

## What is the “New Public Health”?

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### ABSTRACT

The New Public Health is a contemporary application of a broad range of evidence-based scientific, technological, and management systems implementing measures to improve the health of individuals and populations. Its main objectives are the political and practical application of lessons learned from past successes and failures in disease control and the promotion of preventive measures to combat existing, evolving and re-emerging health threats and risks. We address present and anticipated health problems in a complex world with great inequalities with specific targets which would help to achieve higher standards of health and a more just and socially responsible distribution of resources.

We present some examples of achievements in public health and clinical medicine, particularly from the past half century, that have resulted in improved disease control and increased health and longevity for populations. Many remaining challenges must be overcome in order to reduce the toll of avoidable morbidity and mortality and to achieve improved and equitable health nationally and internationally. The tools at our disposal today are much more effective than they were even just ten years ago. Promoting wider application of these tools and greater awareness of achievements and failures in public health will improve our capacity to affect greater change in population health in the future.

The New Public Health is a moving target, as the science and practice of public health grow in strength. It is relevant to all countries, developing, transitional, or industrialized, all facing different combinations of epidemiologic, demographic, economic and health systems challenges. A greater understanding of these issues is vital to both a European and a wider audience of policy makers, educators, students, health systems managers, and practitioners of public health to address these challenges.

**Key Words:** New Public Health, Public Health, population health, community health, health promotion, health systems management, diseases prevention

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## **INTRODUCTION**

The New Public Health (NPH) is an integrative approach to protecting and promoting the health status of both the individual and the society. The dimensions of the NPH include conceptual, methodological, scientific, political and moral factors recognizing the interdependency and interrelationship of the health of people, communities, and nations.<sup>1</sup> As outlined at the Alma-Ata conference of 1978, the NPH encompasses a wide range of essential preventive, curative, and rehabilitative factors crucial to the health and well-being of a society.<sup>2</sup> As such, it is based on an efficacious balance of services within the health and social systems. The focus is the functional and administrative linkages and tools required to attain coordination in provision of a wide range of services and social movements, with community participation and cooperation between health and other community services organizations.<sup>3</sup> This leads to burgeoning task lists and required competencies for primary health-care workers, which will in turn necessitate long-term human resource planning and improved training, support and supervision.

The fundamental policy of the NPH is based not only on responsibility and accountability of national, regional, and local governments for the health and well-being of society, but also involves self care by the individual and the community. It also involves the voluntary organizational and private sectors, such as food, medical equipment, pharmaceutical and vaccine manufacturers. Health promotion and medical care systems will need to address health inequalities, access to services, and quality of care, and define health targets related to achieving health outcome goals.<sup>1,4,5</sup> A society itself needs to be engaged in health development to cut health risks and responsibly adapt successful measures and promote their acceptability in the community. Monitoring and adoption of evolving scientific knowledge and changing health systems offer new potential for combating disease and promoting health for present and future generations (e.g., preventing birth defects).<sup>6</sup>

Successful achievements in infection and occupational disease control in the first half of the 20<sup>th</sup> century are now challenged by the emergence of antibiotic and antimalarial drug resistance and of newly identified infectious diseases. The ongoing battles against long known and manageable diseases such as malaria, TB, and parasitic infections, now include the new challenges of rapid transmission of disease (e.g., West Nile Fever and Chikungunya) to new locations.<sup>7</sup> New dimensions to the NPH must also address the growing challenges of micronutrient deficiencies and chronic diseases, in aging developed countries and in developing countries now

going through the epidemiologic transition. The challenges of the New Public Health include cardiovascular diseases and diabetes, healthy food consumption patterns, adequate physical activity, prevention of injury and violence, consumption of alcohol during pregnancy and addictions (tobacco, alcohol and drugs), biopreparedness and preparedness to adapt new advances of research, in genetics and nanotechnology.

The NPH seeks to improve population health by application of cumulative evidence from published and other reports on epidemiology, nutrition, vaccines and many other related biological, physical and social sciences and technological developments. The NPH requires continuous monitoring of health status as an integral part of government priorities, policies, and funding systems and the adoption of best practices for management, evaluation, and planning. The selection of preventive health practices for special funding priorities in the payments for general practitioners in the United Kingdom National Health Service (UK NHS), or in private health insurance plans in the United States is based on solid evidence that prevention is a cost-effective use of resources.

A growing evidence-base is available on many topics which have become standard recommended "best practices" in leading health systems, but which many other countries adopt only after long delays. Examples of best practice topics include guidelines for immunization of children, the elderly and other targeted groups annually at risk for influenza and periodically for Pneumococcal pneumonia. Regular monitoring of risk factors for cardiovascular diseases (i.e., blood pressure, blood sugar, cholesterol and other lipids; organized screening programs for cancer (e.g., mammography, Pap smears, fecal occult blood, and periodic colonoscopy)) are also part of cost-effective preventive care. These are dependent on access to the primary care provider system and the policies of insuring or funding agencies.<sup>8-14</sup>

The NPH is new in that it links health promotion with healthcare access; it is an integration of transdisciplinary and multi-organizational work. It is important for all countries, especially those with a weak infrastructure in primary care and those finding a new way in the post-Soviet transition. It is important for all countries, especially those with a weak infrastructure in primary care and those finding a new way in the post-Soviet transition. Adoption of different types of management systems and stimulation of behavioral changes requires knowledge of health risks and potentials, individual and community responsibility, the creation of positive environments with regulation of population health issues (e.g., chlorination of water supplies, road safety, and smoking restriction).<sup>15,16</sup>

## WHAT DO WE MEAN BY “NPH”?

The term “The New Public Health” is itself not new. It was used in international publications during the 1990s in recognition of the observation that disease prevention and the organization of personal care services were interlinked and interdependent with health promotion and social conditions.

