Blueprint for an Undergraduate Primary Care Curriculum

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Abstract

In light of the increasing demand for primary care services and the changing scope of health care, it is important to consider how the principles of primary care are taught in medical school. While the majority of schools have increased students' exposure to primary care, they have not developed a standardized primary care curriculum for undergraduate medical education. In 2013, the authors convened a group of educators from primary care internal medicine, pediatrics, family medicine, and medicine–pediatrics, as well as five medical students to create a blueprint for a primary care

curriculum that could be integrated into a longitudinal primary care experience spanning undergraduate medical education and delivered to all students regardless of their eventual career choice.

The authors organized this blueprint into three domains: care management, specific areas of content expertise, and understanding the role of primary care in the health care system. Within each domain, they described specific curriculum content, including longitudinality, generalism, central responsibility for managing care, therapeutic alliance/ communication, approach to acute and

chronic care, wellness and prevention, mental and behavioral health, systems improvement, interprofessional training, and population health, as well as competencies that all medical students should attain by graduation.

The proposed curriculum incorporates important core features of doctoring, which are often affirmed by all disciplines but owned by none. The authors argue that primary care educators are natural stewards of this curriculum content and can ensure that it complements and strengthens all aspects of undergraduate medical education.

Primary care is the cornerstone of efficient and effective health systems, with its emphasis on prevention and the abundant evidence of its contribution to improved quality and lower costs of care. Ultimately, high-functioning primary care practices are based on the tenets of the Institute for Healthcare Improvement's Triple Aim—improving patients' experience of care and the health of populations and reducing the per capita cost of health care.[1] To this end, the focus of care has shifted recently to preventing disease rather than waiting to treat complications, and on coordinating care to improve quality and decrease the duplication of services. Expanded access to primary care in the wake of the Affordable Care Act should benefit our country, yet more than one group

has predicted a significant shortage of primary care physicians.[2,3] This shortage cannot simply be addressed by expanding enrollment in medical schools, as fewer than 25% of U.S. MD-granting and 31% of DO-granting medical school graduates plan to enter primary care.[4,5] In addition, evidence suggests that graduate medical education training does not adequately prepare clinicians for many aspects of current primary care practice.[6]

In 1994, the Institute of Medicine defined primary care as "the provision of *integrated, accessible health care services* by *clinicians* who are *accountable* for addressing a large *majority of personal health care needs*, developing a *sustained partnership* with *patients*, and practicing in the *context of family and community*."[7] The major academic primary care organizations have called for the education of all physicians in the principles of patient-centered medical homes in a reformed health care delivery system.[8] While many medical schools have implemented initiatives over the past two decades to increase students' exposure to primary care, they have not agreed on objectives, outcomes, or assessment tools for undergraduate medical education in primary care, nor have they developed a standardized

curriculum to address these needs. Instead, schools rely on individual disciplines to cover primary care topics, with variable emphasis and degrees of coordination.

The 21st century poses multiple challenges to our health care system and to health care providers. The epidemiology of illness has evolved from acute infections to chronic complex, multisystem diseases, and goals have shifted from curing disease to maximizing well-being. Non-primary-care physicians will need to understand the pivotal role of generalists in this system, as well as the importance of reforming their own practices to better coordinate with primary care physicians for optimal patient management.[9]

To meet these goals, we developed a blueprint for an undergraduate primary care curriculum at Harvard Medical School (HMS). In this article, we describe its development and content, including domains and competencies.

Overview of Developing a Primary Care Curriculum

As part of a major curriculum overhaul at HMS and in light of the recent

publication of the Association of American Medical Colleges' Core Entrustable Professional Activities for Entering Residency,[10] the education committee of the HMS Center for Primary Care invited leaders in primary-care-related courses at HMS to come together to define a "curriculum" in primary care that all our medical students would complete, regardless of whether they planned to pursue a career in a primary care discipline. These leaders represented all of the major teaching hospital systems and are authors of this article (see Supplemental Digital Appendix 1 at http://links.lww.com/ACADMED/A375 for a list of the authors and their educational roles at HMS).

