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The Prevention of Global Chronic Disease: Academic Public Health's New Frontier

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A confluence of stimuli is propelling academic public health to embrace the prevention of chronic disease in developing countries as its new frontier. These stimuli are a growing recognition of the epidemic, academia's call to reestablish public health as a mover of societal tectonics rather than a handmaiden to medicine's focus on the individual, and the turmoil in the US health system that makes change permissible.

To enable graduating professionals to participate in the assault on chronic diseases, schools of public health must allocate budgets and other resources to this effort. The barriers to chronic disease prevention and risk factor modulation are cultural and political; confronting them will require public health to work with a wide variety of disciplines.

Chronic disease will likely become the dominant global public health issue soon. In addressing this issue, academia needs to lead, not follow. (*Am J Public Health.* 2011;101:1386–1391. doi:10.2105/AJPH.2011.300147)

THE TIME SEEMS RIGHT FOR

a new wave of innovation and invention to energize academic public health (which, for our purposes, consists of the curriculum-defining components of the US members of the Association of Schools of Public Health). Three discrete, unrelated stimuli have aligned to harness energy to benefit both new constituencies and the profession itself. The first is the global epidemic of chronic disease, especially cardiovascular disease (CVD) and its associates—hypertension, stroke, type 2

diabetes, and kidney disease. The impact of this epidemic has evolved gradually but inexorably since Omran identified it with stunning clarity nearly 4 decades ago.¹

However, with a surge in obesity and diabetes, the trajectory has changed, and the epidemic poses a threat to economic development in developing and developed countries alike. The global epidemic of CVD is real and growing. It has been recognized by the World Health Organization (WHO)² and is slowly making its way into the consciousness of other agencies. India has inaugurated a new public health initiative to address it³; important studies and persuasive data on CVD are pouring out of China⁴; and African investigators are finding powerful evidence of disturbing trends in hypertension and a broad array of CVD risk factors.^{5,6}

Perhaps even more important than the accumulating data is the epidemiological timing of the burden these diseases will place on emerging economies. The dependency ratio—the ratio of the sum of the very young and elderly to the working-age population—is falling now because fertility rates are down and the elderly population remains small in much of the developing world. This trend will continue for another decade or so. But then the elderly contribution to the population will rise substantially, adding expenses related to the complications of stroke, diabetes, and myocardial infarction. The dependency door will close soon.^{7,8} The current era of relatively low health costs for acute care needs to be seen as an opportunity to invest in the public health infrastructure of CVD prevention. Now is the time to act.



The second stimulus driving a focus on chronic disease in the developing world is public health leaders' call for change in the core mission of public health and a return to the role of crafting change in societal structures to influence society's health.^{9,10} Academic public health seems to want to act. In a challenging article that threw down a gauntlet, the leadership at Columbia University's Mailman School of Public Health has called for substantive, structural changes in public health, albeit limited to the domestic arena.⁹

Among these calls for change, 3 themes stand out. (1) Public health needs to emerge from the hospital- and physician-dominated hegemony of a science-based focus on the individual. (2) Instead, public health must confront macro-level issues that push or pull society toward or away from long-term health markers that are beyond the scope of the doctor-patient relationship. (3) Public health needs to establish an independent expertise and claim its own seat at the "big table." There have been earlier calls for change in the field,¹¹⁻¹⁴ but today's calls seem more likely to gain traction because of an increasing recognition that health and health care delivery patterns have changed and that a focus on costs and economics alone is no longer sufficient.

According to the Columbia University group, the domestic societal issues that academic public health should tackle include industrial pollution, bioterrorism, climate change, and the lack of universal health care.⁹ Working toward establishing a universal health care delivery system with

a strong emphasis on upstream prevention is an appealing goal. The other topics may be a bit of a stretch because many other constituencies, including dozens of congressional committees on climate change or bioterrorism, are unlikely to surrender any elbow room at the table, even if they do little to solve problems. Nonetheless, the challenge presented by this group injects important vigor into the debate about the role of public health.