*“The New Public Health is not so much a concept as it is a philosophy which endeavors to broaden the older understanding of public health so that, for example, it includes the health of the individual in addition to the health of populations, and seeks to address such contemporary health issues as are concerned with equitable access to health services, the environment, political governance and social and economic development. It seeks to put health in the development framework to ensure that health is protected in public policy. Above all, the New Public Health is concerned with action. It is concerned with finding a blueprint to address many of the burning issues of our time, but also with identifying implementable strategies in the endeavor to solve these problems.”<sup>17</sup>*

The New Public Health emerges from the evolution of public health, with articulation attributed to many farsighted individuals in the 19<sup>th</sup> century with sanitary and infectious disease control and continuing into the 20<sup>th</sup> with nutritional improvement, chronic disease management and newly emerging disease control.<sup>1,18-25</sup> During much of the 20<sup>th</sup> century, Western countries focused primarily on the provision of national health insurance or national health services, while public health, especially as a force for social change, was sidelined as a lower priority.<sup>25-28</sup> Public health has acquired skills and technological advances over the past 50 years to address many new challenges: newly emerging infectious diseases (e.g., HIV); epidemics of chronic diseases and their risk factors and comorbidities (e.g., stroke, coronary heart disease, hypertension control, tobacco, fatty diets). Many of these advances relied on behavioral changes and regulation as well as on personal medical services or biomedical technologies (e.g., new vaccines, antiretroviral therapy). New scientific and policy advances hold promise in the use of nanotechnologies, new methods of early detection, management, prevention and treatment methods (e.g., micronutrient fortification of basic foods and vitamin and mineral supplements, fruit and vegetable access) of cancers, and new social and urban planning approaches (e.g., recreational opportunities, access to healthy foods) to reduce the harmful effects of poverty.<sup>13,29-31</sup>

Advances in science have contributed both to increasing costs of new technologies, and also to cost containment through advances such as eradication or control of many infectious diseases (e.g., smallpox, soon hopefully, poliomyelitis, measles), and major reductions in infectious conditions leading to chronic diseases such as rheumatic heart and peptic ulcer diseases. New methods of payment and management in health systems are also vital to maintaining and promoting health within sustainable economic capacity of a country. New vaccines already in use will, when applied more universally, reduce the still common respiratory and diarrheal morbidity and mortality of children. At the same time, we need to be cognizant of the risk given the present focus and priority placed on new medical technology, which may divert resources from basic primary care needs and again contribute to the sidelining of public health and population health status.

There is a growing trend to use health promotion to address issues where lifestyle and social conditions are major risk factors. A landmark document published by the then Minister of Health, Marc Lalonde in 1974 (*New Perspectives on the Health of Canadians*),<sup>32</sup> directed attention to the lifestyle, genetic, and environmental causes of disease, including social factors in health, as well as in medical care itself. This work was a forerunner to the Ottawa Charter on Health Promotion.<sup>33</sup> During the 1970s, national health targets were articulated by the United States Surgeon General<sup>14</sup> and later by the European regional office of the World Health Organization (WHO),<sup>34,35</sup> bringing the concept of management by objectives from the world of business to health systems and public health. The Alma-Ata conference of 1978, and its rearticulation at its 30<sup>th</sup> anniversary in 2008, brought primary care and health promotion back into the central thinking of health policy.<sup>2,3</sup>

The NPH is new in many countries that have placed priority of funding on hospitals and tertiary care, while health needs and primary care remains weak and underfunded. The longstanding separation in administrative, funding, and training between public health and personal healthcare has hindered development of effective personal care and population health. This has both day-to-day and long-term consequences. Managers and public health professionals need to have a common cultural orientation, language, and base of learning. Improved population health requires advocacy, policy (e.g., Health in All policies),<sup>36</sup> and educational roles delivered in a cost-efficient and cost-effective manner. While these practices are improving in many countries, many other nations are still in need of advocacy, and there are often policy conflicts over resource allocation, for example, between institutional versus community care.

The New Public Health addresses health system management of facilities for both in- and outpatients and the relationships with home care and comprehensive primary care through the life span. Advocacy, policy, and organized educational efforts of the NPH in a cost-efficient and cost-effective manner are crucial to achievement of better population health. Newly emerging issues occur with the interface between traditional health issues such as communicable diseases, chronic diseases, and trauma particularly among vulnerable population groups. These at-risk groups include the poor, institutionalized patients in long-term care facilities, intravenous drug users, prisoners, commercial sex trade workers, and refugees, all of whom interact with the wider community. Successful international evidence-based experience and the literature on individual and population health provide case studies that help to demonstrate the broad aspects of public health locally, nationally, and globally.

