

Medical Education for a Healthier Population: Reflections on the Flexner Report From a Public Health Perspective

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Abstract

Abraham Flexner's 1910 report is credited with promoting critical reforms in medical education. Because Flexner advocated scientific rigor and standardization in medical education, his report has been perceived to place little emphasis on the importance of public health in clinical education and training. However, a review of the report reveals that Flexner presciently identified at least three public-health-oriented principles that contributed to his arguments for medical education reform: (1) The training, quality, and quantity of physicians should meet the health needs of the public, (2) physicians have societal obligations to prevent disease and promote health, and medical training should include the breadth of knowledge

necessary to meet these obligations, and (3) collaborations between the academic medicine and public health communities result in benefits to both parties.

In this article, commemorating the Flexner Centenary, the authors review the progress of U.S. and Canadian medical schools in addressing these principles in the context of contemporary societal health needs, provide an update on recent efforts to address what has long been perceived as a deficit in medical education (inadequate grounding of medical students in public health), and provide new recommendations on how to create important linkages between medical education and public health.

Contemporary health challenges that require a public health approach in addition to one-on-one clinical skills include containing epidemics of preventable chronic diseases, reforming the health care system to provide equitable high-quality care to populations, and responding to potential disasters in an increasingly interconnected world. The quantitative skills and contextual knowledge that will prepare physicians to address these and other population health problems constitute the basics of public health and should be included throughout the continuum of medical education.

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Abraham Flexner's¹ 1910 report, *Medical Education in the United States and Canada: A Report to the Carnegie Foundation for the Advancement of Teaching*, is credited with promoting critical reforms in medical education that helped to standardize its content and quality. Flexner's fundamental argument was that medical education should be rooted in the best science of the time and in clinical experiences that train students to meet the pressing health needs of the population. Because Flexner's report frequently is associated with the traditional medical education model (i.e., basic science followed by mentored clinical experience), it has been perceived

as a potential barrier to the inclusion of public health in the continuum of medical education. However, in his report, in the section "The proper basis for medical education," Flexner^{1(p26)} clearly describes the evolving role of physicians:

For scientific progress has greatly modified his ethical responsibility. His relation was formerly to his patient—at most to his patient's family; and it was almost altogether remedial. . . . But the physician's function is fast becoming social and preventive, rather than individual and curative. Upon him society relies to ascertain . . . the conditions that prevent disease and make positively for physical and moral well-being."

Flexner does not use the words *public health* in his report, but discusses *preventive medicine and hygiene*. Using the terminology of his day, Flexner commented on medical education in the context of public health and noted the benefits of collaborations between the

academic medicine and public health professions. Although portraying the 1910 report as a plea to improve public health content in medical education would be inaccurate, Flexner identified at least three public-health-oriented principles that are repeated throughout his report and contributed to his arguments for medical education reform:

1. The training, quality, and quantity of physicians should meet the health needs of the public.
2. Physicians have societal obligations to prevent disease and promote health, and medical training should include the breadth of knowledge necessary to meet these obligations.
3. Collaborations between the academic medicine and public health communities result in benefits to both parties.

The scope of public health frequently is misinterpreted as medical care for the

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underserved. Common definitions for public health (e.g., *the science and the art of preventing disease, prolonging life and promoting health and efficiency through organized community effort*,² *the organized efforts of society to improve health and well-being and reduce inequalities*³) reveal a broader mandate. The disciplines and content areas that are critical to this mandate and that are relevant to medical school education include the quantitative sciences (biostatistics, epidemiology), the social, behavioral, and environmental sciences, the study of health systems (health policy, financing, and regulation), clinical/community prevention, leadership and communication skills, and contemporary disciplines and issues (e.g., informatics, genomics, preparedness) that together emphasize an ecological model of health.

