GLOBAL POPULATION HEALTH AND WELL-BEING IN THE 21ST CENTURY

TOWARD NEW PARADIGMS, POLICY, AND PRACTICE

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Global Population Health and Well-Being in the 21st Century
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Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has.

Margaret Mead (1901–1978)
Anthropologist
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Foreword

This is a remarkable, much-needed book that fills a significant gap in the health and social care literature in the early decades of the 21st century—public, global, clinical, and ecological. It is powerful, ambitious, comprehensive, and sweeping at the same time that it is visionary, focused, and deep. Its power and passion are about the potential of population health and well-being optimally applied around the globe to help in creating a world that is healthier, safer, more just, and more sustainable.

The book is written for a wide-ranging readership. One of the main reasons for this broad audience is that striving toward planetary and population health and well-being must be one of the top priorities of this century. This work affirms this stance.

WHY NOW?

The world is facing an “ingenuity gap.” After thousands of years of human evolution, we seem to have arrived at a turning point, where the problems we face—social, political, and economic—seem greater than our capacity to resolve them, where, as one example, the technology we possess could advance civilization or, in an instant, make us extinct.

The chapters of this far-reaching, evidence-based, highly readable, and authoritative work put into stark contrast the differences between the “have” and “have-not” countries, while reminding us of our global interconnections. In the West and North, we now realize more than ever before in human history that although an epidemic may be thousands of miles from where we live, it is also only a plane ride away. Fundamentally, George R. Lueddeke alerts us to the growing recognition that, of the 7.2 billion people on the planet, only about one fifth reap the benefits of the modern world. Thus, there is an increasing urgency of grappling, as examples, with health and income inequality, along with access to food, water, and sanitation for billions of people, many of whom live in extreme poverty and in fear.

And while developing countries have special, urgent needs, so do middle- and high-income nations that also have serious challenges—stemming arguably in some measure from modernity, fragile economies, and uncertainties about the future, including the consequences of climate change; pandemics of noncommunicable conditions and diseases, like obesity, diabetes, heart disease, and cancer; and infectious diseases, including emerging ones.
TOWARD THE “WORLD WE WANT”

Substantive consideration is given to the United Nations (UN) Millennium Development Goals (MDGs) and post-2015 Sustainable Development Goals (SDGs), along with the World Bank’s priorities to 2030. A hallmark of these discussions is the recommendation for the UN and other decision makers to adopt an integrated, Sustainable Development Goals framework. The framework could facilitate, the author posits, the movement toward universal health care (UHC), which is inclusive, unifies services, and delivers them in a comprehensive, integrated way based on primary health care. WHO Director-General Margaret Chan has identified UHC as “the” most important public health priority.

Current health statistics highlight that many public health measures, based largely on 20th-century assumptions about health and well-being, have had limited success. Dr. Lueddeke traces the reasons for slow progress, including the constraints of conventional health care measures and the need to reconcile health-funding expenditures. Most of these expenditures are presently allocated to acute illnesses with hospital dominance, while most deaths (close to 70%) and morbidities worldwide now are caused by noncommunicable diseases (many, diseases of affluence) and chronic illnesses, related to a large degree to an aging population—both, however, likely best treated in family or community contexts. The way forward, he asserts, is to create and adopt a new vision of public health, one that embraces, among other elements, the recognition of the impact of social determinants of health and the need for interprofessional health care approaches, applying “fifth” wave (complex, adaptive) thinking, while working closely with “struggling” communities and addressing inequities in health. It is through these transformations that we will create effective, sustainable public health interventions that promote wellness instead of sickness, hope instead of despair, and connectedness and collaboration instead of competition.

The author emphasizes the need to shift toward a holistic view of public health, not separate from health and primary care, built on sustainable partnerships that are grounded in a recognition of “One Health.” The One Health concept and approach advocate two fundamental truths: that the environment and animal and human health are inextricably interconnected and that all actions have consequences. A biopsychosocial, ecological model is the appropriate foundation because it takes into account the many health and nonhealth influences on health, including those that are volitional and those that are outside one’s control, and those that are changeable and those that are immutable.

The myriad challenges facing us demand a dramatic change in how we prepare our health and social care workforce. The author’s vision and practical guidance are consistent with recommendations of the seminal Lancet Commission report that emphasizes improving “the performance of health systems by adapting core professional competencies to specific contexts while drawing on global knowledge.” Transformative learning and interdependence in education call for major shifts in the educational process, including, inter alia, moving “from fact memorization to searching . . . adopting competency-driven approaches to instructional design and adapting these to rapidly changing local conditions drawing on global resources,” promoting active and collaborative learning (versus learning in silos), as well as taking
full advantage of new digital technologies. Our education must be lifelong and not sequestered into a small window in one’s lifetime. The implications for faculty and educational development are considerable, but need to be robustly pursued to make a fundamental difference to local, national, and global health and well-being in this decade and beyond.

A FINAL COMMENT

The vision of public health contained in this volume has many strengths. Particularly noteworthy is a timely recognition of the One Health concept, which highlights that the health of humans is intimately connected to the health of animals and the environment; another forte is about individuals and populations, a shift in thinking about public health—and a good one. For too long, public health was framed as focused on communities without attention to individuals. There is no contradiction here. What are populations but people? We are all in this together!

Barbara K. Rimer, DrPH, Dean
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Preface

The history of modern *Homo sapiens*—us!—is short, although our tiny, fragile planet is billions of years old—about 4.56 billion years to be more exact—and the universe is even older, estimated at 13.8 billion years, expanding from “an unimaginably hot, dense point a billionth of the size of a nuclear particle” (1). While we have been evolving for millions of years, the journey of modern *Homo sapiens* (Latin for “wise man”) dates to about 200,000 years ago in East Africa, then spilling out into the rest of the world, and culminating in our becoming “anatomically human” at least 100,000 years ago and more “behaviourally human” perhaps 40,000 to 50,000 years ago. However, in line with the European archaeological record, it is “only over the last 20,000 years,” that “we consistently see the usual archaeological signatures of behavioural modernity: broad-range foraging; environmental management; technological innovation; and obvious symbolic culture” (2).

The story of more scientific approaches to caring for the sick is even more punctuated. Indeed, it was not until the 1940s—roughly 70 years ago—that we were able to treat infections with antibiotics. Since that time—especially in the last 60 years or so—our technological progress has been immense.

In the past few decades, we have seen many changes triggered, to a large extent, by the genomic revolution, including pharmacogenomics, nutrigenomics, molecular diagnostics, regenerative medicine, and designer vaccines, to name several areas (3,4). In addition, there have been enormous changes in communications and data management technology, thereby offering new opportunities for data collection, analysis, and dissemination, as well as advancing distance medicine.

Regrettably, however, throughout history—and continuing to this day—the same cannot be said for our social or humanitarian advances, despite a global framework enshrined in the 1948 “Universal Declaration of Human Rights” (5) and subsequent covenants (6).

More specifically, while we have been able to map the human genome and make huge strides in life expectancy—mostly in the more developed nations—and medicine generally, we fall short when it comes to realizing the “well-being,” psychological, economic, social, and physical, or simply “life satisfaction,” of most of the planet’s population, now exceeding over 7.3 billion people. Globally, there are a few rich, but far too many are still living in poverty—economic, social, and aspirational—and in fear.
We seem to be facing what some writers have called an “ingenuity gap,” that is, the incapacity of tackling many of the global problems relating to health inequities and inequalities, many of which appear to be the result of “unequal distribution of power, money and resources” (7). Other health risks stem from modern lifestyles or “modernity,” bolstered by “prevailing norms and practices” that can “exert illegitimate or undemocratic influence in global health processes” (7). In fact, it may be argued that current health epidemics—for example, obesity and associated diseases; environmental threats, such as climate change; and ongoing “people” conflicts, often resulting from self-interest, corruption, differing ideologies, lust for power, and control—may seriously hamper the long-term survival of our—and perhaps other—species. Indeed, we might expect that images of the vast cosmos and classics like Carl Sagan’s The Pale Blue Dot: A Vision of the Human Future in Space (8) would put everything into perspective for most decision makers but, bafflingly, they do not.

