical considerations in evaluating and studying medical education.](#) *Med Educ Online*. 2016;21:10.3402/meo.v21.32021.

This article reviews institutional review board issues with regard to valuation and research in medical education and two schools' application of a data repository approach to mitigate these issues. This approach is specifically helpful for institutions implementing and evaluating curricular innovations. One school included medical students, residents, and fellows in their data repository, and data are only included if it is a standard part of the educational experience, collected for all trainees, and if the trainee has actively consented to allow for identified data to be used in the registry. With an 86% consent rate for medical students and 71% for residents, there are 2066 individuals in the

registry, 183 of which have data from both medical school and residency. Another medical school uses a similar repository to collect medical student data and uses this to facilitate feedback for students within an individualized curriculum, as well as including data within observational studies to improve curricular approaches. In preparing a repository application, it is important to identify primary data collection periods, specific plans for how the data will be used longitudinally, and how the data will be retrieved for analytic purposes. For example, schools may deliberately request sharing data with other institutions for joint research opportunities. This article informs health professions education programs in describing how they may create a data repository for collecting, analyzing, and sharing data for the purpose of educational research.

NEW

Thompson BM, Gonzalo JD, Levine RE. [The power of the written word: Team assessment of behavior.](#) *Med Educ*. 2016;50(7):706-8.

This article raises questions identified by a study that analyzed multi-source feedback (MSF) to assess the functioning of health care teams. The questions include: Who are the most reliable assessors in MSF of teamwork skills? Can we train individuals, such as peers, to provide more robust ratings and comments regarding team performance? Does MSF improve team functioning? If multi-source assessment is advantageous, why isn't it used more often? The authors conclude that MSF provides an opportunity to not only improve the performance of

individuals within teams, but also the performance of teams themselves, but that much research is needed in this area. This article informs the efforts of medical schools to improve interprofessional education and effectively assess interprofessional teams.

Tsai J, Ucik L, Baldwin N, Hasslinger C, George P. Race matters? [Examining and rethinking race portrayal in preclinical medical education](#). *Acad Med*. 2016;91:916-920.

This article discusses race portrayal in preclinical medical education. The article focuses on a sampling of lecture slides at the authors' medical school over a three to five month time frame that demonstrated that race was almost always presented as a biological risk factor. This presentation of race as an essential component of epidemiology, risk, diagnosis, and treatment without social context is problematic as a broad body of literature supports that race is not a robust biological category. The authors opine that current preclinical medical curricula inaccurately teach race as a definitive medical category without context, which may perpetuate misunderstandings of race as a bio-scientific datum, increase bias among student-doctors, and ultimately contribute to worse patient outcomes. The survey led to the implementation of changes in curriculum for first and second-year orientation, doctoring, and preclinical courses as part of the creation of a longitudinal curriculum on race in medicine. This article informs other medical schools interested in making changes to adequately contextualize race in their curriculum.

Tunkel AR. [Health disparities education – the time is now](#). *R I Med J*. 2014;97:21.

This article stresses the need for health disparities education despite a lack of consensus on the definition of health care disparities. As long as there are inequities in health outcomes, students need to be taught about the social determinants of health in settings that affect outcomes. In addition, the author introduces a special issue of this journal highlighting innovations at one medical school that address these issues. This article describes the need for education addressing health care disparities and the social determinants of health.

Wagenshutz H, McKean E, Zuraes K, Santen S. [Facilitating guided reflections on leadership activities](#). *Med Educ*. 2016;50:1149-1150.

This article presents an instructional strategy from the University of Michigan on implementing Borton's framework (*What? So what? Now what?*) to broaden recognition about concepts of leadership among first year University of Michigan medical students. The authors describe the process of leadership learning opportunities, including leadership reflection throughout medical students' first year. In these reflections, the authors implement Borton's framework and students identify the task, articulate the significance, and synthesize their goal setting. The authors found that the model facilitated objective assessment of students' reflections. Furthermore, the authors promote further instruction in Borton's framework to help students further develop effective leadership skills. This article describes an instructional approach

that may be integrated within other health professions education programs to provide medical students with the tools to recognize various leadership opportunities.

Welcher CM, Hersh W, Takesue B, Elliott VS, Hawkins RE. [Barriers to medical students' electronic health record access can impede their preparedness for practice](#). *Acad Med*. 2018;93:48-53

This article describes the current limitations surrounding medical student access to electronic health records (EHRs). While there is widespread access to EHRs by universities, student access remains inconsistent. The implications of such access includes students lacking skills including patient charting and accessing lab results. Second, first-year residents then end up spending too much time familiarizing themselves with EHRs, shifting some focus away from patient care. Some medical schools have allowed students access to EHR simulations and electronic templates; however, these tools do not provide necessary skills in data management. The authors attribute limitations of student access to EHRs to strict interpretations of current HIPAA laws, even though patient care team members are allowed access—including medical students. Secondly, because there are various EHRs, a medical student's familiarity with one system does not mean fluency for all EHR systems. The authors further discuss policy proposals for implementing greater medical student access to EHRs. These proposals include assigning medical students unique usernames and passwords, along with supervisor sign off and feedback to all medical student EHR

notes. Lastly, the authors provide innovative models of EHR access by identifying best practices from United States medical schools who have allow students access to EHRs as a teaching tool. Additional solutions to these issues include the growing interoperability of systems improving student adaptability to various EHR systems, as well as a more robust medical education training. The authors advocate for more consistent and thorough student access to EHRs as a method for better preparing medical students for residency and practice, and provides examples of how health professions education programs may integrate EHRs within their curricula.