Academic public health will want to participate in health care reform efforts because the field has an enormous potential contribution to make. For instance, the further prevention of CVD is an essential goal. We know how to do it, and it requires inputs that are specific to public health. The more of this we accomplish, the more that health costs will fall. Fries has shown¹⁵ that aging can be associated with far fewer of the usual expensive disabilities, saving money, conserving resources, and benefiting society. Aging populations in developed countries, unlike aging populations in developing countries, create an array of problems that are outside the scope of this essay. However, if the illnesses of aging are confronted now with effective prevention programs the ultimate burden of aged populations in developing countries can be lightened while preserving the productivity of a healthy working-age population.¹⁶

The third stimulus for change in academic public health is the current turmoil in US health care delivery and financing systems. The future details of the US health care system remain opaque, but the outcome of the current debate

Cultural, Political, and Behavioral Barriers to Cardiovascular Risk Factor Control

1. Societal transformations: urbanization, globalization, democratization
2. Macroeconomic intervention: a role for all government departments
3. Primary care systems for chronic illness: beyond expressed need
4. Medical management of chronic illness: treating asymptomatic disease
5. Composition of health assistance organizations: a new palette of skills

will be change. Barriers will be breached; new questions will be permitted. Turmoil and uncertainty facilitate change. A new enthusiasm for and focus on prevention have surfaced in the domestic health care debate; they will carry over to the global community.

THE NEW FRONTIER FOR ACADEMIC PUBLIC HEALTH

US public health's view of global health is myopic and needs to change. An ideal forum in which academic public health can play a new, innovative, and important leadership role is the prevention of chronic disease, particularly CVD, in emerging economies. Unlike most cancers and mental illnesses, CVD and its family of related diseases—stroke, diabetes, and vascular diseases—have well-established risk factors that can be modified to reduce the trajectory of progression. These diseases are thus amenable to public health interventions. Accomplishing this goal would meet all of the demands Fairchild et al.⁹ called for. The stars are well aligned to achieve this goal.

First, the need is great, and the attention paid to the problem is small. Only about 3% of WHO's 2006–2007 budget was allocated to chronic diseases.¹⁷ Second, a new breed of public health professional is required. The old (i.e., current) training model does not prepare students to engage these diseases and their risk factors. There are no concentrations in chronic disease in US schools of public health, so the non-MD MPH graduates who staff agencies have had limited, if any, exposure to chronic disease, specifically the CVD group, and thus have little motivation to develop a curiosity for them in midcareer. It is striking that of the many calls to engage global chronic disease,^{2,17-22} few mention the failure of public health education to engage the issue,²⁰⁻²² and none has named education as a major factor in accomplishing such a transition. Third, developing competence in CVD prevention requires skills and capacities that diverge from the public health model of care that focuses on the individual patient.

For academic public health, the likelihood of being unprepared



for the coming decades, when chronic diseases could dominate the global health agenda, is too great a risk to take. Public health's educational establishment is woefully unprepared to confront these conditions and needs a great deal of rehabilitation and reconstitution. Academic public health institutions will need to allocate a portion of their budgets and other resources to create programs that prepare professionals to engage these problems. These measures will be crucial to maintaining academic public health's future relevance. By doing so, schools of public health will engage the global health assistance community in new and exciting ways, depending on the professional capacity available. Nearly all of these inputs will be "upstream" interventions, a methodology consistent with the challenge from Columbia University.⁹

Recently published competencies for the public health professional²³ delineate a systematic, comprehensive, ethically sound methodology for approaching public health interventions. These precepts are germane to chronic disease programs and have seemingly been applied to a new national CVD prevention program in Abu Dhabi.²⁴

PUBLIC HEALTH BARRIERS TO PREVENTION INTERVENTIONS

The barriers to CVD prevention are cultural, behavioral, and political. The public health professional will need to understand that successful implementation of effective risk factor control programs will

require an ability to work in arenas quite far from health issues and from public health's usual areas of engagement. This will surely test the mettle of academic public health; the academics will need all their skills and talents, along with the collaboration of many intellectual disciplines that overlap with public health, to launch and support this assault effectively. Others have pointed out many of the cultural and political barriers, but none have suggested actionable scenarios. The Grand Challenges,¹⁸ WHO,² the Institute of Medicine,¹⁹ Yach et al.,²⁰ Choi et al.,²¹ and Samb et al.²² do not go beyond a simple catalog of areas of concern. And some authors believe the problems exceed the capacity for resolution.²⁵

Interventions need to be upstream from the individual patient's risk factors. Hypertension is less the focus than the ubiquitous availability of salt and the high prevalence of obesity; serum cholesterol is less the focus than agricultural subsidies and dietary options; weight is less the focus than the capacity for exercise in schools or cities and the determinants of childhood nutrition. These and many other examples of upstream risk factors are not newly identified, but they are new to the global health assistance community and need a far greater emphasis in the curricula of schools of public health.