The centenary of the Flexner Report presents an opportunity for U.S. and Canadian schools to review their progress in addressing the three principles stated above in the context of contemporary societal health needs, to provide an update on recent efforts to address what has long been perceived as a deficit in medical education—inadequate grounding in public health (or *population health*, a term that has recently gained favor in the academic community⁴), and to consider new recommendations regarding the important linkages between medical education and public health.

From Flexner's Era to the Present

During the first decade of the 20th century, the leading causes of death in Canada³ and the United States⁵ were infectious diseases (e.g., diarrhea, tuberculosis, and pneumonia). Flexner's case for defining and fortifying the scientific underpinnings of medical education were based on the scientific advances of the late 19th and early 20th centuries, including the growing understanding that microorganisms cause diseases. Infectious disease prevention relied primarily on public health measures such as the provision of clean water, sewage control, and quarantine. These scientific breakthroughs prompted Flexner to predict that physicians increasingly would emphasize prevention, attend to the environmental and social determinants of health, and consider

their individual patients in the context of the community.

Directly or indirectly, disease has been found to depend largely on unpropitious environment. A bad water supply, defective drainage, impure food, unfavorable occupational surroundings—matters, all of them, for social regulation—at once harbor our parasitic enemies and reduce our powers of resisting them. To the intelligent and conscientious physician, a typhoid patient is not only a case, but a warning: his office it is equally to heal the sick and to protect the well.¹(pp67–68)

Concurrent with these advances in science, Flexner recognized the variation in health needs across different communities (e.g., urban versus rural) and encouraged academic medicine's collaborations with public health to meet the educational needs of the learners, support scientific discovery, and identify and address these community problems.

Thus the laboratory sciences all culminate and come together in the hygienic laboratory; out of which emerges the young physician, equipped with sound views as to the nature, causation, spread, prevention, and cure of disease, and with an exalted conception of his own duty to promote social conditions that conduce to physical well-being.¹(p68)

Health and life expectancy in Canada and the United States have improved dramatically in the 100 years since Flexner's report. Twenty-five of the 30 years of additional life expectancy can be attributed to public health measures such as better nutrition, sanitation, and safer housing. Medical care, though important, contributed only five years of the gain in life expectancy.^{6–8}

Noncommunicable diseases such as cancer, heart disease, and stroke have long surpassed the mortality rates of infectious diseases (see Table 1). Research in the mid-20th century (e.g., Framingham and North Karelia studies) showed that a substantial proportion of preventable deaths are related to lifestyles such as diet, sexual behaviors, or to the use or misuse of tobacco, alcohol, firearms, or legal and illegal drugs.^{9,10} Health disparities across socioeconomic strata persist, as do health problems associated with immigration and overcrowding. Modern transport allows products, people, and such diseases as SARS and H1N1 influenza to traverse the world in hours or days.

The health care systems and public health systems in which physicians practice also changed in the last century. In the United States, the incongruity of high spending on health care and suboptimal health status indicators has made health systems reform a priority. Despite biomedical discoveries and new technologies, the costs and investments of our current medical care system have not resulted in corresponding health status improvements, and health disparities persist among and within populations based on factors such as race and ethnicity, income, education, gender, sexual orientation, and geography. In Canada, publicly funded medical services have decreased the health inequities for the majority of the population and improved overall measures of health status. However, as in the United States, concerns about long-term financial sustainability remain. Also, the poor health status of Canadian First Nations, Inuit, and Métis peoples raises questions about the adequacy and organization of health services and other services that influence health.