We envisioned that this primary care curriculum would include two main components—a set of themes fundamental to primary care and a list of the most important clinical conditions in primary care practice with which every medical student should have experience. In addition, we planned to describe the key structural elements that would best enable students' learning of this content, echoing the Donabedian model.[11] Our goal was to develop a "blue sky" template for the key components of such a curriculum that would be generalizable to other institutions and would inform a set of competencies that all students should be expected to attain in their training. We understood that many of these core themes would be basic themes of doctoring—the tenets of the essential clinical transaction and of learning to create caring professional relationships.[12] Indeed, a number of other disciplines have created curricula encompassing longitudinal care, acknowledging the importance of providing students with exposure to critical thinking, the patient's experience, and the doctor–patient relationship over time.[13–17] While many of these themes are important to all disciplines, they often are not owned in discipline-specific curricula, whereas they are the core of primary care.

At many medical schools, the elements of a curriculum in primary care are delivered as part of one or more discrete clinical courses. More institutions are beginning to expose students to primary care practice environments earlier in their training,[18] and several are creating explicit tracks for training future primary care

physicians.[19–23] However, our approach is unique in that it is based on the knowledge and skills that every student needs to learn to be a competent physician, and it was developed as a competency-based, developmentally progressive four-year primary care curriculum experience.

Several operational features emerged as critical for a primary care curriculum. First, it should include the longitudinal integration of students into primary care practices beginning early in their training, to provide experiential grounding to the basic science curriculum, allow for enhanced clinical skills training and assessment, improve student satisfaction, and enable students to build a panel of patients whom they can follow over time.[18,24] In addition, a primary care curriculum should span all four years of undergraduate medical education, providing all students with ongoing involvement in their patients' experiences of illness. Finally, the curriculum should be developmentally progressive and targeted to students' levels of interest, with foundational competencies for every student and expanded competencies for those intending to focus on a career in primary care.

Conceptual Approach to Developing a Primary Care Curriculum

In December 2013, we established a working group of 15 expert educators from HMS in the main primary care fields of practice, including primary care internal medicine, family medicine, pediatrics, and medicine–pediatrics, and 5 medical students. The team reviewed available literature from PubMed (2000 to present), curriculum offerings published in MedEdPORTAL, and available national undergraduate curricula from the Clerkship Directors in Internal Medicine, the Society of Teachers of Family Medicine, the Council on Medical Student Education in Pediatrics, as well as from the Nova Scotia Primary Health Care Competency Framework and the World Health Organization 2011 Sexual and Reproductive Health Core Competencies.[25–28] Each member of the team was asked to create a list of 10 content and experiential elements that should be covered in the new curriculum. We then compiled these lists into a grid. Over the course of monthly meetings

in 2014, 11 core themes emerged. We excluded topics that were not specific to primary care education, including the demonstration of procedural competence, pharmacology of commonly prescribed medications, principles of evidence-based medicine, health care financing, and high-value care. End-of-life care also was excluded, as we felt that it went beyond the purview of a basic broad curriculum.

What emerged was a unique template for a four-year curriculum that defined three main domains of primary care curriculum content: care management, specific areas of content expertise, and understanding the key role of primary care in the health care system. Within each domain, we described specific curriculum content and associated competencies that all students should possess upon graduation from medical school. These competencies include common areas of primary care focus as well as foundational skills that all physicians should possess to practice in the health care system of the future.[29]

We describe in more detail this curriculum content by domain in the sections that follow and in Appendix 1.

Care Management

1. Longitudinality

Central to the Institute of Medicine's definition of primary care is the concept of a sustained relationship over time between a provider and patient.[7] Most medical schools offer opportunities for students to interact with patients early in their education. Such opportunities have clear benefits—students are better able to link the basic sciences to clinical medicine, which allows them to become more confident in their clinical skills, inculcates their self-awareness, nurtures their development of a professional identity, and is more satisfying.[30,31] However, a single patient interaction, generally limited to data gathering and the observation of a care episode, does not provide students with opportunities to witness the core longitudinal nature of primary care.