Taken together, it seems timely to reflect on the state of the human condition and consider options that call for a change in mindset with regard to improving and sustaining the health and well-being of the planet and its people.

Public or population health, which is at the core of societal wellness and cuts across all fields of human endeavor—energy, agriculture, urban planning, and transportation, to name but a few sectors—arguably needs to be at the forefront of essential global transformations in order to help people to stay healthy and to protect them from threats to their health.

This book builds on Transforming Medical Education for the 21st Century: Megatrends, Priorities and Change (9), which complements the findings of the global Lancet Commission report on transforming education for health professionals (10). The Commission report has been a catalyst—not unlike the groundbreaking Abraham Flexner medical education report in 1910 (11)—for stimulating efforts to advance the education and training of health professionals worldwide. Most recently, The Lancet report contributed to the WHO guidelines for transforming and scaling up the education of health professionals (12).

With its focus on public/population/global health, the book draws on current literature as well as the knowledge and experience of experts from around the world. It has seven broad aims:

- To raise awareness about and inform the discussion on contemporary challenges related to population health and well-being
- To suggest ways of tackling some of the unprecedented global health issues
- To assist in positioning public health globally “as a force for social change” (13) and a catalyst for the development of a new “worldview”
- To share insights from individuals and practitioners across the globe in terms of health concerns or priorities and strategies for responding to these now and in the years ahead
- To advocate better understanding of the complex interdependence of natural, socioeconomic, and political systems at local, national, regional, and global levels

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• To help transform public and global health education and learning in line with changing societal needs through the application of innovative pedagogical approaches and the provision of contemporary research tools and learning resources (see online ancillary materials “Public Health Research Tools and Learning Resources” and “Educational Objectives”)

• To help raise awareness of and support for the implementation of the UN Sustainable Development Goals (SDGs) (2016–2030)

In the light of these aims, the book’s primary audience includes public and global health academics and students, health professionals, health services managers, and policy makers across social, economic, and political sectors from developed, developing, and underdeveloped nations and regions. It is also meant for staff involved with national and international population health and humanitarian initiatives and individuals from non-governmental and community-based organizations. Its wide-ranging content—addressing, inter alia, problems caused by “modernity,” namely the obesity epidemic, aging society, urbanization, mental health, poverty, social intolerances—could also help to inform the public at large.

Note: Online ancillary materials “Public Health Research Tools and Learning Resources” and “Educational Objectives” are available for download from www.springerpub.com/lueddeke

REFERENCES


PREFACE


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Introduction: Inspiring a New Vision

Several years ago, William Joy, American computer scientist, showed considerable foresight when he said, “if we could agree, as a species, what we wanted, where we are headed, and why, then we would make our future much less dangerous—then we might understand what we can and should relinquish” (1).

Realizing his vision seems to be even more remote today—but at the same time more urgent—when we are faced with “life threatening problems common to all of us, such as global warming, global divides (demographic, economic and social inequity) and global security” (2). In their paper, “Threats to Global Health and Opportunities for Change: A New Global Health,” Professors Ulrich Laaser and Leon Epstein insist that “these concerns are closely interconnected . . . all too often resulting in poverty and hunger, and impeding the health of entire populations.” A major step forward in this century, they contend, depends on departing “from the Old Thinking of the 20th century still concerned with diplomatic, economic and military power play and to face real challenges,” including “unchecked demographic growth, poverty, the burden of disease, and violent conflicts.”

While there is evidence globally for positive health outcomes, including progress in supporting women’s and children’s health, poverty alleviation, and HIV antiretroviral therapy (3), the present trajectory on which we are traveling is cause for concern and reflection. World Health Organization (WHO) Secretary-General Dr. Chan affirmed the fragility of life across the globe at a recent World Health Assembly in Geneva:

We are living in deeply troubled times. These are times of financial insecurity, food insecurity, job insecurity, political insecurity, a changing climate, and a degraded environment that is asked to support more than it can bear. These are times of armed conflict, hostile threats among nations, acts of terrorism and mass violence, and violence against women and children. Large numbers of people are living on edge, fearing for their lives. Insecurity and conflict mar several parts of the world, endangering the health of large populations.

In the introduction to a 75th anniversary paper on the Welch–Rose report (1915), demanding the need for training of public health workers in the United States, Professor Alfred Summer, then dean of the Johns Hopkins University School of Hygiene and Public Health (now The Bloomberg School of Public Health), observed that the report
“remains refreshingly current” (4). Moreover, he concluded that two issues remain unresolved: “the distinction between ‘maintenance of health’ and ‘cure of disease,’” while the second relates to “our widespread failure to gain understanding of (and support for) what Public Health ‘professionals’ do.”

Viewed historically, medical researchers (5) have concluded that public health was “sidelined ‘as a lower priority’” in the 20th century, as attention focused from poor living conditions and major epidemics in the 19th century (especially in the 1850s)—including outbreaks of cholera, dysentery, tuberculosis, typhoid fever, influenza, yellow fever, malaria, and smallpox—to clinical medicine” (6) and “national provision of national health insurance or national health services” (5). Although these diseases are still a matter of considerable urgency for policy makers, especially in the developing, underdeveloped, or poor nations, throughout the 20th century, in richer countries, “strategic vaccination campaigns,” antibiotics, and other antimicrobial medicines along with technological advances “virtually eliminated diseases that previously were common” (5).

Dr. Francisco Becerra, assistant director of the Pan American Health Organization/World Health Organization (PAHO/WHO), opines that achieving these aims, as was the case “in the Region of the Americas, which has poor and rich countries, and the first to achieve polio and other vaccine preventable diseases,” is “a matter of having a good strategy, political will and funds.” Furthermore, he asserts “we need to learn lessons from both positive and negative experiences and replicate those that hold the greatest potential” (7).

The overarching premise of this book is quite straightforward—although the proposed changes are not: In terms of enhancing global health and well-being, it is argued that we need to learn to think and act differently in the richer, middle-income, and poorer countries. Realizing what is at stake requires greater awareness of public health issues facing us in this century, new conceptualizations of public health and others’ roles and responsibilities, and more aligned and creative approaches to education and training (8,9), underpinned, fundamentally, by “improved global governance across all sectors” (10).

This view is reinforced in this book’s transnational epilogue on “Global Health, Governance, and Education.” The importance of intersectionality in addressing public health issues is also informed by the contributors to this book. As one example, Dr. Eliudi Eliakimu, who is with the Ministry of Health and Social Welfare in Tanzania, reminds us that much more attention must be given to taking “a human rights-based approach to global health, in particular in matters relating to security, disasters and emergencies,” and the “human impact of war and conflicts generally” (11). The crucial need for interdisciplinarity in dealing with today’s complex and increasingly uncertain health and social issues is very much at the heart of The Lancet–University of Oslo Commission on Global Governance for Health report (10), cited previously. According to Professor Ole Petter Ottersen, Rector of Oslo University, who chaired the commission, the commissioners were “overwhelmed by the need to bring into the picture expertise from so widely different arenas as law, economics, political science, and cultural and political history” (12). Moreover, “all of these disciplines,” he notes, “had to be drawn upon for us to better understand how the post-war development of
supranational governance mechanisms has failed to appropriately take into account the need for health equity.” In addition, Professor Ottersen observes, “this realization had a strong impact on our reflections upon contemporary educational systems, where the leaders of tomorrow will have to grapple with this complexity.” Above all, he says,

they will have to recognize the human face behind the graphs that measure economic development of nations—in crises and in times of austerity. They will have to identify the sad impacts on health of conflicts or irregular migration. In brief: they will have to see the full picture—the entanglement of health with policies in all other sectors. It is this coupling between social, environmental and economic sustainability that we have to bring to the fore in the post 2015 agenda. (12)

The Commission’s longer term aspiration, which resonates meaningfully with Chapter 7.0, “Toward a New Worldview,” is “an expression of a shared vision, an emerging global social norm: that the global economic system should serve a global population of healthy people in sustainable societies, within the boundaries of nature” (10).

