

A Basic Public Health Curriculum for the Medical Student

By

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A Master's Paper submitted to the faculty of
The University of North Carolina at Chapel Hill
in partial fulfillment of the requirements for
the degree of Master of Public Health in
the Public Health Leadership Program.

Chapel Hill

2010

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“The LORD said to Moses and Aaron, ‘When anyone has a swelling or a rash or a bright spot on his skin that may become an infectious skin disease, he must be brought to Aaron the priest or to one of his sons who is a priest... If the spot on his skin is white but does not appear to be more than skin deep and the hair in it has not turned white, the priest is to put the infected person in isolation for seven days. On the seventh day the priest is to examine him, and if he sees that the sore is unchanged and has not spread in the skin, he is to keep him in isolation another seven days...if the sore has faded and has not spread in the skin, the priest shall pronounce him clean; it is only a rash. The man must wash his clothes, and he will be clean. But if the rash does spread in his skin...he shall pronounce him unclean; it is an infectious disease.’ “

Leviticus 13:1-8, NIV

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Abstract

With health care reform on the minds of many Americans, the search for timely and cost-effective methods of improving our health care system is gaining new momentum. While it is possible to implement change at many levels, we argue that reform of medical school education is critically important. We maintain that an understanding of the health care system and a foundation in principles of population health are important for all physicians. A systematic literature search reveals that the current state of public health education for medical students is both unorganized and non-standardized across the four years of medical school. Here, we outline a program plan and evaluation of a course designed to expose medical students to population health education in their final year of medical school. With success of the pilot, we hope to incorporate such a program into our medical school's curriculum and influence development of such courses in other medical schools throughout the state and the country.

Acknowledgements

I would like to thank my advisors, Diane Calleson, Ph.D. and Anthony Viera, M.D., M.P.H., as well as Pam Dickens. Your insight, suggestions and gentle pushing have been invaluable. Also, thank you to Adam Goldstein, M.D., M.P.H., for advising me to “do things that make you uncomfortable,” which encouraged me to expand my traditional medical education with a Master of Public Health degree. Finally, I am indebted to my parents, Mark and Marti Springer, for teaching me the value of an education.

Introduction

The passing of the Patient Protection and Affordable Care Act (P.L. 111-148, amended by the Health Care and Education Reconciliation Act of 2010) (Side-by-Side Comparison of Major Health Care Reform Proposals 2010) has thrust the phrase “health care reform” into the awareness almost every adult in the United States. Frequently discussed topics include the role of insurance companies, medical rationing, and programs like Medicare and Medicaid in the changes slated to take place. While it is true that these factors will play a substantial role in reform efforts, they do not address the fundamental issue of education, which is common to all reform efforts.

USA Today statistics cited in a recent report from the Kaiser Family Foundation state that in the last 12 years there has been a more than 50 percent decrease in the number of medical students choosing primary care as a specialty. Estimates from the American Academy of Family Physicians maintain that there will be a shortage of nearly 40,000 family physicians by the year 2020. This inadequacy will be compounded by aging Baby Boomers and expanding coverage to the uninsured, adding more demand to a system that is already struggling to provide care. (Statistics Highlight the Looming Doctor Shortage 2009)

What then will contribute to the solution to this problem? One option would be to create incentives and increased residency positions for medical students and physicians in primary care specialties. However, we propose a different tactic: using exposure to public health education during medical school as a foundation for a clinical practice that considers the broader health of the population. Familiarity with public health may increase the number of students choosing a primary care specialty. However, it will also increase awareness and inform the practice of population-based health care for physicians in other specialties.

According to a 2009 report by the Centers for Disease Control, the top ten causes of death in the U.S. include heart disease, diabetes and cancer. (Leading Causes of Death 2009)

The reality of medical practice today is that specialists and primary care doctors share in the care of patients with these medical problems. Prudent training for all physicians involves adequate population-based health education and enables the application of population health principles in many different specialties. For example, surgeons might use population health information to create an educational program for decreasing the rate of amputations in diabetic patients. A nephrologist might need to use cost-benefit analysis to compare different types of ACE-inhibitors or diuretics to provide the most up-to-date care possible. Modern medical practice requires that both specialists and primary care doctors to go beyond their roles as providers of individual care. Breaking these traditional role barriers to provide effective population-based health care will require universal public health education, and the most effective way to achieve this is to begin in medical schools.

Background and Rationale

The history of public health education in medical schools is complex. In the nineteenth century, it was not considered part of the general education for medical students. For the first half of the twentieth century, medical education and public health were taught by separate programs. It was not until the early to mid twentieth century that medical schools and physician's organizations began to make the curricular changes needed to integrate public health topics in the medical curriculum. The catalysts for these changes were increased use of clinical trials and an emphasis on research that required clinicians to understand epidemiology and biostatistics, both

skills taught in the public health sector. As a number of new epidemics including AIDS and multi-drug resistant tuberculosis began occurring, the role for public health education in medicine became clearer. (Ruis and Golden 2008,)

The definition of public health has changed little over the last hundred years. As early as 1920, C.E.A. Winslow defined public health as

“the science and the art of preventing disease, prolonging life, and promoting physical health and efficiency through organized community efforts for the sanitation of the environment, the control of community infections, the education of the individual in principles of personal hygiene, the organization of medical and nursing services for the early diagnosis and preventive treatment of disease, and the development of the social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health.” (Winslow 1920, 23-33)

In 1988, the National Academy of Sciences and the Institute of Medicine (IOM) defined public health as

“...fulfilling society’s interest in assuring conditions in which people can be healthy.” (The Future of Public Health 1988)

Today, the term “population health” is used interchangeably with public health. (Tricco 2009) In their paper commemorating the hundredth anniversary of Abraham Flexner’s report on medical education, (Flexner 2002) Maeshiro and colleagues provide a broad list of topics included within public or population health, including

“...the quantitative sciences (biostatistics, epidemiology), social, behavior and environmental sciences, the study of health systems (health policy, financing, and regulation) leadership and communication skills, and contemporary issues (e.g., informatics, genomics, preparedness).” (Maeshiro 2010, 211-219)

From the 1950s until today, great strides have been made in incorporation of public health education into the medical school curriculum. Two main types of integration have occurred, termed longitudinal and vertical integration. Longitudinal integration is designed to occur incrementally over a period of one or more years during the four year medical school experience. (McIntosh et al. 2008) Traditionally, vertical integration is defined as occurring at multiple different discontinuous points in the curriculum, rather than as a part of each block during the four years.(Altekruse et al. 1991; Wilkes et al. 1994) Here, I restrict the term even further by referring to a course that occurs at one specific point in the curriculum.

While almost all medical schools with public health curricula integrate at least some information longitudinally, the amount of material integrated differs greatly. For example, some schools include public health topics such as epidemiology during the first or second year of medical school, but do little to promote the subject later. Others have begun to offer optional public-health based electives or certificate programs during medical school. Additionally, an increasing number of schools are offering master’s in public health (MPH) training to those who are willing to take a year off during their training.

Unlike many topics in traditional medical education such as physiology, microbiology and the various clerkship specialties, public health education has not been standardized, nor have universal objectives been created for its teaching. However, there is increasing support for inclusion of public health in the medical curriculum. As part of its 1998 Medical Student

Objectives guidelines, the American Association of Medical Colleges (“AAMC”) published a list of goals for student knowledge of public health topics. (Association of American Medical Colleges 1998,) The AAMC and Centers for Disease Control (CDC) have also formed a set of twelve objectives for use at the Regional Medicine-Public Health Education Centers. (Maeshiro 2010) More recently, a task force convened by the Association of Teachers of Preventive Medicine and the Association of Academic Health centers used the Healthy People 2010 framework to recommend nineteen areas of public health that should be addressed in all health fields (see Appendix A). (Association of American Medical Colleges 1998, ;Allan et al. 2004, 471-476) The work done by this task force represents one of the most recent and complete efforts to create a framework for public health education in medical schools. Unfortunately, the implementation of this framework has been far from universal or uniform.

The purpose of this program plan is to assess the public health education needs of University of North Carolina School of Medicine (“SOM”), using these 19 areas as well as data from focus groups, individual interviews and a literature review. Using this information, we will develop and pilot a basic comprehensive public health course for medical students at the SOM. Along with our program plan, we have designed an evaluation plan. The steps outlined in this evaluation will allow assessment of the program’s impact and facilitate ongoing collection of information necessary to modify and improve the program. Ultimately, we hope our efforts will help other schools incorporate population health education into their curricula.

Literature Review

Introduction

The original goal of this review was to assess the literature for existing curricula that vertically integrate public health material into the third or fourth years of medical school. Because of a paucity of papers directly addressing this area of exploration, I ultimately included two major programs in the review which focused on incorporation of public health education longitudinally beginning during the first year of medical school. (Chamberlain et al. 2008; Finkelstein et al. 2008)

Search Strategy

To perform a systematic review, the PubMed database was searched. The MeSH headings of “medical education, “public health/education” and “medical school” were searched simultaneously to yield 177 results. Only English-language papers were searched. These abstracts were then read to determine relevance. Criteria for relevance included reference to specific public health curricula in place during the third or fourth year of medical school that incorporated public health information beyond epidemiology education. When this search yielded fewer applicable papers than expected, bibliographies were hand-searched for more relevant curriculum designs. From this review, two more papers were chosen with curricular integrations in the first year of medical school.

Required Third and Fourth Year Clerkships

University of Rochester

In 2004, the University of Rochester implemented a required Community Health Improvement Clerkship (CHIC). (McIntosh et al. 2008) The course is a one-month experience for fourth year students that features three days of didactic public health education, with the remainder of the four weeks spent developing and implementing a community health project. The goal of the project is to incorporate the didactic information into a population-specific intervention aimed at improving the health of the community. Project creation is guided by several principles, including focus on a behavior targeted for change, the appropriate community for the intervention, the services that will be effective, and the sustainability of the project.

Didactic instruction is undertaken by faculty from a variety of departments, as well as guest speakers from outside the university. Specific topics addressed in the ten-lecture series include community health assessment, risk behavior change, health disparities and cultural determinants of health, advocacy and policy change, environmental interventions, community organization and partnership building and program evaluation. The University incorporates a unique policy workshop with active role-playing during this three-day period. The course is supervised by the Department of Preventive and Community Medicine, as well as faculty and community preceptors who guide students and give feedback on weekly project reports.

In its original design, the course was offered as an elective, mainly taken in the preclinical years. However, the course directors felt that the content of the course would be more effectively utilized by students with clinical experience. Thus, two years after its initial implementation, the course became a required fourth-year clerkship. The University has also longitudinally integrated public health education by allowing students to take part in a

community health improvement elective during the first three years of medical school, prior to the fourth year clerkship. This experience is supplemented by an online curriculum and evaluations, along with a requirement of hours spent in community service.