Public health agencies in both the United States and Canada have broadened their scope of activities to include chronic diseases and their behavioral and environmental risk factors, health disparities, and the health consequences of a global society. In 1974, the Canadian government published a seminal paper on population health, "A new perspective on the health of Canadians," which came to be known as the Lalonde report.¹¹ It proposed integrating, in health care policy development, (1) the health care system, (2) prevention of health problems, and (3) promotion of good health. In the United States, the Healthy People movement began with the 1979 *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention*.¹² Unfortunately, more than 20 years after the Institute of Medicine (IOM) proclaimed that public health was "in disarray,"¹³ U.S. public health infrastructure remains underfunded and underappreciated even in times of crisis. Similarly in Canada, the funding of public health has lagged behind that of curative medicine. In both countries, these health and health system challenges have prompted calls to refocus medical education to prepare the future physician workforce to focus on prevention,

Table 1

The 10 Leading Causes of Death in Canada and the United States in 2000 (Both Countries) and in 1900 (United States)*

1900 (United States)	2000 (United States)	2000 (Canada)
1. Pneumonia (all forms) and influenza	1. Diseases of the heart	1. Malignant neoplasms
2. Tuberculosis (all forms)	2. Malignant neoplasms	2. Diseases of the heart
3. Diarrhea, enteritis, and ulceration of the intestines	3. Cerebrovascular disease	3. Cerebrovascular disease
4. Diseases of the heart	4. Chronic lower respiratory diseases	4. Chronic lower respiratory diseases
5. Intracranial lesions of vascular origin	5. Accidents (unintentional injuries)	5. Accidents (unintentional injuries)
6. Nephritis (all forms)	6. Diabetes mellitus	6. Diabetes mellitus
7. All accidents (injuries)	7. Influenza and pneumonia	7. Influenza and pneumonia
8. Cancer and other malignant tumors	8. Alzheimer disease	8. Alzheimer disease
9. Senility	9. Nephritis, nephrotic syndrome, and nephrosis	9. Intentional self-harm (suicide)
10. Diphtheria	10. Septicemia	10. Nephritis, nephrotic syndrome, and nephrosis

* Adapted from (1) Ward JW, Warren C, eds. *Silent Victories—The History and Practice of Public Health in Twentieth-Century America*. New York, NY: Oxford University Press; 2007, and (2) Statistics Canada. *Leading Causes of Death*. Available at: <http://www.statcan.gc.ca/daily-quotidien/081204/t081204c1-eng.htm>. Accessed September 16, 2009.

systems-thinking, and cross-disciplinary practice.^{14–16}

Fundamental change in the quality and character of medical education over the past century occurred in response to Flexner's recommendations, but improvement has not been as extensive for the inclusion of public health in medical education. Yet the call to improve education in public health, prevention, and now population health throughout the continuum of physician education is not new. As early as 1939, U.S. educators have published their concerns about improving public health curricula in medical education.¹⁷ More recently, the IOM has issued two reports addressing this issue within four years.^{18,19} Canadian and U.S. medical students are aware of the deficiencies in contemporary medical education. Recent data from the annual Graduation Questionnaire of the Association of American Medical Colleges (AAMC)^{20,21} reveal that a significant proportion of graduating students believe that their medical school curricula devoted insufficient attention to key public health topics (see Table 2).

Current Initiatives in Public Health Education

Canada

Before 2000, Canada had started to make changes towards improving public health content in medical education. For example, in the first part of the Medical Council of Canada's (MCC's) qualifying examination—equivalent of the United States Medical Licensing Examination (USMLE)—population health, ethics, and the legal and organizational aspects of medicine form one of the six major domains. Similarly, the Royal College of Physicians and Surgeons, which grants specialist certification, has, in adopting the CanMEDS framework of physician roles,²² tacitly endorsed the inclusion of certain aspects of public health as part of training and evaluation of residents in both medical and surgical specialties.*

*The CanMEDS framework is organized around seven roles: Medical Expert (the central role), Communicator, Collaborator, Health Advocate, Manager, Scholar, and Professional. These competencies have been integrated into the Royal College of Physicians and Surgeons' accreditation standards, objectives of training, final in-training evaluations, examination blueprints, and the Maintenance of Certification program.