Reaching this universal ideal in this century will not be an easy road to tread and requires, as two examples, rethinking of “social resources” and reducing global “inequalities in daily living conditions” (10). In this regard, one of the most serious challenges facing public health worldwide is responding to the threats posed by the exponential rise of noncommunicable diseases (NCDs) or conditions—for example, obesity and diabetes, cardiovascular diseases, and cancers—and chronic illnesses due to an aging population along with high consumption of sugar, fatty food, and salt. While communicable diseases are still a major problem in poor nations, NCDs are emerging as the main causes of death globally, along with unsustainable costs, estimated “over the next 20 years,” at “more than US$30 trillion, representing 48 percent of global GDP in 2010, and pushing millions of people below the poverty line” (13).

Of these, on being elected president of the World Heart Federation in 2013, Professor K. Srinath Reddy concludes:

Cardiovascular diseases are collectively the leading cause of death across the world and are increasing at an alarming rate in low- and middle-income countries. This global threat requires a global thrust to counter and contain it. Efforts are needed to protect populations from acquiring heart disease and to provide timely, effective and affordable care to individuals who have developed disease. The ambit of heart health must extend from the hub of global policy to the throb of a person’s pulse. From tobacco control to promotion of healthy diets and physical activity, national and global policies must encourage and enable people to practice healthy habits. Health services should enable risk reduction and cost-effective management of disease at all levels of health care. The World Heart Federation will catalyse these policies at the global level and assist national efforts through capacity building and collaborative research. (14)

Finding effective and sustainable responses to these health and social care concerns (“wicked” problems, as they have been called) is proving difficult as many are created by modernity or are population-based, are “highly resistant to resolution with
INTRODUCTION: INSPIRING A NEW VISION

many interdependencies and are often multi-causal in origin” (15). However, according to WHO Director-General Dr. Chan, “getting people to lead healthy lifestyles and adopt healthy behaviors faces opposition from forces that are not so friendly. Not at all” (16). For Dr. Chan, it is clear that “efforts to prevent noncommunicable diseases go against the business interests of powerful economic operators ... one of the biggest challenges facing health promotion.” In today’s world, she contends, “it is not just Big Tobacco anymore. Public health must also contend with Big Food, Big Soda, and Big Alcohol. All of these industries fear regulation, and protect themselves by using the same tactics.”

Without question, a vital dimension in moving forward with regard to global health issues lies, as both Professor Ottersen and Professor Reddy point out, with the involvement of multisectoral partners, exemplified, for example, by the Health Literacy Study-Asia (HLS-Asia) project (17).

Patterned after a similar international study, the European Health Literacy Survey (HLS-EU) (18), the project, coordinated by Professor Peter Chang, dean of the International Office of Taipei Medical University, has been carried out between 2013 and 2015 across more than 15 countries in Asia: Brunei, Cambodia, India, Indonesia, Japan, Kazakhstan, Laos, Malaysia, Myanmar, Pakistan, Singapore, South Korea, Taiwan, Thailand, and Vietnam (19).

The project aims to measure health literacy levels across Asia and to provide an overview of the health literacy status in Asia. More particularly, the study involves close collaboration between universities, research institutions and ministries across Asia. Not only will the current state of health literacy in identified countries be evaluated but the health services and healthcare deliveries will be compared. Social and cultural determinants as well as measures to enhance the health service capacities in each country will also be considered. (19)

The results will likely impact on the structure and provision of future health care services across Asia. Dr. Chan asserts that transformations in how we deliver health care services call “for nothing less than a radical change in mindset, a fundamental rethinking of the way health systems deliver services and maintain good health outcomes” (30).

This restructuring also necessitates changing societal expectations of health care delivery systems; integration and streamlining of hospital specialization and services; transferring considerably more care and resources into the community; placing more personal responsibility on individuals for their own health and wellness; and improving coordination as well as communication between health and social care support (8).

In essence, while recognizing the urgent need to tackle global health inequities through political action and strengthening global governance processes (9,10), it is also becoming apparent that there is a parallel issue that needs surfacing.

The case being put forward in this book is that governments, regulators, associations, health professionals, or practitioners need to consider making a basic paradigm shift, that is, espousing a global social norm that moves away from a disease-driven or curative model of health care (provision of a “sickness” service), largely underpinned
by 20th century biomedical assumptions about illness, to one that is population-centered, community-driven, and advocates disease or illness prevention and health promotion (provision of a “wellness” service) through the adoption of a biopsychosocial model of health (21). Interestingly, the need to transition (or return) to a more holistic care model is rooted historically in the deeper philosophies of healing and caring of individuals promoted more than 2,500 years ago by Hippocrates and other ancient Greek physicians! Although improving governance is justifiably vital across the globe, valuing, respecting, and providing for the physical, social, and emotional needs of all people must be the centerpiece of this quest.

To realize this transformation, public health professionals may need to increasingly bolster their collaboration with struggling communities and, in particular, primary care practitioners (22), ideally guided by the Adelaide Declaration and the “Health in All Policies” (HiAP) (23) approach, discussed in Chapter 5.0, to pave the way in making these core transitions in developed, emerging, and developing economies.

Considered collectively, systemic developments in public health will demand a radical reconceptualization and restructuring of professional public and clinical health education curricula (8,9). Innovations for health professions education include:

- Aligning education outcomes with the changing needs of the health/social care systems
- Evolving new models of public/clinical health education, including the integration of interprofessional learning
- Incorporating new educational and information technologies with a view to improving safety and efficiency
- Developing “the next generation of leaders and innovators in Health Professionals’ Education” (24)

These educational innovations are made all the more urgent as, according to Dr. George Thibault, president of the Josiah Macy Jr. Foundation, an organization in the United States dedicated to improving the health of the public, “we will not have enduring healthcare delivery reform without changes in the preparation of health professionals” (24).

Today in an interconnected and interdependent world, where the former “describes the nature of health threats and effects” and the latter “refers to the distribution of power, responsibility, and capacity to respond” (25), “we need a shift in awareness towards the idea of building global public goods,” or as German philosopher Immanuel Kant posited in the 18th century “man must develop this tendency towards the good” (26). This reconceptualization or reorientation “can help us reap the huge potential benefits of globalization while at the same time containing the risks and vulnerabilities that come with it. The main question is one of taking responsibility, of using our democracies to promote change” (27).

Professor John Ashton, president of the Faculty of Public Health in the United Kingdom, advises that an essential requisite for public health is “to get the values right and to build strong capacity for public health leadership to pursue a national, regional and global vision” (28,29). This vision can be augmented by incorporating the notion
of “reciprocal maintenance” allied to sustainability. In other words, fundamentally, “public health is about how well we are able to lead our lives”—that is, at all societal levels we need to “look after the things that look after us, whether that is the earth that sustains us, security, prosperity, freedom or personal relationships.”

Surely, a “global public good” that goes beyond self-interest, craving for power, or social fragmentation and is founded on “a shared commitment to health . . . as a human right based on a recognition of our common humanity” (25), deserves to be placed at the top of all transnational agendas. The survival of our planet and our species may depend on it.