Initial evaluation is now possible, since 340 students had gone through the clerkship at the time of paper publication in April 2008. Methods employed by the study included standardized online evaluation forms, similar to feedback forms available in other clerkships. The curriculum committee also chose to do a smaller survey on the relevance of the curriculum to addressing cultural determinants of health. The committee also gained IRB approval for a focus group of students from 2006-2007. The results of this focus group as well as the other surveys indicated that the majority of students had a positive view of the clerkship. From the standardized end-of-course evaluations, this study reported that 94 percent of students believed the clerkship would “favorably influence their careers.” Only 20 percent of students thought that their clerkship project would have no effect on the health of the community. The curriculum designers eventually hope that the clerkship will train physicians who use community health in their daily practice, are better able to care for underserved populations, and incorporate public health research into their practice.

This elective curriculum nicely illustrates some of the challenges inherent to planning and implementing a public health curriculum in medical school. While the longitudinal elective program provides a more comprehensive public health education, one of CHIC’s strengths lies in the fact that it can be implemented as a stand-alone fourth year clerkship. It sets forth a list of learning objectives supported by the AAMC and Pew Health Professions Commission, and then proceeds to teach them through both didactics and practical application. Another program strength is the implementation through the Department of Preventive and Community Medicine,

where there are many stakeholders in public health education. Weaknesses of the program are also illustrative of those found in many public health curricula. There is a lack of quantitative data about the long-term affects of the clerkship and the means for evaluating whether graduates are meeting the long-term objective of changing practice behaviors. More confidence in the University's curriculum design would follow from the provision of a plan to assess their long-term goals. The challenges of providing a comprehensive curriculum in only one month are inherent to this and other programs of this length.

Cornell University

In 1996, Weill Medical College of Cornell University began offering a two week public health clerkship that focused on the topics of health care organization and financing and delivery. (Finkel and Fein 2004) The course is required for medical students during either third or fourth year. Because of training during first and second years of medical school, students entering the clerkship at Cornell have background knowledge in epidemiology, biostatistics and evidence-based medicine and health systems. Each student works as part of a team to prepare a presentation on one of five topics: quality of care, managed Medicare, managed Medicaid, prescription drug cost management or health care for the uninsured. Students meet with five field experts at different agencies that relate to their assigned topic and conduct interviews. Seven afternoon seminar sessions with assigned readings cover the following topics: an overview of the U.S. system, socio-cultural factors and health care delivery, managed care and the physician, managed care and the consumer and risk management and medico-legal issues. Required attendance at a weekly health policy seminar from September through June further contributes to

the course. Students also participate in a debate on chosen topics and write an individual paper on their group topic.

The clerkship goal is to educate students in healthcare financing and delivery. This is accomplished through use of lectures, discussions and interactions with leaders in the field such that even students who do not pursue public health careers become sufficiently knowledgeable. One of the clerkship's strengths is the very practical nature of the topic choices. Understanding health care structure and financing is indeed vital to all physicians, whether champions of public health or not. Additionally, involvement of key players in the community is commendable; this method compels students to understand how the public health topics learned within the confines of medical school connect with the outside world.

The course directors evaluate the curriculum through surveys of both students and faculty. While the directors reported "almost entirely positive and enthusiastic" responses, this qualitative data is minimally useful (182). In order to determine whether students are gaining knowledge, pre and post-course surveys should be administered. Additionally, long-term data should be gathered on how this course affects students during residency and career. This paper offers no structure for improvement in evaluation, only the assertion that there are plans for formal evaluation "in the future" (182). Another weakness of the program is the limited scope of the course; much of the groundwork for this course is set in the first two years of the medical school curriculum. This course would not be appropriately broad enough to implement at other schools with less longitudinal integration of epidemiology and biostatistics.

University of New Mexico

In recognition of the increasing need for physician participation in health policy, the University of New Mexico School of Medicine began a program that integrated this topic into the eight-week family medicine block. (Jacobsohn et al. 2008) The premise of this design was that hospital wards represent an unused resource for teaching about public health. Both students and residents in family medicine were encouraged to “ask questions on rounds that framed individual patient encounters as windows into broader community health and policy issues” (353) The following questions were asked: “How could this admission have been prevented?,” “What might explain the fact that many in the community have the same health problem but are not receiving care at all?” and “What hospital or health system characteristics facilitate or hinder appropriate diagnosis and treatment of patients with this condition” (353)? The student-resident teams then used these questions to guide the creation of a project aimed at improving patient outcomes by changing a hospital policy. Key components of the project designs were literature searches, stakeholder interviews and advocacy activities. Projects ranged from the development of a new formulary providing medications for homeless patients to advocating for additional social workers to ameliorate placement issues. In addition to the public health integration on the wards, the school created a public health certificate requirement for all graduates, beginning with the class of 2010.

There are several positive attributes of this course design that bear further discussion. Curriculum developers took advantage of time and resources available to upper-level medical students doing clerkships. This is a very practical way to apply health policy education because it allows the learners to understand how public health advocacy fits into the hospital community. Participants are able to practice presenting their ideas in preparation for future activism. The

curriculum provides desirable flexibility by allowing students and residents to choose a project in which they are interested. Furthermore, the developers secured future funding for their curriculum and planned for students who may need grants to complete their projects. Another important component of the curriculum is the required public health certificate. Different components serving to fulfill the certificate requirements were tested by students, faculty and staff in preparation for implementation.

Conversely, there are aspects of New Mexico's program that are not desirable. Most importantly, the clerkship and certificate requirements seemed disjointed. The clerkship focuses only on the practical application of health policy work, and does not allow students time to apply any other public health principles learned from the didactic portion of the certificate program. Additionally, the clerkship component focused only on the hospital community and not the community at large (355). The practicality of using residents to help implement public health integration into the curriculum is questionable; adding to the resident schedule often presents more problems than would be encountered while altering a medical student curriculum. Finally, like the other curriculums discussed, the program falls short in discussing plans for a concrete evaluation for the intervention. The authors state that learner assessments are being developed, along with plans for tracking the curriculum's effects, but no details are elucidated.

First Year Programs

Stanford University

Between 2003 and 2007, Stanford University School of Medicine began a new project-based program to incorporate public health education into the curriculum. (Chamberlain et al. 2008) During this time, 68 community-based population health projects have been carried out.

These projects focused on one of the following three targets: community capacity building, establishing policies and engaging in advocacy/bringing about change or improvement in an aspect of the health care system. Analysis of the 2003-2007 data showed that many students (out of 344 total) chose projects in disease prevention and health promotion (51%), access to care (28%), and improvement of services (15%).

This project is combined with a first year block entitled 'Practice of Medicine' in which the topics of ethics, health policy, behavioral health, epidemiology, patient-physician communication and physical exam skills are taught. Students do background research on their project topics and write a paper that incorporates the topics discussed in this block. The projects must be designed to impact health outcomes in one of the following areas: community health, health policy, or hospital/clinic systems. Additionally, students must present a final poster on their project. Stanford continues the longitudinal integration of public health education in year two through a public health practicum, and in years three and four with a colloquium on public health topics.

Advantages to this type of program include the flexibility of projects in addressing student interests and current events. Additionally, the didactic aspect of the block curriculum is taught in part by leaders from community organizations. The project offers hands-on experiences that can be used to build skills in interacting with the community. In their review paper, the authors address several challenges encountered in the curriculum design. First, the project aspect of the curriculum may be viewed as "forced volunteerism" by some students, rather than a professional or civic duty. There also exists a conflict between student interests and the availability of ready and willing community agency partners. As is the case in most curricular integration efforts, time is limited and may not be sufficient for seeing the project through to a

natural stopping point. Like the other schools' programs, Stanford has no evaluation data available on the curriculum's effectiveness, but plans on assessing the change in student attitude and skills as well as the community partner's perception of any change that has resulted. Finally, the vertically integrated project component of Stanford's curriculum is not stand-alone and is designed mostly for preclinical students; therefore, it is difficult to use as a model for our curriculum. (Chamberlain et al. 2008)

Harvard University

Beginning in 2006, Harvard Medical School instituted a course called "Clinical Epidemiology and Population Health" for first year medical students. (Finkelstein et al. 2008) The main goal of the course is to teach both individual health care and population health care as components of the same professional continuum. Other principles upon which the course is based include a belief that all future physicians should be educated in population sciences and should be able to conceptualize their role in public health care. The course was designed by a team of eight persons (six M.D., two Ph.D. and one education specialist) in weekly meetings over a period of eight months. Course directors designed the curriculum to promote six knowledge objectives covering epidemiology and biostatistics; causal inference, confounding, validity and generalizability; decision-making for policy interventions; prevention and screening at the population level; physician roles in emergencies; and population surveillance using information technology.

Once implemented, the course used a structural combination of large group lectures, conference groups of 24 students and tutorial groups of eight students and one to two faculty. The course consisted of two hour daily meetings over an intensive four-week period. The

combination of learning environments allowed students to receive didactic instruction, yet still engage in problem-based learning, discussion groups and problem sessions. One unique hands-on aspect of the curriculum was the creation of a role-playing exercise in which students had to work together to control an influenza pandemic. This exercise was particularly useful in allowing students to interact with many of the community leaders who would be active in a real-life scenario.

Harvard Medical School's public health education curriculum has several strong aspects that are particularly applicable to our efforts to design a basic comprehensive curriculum. Notably, the authors of the review paper on the curriculum discuss the logistics of course design, including how often the committee met, how many people sat on it and what objectives they used in designing it. The curriculum authors also carried out an initial course evaluation consisting of several parts. First, they detailed that students' public health knowledge was assessed by three methods (problem sets, a final written exam and an individual project in basic science, clinical medicine or population health). Numerical data was provided to prove that students' scores were appropriately high (although perhaps too high, as I will address shortly). Moreover, course directors obtained student feedback using a Likert scale of one to five, with one being "high approval" and 5 being "low approval." The entire course was rated numerically as either a one or a two (mean 1.7) by 84 percent of students. The directors assessed several different measures of student satisfaction, including "How well did this course improve your ability to bring a population health perspective to your career in medicine," to which the average response was a mean of 1.8 on the scale. These student evaluations ranked the problem sets and tutorials as the most worthwhile experiences.

The Harvard design was implemented for first-year students. The authors defended this decision by citing the need to lay a population health foundation early in the students' education, and to capitalize on the eager attitude early in the educational process. While achieving substantially more quantitative evaluation than other curriculums discussed, the Harvard curriculum still needs to carry through with the plan for further evaluation. The future goal is to collaborate with the school's center for evaluation to include a longitudinal survey of students' attitudes. The course directors did a laudable job at including the broadest range of public health topics in this course, and used a credible source to guide their inclusions (the IOM's nineteen content areas, see Appendix A). (Allan et al. 2004) However, in our curriculum we wish to also touch on more contemporary public health aspects missing from this curriculum: ethics, social and behavioral sciences, global health and health services administration. As a final point, 44 percent of the students participating in the curriculum believed that it was too "easy." Care must be taken to avoid under-teaching because the material is new or unusual to the standard curriculum.