The New Public Health incorporates health policy, health promotion in addition to primary, secondary, and tertiary prevention and health systems management as shown in Box 1.<sup>20</sup>

The interaction of smoking, diet, hypertension, cholesterol, and exercise as risk factors for stroke and coronary heart disease grew out of classic studies such as the North Karelia Project<sup>37</sup> (and in Finland generally), the Framingham Heart Study in the United States,<sup>38</sup> and the Whitehall civil servants studies in the United Kingdom,<sup>39</sup> among many others carried out in various settings, all of which confirmed and elaborated on these findings. The decline in mortality from all causes and lengthening life expectancy in most industrialized countries has in large part been due to a decline in mortality from cardiovascular diseases, including rheumatic valvular heart disease, stroke, and coronary heart disease.<sup>13</sup>

The reduction in cardiovascular mortality rates seen in most industrialized countries indicates success in both primary prevention, such as in smoking reduction and reduced fat intake, and in secondary prevention with lipid lowering medications and improved treatment both during and following acute cardiovascular events. A similar trend has not yet been mirrored in countries of the former Soviet Union.<sup>40,41</sup>

### **Box 1**

#### *Elements of Individual and Community, and Health System Prevention in the New Public Health*

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##### **Health Policy**

- Health for All
- Health in All
- Environmental impact assessment

##### **Health Promotion**

- Promoting evidence-based actions on the determinants of health
- Fostering national, community and individual attitudes, knowledge for healthful living practices
- Promoting policies and standards conducive to good health
- Promoting legislative, regulatory, social and environmental measures that reduce individual and community risk

##### **Primary Prevention**

- Implementing programs and services to prevent disease from occurring
- Immunization programs
- Reducing use of tobacco products and harmful substances

##### **Secondary Prevention**

- Early diagnosis at the presymptomatic stage of disease
- Early effective treatment to stop progress and shorten duration of disease
- Prevent complications from the existing disease process

##### **Tertiary Prevention**

- Stabilizing the disease process
- Preventing sequelae of long-term impairments or disabilities
- Restoring, maintaining optimal functioning – functional rehabilitation

##### **Health Systems Management**

- Universal health coverage
- Balance of health services
- Emphasis on primary care
- Emphasis on preventive health services
- Incentives for comprehensive care systems

**Source:** Adapted from Tulchinsky TH, Varavikova EA. The new public health: second edition. Sand Diego (CA): Academic Press; 2009.

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## **THE MISSION AND APPLICATION OF THE NEW PUBLIC HEALTH**

The mission of the New Public Health<sup>5,17-20</sup> is to maximize human health and well-being and to help redress societal and global inequities. Inequities in health across Europe, east to west, north to south, urban and rural, rich

and poor, are part of the challenges of the New Public Health. Societal and transnational gaps in health status exist, even in countries with universal healthcare plans. These social inequities have been highlighted by public health thinkers since the 19th century and again stressed recently by the WHO Commission on the Social Determinants of Health.<sup>25</sup>

The New Public Health is a comprehensive approach to protecting and promoting the health status of the individual and the society with social equity and efficient use of resources. The NPH incorporates a programmatic approach to health services with multiple parallel interventions to reduce the burden of disease and continue reduction in morbidity and mortality, and to improve quality of life, especially for an aging population. The ongoing challenge is to translate research findings into concrete action for the benefit of the population.

The balance between preventive and curative orientations and resource allocation and high professional standards in policy making requires acknowledgement of tradeoffs and prioritization that are often politically challenging. While public health interventions cannot eliminate existing inequities in societies and globally, they can reduce the burdens of the poor and underserved through adoption of evidence-based public health interventions.<sup>15,25,42,43</sup>

There are inequalities in health even in universal health systems such as the UK NHS, and Canadian provincial health plans. The British NHS recognizes the great differences in health status between different regions of the country and social classes.<sup>44,45</sup> The NHS places emphasis on primary care and a balance and coordination between a broad range of preventive, curative, rehabilitative, and long-term care services. The content, quality, organization, and management of component services and programs are all vital to successful implementation.<sup>46-48</sup> In Québec, the government, through legislation and policy instruments, has guided structural reorganization and merged local community clinical and public health services.<sup>49</sup>

The US addresses many gaps in the social fabric through government funded support programs such as Women Infant and Children (WIC), which provides food and support services for poor pregnant women and their children, Medicare (health insurance for the elderly and disabled), and Medicaid (health insurance for the very poor). However, some 47 million Americans suffer from a lack of health insurance due to the loss of employment or the presence of pre-existing health conditions.<sup>20,29</sup> Current health insurance reforms initiated by President Obama will alleviate some of the inequalities in access to care in the coming years. This will require functional and administrative linkages or integration in an organized



systems context, so there is seamless provision of services for the population and the society.<sup>50</sup>

A society that aspires to high standards of health must address with government leadership, a wide complex of health issues that extend out to social and environmental policies, such as pensions, social welfare systems, employment and much more in what has come to be called Health in All Policies.<sup>34,36</sup> Almost anything a government does or does not do affects the health and well-being of the population, mostly in the spheres of resource allocation, planning, social welfare, public health initiatives and regulation, as well as in taxation, urban planning and public works policies.<sup>35</sup>

The following examples from past and more recent public health achievements demonstrate that our work does matter. The concept that health improved in the 19<sup>th</sup> and 20<sup>th</sup> centuries because of rising standards of living and nutrition, not medical care, has some truth to it.<sup>44</sup> Nevertheless, the achievements in increasing life expectancy and reducing mortality of the past half century from both infectious and noninfectious diseases point to the success of both direct and indirect public health measures.<sup>51,52</sup>