Recent outbreaks (SARS,²³ the Walkerton *E. coli* outbreak,²⁴ and the North Battleford *Cryptosporidium* outbreak²⁵) demonstrated a need to strengthen public health services, including addressing the shortage of physicians and the poor links between the health care and the public health systems. Particularly noticeable was clinical physicians' lack of knowledge about public health. Clearly, Flexner's vision of physicians responding to societal needs remains only partially fulfilled.

In response to these outbreaks and to growing concerns about the capacity of Canada's public health system to anticipate and respond effectively to public health threats, the Public Health Agency of Canada (PHAC) was created in 2004. In addition to health protection, PHAC aims to strengthen Canada's capacity to improve the health of Canadians and to help reduce pressures on the health care system.

The Association of Faculties of Medicine of Canada (AFMC) identified Public Health and the health of First Nation, Inuit, and Métis indigenous peoples as priorities under its social accountability mandate and has been working to improve both areas within medical education. With PHAC funding, a network of undergraduate public health educators from all 17 medical schools in Canada was established. The Public Health Educators, Network (PHEN) has achieved consensus on a set of common educational objectives, which were subsequently adopted by the MCC (http://www.mcc.ca/Objectives_Online/objectives.pl?lang=english&loc=phelo). The PHEN shares and develops teaching resources and tools through an online repository, and collectively it is creating a document entitled *Primer on Public Health*. The primer will address the MCC objectives and be available electronically as a textbook and as an interactive module for use as a teaching tool. It also will be a resource for faculty development focusing on the integration of public health in the teaching of medicine. The network is also implementing and advocating key recommendations from the AFMC report, *An Environmental Scan of Best Practices in Public Health Undergraduate Medical Education*,²⁶ such as enhanced structural support for public health medical education and for community

Table 2

Average Percentages of U.S. and Canadian Medical School Graduates Who Felt Instruction Was Inadequate in Selected Topics, 2006–2008*†

Topic	Canada	United States
Biological, chemical, and natural disaster management	‡	47.8
Biostatistics	42.4	24.6
Clinical epidemiology	30.1	‡
Environmental health	‡	42.6
Global health	51.6	44.5
Health care systems	35.1	40.4
Health systems finance	‡	49
Health policy	41	46.9
Health surveillance strategies	‡	35.6
Medical economics	‡	62.7
Nutrition	45.5	‡
Occupational medicine	42.6	43.5
Public health*	33.5	33.7
Risk assessment and counseling	29.2	‡
Role of community health and social service agencies	36.2	33

* The Canadian Graduation Questionnaire inquires about “public health and community medicine” together. The U.S. Graduation Questionnaire inquires about “public health” and “community medicine” separately.

† Sources: *Canadian Data*: Association of American Medical Colleges. 2008 Canadian Medical School Graduation Questionnaire: All Schools Summary Report: FINAL. Available at: http://www.aamc.org/data/cgq/allschoolsreports/2008_cgq.pdf. Accessed October 20, 2009. *U.S. Data*: Association of American Medical Colleges. 2008 GQ Program Evaluation Survey: All Schools Summary Report: FINAL. Available at: http://www.aamc.org/data/gq/allschoolsreports/2008_pe.pdf. Accessed October 20, 2009.

‡ Not applicable.

agencies to enable community-based learning for medical students.

Despite the progress, problems persist. Many medical students do not appreciate the relevance of public health to their medical studies or to their future practices. There are few role models, too much didactic teaching, and few community placements.^{26,27} Lack of adequate practical experience was the very same challenge that Flexner discussed in 1910. The PHEN is working to address these problems within medical schools by promoting curriculum standards for teaching in public health, developing ways to support better integration of public health content into

the clinical curriculum, and conducting the faculty development needed to make it effective. Student-run public health interest groups are also encouraged and supported at all faculties with the intent that the students’ creative activities and passion for the full scope of public health will help raise awareness with their peers and encourage more to enter the profession.