Applications

This systematic review examined five curriculum designs in place in major medical schools across the U.S. From this review, I gained information about the logistics of teaching, forming curriculum objectives and planning for evaluation that will be valuable in shaping our curriculum.

The literature emphasized a need for collaboration between experts to design a well-rounded curriculum. We therefore plan to incorporate faculty (M.D., Ph.D. and M.Ed.) as well as community leaders into our steering committee. This group will need to meet frequently in the

initial stages of planning as well as during curriculum implementation, and will need to follow up with meetings after the pilot course. To incorporate clinical time into the rotation, we will need to accommodate the busy schedules of residents and physicians who work in community health settings. We plan to initially offer the course only one or two blocks during the year, correlating with faculty availability.

Considering the contrasting opinions on the matter of timing, we feel that the most appropriate way to implement this curriculum is to offer the course in the fourth year of medical school. While laying the proper foundation for public health education in the preclinical years is important, the flexibility of the fourth year offers the best option available at the present time. Though longitudinal integration of public health education into the traditional medical school curriculum would clearly be most beneficial, resistance to change combined with a lack of resources and time dictate our current approach to integrating public health education. Implementing the course as a fourth year elective will allow enrollment of students who have a broad clinical experience and who are actively thinking about career choices and practice structures. This is an excellent time to engage students in learning public health principles.

A four week course, while short, will allow for a combination of weekly didactics, meetings with community agency leaders, project work and clinical exploration if planned carefully. Both didactic and hands-on experiences are important to a well-rounded public health curriculum. Group work and small-group instruction will be feasible in our course due to the small initial enrollment size. As the course expands, we will have to work to keep group sizes manageable. Ideally, all nineteen content areas outlined in the Clinical Prevention and Population Health Framework (Allan et al. 2004) that are not addressed elsewhere in medical school should be incorporated into the course. This broad content inclusion is an ambitious goal considering the

proposed four week course length. However, adequately covering points from each of the content areas (evidence-based practices, clinical preventive services and health promotion, and health systems and health policy) is essential to the program goal of improving public health education.

Finally, from the literature, it is evident that we must be diligent in planning for a formal course evaluation. Qualitative data collection is appropriate but limits the acquisition of data needed to determine if an intervention has been successful. Our initial plan of pre and post-course surveys will be expanded to include an evaluation of student performance via a final exam or project. We will strive to use survey rating scales supported by literature in other educational programs, such as the Likert Scale. This will ensure that data obtained are meaningful to a wide spectrum of medical schools and will aid us in our long term goal of disseminating the curriculum across the state and country.

Program Plan

Overview

As previously discussed, there exists a serious lack of population health and health policy education in medical schools.(Garr, Lackland, and Wilson 2000) This academic deficit causes physicians to enter the work force with little or no knowledge about population-level prevention of illness, health promotion and prevention strategies, and physician roles in public health. Since risk factors for chronic health problems are often best understood and addressed from a population health perspective, it is vitally important to train future physicians in these skills. An example of the need for public health education might be observed in the treatment of diabetic patients. The physician needs to be able to critically appraise current literature on diabetes treatment, determine the cost-benefit ratio of a chosen treatment, communicate prevention strategies for avoiding diabetic complications and to promote behaviors that prevent diabetes-associated chronic disease. Physicians should know how to use tools such as patient registries, quality improvement surveys and community outreach programs to improve the health of their patient populations. Currently, medical school curriculums do not uniformly incorporate a comprehensive overview of information students need to perform these public health-related tasks.

In part, the insufficiency arises from the fact that no single practical public health curriculum has been created for widespread implementation at the medical school level. While many schools have made progress in integrating some aspects of public health education into their curriculums, the process has been incomplete. In view of this educational deficit, we propose a program plan to develop a comprehensive overview public health curriculum for fourth year medical students. The course will be piloted at UNC Chapel Hill School of

Medicine (“UNC-SOM”) and will be interdepartmental, incorporating faculty from multiple disciplines in both the School of Medicine and the School of Public Health (“SPH”). The pilot curriculum will begin as an elective course, eventually progressing to become a required course for matriculation from UNC-SOM.

National Context and Priority-Setting

National

Support for addition of public health education to medical school curricula comes from influential national organizations such as the Institute of Medicine (IOM). In its 2003 report, (Gebbie, Rosenstock, and Hernandez 2003) the IOM Committee on Educating Public Health Professionals for the 21st Century expounded upon the need to incorporate public health competencies into medical school education. Their educational objectives involved the topics of epidemiology, biostatistics, environmental health, health services administration, social and behavioral health sciences, informatics, genomics, communication, cultural competence, community-based participatory research, global health, policy and law, and public health ethics. The intent of the committee was that these many objectives would be taught throughout the four years of medical school. The IOM’s 2007 report (Institute of Medicine 2007) on the same topic recognized the need for collaboration among organizations such as the Association of Schools of Public Health and the American Association of Medical Colleges (AAMC) in the design of appropriate public health curricula. As a progressive measure, the IOM recommended that faculty with public health experience be incorporated into the medical school teaching schedule.

The AAMC has also encouraged the incorporation of public health in the medical school curriculum. In 1998, in response to the changing medical practice environment, the

Association's Population Health Perspective Panel issued a report on medical student educational objectives. (Association of American Medical Colleges 1998) The panel defined public health from the perspective of population health, which "encompasses the ability to assess the health needs of a specific population; implement and evaluate interventions to improve the health of that population; and provide care for individual patients in the context of the culture, health status, and health needs of the populations of which that patient is a member" (17). The panel specifically recommended incorporating population health education into curricula over the combined four years of medical school. Even the government-funded Healthy People 2010 initiative by the Department of Health and Human Services addressed the need for public health education in medical schools. (American Association of Medical Colleges 1999) The Curriculum Task Force convened by the Association of Teachers of Preventive Medicine based their recommendations from this government initiative. (Kerkering and Novick 2008) The task force goal was to increase the population health content of clinical health professional education with input provided by representatives from medicine, nursing, pharmacy and other areas of health education. The framework designed by the Task Force includes nineteen domains in clinical prevention and population health that are recommended for incorporation into the curricula of all health professional schools.

Medical Schools

The variety of literature detailing medical schools' action on the subject of public health education lends further context to the issue. An increasing number of medical schools are now offering joint medical and master's of public health degrees, outside of the traditional four-year medical degree. Other schools have attempted to incorporate public health education into the

traditional four-year curriculum, some more successfully than others. We believe that our curriculum will offer a more concise and comprehensive overview than is currently available, because of our detailed program and evaluation plans as well as our thorough research surrounding the choice of objectives. As we see from the literature review, other schools' efforts to incorporate public health can help us set priorities and enhance our understanding of the context in which the curriculum is being developed.

Exploring curricula of other medical schools guides us in narrowing the target intervention group. It is clear that longitudinal integration would provide more exposure to population health and public health topics. However, the challenge of longitudinal integration is adding more material into an already packed schedule during pre-clinical years. To address this problem, we propose that the public health curriculum be vertically incorporated during the fourth year of medical school. While vertical integration alone is not ideal for public health education, it is currently the most viable method, as I discussed in the applications section of the literature review.

Regrettably, public health has only recently come to the forefront as an important issue in medical education. Some medical schools have begun to collect preliminary data on the effects of incorporating public health education into their curricula. Most of this data are being collected through student and faculty surveys. For example UNC-SOM's long-term evaluation strategies include a longitudinal study of dual-degree graduates (medical doctorate plus master's of public health, "M.D.-M.P.H.") and medical degree graduates at five year intervals. (Harris et al. 2008) The study will add new graduates at each five year mark in order to examine cross-sectional changes that might result from the graduates' reactions to environment or the aging process. While this is a year-long degree program, and therefore differs from our curriculum design, it

offers a solid evaluation plan that may be applied to this project. Making formal evaluation a priority will allow us to augment the limited literature available on the effectiveness of public health curricular change.

Local Context

The teaching and leadership environment of UNC-SOM is supportive of our program plan. For example, UNC- SOM and the SPH already work together to offer the one year Health Care and Prevention Master of Public Health degree. This program is led by faculty with joint appointments in both schools (Russell Harris, M.D., M.P.H. and Anthony Viera, M.D., M.P.H.) and administrators (UNC-SOM Dean Georgette Dent, M.D. and SPH Dean Barbara Rimer, Ph.D.). School of Medicine faculty also teach a second year epidemiology course, led by director Jeffrey Sonis, M.D., M.P.H. and Anthony Viera, M.D., M.P.H. Amy Denham (M.D., M.P.H), a UNC family physician with an Associate Professorship in the SPH, teaches a fourth year elective clerkship incorporating aspects of public health education. The Dean of Medical Education, Warren Newton (M.D., M.P.H) has demonstrated interest in incorporation of population health into the curriculum. While the structure is in place for supporting a standardized fourth year pilot elective in public health, we must take care to involve the current stakeholders in our plan. Meeting with these educators to garner support and suggestions for the pilot curriculum will be integral to the planning process. To move forward with our program, it may be necessary to protect the uniqueness of each instructor's course, so that they can feel confident about becoming stakeholders or instructors in the pilot.

As a state institution, UNC has already shown its commitment to public health education by nurturing and developing the number two ranked School of Public Health in the nation. As

discussed earlier, the political atmosphere at UNC-SOM is such that different departments have cooperated with each other and with the SPH to contribute to the current public health education plan, however fragmented it may be. While all departments should be interested in public health education, UNC has strong programs in family medicine, internal medicine, pediatrics and obstetrics and gynecology that should feel compelled to be involved in providing students with exposure to public health education.

Goals and Objectives

Goals

- I. To improve public health knowledge of medical students graduating from UNC-SOM.
- II. To improve public health knowledge of U.S. medical school graduates beginning with students at UNC-SOM.

Comment [ajv1]: This seems like a goal beyond the PP&E

Short Term Objectives (<2 years)

1. By April of 2010, perform a comprehensive literature review of public health education in U.S. medical schools.
2. By May of 2010, assess all of the major types of UNC-SOM courses to determine what public health topics are currently being taught.
3. By May of 2010, conduct two focus groups of seven students each to obtain qualitative data on current public health interest, attitude and knowledge in UNC-SOM students, in order to help us design a new public health curriculum.
4. By July of 2010, draft the curriculum for a basic fourth year public health course.
5. By December of 2010, recruit faculty to teach the course.