## **CASE STUDIES IN A NEW PUBLIC HEALTH**

### **Cardiovascular Disease Control**

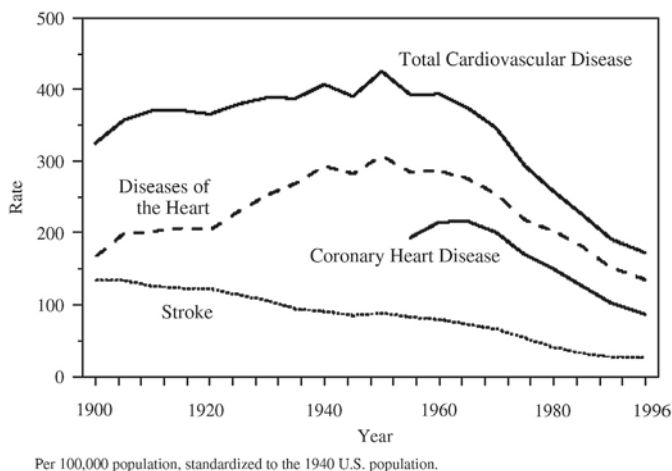
Successful management and prevention of rheumatic fever has resulted in the virtual elimination of rheumatic heart disease in most industrialized countries. Since the 1960s, this condition has become uncommon and could have been virtually eradicated. However, it continues to be a leading cause of cardiac-related morbidity and mortality in transition and developing countries.<sup>53-55</sup> Identification of Group A streptococcal infection as the cause of acute rheumatic fever, rheumatic heart disease, and long-term valvular heart disease led to widely implemented medical practices of treatment and prevention, and improved standards of living with a decline in these complications.

Antibiotic treatment and long-term antibiotic prophylaxis for patients suffering from rheumatic fever related diseases prevents recurrence as well as further heart and kidney damage.<sup>56</sup> This has led to cessation of much of the cardiovascular surgery for rheumatic heart disease and deformed valves that had filled hospital cardiovascular surgical departments in previous decades. Access to primary medical care is thus very important. Streptococcal infections are more likely to occur and to be left untreated in poor and crowded living conditions, still constituting a serious health

problem in poor countries and among uninsured or disadvantaged populations in wealthier countries.

In 1950, about 15,000 people died of rheumatic heart disease. In 2009, the American Heart Association reported that from 1995 to 2005, the death rate from rheumatic fever/rheumatic heart disease fell by 39 percent. Access to primary care and effective use of antibiotic therapy has sharply reduced mortality. However, the battle has not been won, as this group of diseases killed 3,365 people in the United States in 2005.

In terms of the entire burden of total cardiovascular disease (CVD), there has been a dramatic decline in mortality from coronary heart disease in the United States since the 1950s (see Figure 1) yet it remains the commonest cause of death, although with great future potential for continued declines through wider application of present methods of prevention and treatment.<sup>55,56</sup>

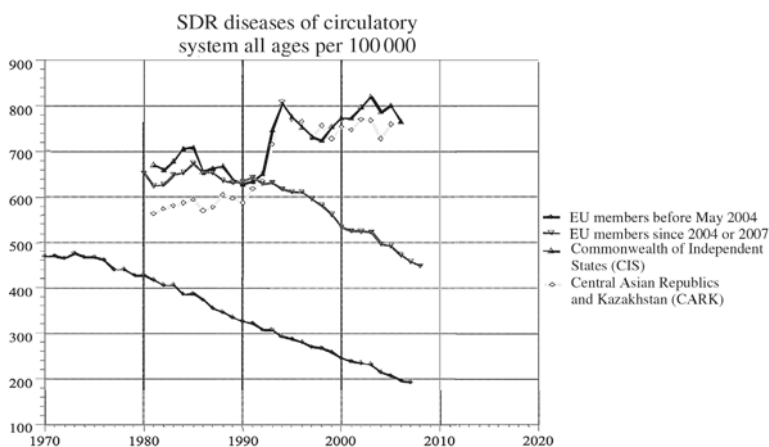


**Fig. 1.** Age-adjusted death rates for total cardiovascular disease, diseases of the heart, coronary heart disease, and stroke, by year – United States, 1900-1996.

**Source:** Centers for Disease Control. Achievements in public health U.S. 1900-1999, decline in deaths from heart disease and stroke – United States, 1900-1999.<sup>56</sup>

In the European Region, trends of standardized mortality rates from all cardiovascular diseases (stroke and coronary heart disease) are marked by wide differences between east and west.<sup>53</sup> Rapidly declining CVD mortality rates (Figure 2) in Western European countries since the 1970s are matched by more recent reduction in Eastern European countries, while these rates

in the countries of the former Soviet Union remain nearly four times higher than those in Western countries.<sup>40,41,53</sup>



**Fig. 2.** Standardized death rates (SDR): cardiovascular diseases of circulatory system, all ages per 100,000, European Region, 1970-2007.

**Source:** Health for All Data Base, WHO European Region, January 2010. Available from URL: <http://www.euro.who.int/HFADB> (Accessed 15 March 2010).<sup>53</sup>

## Vaccination and Control of Infectious Diseases

Edward Jenner’s discovery of the use of cowpox to vaccinate people for protection from smallpox was one of the great breakthroughs of public health. Nearly two centuries later, smallpox, after generations of increasing control and a massive globally coordinated campaign, was finally eradicated in 1972, demonstrating the world’s capacity to challenge and conquer diseases of such historic importance.<sup>7</sup> Eradication of smallpox was one of public health’s finest hours and raised hopes for similar achievements in other infectious and indeed non-infectious diseases.<sup>7,51,52</sup>

A similar effort to eradicate poliomyelitis was launched by the World Health Organization (WHO) in 1982, and with massive efforts worldwide, this campaign is coming closer to achievement. An end-stage strategy, however, needs continuous review. In the still endemic areas such as Nigeria and India, a combination of live oral Sabin vaccine and inactivated Salk vaccine may both be needed in areas resistant to eradication such as in some states in India and Nigeria because of their complementary qualities.<sup>57</sup>