United States

The United States also has experiences that highlight the need to improve public health systems and their linkages to the clinical community,²⁸ including such events as the responses to the 2001 anthrax attacks and to Hurricane Katrina and the tracing and isolation of a multidrug-resistant TB patient who had traveled abroad before receiving a definitive diagnosis and treatment.²⁹ Since the 1980s, health systems have had an increased focus on physicians’ responsibility for panels of patients through managed care and other arrangements that seek to promote health among a group of individuals within available resources. These experiences helped to prompt a number of initiatives (Health of the Public³⁰; UME-21³¹) to enhance the teaching of public health principles in medical education. In response to growing student interest in public health, the number of medical schools that offer MD–MPH programs has increased over recent decades,³² and undergraduate public health degrees are being offered at a growing number of colleges and universities.³³ Questions have been added to both the annual survey part II of the Liaison Committee on Medical Education (LCME)³⁴ and the AAMC Graduation Questionnaire²⁰ to assess and track the inclusion of public health topics in undergraduate medical education and the opinions of fourth-year students regarding their experiences with public health in their curricula.

To help enhance collaborations between academic medicine and public health, a cooperative agreement was established in 2000 between the AAMC and the Centers for Disease Control and Prevention (CDC). The agreement included an objective to improve the teaching of prevention and public health at academic health centers. In 2003, through the cooperative agreement, seven medical schools were awarded grants as pilot Regional Medicine–Public Health

Education Centers (RMPHECs) to improve public health education for their students through collaborations with local or state health departments (<http://www.aamc.org/members/cdc/rmphec/start.htm>). In 2006, a second cycle of the RMPHECs were funded to “fully integrate population health into the medical school curriculum” by working with public health partners. At least one of the partners was required to be a local or state health department. More than 33% of accredited LCME-accredited medical schools submitted applications, and the applicant institutions represented a wide spectrum of medical schools. Others expressed interest but could not meet the timetable.³⁵ In addition to implementing school-specific innovations in population health education (e.g., case studies; population health research projects; population health “ward rounds,” when public health experts round with clinical teams to identify public health issues and concepts that are relevant to their inpatients; “community windshield tours,” when students tour the regions from which their patients come in order to better understand the social and environmental determinants of health, and are introduced to the available community resources; pandemic exercises; public health grand rounds; and community health improvement courses), these grantees, in collaboration with staff from the CDC and the AAMC, have identified a list of population health competencies that they feel are appropriate for graduating medical students (see List 1).

The RMPHEC initiative has been enhanced recently by the addition of 13 residency sites that make up the “RMPHEC–GME” grantees. As a group, these sites represent all of the major medical specialties, and each is working with public health agencies and partners to identify and implement specialty-specific content in public health into their curricula.

The USMLE is currently undergoing a comprehensive review, with plans for a redesign of the exam in the near future. One focus of the redesign is an effort to assess a physician’s skill in accessing relevant information, evaluating its quality, and applying it appropriately in a clinical situation.³⁶ This is an opportunity to enhance the quantitative public health skills content (biostatistics,

List 1

Population Health Competencies for Medical Students Recommended by Regional Medicine-Public Health Education Centers*

All graduates from medical school should demonstrate the following competencies to contribute to improving the health and health care for defined populations (e.g., their patient panels, local communities, states, nations, and global regions).

1. Assess the health status of populations using available data (e.g., public health surveillance data, vital statistics, registries, surveys, electronic health records and health plan claims data).
2. Discuss the role of socioeconomic, environmental, cultural, and other population-level determinants of health on the health status and health care of individuals and populations.
3. Integrate emerging information on individuals' biologic and genetic risk with population-level factors when deciding upon prevention and treatment options.
4. Appraise the quality of the evidence of peer reviewed medical and public health literature and its implications at patient- and population- levels.
5. Apply primary and secondary prevention strategies that improve the health of individuals and populations.
6. Identify community assets and resources to improve the health of individuals and populations.
7. Explain how community-engagement strategies may be used to improve the health of communities and to contribute to the reduction of health disparities.
8. Participate in population health improvement strategies (e.g., systems and policy advocacy, program or policy development, or other community-based interventions).
9. Discuss the functions of public health systems including those that require or benefit from the contribution of clinicians, such as public health surveillance, preparedness, and prevention of chronic conditions.
10. Describe the organization and financing of the U.S. health care system, and their effects on access, utilization, and quality of care for individuals and populations.
11. Discuss the ethical implications of health care resource allocation and emerging technologies on population health.
12. Identify quality improvement methods to improve medical care and population health.