6. By January of 2011, pilot the new fourth year elective course in public health in which at least 10 students enroll.

Long-term objectives (3-5 years)

1. Within 3 years, the course will be implemented as a required course at UNC-SOM.
2. Within 4 years, the program curriculum will become adapted and used by at least two other medical schools in North Carolina.
3. Within 5 years, the program curriculum will become adapted and used in at least five other medical schools in the United States.

Relevant Theories

Stage Theory

The design of the new medical school public health education curriculum is based on several program planning theories. Components of the stage theory, community organization theory and diffusion of innovations theory all contribute to the plan. Stage theory (Theory At A Glance 2005, 15) provides a useful model for our approach to solving the problem of inadequate public health education in medical schools. Using literature searches, we have defined the problem and limited it to a scope within our “sphere of influence” (25). We then decided to initiate action by forming a construct variable (the actual curriculum) that might be used to create the necessary change in the educational system, beginning at UNC. Implementation of the pilot program at UNC-SOM by January 2011 is also a measurable variable based on the stage theory. Finally, the goal of the program is the institutionalize changes in public health education through dissemination of this public health curriculum.

Community Organization Theory

Using a community organization construct (Theory At A Glance 2005, 23) allows us to identify a common problem in the medical education system: a lack of public health training prior to residency. While this problem has been identified by national organizations affiliated with medical education, individual schools may not be focused on this need, and there are many differing levels of public health training already in place. Theory constructs of adaptation and self-efficacy allow medical school communities to choose from among the available resources (hopefully including curriculum used in our pilot program) and adapt them to the school's specific educational needs.

Diffusion of Innovations Theory

Finally, diffusion of innovations theory (Theory At A Glance 2005, 27) provides us with an assessment of the practicality of our program plan. We must convince medical school administrators that our curriculum is better than whatever methods that they are currently using to teach public health. We anticipate achieving this by providing preliminary pilot program data derived from surveying students pre and post-course. Other medical schools will have to use this preliminary data, along with compatibility assessments, to understand where our curriculum fits into their educational plans. Their adoption of our curriculum will depend not only on the visibility of our program's results, which will be limited in the initial data-collecting pilot years, but also on the perceived complexity of implementation. Our hope is that in piloting the curriculum at UNC-SOM, we will provide a "proof of trialability" by which other medical schools can verify the efficacy of our method for addressing public health education needs (28).

Implementation

Activities

Several activities will need to be carried out to reach our short and long-term objectives and ultimately achieve the goal of improving the public health knowledge of graduating medical students. In order to begin, we will conduct a systematic review of the literature available on public health education in medical schools. National objectives in public health education will be assessed and used to form a basic framework for the curriculum. To accomplish our objective of surveying UNC-SOM courses for public health content, we will communicate by email or in-person meetings with the major course directors at UNC-SOM. This will include the curriculum chairs for each block during first and second year, as well as the clerkship directors for third and fourth year students. This information will be organized into a table format for easy reference and use in curriculum design.

To obtain information from the student sector, we will conduct two focus groups of five students each to obtain qualitative data on public health interest, attitude and knowledge in UNC-SOM students. Each focus group will last approximately two hours, and be conducted using a pre-designed set of questions (Appendix B). Participants will be given an initial survey to assess attitudes and knowledge about and experiences in public health (Appendix C). Obtaining a balance of M.D. students and M.D.-M.P.H. students will allow us examine different perspectives. Focus group discussions will be recorded, de-identified and transcribed for later data analysis.

Using the framework gained from the literature search activities, plus UNC-specific data on current public health objective incorporation, we will be able to draft a curriculum for a basic 4th year course. This course will use the nineteen objectives from the Healthy People Curriculum

Task Force as a starting point for development.(Allan et al. 2004) We will then develop the syllabi and gather the text materials for the course. We plan to identify and recruit faculty to teach the course through discussion with the Chair of the Department of Family Medicine (Dr. Warren Newton) and the plan's principal investigator, Dr. Anthony Viera as well as collaboration with Dr. Amy Denham, who currently teaches a public health elective for the department. To achieve the goal of development of a certified elective, we must coordinate with the Department of Family Medicine and the University registrar to gain a listing for the course. To promote our objective of enrolling ten students in the first iteration of the course, we will advertise through email, as well as provide specific information about the course at students' required advisory meetings each semester.

After an initial two year period of elective enrollment, our goal is to make the class a requirement for medical school matriculation. We will need to conduct evaluation measures pre and post-enrollment that prove that the course offers a valuable public health education experience not currently being offered at UNC-SOM. As the data become available, it will be essential to disseminate it at various state and national meetings. We will have to prove flexibility and adaptability of the curriculum, as many schools are already longitudinally incorporating aspects of public health that they may not want to replicate in a comprehensive overview course. With the successful dissemination of supporting data, we will be able to begin making contacts to implement the course in other medical schools across the state and nation. It is our hope that this curriculum will provide the prototype for a course that can be adapted for other medical schools' public health education needs.

Client Characteristics

The target audience for the initial curriculum implementation will be small (10 students). Both at UNC-SOM and nationally, most students are between twenty and thirty years of age. This age bracket will affect the issues that are seen as important. For example, many medical students now are interested in how health care reform will affect their practice. It will be essential to keep the curriculum grounded in current issues. In the initial stages, we expect to serve small numbers of students, but as the program progresses from the pilot stage, we hope to implement it for entire medical school classes and ultimately most medical schools. Besides students, medical schools must also be considered as clients. These entities will be looking for flexible curriculums that may be adapted to improve their current level of public health integration and may meet with varying levels of resistance to incorporating public health education into an already-crowded curriculum.

Organizational Infrastructure and Personnel

While the course will incorporate faculty from multiple departments within the Schools of Medicine and Public Health, it will be carried out from the Department of Family Medicine. This department has already exhibited strong support by incorporating public health objectives into their clerkships. Several stakeholders in the department also hold joint appointments in the School of Public Health. The course will have a steering committee, headed by Dr. Anthony Viera and overseen by Dr. Warren Newton, Departmental Chair. Other committee members will include faculty from various departments who teach the course, student representatives, and M.D.-M.P.H. students. The committee will meet bi-monthly during the fall semester to review and discuss the curriculum design. Tasks of the committee will include recruiting faculty with a

wide range of expertise and experiences, not only medical doctors. During this time, teaching faculty will familiarize themselves with the curriculum. Beginning with implementation in January of 2011, the committee will meet weekly to discuss course progress.

Budgetary Considerations

Implementation of the course will require personnel costs including hours spent at steering committee meetings, time spent developing the curriculum and syllabus, familiarization with the curriculum and teaching time. Initially, we hope to involve faculty who are already teaching elective courses with public health components, thus keeping the cost of implementation low. We intend to have the main course instructors be people who are already paid as clinical educators. With enough collaboration amongst multiple instructors, a limited course availability one or two times per year and a low enrollment, the burden on instructors should be manageable, and additional compensation will not be offered initially. Community agency heads and experts outside of UNC-SOM and SPH will be solicited on a volunteer basis to deliver lectures or conduct hands-on experiences. As the popularity of the course grows, instructor compensation will have to be considered.

Proposed Budget

| Item/Service | Cost, U.S. dollars (\$) |
|---|--------------------------------|
| Purchase of public health textbooks for comparison | 300 |
| Focus group participant compensation (\$25 for undergraduates, \$40 for medical students) | 800 |
| Transcription of focus group data | 400 |
| Partial travel costs | 500 |
| Poster printing | 200 |
| Research Assistants (2 for 40 hours at \$15/hour) | 1200 |
| Purchase of course texts for 10 students | 1000 |
| Printing of syllabi and course reading packet | 200 |
| Initial pre- and post-survey data survey printing | 200 |
| Initial survey data analysis | 500 |
| Evaluator salary | 1000 |
| <i>Total</i> | 6300 |

Timeline

By May of 2010, we plan to assess all of the major types of UNC-SOM courses to determine what public health topics are currently being taught. At this time, we will also be conducting a review of literature on public health education in medical school. Beginning in April 2010, we will apply for IRB approval to conduct focus groups the following month. Before we conduct focus groups, we will administer and initial survey to participants. By late May, we plan to be analyzing data from the focus groups. During the months of July through December, we will develop the course curriculum, gather materials and recruit faculty. By December 2010 we hope to secure certification of the course as an elective through the Department of Family

Medicine and the registrar's office. In January 2011, we plan to pilot the course with an enrollment of ten students. Over the next three years, we anticipate enlarging enrollment at UNC, as well as disseminating the prototype to other medical schools in North Carolina. Ultimately, in five years, we would like the course to be required for all UNC-SOM graduating students and to be in the initial stages of use in other U.S. medical schools.

Timeline and Costs

| Activity | Costs and Resources | Timeline |
|--|---|------------------------|
| Assess UNC-SOM courses for public health content | Graduate student time, faculty time | May 2010 |
| Conduct literature review | Graduate student time, librarian time | May 2010 |
| Apply for IRB approval | Graduate student time, PI time, IRB committee time | April 2010 |
| Administer initial surveys | Graduate student time, study participant time | April 2010 |
| Conduct focus groups | Graduate student time, study participant time, cost of transcription, cost of participant reimbursement | April 2010 |
| Analyze data | Graduate student time, Cost of data analysis training | May 2010 |
| Develop curriculum | steering committee, cost of materials | July-October 2010 |
| Gather texts and syllabi | Cost of text and printed materials | November-December 2010 |
| Enroll first class of students | Graduate student time, registrar access, steering committee | January 2011 |
| Administer pre-course evaluation | Graduate student time | December 2010 |
| Administer post-course evaluation | Graduate student time | July 2011 |

Logic Model

| Resources | Activities | Outputs | Short- & Long-Term Outcomes | Impact |
|--|--|--|---|--|
| In order to accomplish our set of activities we will need the following: | In order to address our problem or asset we will conduct the following activities: | We expect that once completed or under way these activities will produce the following evidence of service delivery: | We expect that if completed or ongoing these activities will lead to the following changes in 1–3 then 4–6 years: | We expect that if completed these activities will lead to the following changes in 7–10 years: |

Data about:

| | | | | |
|--|--|---|--|---|
| -current public health education in medical schools | -Perform a mini-systematic literature review | -Organized body of information available for refining curriculum objectives | -Curriculum planned, texts and course materials gathered | -Adoption of public health education as part of general medical school curriculum in the US |
| -Incorporation of public health objectives into UNC-SOM curriculum | -Identify current public health objectives taught at UNC-SOM | -Draft of the curriculum | -10 students enrolled in first iteration of course | -Incorporation of both patient and population models of disease into medical school education |
| -Student attitudes, knowledge and experiences in public health | -Conduct focus groups | | | |