Exposure to patients over the full course of their illness is more valuable from an educational standpoint than opportunistic encounters with primarily

acute care inpatients.[32] Students must be involved with patients from the time of their initial presentation through the entirety of their illness episode to foster diagnostic reasoning skills.[33] Such longitudinal contact allows students to get to know patients in the full context of their lives, families, and communities to understand the relevance of contextual factors to illness[34] and to develop mutually trusting relationships, which are a cornerstone of effective practice. Longitudinal contact also provides unique opportunities for students to continuously improve their skills,[35] to appreciate the process of specialty referral and collaboration, and to bear witness to systems gaps.

2. Generalism

The generalist is able to care for patients with undifferentiated illnesses and the widest range of conditions and consistently sees the patient as a whole person and in the context of his or her family and social environment.[36] Primary care physicians are trained in the intellectual habit of considering all possible diagnostic etiologies, including all body systems and mental health disorders, before finalizing a diagnosis. These skills help physicians avoid premature closure and other diagnostic pitfalls. In addition, generalists must develop a certain degree of comfort with uncertainty, a crucial skill in the practice of medicine. When evaluating patients, students must learn to approach each encounter with a combination of medical knowledge, best available evidence, and an understanding of what will serve each patient's particular needs.

3. Central responsibility for managing care

As the central coordinator of a patient's care, the primary care physician must manage chronic illness, identify and coordinate preventive care, and take responsibility for care across many disease episodes as well as over time, often serving as the initial evaluator of acute undifferentiated illness and sometimes coordinating complex care across organizations. Students should learn how to diagnose and provide treatment for common illnesses without having to refer the patient to a specialist but also be able to integrate their care with that of a larger team of physicians when necessary.

4. Therapeutic alliance/communication

Good communication skills are crucial for relationship building, history taking, health education, motivating behavior change, and ensuring adherence to a treatment plan, all of which are key to the practice of medicine. Arguably, these skills are best taught in a primary care setting. A fundamental role of the primary care physician is to ensure communication and collaboration across the care team, as well as shared decision making with the patient and family. Skills to be mastered in this area include shared decision making and negotiation, relationship building, effective organization, and time management in delivering care.[37,38] A basic understanding of general medical ethics skills, including maintaining confidentiality, obtaining informed consent, and truth telling, is also important.

Specific Areas of Content Expertise

5. Approach to acute care

The ability to provide acute or urgent care is an important skill in primary care. Primary care physicians are often the ones to see a patient with a new problem, and they must sort through all the diagnostic possibilities after completing a careful history and exam, using their knowledge of the patient. This common task requires that physicians are proficient in identifying the likely causes of illness prior to determining a diagnostic and treatment plan, and that they have the confidence to proceed in a stepwise fashion to avoid overuse of resources.[36] In addition, a good primary care physician has the ability to triage sick from not-sick patients to determine the appropriate pace and venue for intervention. As in all specialties, some acute care symptoms and diseases are so common in the primary care setting that all students should be familiar with them prior to graduation (see Appendix 1 for a list of these symptoms and diseases).[39]

6. Approach to chronic care

Chronic disease is responsible for more than 50% of mortality worldwide, representing nearly 50% of the global burden of disease.[40] All students must have a basic understanding of the physiology, range of expression and presentation, diagnosis, and management of common chronic illnesses by the time they graduate from medical school. Drawing from the national curricula in internal medicine, family medicine, and pediatrics,[26–28] we determined which conditions are integral to the discipline of primary care and for which a coordinated knowledge about outpatient diagnosis and management is central to a physician's ability to practice in a variety of settings (see Appendix 1). Upon graduation, students must be able to explicitly describe evidence-based and/or consensus-based goals for the treatment of each of these conditions.