Dr. Richard Horton, editor-in-chief of The Lancet, alleges that a key “determinant of sustainability is the strength of our civilizations—their solidarity and wealth, their degrees of inequality and corruption, their susceptibility to conflict, and the quality of their deliberative institutions.” In terms of ongoing discussions relating to the United Nations post-2015 Sustainable Development Goals (SDGs) agenda, he maintains that “unless we embrace and measure the full meaning of sustainability, the SDGs will fail. None of us, and certainly not our children, can afford that failure” (30).

This century may be the last that we have to rebalance or harmonize global threats and inequities, in particular addressing climate change and the unsustainability of only a fifth of the world’s population reaping the benefits of the world’s dwindling resources and basic goods—health, education, peace, and security, to name but a few.

Our key challenge is to build an enduring future, which necessitates moving away from a societal stance that conceptualizes “the world as a place made especially for humans and a place without limits: our task is to subdue and exploit the earth” to a new worldview, which is “compatible not only with our needs as human beings” but also “an outer world that is compatible with the needs of our ecosystem” (15).

The One Health philosophy—discussed later in this book—embraces the need for this fundamental shift and provides a complex and difficult path to the much-needed global transformation in thinking and acting that needs to take place in this century. In essence, the approach, according to Dr. Joann Lindenmayer, chair of the U.S. One Health Commission Board of Directors, focuses on

the shared health (the overlap) of people, animals and the environment, whether that be for prevention of control of infectious, including zoonotic disease, but also chronic disease, the built environment, antimicrobial resistance, violence/welfare, and many other areas that involve all three “healths.” (31)

“That application of the definition,” she emphasizes, “is inclusive of not only public health professionals, but also physicians, veterinarians, environmental health specialists and experts in the social sciences.”

Finally, perhaps it is through the innocent yet determined eyes of the younger generation that we may come closest to safeguarding the “strength of our civilizations” (30), including “hope and change for reconciliation” among the myriad divergent voices and cultures that inhabit our planet. This prospect was affirmed not long ago in Belfast, Northern Ireland. Here a young teenage girl, who had just won an essay
contest, spoke from the heart, not harnessed by years of conditioning, to an audience where U.S. President Obama and other G8 summit world leaders were present.

I just realised everyone is the same as me; peace is something we need to achieve in Northern Ireland . . . it is achievable and I just want to live in a society where we are safe and can be friends with everybody and there are no divisions. That’s what I want so I decided I would try to write something about that. (32)

REFERENCES

INTRODUCTION: INSPIRING A NEW VISION


Global Population Health and Well-Being in the 21st Century
A Snapshot of Public and Population Health Through the Ages

1.1 DEFINING AND CONTEXTUALIZING PUBLIC AND POPULATION HEALTH

Views on the meaning of “public health” vary considerably. Professor C. E. A. Winslow, an American bacteriologist, public health expert, and founder of the School of Public Health (1915)—and the person instrumental in establishing the School of Nursing! at Yale University—was “a seminal figure in public health, not only in his own country, the United States, but in the wider Western world” (1). In 1820, he defined “public health” as “the science and art of preventing disease, prolonging life and promoting health and efficiency through organized community effort.” While his definition has been in use for close to 200 years, it has serious limitations when applied to the concept of “health” in the modern world, discussed further in Chapter 6.0, as have the terms “public” and “population” health.

“Population health” seeks to distinguish between the “individual-level focus of traditional clinical and preventive medicine” and the improvement of “the health of an entire human population” (2). Although WHO defined “health” as “a state of complete physical, mental, and social well-being” more than 60 years ago (3), historically, “public health” focused solely on physical health and communicable diseases, particularly maternal and child health, throughout much of the 20th/21st centuries (4). Today much more attention is being paid to noncommunicable diseases and mental conditions such as depression, toxic substances, and reducing “health inequities or disparities among different population groups due to, among other factors, the social determinants of health,” highlighted in Chapter 2.0.

In addition, “the full spectrum” of population health now encompasses health care systems, traditional public health, and social policy. While “health” is being redefined, the concept of “population” is also undergoing change from “geographic communities” to global, networked, and social communities underpinned by the Internet. Although health issues have been scrutinized by well-intentioned boards, institutes, and commissions, success in responding to these through workable strategies is proving difficult.
As one example, in the report by the U.S. Board on Health Promotion and Disease Prevention/Institute of Medicine, *The Future of the Public’s Health in the 21st Century* (5), the “guiding vision of Healthy People 2010, the health agenda for the nation,” the authors make a number of recommendations. Their proposals highlight the importance of paying greater attention to multiple determinants of health, public health infrastructure, intersectoral partnerships, accountability, evidence-based practice, and communications within the public sector system. While these proposals were timely and highly commendable, the health of the U.S. population as well as that of many other societies has, arguably, deteriorated since 2003, judging by increases in noncommunicable diseases, such as obesity, diabetes mellitus type 2, and cardiovascular diseases. Their finding that “the public health workforce must have appropriate education and training to perform its role” may be particularly relevant and a factor in the status quo, especially in the light of a working hypothesis or possibility that, given funding imbalances described in Chapter 2.0, “a majority of governmental public health workers” still “have insufficient training in public health,” thereby making it difficult to ensure that “essential public health services are competently delivered” (5).

Reflecting on historical perspectives, Professor Julio Frenk, now dean of Harvard’s School of Public Health, in an earlier article (6) voiced the concern that public health was “experiencing a severe identity crisis, as well as a crisis of organization and accomplishment.” Moreover, citing an Institute of Medicine report in the late 1980s (7), he noted that public health “as a profession, as a government activity, and as a commitment of society is neither clearly defined, adequately supported, nor fully understood.” While there have been many achievements in the 20th and early 21st centuries, some outlined later in this chapter, fundamental issues relating to the “intellectual tradition”—conceptual base, production base, reproduction base, and utilisation base” (6)—of public health remain. However, perspectives on the rising importance of public health in the developed and developing worlds and its emerging roles appear to be coming into sharper focus as we journey through the uncertainties and ambiguities of this century.

Modern public health emerged in response to the conditions that resulted from industrialization and the subsequent rise in infectious diseases. However, the majority of today’s health and well-being problems and issues now originate within society, with increasing emphasis on “improving conditions where people spend their lives outside of healthcare settings” (8) and with the growing need that “public health’s broad mission of ensuring healthy communities requires interactions among a number of health-influencing actors, such as communities, businesses, the media, governmental public health, and the health delivery system” (9).

Over the past few decades, international and national bodies have refined concepts of “public health,” defined needs and strategies, evolved professional competences, established accreditation bodies, and strengthened education and training, as well as initiating research and development programs. Further details on the types of priority projects in which these—and other health organizations—are engaged are discussed in later chapters of this book.
1.2 THE NEW PUBLIC HEALTH

A continuing challenge that cuts across these organizations, and advocated at the Alma-Ata International Conference in 1978 (10), which “identified primary health care as the key to the attainment of the goal of Health for All,” relates to strengthening intersectoral and multidimensional approaches to health and socioeconomic development. In retrospect, it seems regrettable that a number of governments, agencies, and individuals felt that Alma-Ata’s declaration of primary health care and the goal of “Health for All in the Year 2000” were “unrealistic” and “unattainable.” Those who opposed implementation of the declaration were able to argue successfully that the focus should be “on achieving tangible results instead of promoting change” (11). An alternative plan involved “reducing Alma-Ata’s idealism to a practical set of technical interventions that could be implemented and measured more easily, focusing on an alternative concept to that articulated at Alma-Ata—‘Selective Primary Health Care’—which was built on the notion of pragmatic, low-cost interventions that were limited in scope and easy to monitor and evaluate.” Backed by the United Nations Children’s Fund (UNICEF), Selective Primary Health Care “was soon operationalized under the acronym GOBI (Growth monitoring to fight malnutrition in children, Oral rehydration techniques to defeat diarrheal diseases, Breastfeeding to protect children, and Immunizations),” (11) and, while very important, there was a missed opportunity to do “much more for many more,” the driving spirit of the new public health (NPH).

