Washington Public Health

Message from the Dean

The past year has been exciting, challenging, and busy for the School of Public Health. Last fall, during my first year as dean, we embarked on a strategic planning process, appropriately timed to coincide with the thirtieth anniversary of our school and the new millennium. The development of our strategic plan has been a bottoms-up initiative starting with input from our faculty, staff, and students, and also, importantly, from the public health community in Washington State. We sought to determine how our school can best represent academic public health within the state and the Northwest region, and also nationally and internationally.

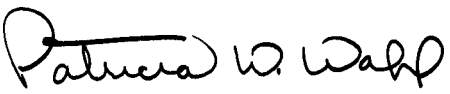
As part of the strategic planning effort, but also to educate myself as the new dean with a background in academia and research, I visited local public health jurisdictions throughout Washington. Mark Oberle, associate dean for public health practice, and occasionally faculty and students, have joined me on some of these visits. I have learned much about the "real world of public health" — the organizational structure of each jurisdiction and the varied health problems each faces. Equally important is the inspiring experience of meeting the dedicated people who daily confront and solve the many challenging public health problems in our state.

In addition, we have been meeting with Mary Selecky and others at the state Department of Health to determine how we can assist Mary with her goals for workforce development throughout Washington. I've also met with many local health care delivery organizations to discuss the current difficult issues within the U.S. health care system.

In my conversations with our public health partners I have sought to learn about the educational needs of their staff, and to determine the knowledge base essential for our students to meet future workforce needs. Our graduates have long been known for their strong technical skills. Additional skills desired by many employers focus on community organization, communication, and a broader view of all public health disciplines. As a result, our school is now planning to develop a new practice-based Master of Public Health option that will provide a more integrated view of the field.

Strategic planning is a dynamic process and as Mark and I visit additional health jurisdictions, we will learn more. I am pleased to have had the opportunity to meet many of you this past year and look forward to meeting others in the coming year. To everyone who has contributed to the development of our strategic plan — thank you. Your comments and suggestions are always welcome.

This issue of *Washington Public Health* highlights the numerous significant trends influencing diverse public health disciplines at the beginning of this new decade and century. Aaron Katz, the magazine's new editor, brings special skills to this task from his experience with the Health Policy Analysis Program. He is already planning new and exciting directions for the publication. As always, we seek your input and suggestions for articles as this is a shared publication for everyone working in the public health field.



Patricia W. Wahl, Dean
UW School of Public Health and Community Medicine

Washington Public Health

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Message from the Editors

We're past the anticipations, celebrations, and the hype about January 1, 2000 and are settling into our lives as citizens of the twenty-first century. Now seems a good time for a considered look at the trends and forces that will shape the course of the public's health and public health work in this first decade of the new century.

This issue of *Washington Public Health* addresses such fundamental social forces as economics, politics, and demographics. It ranges into the revolutionary trends whose impacts challenge the imagination: sequencing of the human genome, globalization of economies and societies, the explosion of information technology. It looks at the downside issues at the turn of the century — the market turmoil tearing at the health care system, concerns over continuing environmental degradation, and the lamentable need to prepare for potential acts of bioterrorism. It also examines the upside gains in scientific knowledge that are deepening understanding of infectious causes of some chronic diseases. And to close the issue, several articles focus on collaborative programs that are assisting public health organizations move forward to more effectively meet the challenges shaping our field at the beginning of the twenty-first century.

As Dean Pat Wahl notes in her introductory message, the 2000 calendar transitions also coincide with the School of Public Health's strategic planning initiative.This process calls attention to new opportunities for outreach, training, service, and research in the Northwest region and beyond, building on the School's strong base in Washington State.

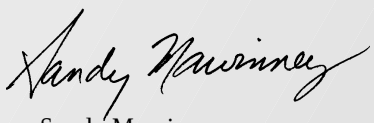
As part of that vision, *Washington Public Health* will reach out to encompass the challenges and accomplishments of public health practice throughout the region, including the states of Alaska, Idaho, Montana, Oregon, and Wyoming. The publication has been a mainstay in the evolving relationships between academia and the practice community, with an editorial board of representatives from both the School and the Washington State Department of Health (see left column). We intend to build on the high professional standards they have set for the publication as we transform the board into a regional body that is integral to the School's strategic efforts.

So what can you expect from this publication in the near future? First, we will be recruiting members for a new editorial board that represents the diversity of the Northwest region. Second, we will rename the journal to reflect the regional focus — our working title is *Northwest Public Health.* We intend to publish two issues annually, the first in spring 2001.

What do we need from you? We need your comments about the new vision and what you would like this publication to do for you. We welcome suggestions for a new name and recommendations for editorial board members. Contact Aaron at 206-616-5227 / garlyk@u.washington.edu or Sandy at 206-329-9494 / sandymar@u.washington.edu.

We hope you enjoy this final issue under the banner of *Washington Public Health* and we look forward to introducing you to the new journal in 2001.

Aaron Katz, *Editor*
Director, UW Health Policy Analysis Program



Sandy Marvinney
Managing Editor

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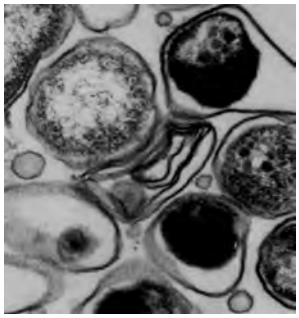

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Message from the Secretary Washington State Department of Health

Given all that public health does, it's often hard to keep up with the present, let alone plan for the future. But it's important to think about what lies ahead and be prepared. I want to address six challenges I believe will have a significant impact on our work in this century, and share with you how the state Department of Health is getting ready to meet them head on.