While much of the focus of a chronic disease curriculum is on teaching disease-specific knowledge, all graduating students should also have a basic understanding of the tenets of the Chronic Care Model,[40,41] which includes educating and supporting patients, improving provider expertise through decision support, creating care delivery that is planned and team based, using registry-based clinical information systems, focusing on the organization of health care, and understanding the role of community support. The Chronic Care Model shifts the approach to chronic illness from a reactive model to one that is proactive.[40]

7. Wellness and prevention

An undergraduate medical school curriculum should include preventative approaches to health care for patients at all stages of life.[26,27] This begins with a working knowledge of child development and continues with an understanding of other prevention strategies that are applicable throughout an individual's life, including the needs of geriatric patients. Students should understand the role that vaccines play in infectious disease control and be able to advise patients on their use. They also should be well versed in the risks and benefits associated with screening for conditions such as cancer, heart disease, and genetic disorders.[42] Students need to be able to effectively counsel patients on the risk/benefit ratios of preventative interventions, their effects on outcomes, costs, and the sensitivity and specificity of a test in a given population. Students must demonstrate strong motivational interviewing skills and the ability to effectively counsel patients on the importance of lifestyle modification.

8. Mental and behavioral health

More than 18% of adults in the United States receive a mental health diagnosis.[43] Most of these patients will receive treatment from a primary care provider rather than from a mental health specialist. Thus, medical students should learn how to evaluate patients with the most common mental illnesses as well as how to treat those conditions in the outpatient setting. Students also should be familiar with validated screening tools for depression, anxiety, autism spectrum disorders, and attention-deficit/hyperactivity disorder, and understand differential presentations in pediatric, adult, and elderly patients. In addition, students should be able to assess patients for substance use disorders and be aware of the treatment options for the use of tobacco, alcohol, and opiates. Because of the strong correlation between exposure to violence and other adverse life events and mental and physical health outcomes, students must learn to screen for these exposures at all stages of life and be familiar with the resources available for patients who have had such experiences.

Understanding the Key Role of Primary Care in the Health Care System

9. Systems improvement

In an effort to transform systems of health care delivery to increase quality and reduce costs, the patient-centered medical home has become one of the defining primary care practice models of our generation. Current medical students likely will be exposed to practices either transitioning to patient-centered medical home models or implementing smaller-scale enhancements.[44] Thus, they must appreciate how quality improvement methodologies are applied in the ambulatory setting with the aim of redesigning primary care to optimize outcomes for patients and populations.

10. Interprofessional training

Given the increasing complexity of health care delivery, volume of information, and number and type of health care providers, high-functioning teams are essential for delivering efficient, high-quality, patient-centered care. Although best practices in interprofessional education have not yet been clearly defined,[45,46] an important way to address this educational need is to provide our students with experiences that allow them to learn and work with both trainee and practicing non-MD health professionals in a variety of settings.[47] Because students adopt the characteristics of the culture in which they are trained, it is important to provide interprofessional experiences throughout their learning, starting early on in training.

11. Population health

Managing the health of a population, both in and out of the office, presents a different set of challenges and opportunities than the care of individuals in an inpatient or outpatient setting. Key elements for population health practice include knowledge of how a health system contributes to the health of individuals and populations, familiarity with methods to identify unmet population health needs and to track the impact of initiatives, and skills to effectively engage and collaborate with stakeholders to coproduce health.[48,49] Principles of population health and health care delivery can be taught didactically, but they are best internalized when they are reinforced through experience. Several well-articulated frameworks exist for curricula in population health, as do the means for competency mapping, which educators should consider incorporating into this paradigm.[50–52]

The Need for Meaningful Reform

In 2010, the Carnegie Foundation for the Advancement of Teaching called for the integration of formal learning with clinical experience in medical education, including early clinical immersion, longitudinal patient experiences, and interprofessional education, as well as for engaging learners in habits of inquiry that allow them to learn about population health, innovation, and improvement of care.[53] We can envision no better setting than a high-functioning primary care practice in which to realize these goals.