* In 2003, through a cooperative agreement between the Association of American Medical Colleges and the Centers for Disease Control and Prevention, seven medical schools were awarded grants as pilot Regional Medicine-Public Health Education Centers (RMPHECs) to improve public health education for their students through collaborations with local or state health departments. In 2006, a second cycle of the RMPHECs were funded to "fully integrate population health into the medical school curriculum" by working with public health partners. At least one of the partners was required to be a local or state health department.

epidemiology) of the exam. The redesign might also result in improvements in other public health content areas, and faculty experts in public health have been asked to participate in portions of the redesign activity. In GME curricula, the Accreditation Council for Graduate Medical Education³⁷ has acknowledged the incorporation of public health skills and responsibilities in their description of three of their general competencies for residency programs:

Medical Knowledge . . . knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral sciences, as well as the application of this knowledge to patient care; *Practice-based learning and improvement* . . . the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life-long learning; *Systems-based practice* . . . an awareness of and

responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care [italics added].

Discussion

As Flexner believed, medical schools must be accountable to the society they serve. This principle has been widely embraced and is included in the Edinburgh Declaration on medical education in 1988³⁸ and in material from the World Health Organization,³⁹ the World Federation for Medical Education,⁴⁰ and Health Canada.⁴¹ Medical education must include a curriculum that addresses the major causes of mortality and morbidity in the population, as well as the systems in which physicians will practice. As the challenges to health in societies shift, the curriculum must change accordingly.

In many countries, particularly the United States, but also Canada, the structure and incentives of the health care system do not promote a focus on population health by physicians. Rather, the system rewards diagnostic and treatment services to individuals. This emphasis can undervalue both individual and community-level preventive services. In the current crisis surrounding health care access, quality, and, particularly, cost, the development of more integrated care systems that have as their primary mandate a focus on the health and health care of defined populations is of great interest. Whatever the outcome of the current attempts at health reform, medical school graduates will practice in environments that are markedly different from today's and must consider population needs alongside the treatment of individuals.

To address these different health issues, today's students require an understanding of a larger set of disciplines than those of a century ago. These include psychology (to study the causes of health behaviors and their amenability to change) and sociology and other nonbiomedical disciplines (to understand the associations between the structure and organization of our society, individual behavior, and how these elements affect health and disease). These disciplines can be integrated into the medical school curriculum in the context of other preclinical and clinical learning, not necessarily as stand-alone courses.

Given advances in the understanding of these and other determinants of health, two of the critical "basic sciences" of public and population health, biostatistics and epidemiology, are also more crucial to contemporary physicians than they were to their predecessors in 1910. Modern physicians require quantitative and communication skills that were not part of Flexner's paradigm. The skills required of clinicians to treat individual patients effectively include the ability to critically assess evidence and then apply the results in practice, to understand and apply the predictive value of a test based on prior probabilities, to choose the best antibiotic or other drug for treatment, and to explain risks and benefits of different prevention and treatment options in lay terms. Physicians must apply epidemiologic principles along with other

analytic tools such as health economics to understand how the rates of disease in a population might change or be affected by global and local influences, to assess and develop clinical quality improvement tools (e.g., disease registries, clinical guidelines), and to be active participants in shaping health policy (ranging from making cost-effective decisions about the use of technology in a health care system to analyzing the best options to broaden health care coverage).