The political, cultural, and behavioral barriers to CVD prevention can be somewhat arbitrarily classified into 5 distinct categories (Box 1). Each is worth examining, not only to elucidate the complexity of the problem but also to document the need for a wide

range of contemporary (i.e., new) public health skills. Also, these categories of barriers help illuminate the new demands on academia to produce capable professionals. One of these categories is the structure and composition of future global health assistance organizations. A description of the new requirements in this category is embedded in the following discussion of the other 4 categories of barriers (see the box on page 1387).

SOCIETAL TRANSFORMATIONS

Societal transformations—an umbrella term encompassing urbanization, globalization, and democratization—are the most powerful forces for beneficial change in the developing world, but they can also establish the context for the emergence of CVD risk factors.⁷ These phenomena give rise to behavioral modifications that are often CVD maladaptations. In fact, the recent changes in diet, physical activity, smoking, pollution exposure, work patterns, enhanced expectations, and generational disparity have now begun to reflect back to nonurban settings^{26,27} and conspire to cultivate an even broader individual and collective susceptibility to CVD. Establishing programs that inaugurate and maintain behavioral changes that favorably alter risk factor profiles requires the introduction of cultural and political adaptations that have complex upstream tentacles. Health assistance will need to engage issues well beyond health care delivery.

For example, the urbanization component of these transformations raises important issues for health

assistance organizations. Urban planners and social anthropologists will need to participate in public health efforts, with commensurate planning and budget capacities. Staff in nongovernmental organizations often have some influence in policy formulation, but they, in turn, need to be educated about the health issues of urbanization beyond safe water, sanitation, and vaccination. Although they may be unable to directly dictate construction of parks and playgrounds, availability of food and produce, and content of school curricula, they can begin to lobby for a variety of changes that can come sooner rather than later. The table of organization for health assistance begins to look a lot different.

MACROECONOMIC INTERVENTION

In its seminal report, the WHO Commission on Macroeconomics and Health introduced the concept of a macroeconomic commission on health.²⁸ This concept posits that many, if not all, government departments have a role in the development and promulgation of health policy. Because agriculture subsidies, school curricula content, tax policy for tobacco, urban design, the increasing need for a healthy workforce and military, and the information content of public discourse all influence behavior that contributes to health status, policies and political action related to these are germane to a nation's health. However, persuading senior political leadership to view a wider horizon will lead to encroachment on the terrain of other departments. Consider the ripple effects of



proposing that tobacco be taxed to extinction rather than for income or that agricultural subsidies favor vegetable oil rather than animal fat. These measures will not be easy to implement. Thus, governments need to recognize and accept the inherent conflicts such considerations generate and to display a willingness to resolve them within the confines of the usual political negotiations.

Global health assistance organizations will need to develop the capacity to help governments reassess the importance of the public's health as an essential ingredient for a successful society or nation. This is what is meant by "lobbying," and it is a skill that can be learned. With credible, country-specific data in hand, public awareness and public information programs can begin to make headway. Coalitions of medical and lay organizations can begin to engage industries and governments to join in supporting such goals.

A recent news item captures the sequencing and time line of such actions. The Clinton Foundation garnered headlines because it appeared to have convinced soft drink producers to remove sweetened drinks from school vending machines in the United States,²⁹ but the basis for this agreement was these same producers having a stable of nonsweetened drinks to substitute for those that were removed. That capacity existed in part because community chatter over many years had informed these corporations that such demands were likely to arise, and with powerful public support. When the time came, the corporations were ready, having bought juice

and water companies. The result was a win-win solution.

Global assistance organizations need to understand these dynamics and build staff capacities to introduce these concepts to the local public health community and to offer these skills as part of their training programs. The new health assistance teams need to be populated by epidemiologists for designing and interpreting data surveys, advertising personnel for providing advocacy arguments in the public arena, and political operatives and lobbyists for creating capacity to influence health priorities. These skills are essential for the agenda of chronic disease prevention. Each country's passage of the Framework Convention on Tobacco Control³⁰ is an example of such an approach.

PRIMARY CARE HEALTH DELIVERY

Management of chronic disease requires a more sophisticated organization than is needed for treating acute illness or even a clinical exacerbation of a chronic disorder such as malaria. For many countries this organization will be a new paradigm and hence a perturbation of cultural equipoise.