We have broken these elements of formal learning into thematic components: care management, specific areas of content expertise, and understanding the role of primary care in the health care system. The expectation is that all graduating medical students should acquire a core set of knowledge and skills and that they will do so through an experiential framework that will anchor their learning in developmental phases appropriate to the stage of their training. We envision that some of the basic principles may be taught in didactic portions of the curriculum, but the majority of the learning objectives are best reinforced and internalized in the clinical setting, preferably in a primary care clinical experience that spans the four years of undergraduate training. See Table 1 for specific examples of developmental competencies by stage of training that align with these domains and curriculum content.

Some might question why all of these domains should be required learning for a student who is pursuing a career as a subspecialist or physician–scientist. The Centers for Disease Control and Prevention reported 472 generalist physicians and 636 specialist physicians per 1 million people in the United States in 2010,[54] and the Association of American Medical Colleges has called for expansion of the physician workforce across both these groups.[55] However, the future of medicine likely will require the ability to practice in an integrated health system, and the primary care physician plays a central role in this construct. Berwick and Finkelstein[56] have argued that system improvement skills must be taught to all medical students and that medical education must focus on patient-centeredness, transparency, and stewardship of limited resources. In addition, the Liaison Committee on Medical Education requires all medical schools to offer opportunities for service learning and interprofessional education as well as instruction in culturally competent care and health care disparities.[57] Although each of these content elements could be learned in alternative settings, longitudinal clinical experiences cover them all. Having future specialists and generalists practice alongside one another in the later years of medical school also allows them all to learn the art of smooth referrals as well as the benefits of collaboration. Students with an interest in any discipline of clinical practice will benefit from a curriculum that spans all four years and focuses on such core skills of doctoring as the therapeutic relationship; working in multidisciplinary teams; and understanding social, psychological, and cultural factors to provide effective health care.

Table 1

Examples of Developmental Competencies by Stage of Training That Students Should Attain From an Undergraduate Primary Care Curriculum

Curriculum content	Competencies by stage of training		
	Foundational	**Core clerkships**	**Advanced**
1. Longitudinality	• Demonstrate understanding of patient's experience of care through reflective writing • Identify gaps of care • Perform one home visit	• Follow the course of illness over time for a defined panel of patients	• Demonstrate principles of patient advocacy
2. Generalism	• Appreciate the patient as a whole person in the context of his or her family and wider social environment	• Demonstrate an approach to undifferentiated illness • Explore symptoms in a cost-effective manner	• Apply a broad and holistic perspective to patients' problems • Avoid premature closure and other diagnostic pitfalls • Become comfortable with diagnostic uncertainty
3. Central responsibility for managing care	• Describe the role of the primary care physician in coordination of care	• Learn how and when to initiate a consult	• Participate in effective models of care coordination
4. Therapeutic alliance/ communication	• Communicate with patients empathically and effectively	• Demonstrate ability to engage in shared decision making • Demonstrate ability to use communication skills to improve patient understanding and education	• Employ advanced communication skills such as giving bad news, difficult patient interactions
5. Approach to acute care	• Describe pathophysiology of core content areas • Incorporate principles of evidence-based medicine in understanding disease	• Describe typical disease presentation and appropriate diagnostic approach • Demonstrate diagnostic reasoning over time • Demonstrate understanding of use of practice systems to triage, treat, and follow up on acute visits	• Describe treatment of common illnesses • Understand common errors in diagnostic reasoning
6. Approach to chronic care	• Describe pathophysiology and presentation of common chronic diseases • Incorporate principles of evidence-based medicine into care decisions	• Demonstrate the appropriate diagnostic approach to common chronic diseases	• Describe principles of management in commonly observed chronic diseases • Describe the Chronic Care Model
7. Wellness and prevention	• Describe principles of a screening tool	• Describe specific tools for age-appropriate screening	• Perform age-appropriate screening • Demonstrate lifestyle counseling skills
8. Mental and behavioral health	• Engage in motivational interviewing	• Describe presentation and diagnosis of common mental health disorders	• Demonstrate principles of disease management for common psychiatric conditions in the ambulatory setting
9. Systems improvement	• Describe the relationship of health care systems to patient well-being	• Care for patients in a patient-centered medical home practice	• Engage in a practice improvement project
10. Interprofessional training[47]	• Recognize the expertise of other health care professionals	• Demonstrate the ability to work effectively and collaboratively in teams • Communicate effectively with other team members	• Engage other professionals in patient-centered problem solving
11. Population health	• Explain the role of cultural determinants of health	• Link patients with resources specific to their needs	• Engage in a community-specific health promotion project