A widening control of measles in most parts of the world is slowly reducing the burden of this disease, but child morbidity with attendant hospitalization leading to costly long-term care, and mortality are still high (more than a quarter million persons per year).<sup>58</sup> Developing and many mid-level countries lag 10-20 years behind in their adoption of relatively recent vaccines, such as *Haemophilus influenzae* type b, Pneumococcal pneumonia, and rotavirus vaccines.<sup>7</sup>

Most industrialized countries have advanced immunization programs, but there is no single recommended program to serve as a guide for new countries joining the European Union and those in the Eastern parts of the European Region. This is not only a technical and professional matter for infectious disease specialists and economists, but it is even more so a NPH issue involving national and international governmental and non-governmental organizations, and advocacy for the Millennium Development Goals for the year 2015.<sup>59</sup>

### **Preventing Micronutrient Deficiency Conditions**

In the early part of the 20<sup>th</sup> century, vital amines, later termed vitamins, were first identified as public health problems with widespread deficiency conditions that could be addressed by fortification of salt with iodine, and flour with vitamin B complex.<sup>29</sup> Since then, new micronutrient deficiency conditions have been identified, such as those concerning folic acid and vitamin D. Fortification of basic foods with essential trace elements has become part of high quality public health practice, to reduce the burden of disease.<sup>60,61</sup>

Gradual reduction in micronutrient deficiency conditions such as goiter, rickets, and vitamin A deficiency have been of great benefit to child health in many parts of the world. Despite nearly a century of iodization of salt and its recommendation for universal adoption by WHO, iodine deficiency affects some 1 billion people including over 50 percent of the population in the European Region of WHO. The continuing failure to control iron deficiency and subclinical vitamin D deficiency in developing and developed countries has implications for preventive and clinical health services and outcomes for a nation as a whole and for vulnerable groups, especially with increasing longevity of the population.

Food fortification has occurred as the result of parallel and sometimes cooperative efforts between governmental and non-governmental agencies, as well as the food industry. Health education for the population, now commonly influenced by widespread use of the internet, is currently playing a key role in conveying the importance of vitamin supplements such as

vitamin D to those at risk for vitamin D deficiency.<sup>60,62,63</sup> Vitamin D fortification of milk and supplements for many age groups prevents rickets, osteomalacia, cardiovascular diseases, cancer, asthma, and many other conditions that involve high consumption of costly medical care.<sup>30</sup>

Food fortification is a field rife with controversy. North Americans and people in many countries in the Americas and elsewhere widely accept fortification of milk with vitamin D, and flour with folic acid, vitamin B complex, and iron.<sup>64</sup> Even with hundreds of millions of person years of exposure, there is no clinical or epidemiological evidence of ill effects or litigation on account of these measures.

Folic acid fortification of flour (along with iron and vitamin B complex) in North and South America since 1998 has reduced the incidence of neural tube defects, leading to important economic and social benefits. Few countries in Europe mandate the fortification of flour with folic acid to prevent neural tube defects, nor do most fortify their milk with vitamin D. The Centers for Disease Control and Prevention in the United States reported in 2008 that in the period 2004 to 2008: "The portion of wheat flour being fortified increased from 90 to 97 percent in the Americas Region (the region with the highest percentage of wheat flour being fortified), from 26 to 31 percent in the African Region, from 16 to 21 percent in the South-East Asia Region, from 3 to 6 percent in the European Region, and from 2 to 4 percent in the Western Pacific Region."<sup>65</sup>

Vitamin D deficiency is described as a world pandemic with great impact on public health<sup>30</sup> and yet in many countries in Europe, not only has there not been any effort to recommend it, but in some cases, it is forbidden by law. The same applies to fluoridation of community water supplies, also deemed by the US Centers for Disease Control and Prevention to be one of the great achievements of public health of the 20<sup>th</sup> century.<sup>66</sup>

### **Addressing the Tobacco Epidemic**

Reduction of smoking and tobacco use through health promotion including restrictive legislation lessens the burden of coronary heart disease, stroke, chronic respiratory disease, and lung cancer and reduces length of hospitalizations and long-term care utilization. A principal target group for change in health behavior is the preschool and youth population. Smoke-free policies, increased taxation, warning signs on cigarette packages and open criticism of the tobacco industry have contributed to the marked reduction in smoking in most industrialized countries. Punitive measures by the courts against tobacco companies have helped reduce advertising and promotion of cigarette smoking in most western countries. However,

tobacco companies continue to promote their products and profits in developing and transition countries, which lack adequate public health awareness and infrastructure to prevent this leading cause of premature disability and death.<sup>13</sup>

The WHO Framework Convention on Tobacco Control (WHO FCTC) is the first treaty negotiated under the auspices of the World Health Organization. It was adopted by the World Health Assembly, which entered into force in 2005. It has since become one of the most widely embraced treaties in UN history with its adoption by 168 member countries. The WHO FCTC was developed in response to the globalization of the tobacco epidemic and is an evidence-based treaty that reaffirms the right of all people to the highest standard of health. The Convention represents a milestone for the promotion of public health and provides new legal dimensions for international health cooperation.<sup>67</sup>

### **Infections Causing Chronic Disease**

*Helicobacter pylori* was discovered to be the direct cause of peptic ulcer disease, as described by Warren in the Foreword to this issue. *Helicobacter* is a spiral-shaped Gram-negative bacterium that colonizes the stomach and is reported to be present, most often asymptotically, in an estimated 50 percent of all humans, more frequently in populations living in poor hygienic conditions.<sup>68</sup> In the industrialized countries, this discovery quickly led to readily available diagnosis and inexpensive treatment, bringing relief of suffering to millions of people. Reduction of peptic ulcer disease may also be an important factor in reducing stomach cancer in many parts of the world.