Approval from:

| | | | | |
|------|-------------------|---|--|---|
| -IRB | -Submit IRB forms | -IRB approval for to conduct focus groups | | -Enhanced awareness of the role of the physician in public health |
|------|-------------------|---|--|---|

Relationships with:

| | | | | |
|---|--|--------------------------------------|---|---|
| -fourth year elective course directors in the Department of Family Medicine | -Work with Dr. Warren Newton and Dr. Anthony Viera | -List of faculty teaching the course | -Course becomes required for matriculation from UNC-SOM | -Increasing physician use of critical appraisal of scientific literature to implement population-based health strategies in clinical practice |
| -Potential faculty willing to teach the elective | -Meet with Drs. Newton and Viera to identify | | -Curriculum is adopted by other NC medical schools | -Improvement in measures of public health including chronic disease prevalence and accidental causes of death, as well as an increased focus on preventive medicine |

Resources from:

| | | | | |
|---|------------------|--|--|--|
| -Monetary resources from UNC-SOM Academy of Educators | -Apply for grant | -Monetary compensation for focus group participants, graduate assistants | -Course becomes required at other US medical schools | |
|---|------------------|--|--|--|

Sustainability

To ensure the program's sustainability, we will need to invest in future leaders. Dr. Anthony Viera and Dr. Warren Newton will continue to head the steering committee after the initial pilot implementation in January 2011. Importantly, evaluation, promotion and dissemination of the course will be carried out by future M.P.H. practicum students who choose to participate in the project. An environment that promotes program sustainability is also important to the program's success, and the Department of Family Medicine's mission statement is consistent with the promotion of public health education. For the program to be ultimately successful, we will need to challenge policies surrounding U.S. medical school education. This will be accomplished through presentations aimed towards persuading national medical bodies such as the AAMC and the IOM to include a comprehensive set of public health educational objectives in the required medical school curriculum. These presentations may occur at national meetings or through peer-edited journal publications. To fully disseminate the course, it will have to be flexible enough to implement in medical schools with varying levels of public health already in place. We will strive for a high level of course sustainability because of the environment available in the Department of Family Medicine and the anticipated continued involvement of future generations of M.P.H. students.

IRB Summary

In order to carry out the initial focus group work needed to inform the curriculum development for our program, we decided to seek approval of UNC's Public Health-Nursing Institutional Review Board (IRB). Approval from the IRB lends credibility to the research data by qualifying it as ethical. Since many peer-reviewed journals require IRB approval for

published research, planning ahead to have our focus group research approved was important. Aside from the main application, documents submitted for review by the board included a copy of the original grant written by Dr. Viera (Appendix D), the focus group recruitment email, consent form, initial survey and question guide. After a brief correction to the focus group email, the application was exempted from further review by under 45 CFR 46.101(b), and classified in the category of survey/interview/public observation. (Human Research Protection Program 2009, 168) Appendices B and C include examples of the focus group question guide and initial survey, respectively.

Evaluation Plan

Introduction

Program evaluation is an essential component of the program's success. Planning for a thorough program evaluation is important because without this component, the program will not be able to make informed changes to improve implementation. Quality program evaluation is needed to determine which factors make the program a success, including cultural, fiscal, demographic and organizational influences. (U.S. Department of Health and Human Services 2005, 4) Determining these factors will guide dissemination, as well. Eventually, stakeholders will require information about how their investment has performed, and a good program evaluation will provide them with this information. While evaluation can seem like a series of straightforward tasks, it is important to think of the process as a cycle, rather than a one-directional flow diagram. This cyclical nature is due to the fact that continuous feedback on a program component may create ongoing changes. (Issel 2009, 13)

In addition to external stakeholders and internal program staff, it is important to choose one or more evaluators with requisite skills. For our program, it would be best to hire an external evaluator to perform the technical aspects of data collection and analysis. However, this external evaluator will need to work closely with the internal evaluator, who will be more familiar with the program goals and history. Both evaluators should be organized, thorough communicators who are willing to teach stakeholders and program staff about the evaluation process.

(Anonymous2005,)

Design

In order to choose the evaluation design that will be most useful for our program, we outlined two main priorities. The first was to decide whether we could find an association between our program and improved public health knowledge. The second was to discover how effectively our program was being implemented, during the time the actual course was being taught. We wanted to limit the outcome evaluations to the individual level, but plan for future population-level evaluation.

Our main evaluation system will be quasi-experimental in nature. Like many experimental designs, quasi-experimental designs compare data before program delivery to data collected after delivery. (Issel 2009, 384) However, in this type of evaluation, the intervention and non-intervention groups are not matched, and participants are not randomly assigned. Initially, the intervention (participation in the course utilizing the new curriculum) will be at the individual level, rather than population level. This is due to the fact that population-level interventions often are complicated and expensive to carry out. This type of evaluation technique is not the most useful for proving cause and effect relationships, but causal relationships are typically very difficult to prove without performing several well-designed randomized controlled trials. (Issel 2009, 381) An experimental design of this nature would require more resources and time than is available for our program, due to of the number of confounding factors present. The quasi-experimental design will allow us to assess the significance of the relationship between the intervention and the outcome, as well as to examine data on implementation of the program.

Methods

In order to evaluate the program's short and long-term outcomes, we will use both quantitative and qualitative data. While quasi-experimental evaluation designs of educational interventions most frequently facilitate qualitative data collection, quantitative data is also important to the program's success. Proving effectiveness of the intervention with quantitative data will eventually be necessary for expanded implementation at UNC-SOM and other schools in the state and nation.

Quantitative data will be collected through implementation of pre-and post course student surveys. These surveys will incorporate aspects of the students' interest towards, experiences in and knowledge of public health. In addition to the open-ended questions on the surveys, Likert scales will be used to assess these main areas. Qualitative data will be obtained through focus groups, meetings, ongoing surveys during the course, and literature reviews. Pre- and post-course surveys will incorporate open-ended questions to assess student interest, experience and knowledge. Student surveys will be supplemented with qualitative data from faculty surveys both during and after the course. Maintaining a database of long-term career paths and public health involvement will be another method of collecting qualitative data about the course graduates.

There are multiple advantages and disadvantages to consider in choice of evaluation method. (Issel 2009, 472) Using surveys is cost-effective and efficient to administer, but has the potential of a low response level. Additionally, open-ended questions may be answered in a manner that is not useful or understandable. Personal interviews and meetings are more useful for facilitating open feedback and suggestions. They are useful for building rapport and involving stakeholders. Unfortunately they are also expensive, both in terms of human resources

and time. Finally, focus groups are excellent ways to collect concentrated data from a group of people. Group dynamics can facilitate discussion and motivate participants. However, they can also cause “group-think” and cause less extroverted group members to avoid participation. Administering a focus group requires preparation, training and effective data recording. (Issel 2009, 472) Despite the disadvantages discussed above, these methods were chosen for our evaluation because they facilitated the quasi-experimental design and were most congruent with our budgetary and personnel resources.

Dissemination

To disseminate the results of our evaluation we will begin at the local level. Stakeholders will need ongoing evaluation summaries at several points to keep them abreast of the program activities. Pre, mid and post-course feedback from surveys will be compiled into a short and readable two-page summary to distribute to stakeholders, including faculty teaching the course. Once the pilot course has been completed, we plan to compile data on the comparison of student knowledge and attitudes pre and post-course, and to consider data for the purpose of informing the curriculum committee. If data support expanding and requiring course enrollment, then we will prepare a concise one to two page summary of the results for distribution to the committee. It will also become important to make one or more presentations to the curriculum committee regarding long-term plans for evaluating the project, and what measures have been taken to start those evaluations. For example, while reporting the pre and post-course data for the pilot, we will detail our plans to create a database that correlates this information with the career choices and public health activities of students who have completed this course.

Dissemination at the state and national levels will involve a combination of meetings and publication in peer-reviewed journals. After data from the preliminary four years of the course at

the SOM, we plan to publish a second paper (the first will be published before course implementation and will incorporate focus group and initial survey information that informed curriculum design). The second paper will detail the initial four years of course evaluations and will include details about how the curriculum was adapted during that time. We will invite the curriculum chairs and public health educators from each of the state's schools of medicine to participate in a seminar at which we will discuss our results and how the course could successfully be adapted at their schools. At the national level, peer-reviewed publications will be the main vehicle for communicating our program. We plan on submitting both the first and second papers to nationally-read peer-reviewed journals such as *Academic Medicine*. Additionally, we will prepare posters to present our preliminary data as well as our four-year data at national meetings of the American Academy of Family Medicine and the AAMC.

Evaluation Tables

Short-term process Objective 1: By May of 2010, we will have performed a comprehensive literature review of public health education in U.S. medical schools and assessed major UNC-SOM courses to determine what public health topics are currently being taught

| Evaluation question | Participant | Evaluation method |
|--|--|--|
| Has a comprehensive review of the literature and UNC-SOM courses been performed? If no, why not? | Graduate student assistant | Review of systematic search documents |
| Were course directors contacted in a professional manner using a standard email or contact document? | Graduate student assistant, course directors | Review of sent documents |
| Was the information organized into an easy-to-read format? | Graduate student assistant | Dissemination of information to key stakeholders for suggestions |

Short-term process Objective 2: By May of 2010, we will conduct two focus groups of seven students each to obtain qualitative data on current public health interest, attitude and knowledge in UNC-SOM students.

| Evaluation question | Participant | Evaluation method |
|---|---|---|
| Were focus groups conducted to assess student interest, attitude and knowledge? Why or why not? | Graduate student assistant | Review of focus group transcripts |
| Were focus group participants representative of the medical student population? | Graduate student assistant, focus group participants | Review of basic demographic data from pre-focus group surveys |
| Were participants satisfied with their participation? | Graduate student assistant, focus group participants | Review of post-focus group follow up survey |
| Was useful information gained to inform the curriculum design? Why or Why not? | Graduate student assistants, data analysis expert | Analysis of qualitative data obtained from focus group transcripts |
| How could focus groups be improved? | Graduate student assistants, focus group participants | Examination of post-focus group surveys, graduate student assistant experiences in leading groups |

Short-term process Objective 3: By July of 2010, we will draft the curriculum for a basic fourth year public health course.

| Evaluation question | Participant | Evaluation method |
|--|--|--|
| Was the basic curriculum drafted? Why or why not? | Graduate student assistant, steering committee members | Review of curriculum document, meeting with steering committee members |
| Is there enough faculty support for implementation? Why or why not | Graduate student assistant, steering committee members, faculty | Review of recruitment techniques and responses |
| Is the scope of the course realistic, considering the time frame (1 month)? | Graduate student assistant, students, faculty | Audio-recorded and transcribed focus groups with students and faculty |
| Does the curriculum design include all of the AAMC objectives? Why or why not? | Graduate student assistant, steering committee members | Comparison of draft curriculum document to AAMC objectives |
| How could the curriculum be improved during implementation? | Graduate student assistant, steering committee members, students | Ongoing surveys from faculty and students during course |
| How could the curriculum be improved after its first implementation? | Graduate student assistant, steering committee members, students | Post-course surveys from faculty and students |