Despite this setback, Professors Judith Green and Ron Labonté, recognizing the need for a broader, multidimensional or socioecological view of health, observe in their book, Critical Perspectives in Public Health (12), that “by the 1980s public health was already branding itself as the new public health in the UK and elsewhere.” As one example, they reference the work of Professors John Ashton and Howard Seymour, who were “calling for a turn towards the social and economic ‘upstream’ determinants of health, and away from the dominance of therapeutic, curative medicine” (13). Similarly, in Australia, they mention the efforts of Professor Fran Baum (14), whose renewed “concern for the social determinants of health as well as social justice, healthy public policy” along with “a globalizing vision that took account of international inequalities,” informed the WHO Ottawa Charter for Health Promotion (15). The charter, inter alia, addressed “health as a goal for which disease reduction was simply just one of the many means of achievement.” Other fundamental conditions and resources for health identified in the charter included peace, shelter, education, food, income, a stable ecosystem, sustainable resources, social justice, and equity.

With a view to revitalizing and contextualizing public health within the larger health community in the 1990s, Julio Frenk, then working for the National Institute of Public Health in Mexico and Harvard University’s Center for Population Studies, succinctly summarized the fundamentals governing the NPH (6):

The modern conception of public health goes beyond fragmentary dichotomies, such as personal versus environmental services, preventive versus curative activities, and public versus private responsibilities. Instead of lending itself to these dichotomies, the new public health addresses the systematic efforts to identify health needs and organize...
comprehensive services with a well defined population base. It thus encompasses the information required for characterizing the conditions of the population and the mobilization of resources necessary for responding to such conditions. In this sense, the essence of public health is the health of the public.

Therefore, it includes “the organization of personnel and facilities to provide all health services required for the promotion of health, prevention of disease, diagnosis and treatment of illness, and physical, social and vocational rehabilitation” (16). Public health encompasses the more narrow concept of medical care, but not in its technical and interpersonal aspects as applied to individuals in clinical situations, but rather in its organizational dimension as related to well-defined groups of providers and users.

In the last few years, many factors have contributed to setting the stage for accelerating change in health care generally, and public health in particular, especially the urgent need to focus on the prevention of disease, “the pillar of public health’s work” (17). Issues that have come to the fore and are endangering national budgets, discussed further in Chapter 2.0, include the rapid rise of noncommunicable diseases, the urgent need for community (vs. hospital-dominated) interventions, a shrinking workforce, inadequate investment in health education and information technology, and the need to think more globally in terms of health inequities and the social determinants of health (18).

To pave the way, there appears to be growing understanding that “disease prevention and the organization of personal care services,” as Professor Frenk emphasizes, are “interlinked and interdependent with health promotion and social conditions” and that public health has to widen its scope to address “such contemporary health issues as are concerned with equitable access to health services, the environment, political governance and social and economic development” (19). This theme also underpins the position paper of the Association of Schools of Public Health (ASPHER) in response to the new European health policy, Health 2020 (20). Author Dr. Anders Foldspang and ASPHER director Robert Otok hold that “individually-oriented health work also constitutes part of the public health toolbox. As do, for example, health promotion mass campaigns, disease and disaster prevention, urban planning, management and financing of health systems, etc.” (20).

Indeed, the charge that “public health, as practice and academic endeavour, has traditionally been at the margins of both health policy and the academy, and the public health movement has had to position itself throughout its history as both new and radical” (12) requires reconsideration, as its place in society now needs to be seen as central to enabling current and future population health and well-being.

Radical changes are needed globally in the light of evidence that calls for not only rebalancing of infrastructure but also, and more importantly, reducing inequities and inequalities at population levels.

An important NPH attribute is that it is action oriented, and as physicians Theodore Tulchinsky and Elena Varavikova observe in their seminal article (19), one of NPH’s key challenges is “with finding a blueprint to address many of the burning issues of our time, but also with identifying implementable strategies in the endeavour to solve these problems” and that “responsibility and accountability” rest not only with governments “but also involves self care by the individual and the community.”
1.0 A SNAPSHOT OF PUBLIC AND POPULATION HEALTH THROUGH THE AGES

This global reorientation in public health, say the authors, may be particularly problematic “in many countries that have placed priority of funding on hospitals and tertiary care, while health needs and primary care remain weak and underfunded.” This schism has been further eroded through “the longstanding separation in administrative, funding, and training between public health and personal healthcare [which] has hindered development of effective personal care and population health.” This gap also “has both day-to-day and long-term consequences” as “managers and public health professionals need to have a common cultural orientation, language, and base of learnin” (19).

In the last century, public health as well as health and social care generally have moved on considerably, particularly in the richer nations, and it may be useful to look back how far we have actually traveled, reminded by Winston Churchill’s insight that “the farther backward you can look, the farther forward you can see.” It is with his reflection in mind that the following “snapshot” of the sociohistorical record in medicine and health care was written.

1.3 HISTORICAL DIMENSIONS OF PUBLIC HEALTH: A SYNOPSIS

Early Medicine to Medicine in the 1700s

Viewed historically, public and individual health were interdependent as “early medicine in China, Ayurvedic medicine in India (400 BCE), Hippocrates in Greece (460–377 BCE), and Galen (129–199 CE) in Rome” shared the belief that “season, diet, the winds and lifestyle for individual people’s health” influenced personal health and quality of life (21).

Hippocrates, known as “the father of medicine” and, according to some, “the first epidemiologist” is also credited with “the idea of collecting and analyzing data.” Believing “that diseases were caused naturally and not because of superstition and gods,” he concluded that “disease was a consequence of local conditions, which had to be favorable for a particular disease to occur,” thereby establishing “the concept of collecting data on place, natural environment and people for determination of illness” (22).

Moreover, Hippocrates began to define “illnesses as acute (short duration) or chronic (long lasting),” and coined the terms “endemic” (for diseases usually found in some places but not in others; steady state) and “epidemic” (for diseases that are seen at some times but not others; abrupt change in incidence).

His book, On Airs, Waters, and Places (23,24)—written more than 2,500 years ago!—reflects his meticulous attention to detail in diagnosing health conditions of his day:

The men are subject to attacks of dysentery, diarrhea, hepialus, chronic fevers in winter, of epinyctis, frequently, and of hemorrhoids about the anus. Pleurisies, peripneumonies, ardent fevers, and whatever diseases are reckoned acute, do not often occur, for such diseases are not apt to prevail where the bowels are loose. Ophthalmies occur of a humid character, but not of a serious nature, and of short duration, unless they attack epidemically from the change of the seasons. And when they pass their fiftieth year, defluxions supervening from the brain, render them paralytic when exposed suddenly to strokes of the sun, or to cold. These diseases are endemic to them, and, moreover, if any epidemic disease connected with the change of the seasons, prevail, they are also liable to it. (24)
During the so-called Dark Ages (ca. 500 CE–1000 CE), medicine advanced very little in Europe and actually took a backward step (25–27), unlike in the Arab world, as one example, where individuals such as the Persian Avicenna (Ibn Sina) (980–1037), sometimes called the “Father of Modern Medicine,” wrote the 14-volume *The Canon of Medicine.*

While detailed diagnoses were done in ancient Egypt (ca. 2600 BCE–332 BCE), Greece (ca. 500 BCE–300 CE), and Rome (ca. 146 BCE–374 CE), effective treatments for most diseases or illnesses were nonexistent, even after about 3,000 years of medical practice and public health interventions, including improved sanitation practiced by the Romans. It is not surprising then that nothing could be done to counter the effects of the first major global pandemic, likely originating from China: the Bubonic Plague, also known as “The Plague of Justinian.” The plague occurred in the 6th and 7th centuries, killing as many as 40% of the population of Constantinople, capital of the Eastern Roman Empire (Byzantine Empire), and spread to central and south Asia, North Africa, and Arabia, wiping out half of Europe’s population, including as far north as Denmark and Ireland (25–27).