Despite resistance to its acceptance by the medical world, this led to enormous benefits in its relief of a set of chronic conditions from peptic ulcer diseases for mankind. This included a dramatic change in not only surgical practice (reducing the high rates of surgical treatments), but also economics of health systems (reducing expensive treatments with long lengths of stay); both of these contributed to a reduction in the number of hospitalizations and correspondingly the total of acute care hospital bed supply used for these conditions in most Western countries. The spread of the knowledge and technology not only to diagnose and treat peptic ulcers, but also to promote their prevention in developing and transition countries, will be a continuing challenge for health systems in the coming years.<sup>69-71</sup>

The discovery of *Helicobacter* expanded a new vista in relating infectious disease to chronic conditions. This discovery has more recently been followed by the scientific proof for the causal relationship between

human papillomavirus (HPV) and carcinoma of the cervix. Pap smear screening had led to a major reduction in mortality from cancer of the cervix in the industrialized countries, but the disease is rampant in some Eastern European and developing countries. Since 2008, effective vaccines are a major new primary prevention method for this still common and deadly cancer. Initially targeting prepubertal girls and young women, in time it will also be used for boys to reduce the spread of HPV through sexual intercourse. Evidence that circumcision may be an effective preventive measure for this and other sexually transmitted infections that have chronic disease sequelae is now affecting health policies in some African countries. The relationship between infectious and chronic diseases is further addressed in other articles in this issue.<sup>7,13,72</sup>

### **Risk Reduction**

Prevention of diseases and disability brings relief of suffering and is of economic benefit to individuals, communities, health systems and society, in general. The aforementioned cases involve the longstanding issues of public health, or classical public health, such as environment, occupational health, food safety, and maternal and child health, as well as clinical medicine. Risk reduction is multifaceted and extends to health policy and targets, legislation, multidisciplinary public health training and workforce development and the links between these.

Some of the strategies in a public health agenda are restrictive of individual “rights” such as driving on the left side of the road, driving without a seatbelt, and smoking in public places. These measures are, however, important to promote healthy lifestyles and reduction of harm from avoidable morbidity and mortality. Community education for compliance with these and other important preventive measures such as immunization and healthful nutrition are important in promoting healthy lifestyles and reducing morbidity and mortality.

We take for granted strong public awareness and support for basic public health sanitation such as safe water supply and security (i.e., testing chlorination, regular laboratory testing), and general sanitation. But this is not always the case for government legislative measures, such as in fluoridation, food fortification nor for direct outreach services such as screening programs for early detection of disease. Risk reduction activities combine education for both infectious and noninfectious diseases and a wide array of direct interventions. Needle exchange programs, condom distribution, and immunization of hepatitis C carriers for hepatitis B and hepatitis A, are now all considered highly relevant to preventing chronic

diseases. With future development of new vaccines such as for *H. pylori* it will be possible to reduce its worldwide prevalence in over half a billion people, especially those in unfavorable social/environmental conditions with great benefit to populations and health systems.

## **EDUCATIONAL PROGRAMS AND SCHOOLS OF PUBLIC HEALTH**

Public health training programs play a significant role in the new public health. The public health workforce is cross-disciplinary, with workers from many professional backgrounds. It is as important to train economists, veterinarians, nurses, psychologists and others from the biologic and social sciences in public health as it is to train physicians. The New Public Health is cross-disciplinary. Managers of medical and hospital care systems need to be knowledgeable of epidemiology as well as economics and management skills, just as epidemiologists need to know about economic and social factors in health status.<sup>50</sup> Thus the curriculum may best be taught, as required by United States accreditation agencies, in academic settings not confined to medical faculties.

In countries with other academic traditions, such as Canada,<sup>73</sup> public health has generally been taught within departments of community medicine or social medicine. In many cases, this implies few resources, low prestige, and a tendency toward an apprenticeship approach to PhD training. Since the 1990s, new directions in development of schools of public health have been emerging in the European Region and in South East Asia.

In the former Soviet model, the separation in medical school programs between public health and the traditional medical curriculum continues to the present, and raises major concern in the balance between clinical and basic medical sciences. The failure to adapt training, research and service systems to the epidemiologic transition from predominance of infectious diseases to noninfectious diseases and conditions has resulted in a stagnation and decline in life expectancy lasting several decades.<sup>40,41</sup>

The standard recommended curricula for a master of public health program are built around core topics including epidemiology and research methods, statistics, behavioral and social sciences, and health policy and management along with environmental and occupational health, maternal and child health, nutrition, and communicable disease control, with a required master's paper or thesis.<sup>74</sup> Ethics and law of public health are cross-cutting issues explored in graduate studies of public health (related to topics such as aging, mental health, dental health, public health law and



ethics among others) and are vital to successful implementation of a new public health.

The American Association of Schools of Public Health defines public health as a profession and discipline that "focuses on population and society's role in monitoring and achieving good health and quality of life."<sup>74</sup> In the United States, schools of public health are accredited based on a well-established system promoting high-quality programs at the MPH and PhD levels, with a growing approach towards core competency models for the MPH degree.<sup>75</sup>

More recently, DrPH programs have taken a rapidly growing practice-oriented approach to doctoral education in American schools of public health intending to meet the needs of professionals for management positions in the health sector.<sup>76</sup> Public health education for medical students, residents in clinical fields and the biological/social sciences is as important as the study of anatomy and physiology. Population and community health issues should also be incorporated in liberal arts education, being relevant as are the studies of anthropology, sociology or chemistry, in terms of understanding science, society and social progress.