Short-term process Objective 4: By January of 2011, we will pilot the new fourth year elective course in public health with at least 10 enrolled medical students.

| Evaluation question | Participant | Evaluation method |
|---|---|---|
| Was the target for enrollment met? Why or why not? | Graduate student assistant | Examination of registrars enrollment list |
| Was the course piloted on time? Why or why not? | Graduate student assistant | Comparison of original timeline document to actual timeline |
| What factors facilitated or hindered course implementation? | Graduate student assistant, steering committee, faculty | Ongoing surveys from faculty during course |
| Was the Department of Family Medicine supportive? Why or why not? | Graduate student assistant, steering committee | Audio-recorded and transcribed focus groups (and/or individual meetings) with faculty and |

| | | |
|--|--|--|
| | | steering committee members |
| Was the course effective at improving student knowledge of public health topics? | Graduate student assistant, data analysis expert, students | Comparison of pre- and post-course surveys |
| Did student attitudes change as a result of the course? | Graduate student assistant, students | Comparison of pre- and post-course surveys |

Long-term process Objective 1: Within 3 years, the course will be implemented as a required course at UNC-SOM.

| Evaluation question | Participant | Evaluation method |
|--|---|---|
| Was the course required at the end of the three year period? Why or why not? What barriers are in place to inhibit this? | Graduate student assistant, steering committee, medical school curriculum committee | Meetings with steering committee, curriculum committee; Review of impact evaluations (pre- and post-course surveys) |
| Is data available to prove the course effectiveness? | Data analysis expert | Review of impact evaluations (pre- and post-course surveys) |
| Is the medical school community supportive of including this class as a required part of the curriculum? | Graduate student, steering committee, medical school curriculum committee | Meetings with stakeholders on the curriculum committee |
| Did this course impact how students practiced medicine after graduation? | Data analysis expert, steering committee, students | Long-term database of students, specialties and public health-related activities |
| Does requiring this course negatively impact student and faculty perception of it? | Students, faculty | Survey about required versus elective course status |
| Has this course increased collaboration between the SOM and the SPH? | Stakeholders from SOM and SPH, students, steering committee | Audio-recorded and transcribed focus groups and/or individual meetings |

Long-term process Objective 2: Within 4 years, the elective course (using our curriculum) will be implemented in at least two other medical schools in North Carolina.

| Evaluation question | Participant | Evaluation method |
|---|---|---|
| Was the course implemented outside of UNC within 4 years? Why or why not? | Graduate student assistant, curriculum members from other | Review of impact data, meetings with curriculum chairs from |

| | | |
|--|---|--|
| | schools | other schools |
| What are the barriers in place to implementing this course at other medical schools? | Graduate student assistant, curriculum members from other schools | Meetings with curriculum chairs from UNC and other schools |
| How was the course adapted for implementation in other areas of the state? | Graduate student assistant, curriculum members from other schools | Meetings with curriculum chairs from other schools |
| Has the state government's view of the need for public health in health professions changed as a result of implementation in multiple medical schools? | Graduate student assistant, state lawmakers, state medical bodies | Meetings with lobbyists, department of health officials |

Long-term process Objective 3: Within 5 years, the course will become required for matriculation from at least five other medical schools in the United States.

| Evaluation question | Participant | Evaluation method |
|---|---|---|
| Has the course become required outside of the state? Why or why not? | Graduate student assistant, curriculum members from other schools | Meetings with curriculum chairs from other schools |
| What are the barriers in place to implementing this course at other medical schools? | Graduate student assistant, curriculum members from other schools | Meetings with curriculum chairs from other schools |
| How was the course adapted for implementation in other areas of the country? | Graduate student assistant, curriculum members from other schools | Meetings with curriculum chairs from other schools |
| Has the federal government's view of public health education changed with implementation in multiple schools? | Graduate student assistant, lawmakers | Examination of government documents for Congressional Budget Office statements on pre-graduate education |
| Do national medical bodies support this curriculum? | Graduate student assistant, state medical bodies | Literature search for American Association of Medical Colleges, American Medical Association, American College of Physicians curriculum guidelines. |

Discussion

From our systematic review, it is possible to conclude that most medical schools are making an effort to incorporate public health education into their curricula. Exploring other literature, we see that national medical bodies are also making an effort to promote public health. The most recent work done by these bodies includes a collaboration of the AAMC and the CDC. Through this cooperation, Region Medicine-Public Health Education Centers (RMPHECs) have been developed at certain medical schools. The RMPHEC schools are expected to work closely with public health partners in the community to cover twelve agreed objectives. (Maeshiro 2010) In February 2010, the Licensure Committee for Medical Education (LCME) recently updated two of its education standards (ED-11 and ED-15) to more specifically define public health objectives as part of the required curriculum. (Maeshiro 2010)

However, even with national-level efforts, public health education in medical schools is non-standardized and incomplete at best. Of the 132 LCME-accredited medical schools in the U.S., only eleven are currently participating in the RMPHEC program. (Maeshiro 2008) Many schools are beginning the arduous process of curriculum evaluation for LCME-reaccreditation. However, while objectives such as these are useful, they merely propose public health topics that should be added to the curriculum, and do not provide guidance on how this incorporation should happen. Therefore, we maintain that the efforts of medical educators must be redoubled and redirected towards a standardized curriculum, including plans for which widespread implementation would be possible. We propose that the course outlined in this program plan and evaluation is unique, because it serves as an organized, comprehensive and feasible proposal for increasing the public health knowledge of medical graduates at both local and national levels.

Our program plan outlines the steps needed to pilot a basic public health education curriculum for medical students. Considering the scope of public health topics, it will be necessary to utilize a comprehensive set of objectives to guide creation of our curriculum. The objectives set forth by the Healthy People Curriculum Task Force convened by the Association for Prevention Teaching and Research are comprehensive and have resulted from deliberation among many different types of health professionals. (Allan et al. 2004) We choose these nineteen objectives as a starting framework for several reasons. They are the most comprehensive and recent guidelines available. These objectives are detailed in their expansion on the four main categories of focus (evidence base of practice, clinical preventive services – health promotion, health systems and health policy, and community aspects of practice). This detail is useful for more precisely informing curriculum design. Finally, these objectives were agreed upon by a task force composed of many different types of health professionals. The breadth of experiences in the Task Force members is an asset. While these objectives are lengthy and fairly complete, we anticipate revising and adding to them as we consider the public health education components already existing within the medical school curriculum at UNC-SOM. We anticipate that these objectives will have to be revised, and the curriculum will have to remain flexible in order for adoption in other medical schools to be feasible. However, the basic framework and program plan should remain the same.

We have chosen to implement the pilot program as a fourth year elective for several reasons. Although we feel that public health education should be required of all medical students, there is resistance to changing the traditional medical school curriculum. For this reason, the pilot program will be implemented first on an elective basis and then later as evaluation supports it, as a required course. The fourth year time slot has both practical and logistical implications.

Many students at UNC-SOM and other medical schools have flexibility built into the fourth year that would afford exploration into public health. Additionally, students taking the elective will have clinical experience, which is a tool useful for building understanding of population health concepts.

Evaluation of the program is a vital part of the overall plan, and one without which the curriculum will not be successfully integrated on any level. In our plan, we outline basic steps for collecting preliminary data on the success of the curriculum from both students and faculty. Plans include ongoing literature review as well as focus groups and meetings with stakeholders. Long-term evaluation will continue through use of a database designed to keep track of the careers of students who complete the course. We expect that these evaluations will contribute to the legitimacy of our efforts to disseminate this curriculum to other schools in the state and nation.

To realize the future goals outlined by our program plan, namely the expansion at UNC-SOM and at the state and national levels, we will need to ensure sustainability of the program. This will begin at UNC-SOM, with recruitment of faculty stakeholders, involvement of the Chair of the Department of Family Medicine, and collaboration between UNC-SOM, the SPH and the UNC's Medical Curriculum Committee members. While needs for monetary support will initially be low, expansion of the course will require investments of time and money from all of the aforementioned stakeholders. Additionally, investment in stakeholders at other medical schools will be necessary as we discuss the adaptation of the curriculum to other schools' public health needs.

The quest to incorporate public health education into the foundational principles of medical education will continue to be a gradual process. We can appreciate the historical

improvement of dialogue between physicians and public health experts over the last fifty years, which has brought population health into the consciousness of medical schools nationally. It is vital to remember that while significant progress has been made, the standardized, comprehensive integration of population health into the traditional medical curriculum is still years from fruition. Nevertheless, the importance of public health education to our national health and health care system dictates that we continue, through programs like ours, to work towards making this educational reform a reality.

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Evidence Based Practice

1. Problem Description - Descriptive Epidemiology
 - Burden of disease, e.g., morbidity and mortality
 - Course of disease, e.g., incidence, prevalence, and case-fatality
 - Determinants of health and disease, e.g., genetic, behavioral, socioeconomic, environmental,
 - health care (access and quality)
 - Distribution of disease, e.g., person, place, and time
 - Sources of data, e.g., vital statistics, active and passive public health surveillance
2. Etiology, Benefits and Harms - Evaluating Health Research
 - Study designs, e.g., surveys, observational studies, randomized clinical trials
 - Estimation - magnitude of the association, e.g., relative risk/odds ratio, attributable risk percentage, number-needed-to-treat, and population impact measures
 - Inference, e.g., statistical significance test and confidence intervals
 - Confounding and interaction - concepts and basic methods for addressing
 - Quality and presentation of data, e.g., accuracy, precision and use of graphics
3. Evidence-Based Recommendations
 - Assessing the quality of the evidence, e.g., types and quality of studies and relevance to target population
 - Assessing the magnitude of the effect, i.e., incorporating benefits, harms, and values
 - Grading of the recommendations, i.e., combining quality of the evidence and magnitude of the effect
4. Implementation and Evaluation
 - Types of prevention, e.g., primary, secondary, tertiary
 - At whom to direct intervention, e.g., individuals, high risk groups, populations
 - How to intervene, e.g., education, incentives for behavior change, laws and policies, engineering solutions
 - Evaluation, e.g., quality improvement and patient safety, outcome assessment, reassessment of remaining problem(s)

Clinical Preventive Services and Health Promotion

1. Screening
 - Assessment of health risks, e.g., bio-psycho-social, environment
 - Approaches to testing and screening, e.g., range of normal, sensitivity, specificity, predictive value, target population
 - Criteria for successful screening, e.g., effectiveness, benefits and harms, barriers, cost, acceptance by patient
 - Clinician-patient communication, e.g., patient participation in decision-making, informed consent, risk communication, advocacy, health literacy
 - Evidence-based recommendations