A recurrence of the Bubonic Plague, or Black Death, was caused and spread by a bacillus—*Yersinia pestis*—carried in the guts of fleas on black rats or other rodents. One of the most devastating viral pandemics in human history, the disease ravaged Europe from 1348 to 1350 and reinforced the limitations or futility of public health interventions, as doctors simply wore bird masks to protect themselves from the disease.

The outbreak has shattered communities. Families have been set against each other—the well rejecting the sick. Essential services have collapsed; law and order, with so many administrators struck down, barely exist in some areas. A sense of panic pervades Europe and everyone, it appears, is struggling only for his own survival. Properties stand empty, deserted by desperate owners; the sick die alone, for even the most devoted doctors cannot save them: corpses are simply dumped in the street or buried in mass graves. Some depraved creatures, themselves already infected, break into houses and threaten to contaminate all within unless bribed to leave. Agriculture is at a standstill. Crops wither in the fields; cattle wander untended. Doctors do what they can, but the plague seems irresistible. Even the most expert physicians can do little more than help strengthen people’s resolve and build morale. (28)

Black Death—so-called because “symptoms produced a blackening of the skin around the swellings”—killed about 200 million people in Europe and may have reduced the world population from an estimated 450 million down to 250 to 275 million by the year 1400. Major social and economic changes followed, with “higher value being placed on labour. In England the Peasants Revolt followed in 1381. Farming changed and the wool industry boomed. People became disillusioned with the church and its power and influence went into decline. This ultimately resulted in the English reformation.” (25).

The Middle Ages (ca. 1000–1450 CE) witnessed a shift from Greek and Roman values regarding personal hygiene and physical fitness. As medicine was dominated by religion—cure the soul, not the body—the physical body became much less important.
than religion (25–27). The Renaissance (ca. 1450–1650) was essentially a rebirth of Greek and Roman ideas and a time when physicians became medical humanists, beginning to rely increasingly on “curiosity and invention,” epitomized by Leonardo da Vinci (1452–1519; 25–27).

In his book *Natural and Political Observations Made Upon the Bills of Mortality* (1662), John Graunt (1620–1674), an amateur scientist living in London, was the first to “quantify the patterns of disease and to understand that numerical data on a population could be used to study the cause of disease.” Graunt was also “the first to estimate the population of London and to count the number of deaths from specific causes,” an idea first formulated by Girolamo Fracastoro (1478–1553), an Italian doctor, who proposed that “very small, unseeable, particles that cause disease were alive,” contradicting Galen’s miasma theory. However, it took another 300 years or so before Fracastoro’s theory could be confirmed, and at least 200 years from the 16th century before Edward Jenner, an English scientist, developed the first vaccine against smallpox, using the much less virulent cowpox virus (25–27).

**Medicine From the 1800s to the Present Day**

In the 1800s, North American and European countries were characterized by rapid industrialization, urbanization, and unsanitary living conditions; this period was similar to the situation in many developing nations today, such as those known as the BRICS countries—Brazil, Russia, India, China, and South Africa. Collectively, these developments led to the establishment of public health departments, the “great sanitary awakening” (29,30) on both continents, and “a move toward humanitarian ideals.” The roots for public health were firmly established when policy makers began to make a connection between poverty and disease, water supply and sewage removal, and monitoring “community health status.”

In her retrospective on the Welch-Rose report, Professor Fee at Johns Hopkins University gave a particularly clear portrayal of life in the United States at this time before sanitation measures were introduced (31).

The population moving from the land to the rapidly growing cities competed for living space with the flow of immigrants from western, southern, and eastern Europe; families crowded into tenement housing, back alleys, and damp basement apartments, supplied with communal privies and polluted water sources. City streets were heaped with garbage, including dead and decaying animals, and the waste products of small manufactories; factories produced their own noise, smells, smoke, and industrial wastes to add to the dirt and confusion of the new industrial order. Children died young of diarrheal and respiratory diseases, diphtheria, whooping cough, smallpox, and typhoid fever. Tuberculosis and other infectious diseases killed young adults and further impoverished families already struggling for survival. City health departments, especially in the eastern port cities, faced overwhelming social and health problems.

Jacob Riis, who emigrated to the United States from Denmark in 1870, wrote *How the Other Half Lives* (1890), providing “a factual, first-hand account of poverty in 19th century New York” (32). It is difficult to imagine but, as he noted, “There are
numerous examples of tenement-houses in which are lodged several hundred people that have a pro rata allotment of ground area scarcely equivalent to two square yards upon the city lot.” It was estimated that “the tenement houses in East Side Manhattan were once the most densely populated district in the world, not excluding China,” as they were “packed at the rate of 290,000 to the square mile.” In these crowded conditions, diseases such as “Cholera, Typhus fever, and Smallpox” were rampant with “scores of children dying before their 5th birthday.”

The New York Bureau of Vital Statistics commented that solely due to “suffocation in the foul air of an unventilated apartment . . . there are annually cut off from the population by disease and death enough humans to people a city, and enough human labour to sustain it.” The stifling air in the warmest of months was the cause of many cases of suffocation and ill health, particularly among young children. Riis’s work in public health, which led to the birth of the Board of Health and other reforms, not only demonstrates “the importance of awareness” but also “shows how we each have a moral obligation to recognize the plight of the poor and that real lasting change is achievable.”

As a nation that was quickly becoming industrialized, Britain suffered along similar lines as “in the 1830s and 1840s three contagious diseases had swept across the country: from 1831 to 1833 there were two influenza epidemics, and the first-ever outbreak of cholera in Britain, which alone killed 52,000; from 1836 to 1842 there were epidemics of influenza, typhus, typhoid, and cholera again, especially Asiatic cholera which spread quickly among the waterways.” An inspection in 1849 of London houses found that “up to one third of the houses had major hygiene problems,” many stemming from contaminated water from the Thames (33).

Roy Porter, in his seminal book The Greatest Benefit to Mankind (25), paints a vivid picture of industrial life in Britain, which echoes the squalor in the United States in the 19th century.

For millions, entire lives—albeit often very short ones—were passed in new industrial cities of dreadful night with an all too typical socio-pathology: foul housing, often in flooded cellars, gross overcrowding, atmospheric and water-supply pollution, overflowing cesspools, contaminated pumps; poverty, hunger, fatigue and abjection everywhere. Such conditions, comparable to today’s Third World shanty towns or refugee camps, bred rampant sickness of every kind. Appalling neo-natal, infant and child mortality accompanied the abomination of child labour in mines and factories; life expectations were exceedingly low—often under twenty years among the working classes—and everywhere sickness precipitated family breakdown, pauperisation and social crisis. The squalor of the slums was exposed time and again by social reformers, novelists, newsmen, and clergymen appalled to find hell at the heart of civilization.