## **PUBLIC INFORMATION AND PUBLIC HEALTH**

With growing access to global information systems on the internet and through mass media, high level information regarding health issues is available to the literate population and will, rapidly become so in developing countries.<sup>77</sup> As a result, the public has access to nearly the same information about public health as the medical graduate.<sup>78</sup> The health community needs to facilitate information dissemination on key public health topics. Given the mass access to information, there is also misinformation available on global websites, promoting views antithetic to good public health practices. One example is the case of the measles, mumps, rubella (MMR) vaccine, when a leading medical journal published allegations of MMR causing autism, later shown to be a falsified presentation and retracted by the journal. Legal proceedings against its lead author are in process. Britain and other countries in Western Europe have since experienced a return of endemic measles and a resurgence of measles is a serious threat to many vulnerable countries.<sup>79,80</sup>

The use of available preventive measures such as vaccines even in the industrialized countries is far from satisfactory. Observational studies show that in nursing homes, vaccines can prevent about 45 percent of pneumonia cases, hospital admissions and influenza-related deaths. Even in community

settings, influenza vaccine can prevent about 25 percent of hospitalizations from influenza or respiratory illness,<sup>81,82</sup> and should be mandatory for patients in hospital and long-term care settings.

## **WHY IS THERE AN URGENT NEED FOR A NEW PUBLIC HEALTH CONCEPT?**

Public health measures are not implemented in isolation. Though public health has its own organizational structure and content, it also functions within a wider national and international network of governmental and non-governmental agencies, some with competing interests. Differences of approach between countries, or even on a smaller scale within countries, may result in action or inaction that can benefit or harm the health of the public. Monitoring of water and air quality are local issues with wider, even global, implications. The first indications of the harmful effects of toxic chemical exposures may show up in hospital emergency rooms or primary care clinics, and epidemiologic investigation may later reveal long-term health issues from such exposures. Global warming requires close monitoring as the international community, nations, companies and individuals try to adjust to a new threat to mankind along with terrorism, threatened and actual genocide, and the spread of nuclear weapons.<sup>83</sup>

Delayed implementation of new knowledge into the sphere of public health practice is an important issue for global health. Such delays involve policy, economic, management, and scientific aspects. The long “incubation period” between availability of new science in practical and cost-effective forms and its adoption into health systems in developing and transition countries is one of the shortcomings of international public health advocacy. For example, many countries including Russia only adopted *Haemophilus influenzae* type b (Hib) vaccine for routine use in 2006, even though it has been available since the early 1990s. Years of delay in modernizing the guidelines and content of immunization programs have severe negative consequences for the health of the population and delay in achievement of the Millennium Development Goals agreed to by the United Nations.

Despite impressive progress in reducing measles mortality rates, continuing endemicity of this disease still kills some two hundred thousand children each year. There was a lengthy period of delay in the adoption of the “Two Dose Policy” i.e., two doses of measles vaccine with a catch up campaign for school aged children, that has put millions of children at risk. Measles, as mentioned above, has also re-entered a number of countries in Europe in endemic form.<sup>7</sup>

Micronutrient deficiency conditions are widely prevalent in industrialized and developing countries. Often subclinical, these result in a wide array of preventable morbidity and mortality. Fortification of basic foods (i.e., iodine in salt, iron, vitamin B complex and more recently folic acid in flour, and vitamin D in milk) has been a part of fundamental public health nutrition policy since the early decades of the 20<sup>th</sup> century. The failure to adopt adequate policies regarding folic acid fortification of flour results in excess neural tube defects with heavy economic burdens on families and society as a whole. Widespread anemia among women has important health effects with economic implications. Prevention of these deficiency related conditions is complex and requires broad strategies including health promotion, legislation, regulation and education.<sup>29,30</sup>

The slow adoption of health promotion practices concerning prevention of high risk behaviors such as smoking and binge drinking may be explained by many social and political factors, and represents a failure to readily implement effective public health policies in many countries. The failure in developing countries to control malaria or to achieve specifically targeted Millennium Development Goals, such as reducing maternal and child mortality in many sub-Saharan African countries, is also the result of governmental and non-governmental organizational failures to adopt effective policies and undergo a transition designed to meet the greatest challenges.<sup>83</sup> Even in developed countries, however, major differences indicate a wide gap of inequality between regions and ethnic and socioeconomic groups in the population.

## **WHAT DOES THIS MEAN FOR NATIONAL HEALTH SYSTEMS?**

Training in the disciplines of epidemiology, economics and other fundamentals of public health is important for policy and clinical managers of healthcare systems as well as for clinical providers at primary and specialty care levels.<sup>84</sup> Health systems managers in health insurance systems and hospitals need a broad understanding of public health and its methods as well as to understand the functions of a health system. Similarly, clinical providers at primary and specialty care levels also need to have a basic understanding of these disciplines. Training in public health-related disciplines in medical schools usually has a very modest place in the curriculum. Schools of public health are needed to provide the training and research expertise required for health system managers and practitioners to understand the policy, strategic issues and inter-relationships between curative and public health services.