Our primary care curriculum proposal has a number of limitations. Principal among them is that it was developed at a single institution in the process of curriculum reform; thus, the ability to incorporate it into alternate settings may be challenging. Our first-year students already take part in a longitudinal primary care experience as part of their clinical skills development. In addition, the domains chosen for this template were not selected through the use of a predefined qualitative approach but, rather, through a series of iterative discussions among educators and students who were invested in the process. A key operative feature of the curriculum is a longitudinal experience

superimposed upon (but not replacing) required curriculum elements, which may mitigate some of the difficulty that other institutions would face if they were to adopt our model.

A number of the curriculum elements we propose in this blueprint ultimately will require concurrent transformation in teaching practices to allow time and space for learners to take part in this longitudinal clinical experience, as well as a focused effort to foster faculty development. However, the investment is well worth the cost. As educators, we must provide our students, regardless of their career choice, with the best possible tools and experiences for understanding our health care system and the roles and responsibilities, intellectual demands, and expertise of those who function within it.

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Appendix 1

Domains, Curriculum Elements, and Learning Objectives for a New Undergraduate Primary Care Curriculum

Domains and curriculum elements	Learning objectives By the end of medical school, students should be able to:
Care management	
1. Longitudinality	• Use staged, iterative diagnostic and therapeutic reasoning in which evolution over time, probabilistic data, and evidence-based thinking are carefully considered. • Recognize the psychological and social contextual variables of patients' illnesses and incorporate these factors into the design of care plans. • Appreciate the central role of the patient–physician relationship in providing care and advocacy and be able to establish strong longitudinal supportive connections with patients. • Describe the importance of the clinical team, of ensuring coordinated care across the multiple venues of a patient's care, and participate in the team assessment and care of complex patients.
2. Generalism	• Approach a patient with an undifferentiated disease and explore her or his symptoms in a thorough yet cost-effective manner. • Demonstrate comfort with uncertainty.
3. Central responsibility for managing care	• Recognize when a primary care physician can manage care and when coordination of care with other health care professionals is indicated. • Clearly identify and articulate the reason for a referral. • Appreciate the central role of the primary care physician in coordinating care with other caregivers and the concept of co-management to allow for ongoing involvement in the patient's care. • Adopt techniques for improving communication among care team members and participate in effective models of care coordination.
4. Therapeutic alliance/communication	• Demonstrate a variety of effective communication skills, not just those used for particular situations, such as breaking bad news, but also strategies that encourage effective and empathic communication in all patient encounters. • Demonstrate shared decision-making, including using decision aids to help with significant medical decisions, and strategies for incorporating shared decision-making skills into routine primary care. • Describe the importance of close communication and collaboration with specialty care as well as strategies for enabling and supporting this communication. • Explain the role of primary care physician as advocate and discuss strategies for advocating for individuals, groups, or populations.
Specific areas of content expertise	
5. Approach to acute care	• Delineate possible diagnoses based on a complete history and physical, identify the most likely and "can't miss" diagnoses, elaborate a diagnostic plan, and propose initial therapy. • Utilize prior knowledge of the patient and the patient's history to enhance and facilitate this process. • Be aware of common errors in diagnostic reasoning, including anchoring and bias, that can lead to premature closure and thus a possible poor outcome. • Demonstrate proficiency in understanding the diagnosis and management of common acute conditions evaluated in the primary care setting, including:

Adults	**Children**
Abdominal pain	Abdominal pain
Chest pain	Acute gastroenteritis
Cough	Asthma exacerbation
Headache	Evaluation of fever in an infant
Knee pain	Injury
Low back pain	Otitis media/pharyngitis
Pharyngitis/sinusitis	Sexually transmitted infections
Sexually transmitted infections	Skin rash
Skin rash	Urinary tract infection
Urinary tract infection/dysuria	

(Appendix continues)

Appendix 1
(Continued)

Domains and curriculum elements	Learning objectives By the end of medical school, students should be able to:
6. Approach to chronic care	• Describe the physiology, presentation, diagnosis, and management of common chronic illnesses seen in the primary care setting. • Demonstrate competence in counseling patients on personal goal setting and self-management of chronic illness. • Explain the role of evidence-based and expert opinion guidelines in informing the management of chronic illness. • Demonstrate proficiency in understanding the diagnosis and management of common chronic conditions evaluated in the primary care setting, including: **Adults** **Children** Anemia — Anemia Arthritis — Asthma Asthma/COPD — Autism Care of the geriatric patient — Care of the medically complex child Chronic back pain — Chronic abdominal pain/constipation Coronary artery disease — Diabetes mellitus Diabetes mellitus — Failure to thrive Dyslipidemia — Food/environmental allergies Heart failure — Headache Hypertension — Learning/school difficulties/developmental delays Obesity — Seizure disorders Substance use
7. Wellness and prevention	• Describe childhood developmental milestones. • Recognize vaccine-preventable diseases as well as the indications and contraindications for currently available vaccines. • Perform an assessment of screening tests, including how to assess the quality of a screening test and which ones are indicated in what setting. • Develop lifestyle modification counseling skills. • Perform competent screenings for substance use, sexual health, occupational and environmental hazards, and geriatric safety.
8. Mental and behavioral health	• Screen, evaluate, and propose appropriate treatment for the most common mental health disorders, including anxiety, depression, bipolar disorder, and attention-deficient/hyperactivity disorder. • Assess patients for substance use disorders and addiction and describe treatment options. • Describe the differences in presentation of these disorders in various patient populations and take these disorders into account when proposing treatment plans for other illnesses. • Demonstrate motivational interviewing techniques.
Understanding the key role of primary care in the health care system	
9. Systems improvement	• Describe the basic tenets of health care reimbursement, particularly as they relate to constraints on an individual patient. • Participate in the work of a practice that is undergoing transformation into a patient-centered medical home. • Become engaged in a practice-based innovation project.
10. Interprofessional training	• Work in cooperation with those who receive care, those who provide care, and others who contribute to or support the delivery of prevention and health services. • Develop strategies to meet specific patient care needs by engaging health care professionals with diverse expertise who complement one's own professional expertise, as well as associated resources. • Organize and communicate information with patients, families, and health care team members in a form that is understandable, avoiding discipline-specific terminology when possible.

(Appendix continues)

Appendix 1
(Continued)

Domains and curriculum elements	Learning objectives By the end of medical school, students should be able to:
11. Population health	• Describe the tools used by high-functioning practices to analyze their delivery of essential services to their patient population, including information technology, plan, do, study, act (PDSA) cycles to improve care delivery, and outreach to patients.
	• Participate in the design and implementation of a population-health improvement project.
	• Identify the link between primary care and systems-based community medicine to gain a broad clinical understanding from the ecological perspective of a person/family in their environment.
	• Develop an appreciation for the importance of interdisciplinary collaboration and preventative work on individuals, families, and communities.
	• Work with the system in which one practices to help develop cost-effective patient care.
	• Adapt one's practice to meet the needs of the community through investigation and community-specific research or project development.[58]