Physicians must also understand their roles in the broader health system so that they can effectively address issues at the population level. These system-level responsibilities range from notifying a partner of a patient with a sexually transmitted infection, to assisting in the investigation of a local outbreak of gastroenteritis in a nursing home, to providing emergency services following a natural catastrophe or terrorist attack. They also must learn how to “think upstream” to identify remediable underlying causes as they consider the determinants of health affecting their patients and communities. Finally, they must embrace leadership roles in community efforts to address population health (e.g., improved access to health care, healthier school lunches, or safer roads).

Although the 2007 IOM report, *Training Physicians for Public Health Careers*,¹⁹ focused on public health physicians, the authors made clear that all physicians “intersect with public health in many activities of their practice” and “are part of the public health system,” whether as “attentive physicians in the community” who can help detect and respond to epidemics, chemical exposures, and other threats; as clinicians who rely on guidance from public health experts (e.g., immunizations, clinical preventive guidelines, community preventive services, international travel); or as leaders in emergency response, health promotion, nutrition, or tobacco control. The IOM report further describes a second, smaller group of physicians who devote part of their practice to public health (e.g., infectious disease specialists investigating health-care-associated outbreaks; pediatricians working in school health; emergency physicians directing emergency medical services) and, finally, describes the smallest group, that of public health physicians. As all

medical students will spend their careers in at least one of these three categories, the authors reiterated an earlier IOM report’s recommendation¹⁸ that the introduction to public health content should occur in medical school for all students. The LCME’s standards for medical schools in the United States and Canada include broad language regarding the inclusion of public health. Standard ED-11 states that

[the curriculum] must include the contemporary content of those disciplines that have been traditionally titled anatomy, biochemistry, genetics, physiology, microbiology and immunology, pathology, pharmacology and therapeutics, and preventive medicine.⁴²

Medical school faculty and administrators might be unaware that “preventive medicine” includes the scope of the population health sciences described in this article, along with clinical preventive services. For the accreditation reviews, many of the LCME “hot topics” reflect population health objectives. These range from population health itself, subgroups (e.g., women’s health) or nonbiologic determinants of health (e.g., culture and health). After 100 years, Flexner might ask when the teaching of public health will evolve from being just a hot topic to a clearly stated, core requirement for the accreditation of medical schools. For the latest information on the inclusion of public health in medical school accreditation standards, see the “Note Added in Proof” at the end of this article.

Flexner also held that rote scientific learning alone, devoid of clinical experiences, was not acceptable, since understanding and medical skill are developed through the application of science in clinical situations. For public health, students should have practical experiences in the community where they can apply principles central to improving population health. Developing community placements that successfully integrate public health sciences into the curriculum can be challenging. Although clinical venues for teaching are supported financially in Canada and the United States, the concept and value of the “teaching public health unit” or “academic public health department” are not pervasive. Limited financial or other incentives exist for health departments to contribute to medical student education.

This creates a tremendous challenge to public health agencies, particularly in light of growing public health demands and budget reductions.^{43,44}

As changes in regulatory requirements for nonprofit status are implemented in the United States, academic health centers are increasingly required to demonstrate “community benefit,” encouraging them to partner with public health agencies to identify ways to provide benefit to their communities. In addition, the National Institutes of Health (NIH) Roadmap has clearly identified the necessity of translating scientific advances to community health improvement to realize the promise of the scientific endeavor.⁴⁵ Opportunities for academic centers, such as the Clinical and Translational Science Awards from NIH, are supporting community engagement that inherently links the public’s health to academic research. Medical schools are exploring ways to address the public health issues of their surrounding communities, including opportunities to better engage communities in clinical or population-based research. Such institutional changes should support faculty who engage in public and population health research and should result in improved public and population health education for future physicians.