Health managers need training in use of national and international health information systems such as the European Health for All Data Base.<sup>53</sup> This database is an outstanding resource for national and international trends and comparisons of hundreds of indicators on health status, resources, utilization and health risks. This should be one of the tools employed by health workers at all levels, especially those involved in teaching and research, as well as those in public policy and program development areas within the governmental health sectors. Computerized health information systems are important for individual patients and for health systems such as hospitals, for tracking utilization of care measures across the health sector, occurrence of medical errors, as well as compliance with practice standards and clinical guidelines, which are increasingly being incorporated at the primary care level.<sup>85</sup>

Practice standards and clinical guidelines are increasingly becoming part of modern medical care, especially at the primary care level within the realm of preventive care. Preventive measures are being incorporated into computerized medical information systems, so that reminders for immunizations, occult blood stool testing, mammography and Pap smears are part of routine care. In Britain, up to one third of the incomes of general practitioners depend on compliance with these routine preventive care measures. Hospital information systems are used to promote safety and reduce occurrences of medical error. They are also important for transmission of information needed for care during and following hospitalization to improve patient care and reduce unnecessary return hospitalizations. Information systems provide the basis for evaluation and planning by objectives or health targets essential for national health systems. The translational application of new science and best practices into public health oriented practice is an ongoing educational function at all levels of medical care, as well as in health promotion and targeted programs dealing with special risk groups.

Continuing assessment of the state of the art is a challenge for those who make decisions regarding funding and priorities as well as education of health workers. Research and evidence from published studies, governmental agency and other reports and the “best practices” recommended by professional agencies must be considered to gain new knowledge and make more sound decisions. All this must be assessed in terms of the costs and effectiveness of new technologies, and in light of the fact that priorities are increasingly open to public scrutiny and debate. Research to gain new knowledge regarding health and risk factors for diseases is an essential part of the evolution of the field as exemplified by

Robin Warren's description of the discovery of *Helicobacter* as the cause of peptic ulcer disease and its dire consequences, as well as other examples noted previously.

## **GLOBAL HEALTH AND THE NEW PUBLIC HEALTH**

There are enormous challenges requiring stronger coordination and application of already available technology in developing and transition countries.<sup>86</sup> The implementation of NPH has to address the imbalance of resource allocation resulting from an overemphasis in priority setting and funding given to biomedical aspects of health. This is associated with the relative underdevelopment of primary care and health promotion, both of which have played such important roles in the reduction of cardiovascular disease, HIV, smoking cessation, and many other areas of public health.<sup>83</sup>

Evaluation of public health organizations, the content of programs, and their effectiveness is gradually becoming an important element of the management of health systems. Computerized health records facilitate clinical care but also provide the possibility of epidemiological and quality assurance analysis of healthcare issues. Many process and outcome measures are needed to monitor the health of the population across all health services.

With efforts to control the rising costs of healthcare and address the needs of aging populations, alongside high and rising expectations of the population and political leaders, health systems throughout the world need to address prioritization and rationalization in health. This is a political issue of the first magnitude in domestic politics in the United States,<sup>87</sup> but also in other countries with universal health systems. Adoption of cost-effective preventive measures and health promotion methods for the benefit of society is a challenge faced by all countries; for example, smoking reduction is probably the single greatest health benefit measure, in which individual care providers can play a major role, just as government has an important role to play through legislation, taxation, and other forms of regulation and enforcement.

The return to Alma-Ata 30 years after the famous conference of 1978 brought renewed calls for a return to primary care as the key element needed to reduce health inequalities within and between countries.<sup>2,3</sup> Political and public awareness of health continues to focus primarily on medical and hospital issues while primary health, community care, and the public health generally are mainly attended to during times of systems failure and crises, such as an actual or potential pandemic.

The issues of the New Public Health are raised in many national and international policy documents; yet funding is still most often directed to specific, albeit important diseases such as HIV and cancer. Development and sustainment of national and local capacity is required to change this narrow focus.<sup>88</sup> There is a need to strengthen the primary care infrastructure in industrialized and developing countries with a focus on multiple parallel interventions to reduce the burden of disease and preventable mortality, e.g., managing comorbidity of HIV, TB and poor nutrition. The industrialized countries are also in need of reform of primary care to address chronic diseases and aging with integration between professionals and provider teams from various fields working on patient-centered health care. These are the challenges and possibilities faced by the global health and political community.<sup>89</sup> Innovation in funding systems will be necessary to promote an integrated approach to health. These are vital issues that must be considered in formulating strategies to help the political and health system management levels design, implement, evaluate, and promote such approaches in low and middle-income as well as in industrialized countries.<sup>90-92</sup>

## **SUMMARY AND CONCLUSION**

The NPH provides an organizational framework for all countries, whether industrialized or developing. This includes and is equally applicable to countries undergoing political and economic transitions such as those of the former Soviet Union. In the global context, all countries are at different stages of economic, epidemiologic, and sociopolitical development, each one attempting to assure adequate health for its population with available, but often limited, resources.

A society's approach to health is a statement reflecting the value it places on health as a fundamental human right. This approach includes health policies addressing available technology and current "best practice" standards that may be lagging behind. Examples include the long delay in the United States to ensure health insurance for all, and the former Soviet countries in failing to apply measures to control risk factors for noninfectious disease. High levels of premature loss of life are directly attributable to the failure to understand and apply measures to control risk factors for cardiovascular disease and other preventable causes of morbidity and mortality. Overall failure to achieve the Millennium Development Goals in most sub-Saharan African countries reflects a political failure over a long period of time to develop a primary care infrastructure designed to reduce inordinately high maternal and child morbidity and mortality.

The capacity for public health to prevent and contain disease and its consequences is well proven. Leadership accountability in the New Public Health remains primarily with government. The goal is health for all at highest achievable levels. Public health is not a monopoly of government, but requires leadership and cooperative endeavors from those responsible for national health and provision of health care. Effective policy necessitates cooperation between the political level, governmental agencies, and the private sector. The challenge is to apply what is known and to search for answers to the unknown with optimism, professionalism, determination, and persistence in a New Public Health.

**Conflicts of interest:** None declared.

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