In 1849, an important contribution was made by Dr. John Snow (1813–1858), an anesthesiologist and recognized by many as the “Father of Modern Epidemiology” (34). Seeking to find the cause of cholera outbreaks, “he mapped cholera cases in London and identified the source of the outbreak as the public water pump on Broad Street (now Broadwick Street).” Using a dot map, he illustrated the cluster of cholera cases around the pump. His account “is a good illustration of collection, analysis, interpretation, and dissemination of data leading to public health intervention.”
On proceeding to the spot, I found that nearly all the deaths had taken place within a short distance of the [Broad Street] pump. There were only ten deaths in houses situated decidedly nearer to another street-pump. In five of these cases the families of the deceased persons informed me that they always sent to the pump in Broad Street, as they preferred the water to that of the pumps which were nearer. In three other cases, the deceased were children who went to school near the pump in Broad Street. . . . With regard to the deaths occurring in the locality belonging to the pump, there were 61 instances in which I was informed that the deceased persons used to drink the pump water from Broad Street, either constantly or occasionally. The result of the inquiry, then, is that there has been no particular outbreak or prevalence of cholera in this part of London except among the persons who were in the habit of drinking the water of the above-mentioned pump well.

I had an interview with the Board of Guardians of St James’s parish, on the evening of Thursday, 7th September, and represented the above circumstances to them. In consequence of what I said, the handle of the pump was removed on the following day. (34)

In both North America and Europe, generally “it was recognised early on that poor sanitation was at the heart of disease transmission, long before it was known why.” Edwin Chadwick’s *Inquiry Into the Sanitary Conditions of the Labouring Population of Great Britain* (1842) and, a few years later, Lemuel Shattuck’s *Report of the Sanitary Commission of Massachusetts* (1850) represented major milestones in detailing how filth contributed to the spread of disease, thereby informing directions and policies set by boards of health (25–27).

Although it became evident that poor sanitation and hygiene were at the root of many illnesses, more progress in identifying the causes of diseases was being made on the continent; as one example, in 1847, the Prussian province of Silesia was struck by a typhoid epidemic (35). Recognizing the seriousness of the problem, the Minister of Education appointed Rudolf Virchow (1821–1902), a cellular pathologist, aged 26, to investigate. But rather than poring over statistical information, Virchow decided to live with miners and their families over a 3-week period.

In his paper “*Report on the Typhus Epidemic in Upper Silesia*” (36), which “has since become a classical work in social medicine” (12), he named typhoid, dysentery, measles, and tuberculosis “artificial” as “their prevalence was due to poor housing, working conditions, diet and a lack of sanitation among the coal miners” (36). For Virchow, what needed to be done was obvious: “we must begin to promote the advancement of the entire population and to stimulate general common effort. A population will never achieve full education, freedom and prosperity as a gift from the outside” (36).

Other short-term measures he wanted to introduce included forming “a committee of lay people and professionals to monitor the spread of typhoid and other diseases and organise agricultural cooperatives to ensure people had sufficient food to eat” (37). But, “his long-term solutions were more radical—improved occupational health and safety, better wages, decreased working hours, and strong regional and local government.” Further, he “argued for progressive tax reform, removing the burden from the working poor and placing it on the ‘plutocracy, which drew large amounts from the Upper Silesian mines, [and] did not recognise the Upper Silesians as human beings, but only as tools’” (37). Moreover, “he advocated democratic forms of industrial development, and even suggested hiring temporarily unemployed miners to build roadways, making it easier to transport fresh produce during the winter.”
In the end, going beyond government expectations in criticizing “the economics of industrial capitalism” cost him his job. Later collaborating with Salomon Neumann (1819–1908; 38), a physician to the poor and statistician, they advanced “the notion that the aetiology of many diseases has a social component.” This deduction was a master stroke in German public health, in particular the idea that “major improvements to the health of the public could only be made if housing, sanitary, and working conditions were improved for the majority of the population” (36). Based on his successful career as “anthropologist, pathologist, prehistorian, biologist, writer, editor, and politician, and known for his advancement of public health,” Virchow is regarded as one of the most influential physicians in the 19th century.

Across the Channel in the 1860s, due to increasing awareness that contaminated water in London caused many to become ill, “the first great metropolitan sewage system was begun, with huge pipes to carry away the city’s effluent in embankments all along the Thames, treatment plants and outfall sewers”; this project was completed in the 1870s. The last big epidemic was in 1866, although “France did not pass laws for main-drainage system for another fifty years,” and both Dresden and Hamburg suffered typhoid and cholera outbreaks in the 1890s (34).

Arguably the greatest figure in medical microbiology, the French chemist and microbiologist Louis Pasteur (1822–1895) confirmed in 1862 that germs rather than miasma theory (bad air) caused many diseases (25–27). In 1883, Robert Koch (1843–1910), a German doctor considered the founder of modern bacteriology, identified the vibrio that causes cholera and discovered the tuberculosis bacterium. Whereas Koch advocated public health interventions, Pasteur’s approach favored the development of vaccines and set the stage for “the biomedical model of disease” that has dominated medical thinking and “the microbiological revolution” ever since.

In short, “this model focuses on pathological processes, and on understanding, diagnosing, and treating the physical and biological aspects of disease. The goal of treatment is to restore the patient’s physiological integrity and function” (38). The germ theory made it possible to “differentiate between diseases that had previously been thought of as one, and diagnosis improved: diphtheria could now be told apart from scarlet fever or croup, syphilis from gonorrhea, typhoid from typhus . . . but once the patient’s illness was defined the lack of cure was still an insuperable problem” (34).

For many in the 19th century living in confined and unsanitary environments, “the best solution to illness was to prevent” (34). In the more advanced nations, such as Britain and Germany, there was growing consensus “on how this was to be done: a child should lead an orderly, well-regulated daily life, simple in every element.”

However, although these aspirations were commendable, the treatment of most conditions—many imagined (34)—was mostly more risky than the problem in the first place. Unable to distinguish between cause and effect of an illness, the public often made assumptions that actually made situations worse rather than better. As one example, when babies fretted before their new teeth began to grow, worried parents decided that “milk no longer agrees with the child,” so they stopped the milk and instead fed the infants unsuitable food, upsetting “their digestion” and giving “drugs, most of which contained opium, and, not unnaturally, the babies died in convulsions” (34).
As the latter case demonstrates, health care support was equally deficient well into the 19th century. Nursing was about to change, however, largely due to the dedication of Florence Nightingale (1820–1910), who became known for her efforts—along with 30 other nurses—in caring for troops in the Crimean War in the 1850s (39). She is often referred to as the “Lady With the Lamp,” and has been called the Founder of Modern Nursing, who, to her credit and influence, was also a “compassionate statistician.”

The thinking and interventions—along with medicine generally and the concept and practices of public health specifically—evolved very slowly over the centuries. Perhaps, unsurprisingly, it was not until the early to mid-20th century, with foundations laid in the period between 1750 and 1830, that progress of any significance was made in areas such as sanitation across Europe and North America. Germany, which, as mentioned, pursued the notion of “social medicine triggered to a large extent by the typhus epidemic in Upper Silesia” (37), also became the first nation to establish some form of universal health care and social insurance (later national insurance) in 1883 (40).

Two main reasons for these social reforms in Europe in the late 19th and early 20th centuries were “income stabilization and protection against the wage loss of sickness rather than payment for medical expenses, which came later.” Another factor for introducing these programs was their potential in “buying political allegiance of the workers” (40).

Another breakthrough in medical research was the discovery by Paul Ehrlich (1854–1915) of the first antibiotic or first antibacterial drug in modern medicine, salvarsan, “arsenic compound 606,” to treat syphilis. Ehrlich also coined the term “magic bullet” in 1909 (25–27). In 1935, the drug prontosil, the first of the sulfa drugs to treat streptococcal infections (e.g., puerperal fever), was discovered. As many infections resisted sulfa drugs, penicillin, a substance from living mold, came into wider use, followed in 1948 by tetracycline, which proved effective for most infections (25–27).