In light of current societal health needs, experience that demonstrates the need for better coordination between the medical and public health communities, and the themes Flexner raised a century ago, we offer the following recommendations regarding medical education and the relationship between the academic health center and public health:

- Medical school accreditation standards should assure that each graduating student achieves established public/population health competencies.
- Public/population health content and community-based experiences should be incorporated into the curricula of medical schools, residency programs, and continuing professional development programs.
- The achievement of public/population health competencies should be assessed in medical schools, residency programs, and professional licensing

examinations and addressed in continuing professional education programs.

- Medical schools should identify and recruit educators from within their faculties, public health departments, and community agencies to educate and train students, residents, fellows, and other faculty members in public/population health.
- Medical schools should, as part of their mission, engage with local health departments and community-based agencies in collaborative efforts to improve the health of their surrounding communities.

The Necessity of Improving Public/Population Health Education for Physicians

In 1910, the challenge to academic medicine was ensuring the clinical competence of physicians as they treated individual patients. One hundred years later, the imperatives have shifted. “Crisis” is used frequently to describe the state of the health systems in which U.S. and Canadian physicians now practice. The epidemic of preventable chronic diseases, the unsustainable costs of the current health care delivery system, and the need to improve disaster preparedness and response are examples of the challenges that require physicians to have more than just one-on-one clinical skills. The quantitative skills and contextual knowledge that would better prepare physicians to participate in effective health system reform constitute the basics of public health and should be addressed throughout the continuum of medical education.

Flexner did not mince words in his 1910 report when criticizing institutions and policies. If he were alive to reconsider his report in 2010, he might remind us of his three public health principles and impatiently point out that whereas many of his suggestions have been followed and great progress has been made, the full potential that he had imagined for the practice of medicine has not been attained. Although Flexner focused on the need for physicians to be competent in their one-on-one care of patients, he was prescient in also recognizing that they must also pay attention to local events and interpret them relative to the larger population perspective. As we

write this in 2009, the experience of the novel H1N1 pandemic underscores the necessity of improving public/population health education for physicians. A modern-day Flexner might still make terse, trenchant comments on the continuing failure of medical schools to equip graduating physicians with the knowledge and tools required to meet their obligation to society. Adequate public health training of today’s and tomorrow’s physicians depends on the commitment by all involved in the funding, implementation, and leadership of medical school curricula.

Flexner highlighted the medical profession’s increasing yet unmet responsibility to defend the “public interest” in one of his most insightful comments from the 1910 report:

The overwhelming importance of preventive medicine, sanitation, and public health indicates that in modern life the medical profession is an organ differentiated by society for its own highest purposes, not a business to be exploited by individuals according to their own fancy. There would be no vigorous campaigns led by enlightened practitioners against tuberculosis, malaria, and diphtheria, if the commercial point of view were tolerable in practice. And if not in practice, then not in education. . . . The public interest is then paramount, and when public interest, professional ideals, and sound educational procedure concur in the recommendation of the same policy, the time is surely ripe for decisive action.^{1(p19)}

Despite differences in health systems, culture, terminology, and the administration of medical education, the issues we have described in this article resonate across the U.S.–Canadian border. Although both countries have made great strides in public health and in refining its scientific underpinnings through the last century, their medical schools must do more to become a locus for health education and prevention, to be caretakers of the public’s health and well-being, to help reduce disparities, and to collaborate with public health partners in these efforts. The centenary of the Flexner Report has provided an opportunity for medical educators and public health professionals in both countries to draw attention to this shared challenge.

Note added in proof. Earlier in this article in the Discussion section, we noted that

the medical school standards of the Liaison Committee on Medical Education (LCME) do not explicitly state a requirement for public health content in medical school curricula. In the autumn of 2009, the LCME introduced proposed changes to two of its standards (ED-11, ED-15). The proposed changes add “public health sciences” to the required curriculum. The LCME is scheduled to make decisions regarding the proposed changes in February 2010.

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