- Government requirements, e.g., newborn screening
2. Counseling for Behavioral Change
 - Approaches to behavior change incorporating diverse patient perspectives, e.g., counseling skills training, motivational interviewing
 - Clinician-patient communication, e.g., patient participation in decision making, informed consent, risk communication, advocacy, health literacy
 - Criteria for successful counseling, e.g., effectiveness, benefits and harms, cost, acceptance by patient
 - Evidence-based recommendations
 3. Immunization
 - Approaches to vaccination, e.g., live vs. dead vaccine, pre vs. post exposure, boosters, techniques for administration, target population, population-based immunity
 - Criteria for successful immunization, e.g., effectiveness, benefits and harms, cost, acceptance by patient
 - Clinician-patient communication, e.g., patient participation in decision-making, informed consent, risk communication, advocacy, health literacy
 - Evidence-based recommendations
 - Government requirements
 4. Preventive Medication
 - Approaches to chemoprevention, e.g., pre vs. post exposure, time limited vs. long term
 - Criteria for successful chemoprevention, e.g., effectiveness, benefits and harms, barriers, cost, acceptance by patient
 - Clinician-patient communication, e.g., patient participation in decision-making, informed consent, risk communication, advocacy, health literacy
 - Evidence-based recommendations
 5. Other Preventive Interventions
 - Approaches to prevention, e.g., diet, exercise, smoking cessation
 - Criteria for successful preventive interventions, e.g., effectiveness, benefits and harms, barriers, cost, acceptance by patient
 - Clinician-patient communication, e.g., patient participation in decision-making, informed consent, risk communication, advocacy, health literacy
 - Evidence-based recommendations

Clinical Preventive Services and Health Promotion

1. Screening
 - Assessment of health risks, e.g., bio-psycho-social, environment
 - Approaches to testing and screening, e.g., range of normal, sensitivity, specificity, predictive value, target population
 - Criteria for successful screening, e.g., effectiveness, benefits and harms, barriers, cost, acceptance by patient
 - Clinician-patient communication, e.g., patient participation in decision-making, informed consent, risk communication, advocacy, health literacy
 - Evidence-based recommendations
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 - Clinician-patient communication, e.g., patient participation in decision-making, informed consent, risk communication, advocacy, health literacy
 - Evidence-based recommendations

Health Systems and Health Policy

1. Organization of Clinical and Public Health Systems
- Clinical health services, e.g., continuum of care – ambulatory, home, hospital, long-term care
 - Public health responsibilities, e.g., public health functions (IOM); 10 essential services of public health
 - Relationships between clinical practice and public health, e.g., individual and population needs
 - Structure of public health systems
2. Health Services Financing
- Clinical services coverage and reimbursement, e.g., Medicare, Medicaid, employment based, the uninsured
 - Methods for financing health care institutions, e.g., hospitals vs. long-term care facilities vs. community health centers

- Methods for financing public health services
 - Other models, e.g., international comparisons
 - Ethical frameworks for health care financing
3. Health Workforce
- Methods of regulation of health professionals and health care institutions, e.g., certification, licensure, institutional accreditation
 - Discipline-specific history, philosophy, roles and responsibilities
 - Racial/ethnic workforce composition including underrepresented minorities
 - Interdisciplinary health professional relationships
 - Legal and ethical responsibilities of health care professionals, e.g., malpractice, HIPAA, confidentiality
 - The role of public health professionals
 - Interprofessional activities
4. Health Policy Process
- Process of health policy making, e.g., local, state, federal government
 - Methods for participation in the policy process, e.g., advocacy, advisory processes, opportunities and strategies to impact policy
 - Impact of policies on health care and health outcomes including impacts on vulnerable populations and eliminating health disparities
 - Consequences of being uninsured or underinsured
 - Ethical frameworks for public health decision-making

Population Health and Community Aspects of Practice

1. Communicating and Sharing Health Information with the Public
- Methods of assessing community needs/strengths and options for intervention, e.g., community-oriented primary care
 - Media communications, e.g., strategies for using mass media, risk communication
 - Evaluation of health information, e.g., websites, mass media, patient information (including literacy level and cultural appropriateness)
2. Environmental Health
- Sources, media, and routes of exposure to environmental contaminants, e.g., air, water, food
 - Environmental health risk assessment and risk management, e.g., genetic, prenatal
 - Environmental disease prevention focusing on susceptible populations
3. Occupational Health
- Employment-based risks and injuries
 - Methods for prevention and control of occupational exposures and injuries
 - Exposure and prevention in health care settings
4. Global Health Issues
- Roles of international organizations, e.g., WHO, UNAIDS, NGOs, private foundations
 - Disease and population patterns in other countries, e.g., burden of disease, population growth, health and development
 - Effects of globalization on health, e.g., emerging and reemerging diseases/conditions, food and water supply

- Socio-economic impacts on health in developed and developing countries

5. Cultural Dimensions of Practice

- Cultural influences on clinicians' delivery of health services
- Cultural influences on individuals and communities, e.g., health status, health services, health beliefs
- Culturally appropriate and sensitive health care

6. Community Services

- Methods of facilitating access to and partnerships for physical and mental health care services, including a broad network of community-based organizations
- Evidence-based recommendations for community preventive services
- Public health preparedness, e.g., terrorism, natural disasters, injury prevention
- Strategies for building community capacity

Appendix B – Focus Group Questions

Key: K=Knowledge I=Interest N=Need L=Logistics

1. (K) How would you define public health education?
 - a. What subjects are incorporated?
 - b. What disciplines are involved (e.g., Environmental Science, Law, Business Administration)
 - c. Who teaches public health?
 - d. Where is it taught (e.g., schools, community settings, hospitals)
2. (K) What aspects of your training thus far have involved public health?
 - a. Specific rotations?
 - b. Medical school blocks?
 - c. Community week?
 - d. Medicine and society?
 - e. Epidemiology?
 - f. Extracurriculars?
 - g. Interest Groups?
3. (K) Have you been exposed to public health curriculum elsewhere in your academic education?
 - a. Where?
 - i. High school? Undergraduate? Other degrees? Previous careers?
 - b. In what form has the previous exposure been?
 - i. Classes? Jobs? Internships? Volunteer work?
4. (K) Have you been involved in public health service projects?
 - a. What were they about?
 - b. Who were they affiliated with?
 - c. Were M.D.s involved?
5. (N) What do you think medical students should know about public health before residency?
 - a. How it applies to their specialty?
 - b. What the major population health problems are in their specialty?
 - c. How to search for relevant literature on public health topics important to their patient population?
6. (N) Does the population approach to health have relevance and value?
 - a. Who benefits most?
 - b. How does approach affect the doctor-patient relationship?
 - c. Is the public health approach time-effective?
 - d. Is the public health approach cost-effective?
 - e. Do patients trust doctors who use the population approach?
7. (I) Do you envision a role in public health?
 - a. How do you envision public health fitting into your career?
 - i. Do you envision it fitting in at a certain time point?
 - ii. Is it one activity or a series of changes to the way you practice?
 - b. What types of people seek public health education?

- i. Do researchers need this type of knowledge? Why?
 - ii. Do administrators need this type of knowledge? Why?
 - iii. Do specialists need public health knowledge? Why?
- 8. (N) As citizens, what do you think needs to be improved about public health knowledge?
 - a. Knowledge about health care reform?
 - b. How to foster relationships with providers?
 - c. How to identify good sources of information about a disease?
- 9. (I) As (future) practitioners, what do you think needs to be improved about public health knowledge?
 - a. Risk factor awareness?
 - b. Harms from overuse of medical technology?
 - c. How to advocate for health policy changes?
- 10. (K) What sources are your opinions about these questions based upon?
- 11. (K) How has your knowledge of/experience with public health influenced your treatment plans?
 - a. How might public health knowledge improve your treatment plans?
 - i. Using numbers from studies to convey risk
 - ii. Using risk factor knowledge
 - iii. Being able to critically appraise papers
 - iv. Being able to effectively communicate
- 12. (K) How much have your attending physicians incorporated public health into patient plans?
 - a. Only when someone does it for them (e.g., social worker, medical student, interns)?
 - b. Many patients? Some? None?
 - c. How receptive have they been to the incorporation of public health into patient care plans?
- 13. (I/L) What educational objectives would you seek in a public health curriculum or course?
- 14. (L) Where does a public health course fit into the medical school curriculum?
 - a. Should it be an elective or required?
 - b. What year?
 - c. Does having gone through certain parts of the med school curriculum make one more amenable to learning about public health?
- 15. (L) Should there be a standard curriculum for all medical schools, or is it best to use the local resources in each area to guide the curriculum planning?
 - a. What are some benefits and detriments of standard versus locally-developed curricula?
- 16. (L) How would public health education help address the major causes of mortality in Americans today?
 - a. How would public health education help address the major international causes of mortality?
- 17. (L) How can one tell if public health education is changing the way its recipients practice?
- 18. (L) How can one tell if public health education is having a positive effect on patient health?

Appendix C – Initial Survey

Please take a few minutes to fill out this survey:

Demographics

What is your age?

- 18 19 20 21 22 23 24 25 26 27 28 >28

What race do you identify with?

- Asian Black Hispanic/Latino White/Caucasian Native American Other

What is your sex ?

- Female Male

What degree program are you enrolled in?

- Undergraduate M.D. M.D./M.P.H.

If an undergraduate, what undergraduate year are you currently classified as?

- Freshman Sophomore Junior Senior Other

If M.D. or M.D./M.P.H. student, check all years you have completed?

- 1st Year 2nd Year 3rd Year 4th Year M.P.H. Year Other

If an undergraduate, what major(s) and possible minor(s) are you pursuing?

If pursuing an M.D., what is your intended specialty (residency program)?

Knowledge/Experience

How many courses in public health have you taken?

- None 1 2 3 or More

If you answered 1 or more in the previous question, at what type of institution did you complete this course?

- High School College/University Graduate Institution Other: _____

Have you ever worked in public health or health Care?

- Yes No

If Yes Please Explain: _____

Does anyone in your immediate family work in public health or health care?

- Yes No

If Yes Please Explain: _____

Have you participated in volunteer public health activities?

- Yes No

If Yes Please Explain: _____

How well prepared do you feel to use public health concepts in your career?

- Very Unprepared Unprepared Moderately Prepared Prepared Very Prepared

Attitude

How important do you think public health education is to a Doctor's ability to provide quality patient care?

- Unimportant Of Little Importance Moderately Important Important Very Important

How frequently do you feel that your attending physicians (for undergraduates, your primary care/family physicians) integrate public health into their patient care?