At the turn of the 20th century, all that doctors could bring on home visits was “a good bedside manner and a dose of something soothing (or even nasty),” thereby reassuring “the patient that something was being done, that the disease was not being ignored” (41). Indeed, a typical physician’s bag was usually full of narcotics, angesics, and antipyretics—cocaine hydrochlorate, a sedative sleeping potion, strychnine nitrate, morphine sulfate, quinine, nitroglycerine, digitalis, and prescriptive whiskey. In addition, his bag contained instruments such as a stethoscope, forceps, sutures, needles, bandages, and knives, to name several (25–27).

Before the end of the 19th century, medicines were concocted with a mixture of empiricism and prayer. Trial and error, inherited lore, or mystical theories were the basis of the world’s pharmacopoeias. The technology of making drugs was crude at best: Tinctures, poultices, soups, and teas were made with water- or alcohol-based extracts of freshly ground or dried herbs or animal products such as bone, fat, or even pearls, and sometimes from minerals best left in the ground—mercury among the favored. The difference between a poison and a medicine was a hazy differentiation at best: In the 16th century, Paracelsus declared that the only difference between a medicine and a poison was in the dose. All medicines were toxic. It was cure or kill. (42)
Taken together, these interventions were usually dangerous, “yielding little or no results and often killing the patient with a different affliction than the original ailment” (42). Common practices well into the 19th century included “leeching (or blood-letting), purgation, poor liquid diets, and cold water dousing.” It seems curious that “even after newer, more effective methods of medical treatment had been introduced, many of the physicians, surgeons, and apothecaries hesitated to use them. Fearing the loss of their reputations, they hung on to superstitious beliefs, doubting the effectiveness of such advances, and were basically unwilling to try something new” (42).

Professor David Wootton in Bad Medicine: Doctors Doing Harm Since Hippocrates comments, “To ask why doctors didn’t do better makes little sense,” as “they did what they did in a world that was not of their making.” On the other hand, he argues that “it makes perfect sense to ask why doctors for centuries imagined that their therapies worked when they didn’t” (42).

1.4 THE WELCH-ROSE REPORT (1915)

Unlike European and Asian countries, organized public health was nonexistent in the United States for much of the 19th century. However, “increasing urbanization . . . and the growth of mechanization and factories, with their attendant health and safety risks” made the need for improving public health a high priority, especially “in the absence of good sanitation practices” (43).

At the beginning of the 20th century, American physicians preferred the German approach to public health and were drawn to Robert Koch’s bacteriology, which essentially became “the foundation of modern medicine” (25–27). The scientific basis of public health was also embraced by Professor William Welch, a pathologist, who had been named the first dean of Johns Hopkins medical school in 1883. In 1915, Professor Welch and Wickliffe Rose, an original trustee of the Rockefeller Foundation, published the Welch-Rose report (32) “that outlined a system of public health education in the US, initially targeted at control of infectious diseases—a system that was university-based, research intensive and independent of medical schools.” It must be said, however, that Rose favored practical public health training, after the British model, and the establishment of a “national system of public health training with central national schools acting as the focus for a network of state schools.”

In 1916, Welch became the first dean of America’s first public health school. Other schools of public health quickly followed—Harvard, Columbia, and Michigan, to name a few.

The report had far-reaching consequences: First, it raised awareness about the urgency of more coordinated public health interventions and in many ways paralleled “the Flexner Report that had proposed a systematic approach to medical education in the wake of concerns about proliferating numbers of medical schools of dubious quality” (44). Second, it has been viewed as “legitimizing the rift between medicine’s laboratory investigations of the mechanics of disease and public health’s non-clinical concern with environmental and social influences on health and wellness” (44). Third, while both models have made substantial contributions on many fronts and coexist globally today, they seem to be equally stymied when it comes to addressing many of today’s population health problems (45).
1.5 MILESTONES IN THE 20TH AND EARLY 21ST CENTURIES

In their book, *Milestones in Public Health: Accomplishments in Public Health Over the Last 100 Years* (46), the authors, supported by expert reviewers, identified, as summarized in Box 1.1, 10 milestones in public health. The list is similar to one produced by The U.S. Centers for Disease Control and Prevention (CDC) produced a similar list (47) but added family planning, fluoridation of drinking water, and tobacco as a health hazard. A subsequent CDC report (48) for 2000 to 2010 included many of the same categories but added prevention of childhood lead poisoning, improved public health preparedness and response, and sanitation.

Similarly, the *British Medical Journal (BMJ)* published a commemorative supplementary edition on the occasion of its first publication in 1840 (49). Out of 70 submissions, 15 made it to the final list, compiled by a panel of editors and advisers “to stir debate and elicit reflection.” The final listing (Box 1.2) was grouped under 11 headings.

“More than 11,300 readers of the BMJ chose the introduction of clean water and sewage disposal—‘the sanitary revolution’—as the most important medical milestone.” Antibiotics came a close second (50).

Dr. Jeffrey Koplan, director of the Emory Global Health Institute, who contributed extensively to the supplementary *BMJ* edition, observed: “One common feature of all these milestones is that their existence and significance were likely unforeseen when the *BMJ* was established in 1840, but they have all had a major effect on the length and quality of life” (49).

Also of note is that all milestones in Boxes 1.1 and 1.2 are attributable to advances in public health. However, most achievements focus on the physical state of individuals, not on the inner self—emotions, personal well-being, or milestones in addressing mental disorders such as anxiety or depression, aside from the use of chlorpromazine to treat various psychoses.

This is what makes the achievements listed by the Canadian Public Health Association in 2010 unique (51). While supporting nine of the CDC milestones, two additional “population-centered” milestones were recognized in Canada: “acting on

**Box 1.1**

**Milestones in Public Health (United States)**

- Vaccines and the eradication of smallpox
- Automotive safety
- Environmental health
- Infectious disease control
- Cancer
- Cardiovascular disease
- Safer and healthier foods
- Advances in maternal and child health
- Oral health
- Addictions

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the social determinants of health” and the development of “universal programs for income maintenance, social welfare services and health care services.”

Weighing the “relative contributions of biomedical science and public health,” Dr. Koplan concedes that while “biomedical science has won more Nobel prizes, public health has had a greater role in reducing morbidity and mortality and improving our quality of life.” “Of course, each approach contributes to the other,” he concedes (49).

However, future breakthroughs will not come easily. Dr. Fiona Godlee, editor-in-chief of the BMJ and the commemorative supplementary edition, reminds us about today’s economic realities (49), while a research study on the art and science of healing admonishes the imbalances that currently exist between the two.

Dr. Godlee highlights that scientific discoveries rely on expensive “infrastructure that supports applied as well as basic research, encourages the systematic implementation of what we already know, nurtures young talent by creating career structures in research, and encourages commercial investment while protecting against the erosive influence of vested interest.” At a time of severe austerity, finding funds to sustain costly large-scale research trials will come under considerable pressure.

Second, while clinicians and scientists have made significant contributions in the 20th century, such as systems biology and evidence-based medicine, progress has come at a steep price: “a growing imbalance between the art and science of healing as greater reliance is being given to the technical side of medicine rather than human intervention” (52).

A study by the authors of the monograph 21st Century Medicine: A New Model for Medical Education and Practice found that “clinicians are no longer taught how to integrate the science and the art of medicine—indeed, the art of medicine has all but disappeared as a subject of teaching” (52). Further, the researchers conclude, “From the evidence-based medicine perspective, all you really need to do is gather data, focus

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<td>• Therapy—Chlorpromazine</td>
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the data toward securing the diagnosis, and then research the evidence about the best molecule (Rx) or procedure to treat that diagnosis.”

This scientific reductionist approach—the “acute care model”—to population health runs counter to the types of health services most people actually do require in the early decades of this century: not “technicians, who are able to deliver care in less and less time (often for less and less money)” but professionals who make the overall well-being of the individual their first concern and who recognize “the opportunity to better impact the all-important social determinants of health” (46).

REFERENCES