White J, Riese A, Clyne B, Vanvleet MW, George P. [Integrating population and clinical medicine: A new third-year curriculum to prepare medical students for the care of individuals, panels, and populations](#). *R I Med J*. 2015;98:32-35.

This article describes a Primary Care-Population Medicine program at one medical school aimed at filling curricular gaps addressing the integration of population and clinical medicine. A course teaching this content will include small group sessions and case-based sessions which follow a family's interaction with the health care system. The course will also include longitudinal threads of the social and community context, quality improvement, and leadership which include experiential learning opportunities. Learning in this course will be done in conjunction with medical training within a longitudinal integrated curriculum. This article gives medical school an example of how

conceptual and experiential opportunities of teaching components of health systems science can be integrated within a curriculum.

Wiest K, Farnan J, Byrne E, et al. [Use of simulation to assess incoming interns' recognition of opportunities for Choose Wisely](#). *J Hosp Med*. 2017;12:493-497.

This article describes a study assessing postgraduate year one (PGY1) interns' identification of Choosing Wisely™ low-value care recommendations through participation in a simulation at the University of Chicago medical school. This particular simulation, "Room of Horrors," simulates an inpatient hospital room. There are eight identifiable safety hazards, and four additional low-value hazards. The 120 PGY1 interns in this study represented 60 medical schools and seven different specialties. Data collected in this study was comprised of free-response answers, which were manually coded. Furthermore, the use of descriptive statistics summarized mean percentages for each hazard. T-tests were also extensively used to compare various results, including low-value versus safety hazards. In part, the authors found that participants identified significantly fewer low-value hazards than safety hazards. Second, there was a statistically insignificant difference between interns in procedural-intensive versus non-procedural-intensive specialties in identifying low-value hazards. Third, interns identified significantly less chart-based errors than room-based errors. In the participants' follow up and feedback, they expressed an assumption that patient charts were correct. The authors' findings

suggest PGY1 interns exhibit inadequate identification of low-value care, emphasizing the necessity of medical schools to focus efforts on low-value care training to better prepare students for residency. Medical schools may integrate this simulation into their assessment of students and program evaluation to identify gaps in patient safety education within their curricula.

Williams BC, Mullan PB, Haig AJ, et al. [Developing a professional pathway in health equity to facilitate curricular transformation at the University of Michigan Medical School](#). *Acad Med*. 2014;89:1153-1156.

This article describes the development, implementation, and evaluation of an optional Global Health and Disparities Path of Excellence curriculum. The goals of this pathway were to deliberately address the school's social mission, develop and evaluate methods of teaching this content that can be adapted throughout broader medical education curriculum, and provide guidance in developing similar pathways related to different content areas. Students and faculty worked together to identify curricular content and instructional methods, metrics for assessing progress, and criteria for completion. Participation in the program included completion of a scholarly project, small-group activities and seminars, and longitudinal advising. Students' progress through the track was monitored with an electronic portfolio and included narrative feedback from the student, adviser, and others with whom the student worked. Twenty-nine students completed scholarly

projects and included content from clinical interventions to program evaluation. This pathway was reviewed positively by students and faculty. Awareness of the school's social mission increased, and the school modified parts of the overall curriculum to include health disparities content open to all students. Additionally, students have initiated activities to increase the focus on these issues. This article gives medical schools an example of how to integrate and develop a program focused on teaching health disparities.

NEW

Yengo-Kahn AM, Baker CE, Lomis KD. [Medical students' perspectives on implementing curriculum change at one institution.](#) *Acad Med.* 2017;92:455-461.

This article presents five specific considerations to address and manage when implementing student-centered curricular change. These include: (1) communicate the rationale, (2) acknowledge anxiety, (3) adjust extracurricular leadership roles, (4) manage "The Bulge" of learners in the clinical environment, and (5) foster ongoing collaboration of students and administrators. For each consideration, examples and proposed solutions are provided. The authors recommend that broad and continuous involvement by student representatives, from the planning stages into implementation and through maintenance of the new curriculum, is essential to curriculum transition success. This article addresses issues associated with curricular change that emerged at one Accelerating Change in Medical Education school and explains how the lessons learned

can be applied at other schools in similar situations.

NEW

Young E, Stickrath C, McNulty MC, et al. [Internal medicine residents' perceived responsibility for patients at hospital discharge: A national survey.](#) *J Gen Intern Med.* 2016;31(12):1490-1495.

This article examines the duration and content of internal medicine residents' perceived responsibility for patients they discharge from the hospital. It also looks at whether specific individual experiences and characteristics correlate with perceived responsibility. The authors delivered by email and paper a 24-question survey to internal medicine residents at nine university and community-based internal medicine training programs in the United States. Of 817 residents surveyed, 469 responded (57.4 %). One quarter (26.1 %) indicated that their responsibility for patients ended at discharge, while 19.3 % reported perceived responsibility extending beyond 2 weeks. Perceived duration of responsibility did not correlate with level of training ($P=0.57$), program type ($P=0.28$), career path ($P=0.12$), or presence of burnout ($P=0.59$). The majority of residents indicated they were responsible for six of eight transitional care tasks. Approximately half of residents (57 %) indicated that it was their responsibility to directly contact patients' primary care providers at discharge, and 21.6 % indicated that it was their responsibility to ensure that patients attended their follow-up appointments. Internal medicine residents have variability in perceived duration of responsibility for recently discharged

patients. Neither the duration nor the content of residents' perceived responsibility was consistently associated with level of training, program type, career path, or burnout, suggesting there may be unmeasured factors such as professional role modeling that shape these perceptions. This article informs the work of medical educators looking for ways to improve education around patient safety and other health systems science topics.

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