- Never Very Rarely Rarely Occasionally Very Frequently Always

How important is public health education to health care reform efforts?

- Unimportant Of Little Importance Moderately Important Important Very Important

How important is it for consumers to be educated about public health (including insurance, public policy advocacy, health reform)?

- Unimportant Of Little Importance Moderately Important Important Very Important

How necessary is it to have a basic public health course available in your school of enrollment (for Medical Students – School of Medicine; for undergraduates – University granting your first undergraduate degree)?

- Unimportant Of Little Importance Moderately Important Important Very Important

MEDICAL STUDENTS ONLY:

How would you rate UNC-School of Medicine's integration of public health education into medical school curriculum?

- Extremely Poor Below Average Average Above Average Excellent

**Development of Public Health Courses for
Medical Students and College Students**

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A Proposal Submitted to the UNC School of Medicine Academy of Educators
October 2009

Abstract

There is generally broad agreement that medical schools should incorporate population health education into their curricula. To date, however, few schools have accomplished this goal, and most medical students feel that time devoted to health policy, public health, and health systems is insufficient. More recently, national organizations have recommended that all undergraduate schools offer courses in public health. Such courses would not only be excellent preparation for health professional schools (such as medical school), but also would be expected to produce more educated citizens. Few colleges have yet to develop and offer such courses. The aim of this proposal is to develop initial syllabi along with implementation and evaluation plans for two courses: an undergraduate public health course and a medical school population health and health policy course.

Specific Aims and Rationale. In 2003, the Institute of Medicine (IOM) concluded that keeping the nation healthy required not only well-educated public health professionals but also an educated citizenry. The IOM therefore recommended that all undergraduates have access to education in public health.¹ To date, few colleges offer any courses in public health to meet this need. Additionally, in the last two decades, a series of reports have been released by national organizations (including the IOM and the Association of American Medical Colleges (AAMC)), calling to improve population health education in medical school so that physicians (some of the nation's most educated citizens) better understand the system in which they deliver their services as well as the complex health challenges faced by the nation.¹⁻³ Medical schools are increasingly responding to this call with more population health integration⁴⁻⁶, but for the most part have still not incorporated sufficient public health education into their curricula.

The first aim of this project is to develop initial curricula and syllabi for two courses. Both courses will be designed to teach public health principles. One course will be an introductory course for college students ("Public Health 101"), and the other will be a more detailed overview of population health and health policy for medical students. The second aim will be to design evaluations of these two courses in preparation to revise and expand them and begin to consider ways to bring them into mainstream undergraduate and medical education.

Background and Significance. The U.S. health care system is fragmented, inefficient, and costly. Furthermore, the health of the U.S. ranks poorly compared with other developed nations that spend far less. It is clear that improving the health of our nation is a critically important goal. It is also clear that the U.S. could have better health outcomes at a much lower share of the GDP than the 17% currently being spent. Health care reform can realistically happen only incrementally and thus will be an ongoing need for decades to come. In a very real sense, health care reform will require culture change not only on the part of physicians, business executives, and policy makers, but also on the part of American citizens. Affecting culture change requires that citizens be better educated about the many health challenges faced by the nation (e.g., access, quality, disparities) and the complexities of the health care system (e.g., unwarranted variations in care, cost-effectiveness, cost-control). In 2003, the IOM recommended that all college students have access to public health education; and in 2006, a Consensus Conference group made specific recommendations for developing undergraduate public health curricula.⁷ It is further recognized that inclusion of such content would be excellent preparation for health professions education, including medicine.

Currently, most medical students also lack sufficient understanding of public health and health policy. In yet another key IOM report, readers were reminded that all physicians are part of the public health system and therefore medical students should be educated in population health to include epidemiology; biostatistics; disease prevention and health promotion; health care organization, management and financing; environmental health; social and behavioral sciences; informatics; cultural competence; community health; health policy and law; and ethics. Given the challenge of integrating these components into already-filled medical school curricula, ideally, the medical school curricula would build upon the undergraduate public health education mentioned above.

Research Design and Methods. Dr. Anthony Viera will serve as Principal Investigator for this project. Beth-Erin Springer and Matthew DeAugustinis, two current UNC M.D.-M.P.H. students, will work on this project under Dr. Viera's direction. Leading the program planning and evaluation effort will be Diane Calleson, PhD. Dr. Amy Denham (Chatham County Public

Health Dept), who this year began an Advanced Practice Selective in public health, will serve as consultant. Warren Newton (Executive Associate Dean of Medical Education) will serve as Senior Advisor on this project.

To design an initial undergraduate (college) course, we will use the framework shown in the Appendix. We will first conduct a survey of US colleges (including UNC) to assess the current landscape and content of any undergraduate public health courses currently being offered (as well as their popularity) and how they compare to this framework. From this assessment and further literature review we will develop an expanded list of curricular topics and competencies for a college course. Then we will conduct a focus group consisting of current UNC undergraduates as well as UNC medical students with the goal of refining the initial list of topics and competencies. Finally, we will survey various available public health textbooks to determine if any would meet the needs of the course.

To design a medical school course, we will first consider how current UNC medical students are taught about public health and health policy (e.g., through Medicine and Society course). We will examine several current population health curricula being used or piloted in other schools such as the Population Medicine curricular revision begun in 2006 at Case Western Reserve⁴, the “Population Health as a Basic Science” course at Harvard Medical School⁵, and the introduction to health policy during University of New Mexico’s family medicine rotation (“Changing Hospital Policy from the Wards”). We will then consider content that is taught in the UNC Health Care and Prevention M.P.H. program (which has become extremely popular with our medical students) that would be valuable for all medical students to learn. We will conduct a focus group with medical students (some of whom are doing an M.P.H. and some who are not) to refine the initial list of curriculum topics and competencies. Finally, we will survey various available public health and health policy textbooks to determine if any would meet the needs of the course.

The focus group guides will be developed by the research team and the focus groups will be led by current M.D.-M.P.H. students. Participants will complete a very brief written questionnaire that will collect information on demographics and public health knowledge and previous experience. Verbal content will then be recorded and transcribed. Participants for each focus group will be recruited via announcements in classes as well as posted flyers and personal invitations. As an incentive, participants completing the focus group will receive a \$50 gift card.

Expected Outcome. We expect to have four written products as a result of this project. First, we will have a detailed competency-based curriculum (essentially a draft syllabus) for a medical school course (Public Health and Healthy Policy) and a college course (Public Health 101). Second we will have written plans of how we would like to pilot test and evaluate each of these courses. A very practical matter for implementation will be the need to give careful thought to who could (and would) teach these courses. We will develop one or two posters for dissemination of this work at an educational and/or public health meeting.

Proposed Project Timeline

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|----------------|---|
| December 2009: | Planning phase – weekly team meetings and individual assignments; literature reviews |
| January 2010: | College survey, initial textbook searches, current medical school courses assessments |

February – March 2010: Focus group guides developed
Evaluation planning

April – May 2010: Focus groups

June – July 2010: Written product drafts completed; poster(s) made; liaisons with
UNC undergraduate colleges; plans for implementation pilot
testing

Budget Page

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|--------------------------|--|
| Gift cards | \$800 (\$50 each for 8 participants in two focus groups) |
| Books and supplies | \$500 |
| Partial travel costs | \$300 |
| Poster printing | \$200 |
| Two research assistants | \$1200 (40 hours of work each at \$15/hour) |
| <hr/> | |
| Total budget requested = | \$3000 |

References

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3. Institute of Medicine. Training Physicians for Public Health Careers. Washington, DC: National Academy Press; 2007.
4. Ornt DB, Aron DC, King NB, et al. Population medicine in a curricular revision at Case Western Reserve. Acad Med 2008;83:327-331.
5. Finkelstein JA, McMahon GT, Peters A, et al. Teaching population health as a basic science at Harvard Medical School. Acad Med 2008;83:332-337.
6. McIntosh S, Block RC, Kapsak G, et al. Training medical students in community health: a novel required fourth-year clerkship at the University of Rochester. Acad Med 2008;83:357-364.
7. CDC. Notice to readers: Recommendations for public health curriculum – consensus conference on undergraduate public health education, November 2006. Morb Mortal Wkly Rep 2007;56-1085-1086.

Appendix. “Public Health 101” Curriculum Framework and Learning Objectives

| | Framework topics | Learning outcomes |
|-------------------------------|--|--|
| Leadership as a running theme | Overview & basic principles <ul style="list-style-type: none"> - Context & scope of public health - Public health as cross-cutting & systematic, interdisciplinary concepts - Epidemiologic principles and population perspective | <ul style="list-style-type: none"> - Identify eras in the historical development of public health and ways that public health affects literature and the arts, current events, and everyone’s daily life - Illustrate the interdisciplinary, cross-cutting character of public health and the contributions of a range of disciplines and professions to improving health; explain how public health assesses options to improve the health of a population - Explain basic principles of epidemiology including rates, risk factors, disease determinants, causation, and surveillance |
| | Population health tools <ul style="list-style-type: none"> - Health communication & informatics - Health and social behavioral sciences - Health policy, law, and ethics | <ul style="list-style-type: none"> - Explain how public health can use health information and health communications to improve the health of populations - Identify how public health can utilize social and behavioral interventions to improve the health of populations - Explain how public health can utilize health policy and law to improve the health of populations |
| | Disease and disability: Determinants, burdens , & interventions <ul style="list-style-type: none"> - Environmental health and safety - Communicable diseases - Non-communicable diseases | <ul style="list-style-type: none"> - Identify the impact of the environment on the health of populations - Understand the impact of communicable diseases on the health of the population - Explain the burden of chronic diseases on morbidity and mortality and approaches to prevention and early detection |
| | Health care and health systems <ul style="list-style-type: none"> - Health workforce - Organization of health care and public health systems - Costs, quality, and access to health care and public health services | <ul style="list-style-type: none"> - Describe the roles and contributions of health professionals - Describe the basic organization of health care and public health systems - Identify basic payment mechanisms for providing health services and the basic insurance mechanism for paying for health services - Describe criteria for evaluating health systems including issues of access, quality, and cost |
| | Special topics <ul style="list-style-type: none"> - Health disparities & vulnerable populations | <ul style="list-style-type: none"> - Identify the roles of public health in addressing the needs of vulnerable populations and health disparities |

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| | <ul style="list-style-type: none"> - Public health preparedness and disaster management - Community health - Quality improvement - Global health | <ul style="list-style-type: none"> - Identify the roles of public health in disaster prevention and management - Identify health needs of communities and how public health plays a role - Describe the burden of disease in developing countries, health implications of globalization, and potential collaborative solutions |
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Adapted from CDC. Recommendations for public health curriculum – consensus conference on undergraduate public health education, November 2006. Morb Mortal Wkly Rep 2007;56-1085-1086.