Most clinics in most countries are marginally funded, minimally staffed, and overburdened by clinical demand. Little time, space, or budget exists for anything that does not meet an expressed need. However, to confront chronic disease public health practitioners will need to motivate clinic staff to measure blood pressure for every patient, begin tracking files for all those with elevated pressure,

and inaugurate, supplement, and alter pharmacotherapy as needed over time for this asymptomatic disease. Additionally, taking time to advise on diet, exercise, smoking, and other risk factors adds to the complexity of the cultural rift between the traditional staff orientation and new demands. How can these barriers be overcome?

Along with new technologies, 2 allies can help sustain these efforts. First, ministries of health can require compliance with chronic disease guidelines. Assuming the avoidance of unfunded mandates (i.e., requiring clinics to hire more trained personnel), chronic disease management can become a key component of health promotion and advancement. Keeping one's job is a powerful stimulus for guideline compliance. Also, the local academic community can become a powerful ally if its members are made aware of the rich data set to be mined for reports, articles, and academic advancement. In sub-Saharan Africa, centers of academic excellence focused on chronic disease are beginning to emerge.⁵ With the regional health officer and local academicians demanding good data and guideline compliance, staff will have sufficient encouragement to begin the cultural transformation from acute disease treatment to health maintenance.

Remote medical monitoring can be transformative. Blood pressure, weight, blood glucose, lipids, and other markers of chronic disease status can be transmitted via the wireless technology that is available nearly everywhere. Feedback loops, including rewards for

compliance, mean that many of these asymptomatic conditions can be monitored and treated without the patient having to expend the considerable time, effort, and expense to visit a clinic—a hard sell for an asymptomatic condition.³¹

MEDICAL MANAGEMENT

The fourth barrier area is focused on managing CVD risk factors. Successful treatment of hypertension and elevated lipids requires patients to take pills daily and alter other behaviors. For other precursor conditions, such as smoking and obesity, the burden of behavior alteration is far greater. However, the CVD patient typically has no symptoms and no signs—no outward evidence of being ill. Getting such patients to take pills every day and to alter their diet to avoid high intake of sodium or animal fat as active treatment of asymptomatic disease has been devilishly difficult, even in the United States, where—after 50 years of public information campaigns—we have just now achieved blood pressure control in 50% of hypertensives.³² How will this goal be reached in the favelas of Rio de Janeiro, Brazil, the high plains of nomadic Mongolia, or the rapidly urbanized slums of Mumbai, India? Time and patience will be required, as well as a mix of interventions including public information campaigns, remote medical monitoring, and altered policies in multiple jurisdictions, all driven by a recognition that the outcome is essential for robust economic growth. The introduction of the polypill for hypertension in India³³ exemplifies a new way of



approaching these complex clinical realities.

CONCLUSIONS

Corralling these diseases globally, including in the developing world, will be neither easy nor speedy. The proper time horizon is decadal if not generational. Predicting the future is even harder than understanding the past, but a guess at an implementation strategy might look like the measures outlined here. Many intervention programs are now in design and in the field. They will have varying degrees of success and impact on governments and funders over the next 3 to 5 years. Creating a public voice with enough credibility to alter behavior will take at least as long. That voice is in its nascent stage and needs to be amplified by the academic public health community. We can only hope that this amplification begins soon.

It is impossible to overemphasize the importance of reorienting the emerging graduate public health professionals in this process. Major assistance organizations and governments will need staff who are not only skilled in public health but who can recruit the societal alliances necessary to confront chronic diseases and the complex barriers obstructing efforts to address them. Schools of public health will need to embrace this need both in the policy efforts espoused by faculty and in the curriculum offered to students.

Developing this infrastructure will take time. Various feedback

loops, carefully popularized, can accelerate it, and one hopes they will. Successful stroke reduction in high-risk populations might be such a stimulus. Effective progress in diabetes control using wireless technology could be another. The impact of recognition and support of a major global health assistance organization such as the Gates, Ford, or Rockefeller foundations would be a great leap forward.

Regardless of the pitfalls or successes that lie ahead, academic public health has the challenge it covets. It needs only to embrace that challenge. ■

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Contributors

H. Greenberg was the primary author of the article and prepared the first draft. S.U. Raymond and S.R. Leeder contributed to the content regarding policy implications of the upstream aspects of public health policy and to the discussion of the new global assistance organization models. All authors participated in developing the final version of the article.

Human Participant Protection

No protocol approval was required because no human research participants were involved.

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