1. Our growing, aging population — In the past 10 years, Washington State's population has grown by more than one million. There will be 6.6 million of us by 2010. We're also getting older. In five years, the fastest growing group in our state will be those aged 65 or older. By 2020, one in six of us will be in that age grouping.

2. More pressure on our environment — More people mean more waste and more health hazards from the water, air, and soil.

3. Infectious disease will continue to be a challenge — Today, pathogens can travel faster and farther. We're seeing increasing resistance to drugs. Exotic diseases are striking closer to home.

4. Poverty — Poverty is a public health issue because we have a responsibility to protect and improve the health of every person. When I became secretary of health, I rented a home in Olympia. It was the first time in my life I didn't live in an economically distressed area. I can tell you from personal experience it's harder to have a good diet, safe housing, and access to health care if you live in a distressed, rural area.

5. Unhealthy lifestyles — The leading causes of death are all behaviors we can change — tobacco use, poor diet, physical inactivity, and alcohol misuse — and they will become more important as our population ages.

Tobacco use is the leading cause of preventable premature death. The Department of Health launched a major new program this fall to prevent tobacco use and help tobacco users quit. Radio, TV, print, and Internet ads are aimed at convincing young people it's not cool to smoke or chew, and at adults who want to quit. In November, the Washington Tobacco Quit Line, a telephone counseling service for people who want to quit tobacco use, goes "live." In addition, programs that will discourage the use of tobacco products are being funded in schools, communities, and multicultural groups.

6. Less money — I must include funding as a challenge because limits on government spending make it difficult to carry out current programs, let alone meet new needs. The public expects a lot from public health: all children immunized, safe food and drinking water, protection against *E. coli* and other health threats, and many other services.

To be ready to meet these challenges, the state Department of Health has developed and is now deploying its first true strategic plan. The key goals we want to accomplish through the strategic plan are:

- We want people to understand what we do and want to make a difference in their health.
- We want to be responsive to our customers and have strong partnerships that make a difference in people's health.
- We want to make sure our funding is directed to those programs and activities that make a difference in people's health.
- We want to do our work as efficiently and effectively as possible.
- We want to hire and retain the best people, and sustain our ability to change and improve.

During the coming months we'll be working with our partners around the state as we begin implementation of this plan. We are confident our strategic plan will help us become an organization that is well prepared to meet future challenges.

Mary C. Selecky, Secretary
Washington State Department of Health

The Economic Determinants of Health and Illness

Carolyn Watts

Health and illness are inextricably intertwined with economic activity. Changes in how we earn, what we earn, and how we spend our earnings are important determinants of not only how we live, but how we die. In this country, the connection between work and health has been further strengthened by the link between employment and health insurance. As the structure of both the domestic and world economy evolves over the next 10 years in response to rapidly changing technology, the nature of work and working conditions will change. This article speculates on what those changes mean for how we earn, what we earn, and how we spend our earnings, and discusses implications for our health and health care in the future.

We need look no further than the major causes of mortality to see the connection between what we do with what we earn and how we die.

How We Earn

Economic activity has always been an important determinant of health and illness. In "The Changing Face of Death," Ponting traces these connections in the simple economies of early societies. The transformation of nomadic hunting and gathering societies to more sedentary agricultural ones was accompanied by an increase in infectious diseases — the result of increased proximity and the transfer of disease from newly domesticated animals to their human caretakers. In the cities that formed as trading centers for agricultural surpluses, waste disposal created additional health hazards. The first outbreak of bubonic plague, which devastated the population of Europe, was trade related: cargo ships carried plague-infected rats from China to the European continent.

Just as economic activity affects health, major changes in health can profoundly change the nature and level of economic activity. Smallpox and other diseases brought to Mexico by Spanish conquistadors reduced the population of the Aztec state from 25 million to 1 million by 1600 and collapsed the once economically powerful Aztec society. Similar social and economic devastation occurred later in North America when Europeans brought disease to native populations.

Twentieth-century workers in developed countries are virtually guaranteed they will not succumb to the infectious diseases that shortened the lives and killed the children of their ancestors. They are likely to spend their working hours in sedentary jobs surrounded by some combination of dangerous equipment, toxic chemicals, and high stress. Insurance provided by their employers is likely to pay for the sophisticated medical care they receive for the cancer, stroke, and heart disease that result from this way of earning a living. Over five decades of its expansion, employer-sponsored health insurance has financed dramatic growth in medical resources and technology, with profound effects on health and health care.

What We Earn

Researchers have established a clear association between income, employment, and health status. Lower income groups have higher death rates, even after controlling for the somewhat higher rates of risky behaviors, including smoking, obesity, and physical inactivity.

However, a growing body of research suggests that income inequality may be a more important determinant of health than is absolute income level. The reasons for this relationship are not yet clear. Lynch and Kaplan assert that inequitable income distribution within a jurisdiction may be indicative of a wide range of social processes and policies that systematically underinvest in human capital. This underinvestment in social infrastructure (e.g., education, health care and public health, the physical environment) may have health consequences.

In support of this notion, Kaplan and colleagues found that states with a more equitable income distribution had higher spending on education per capita, more library books per capita, lower proportions of their populations without health insurance, lower rates of violent crime, and lower proportions of their populations in jail, even after adjusting for differences in the absolute level of

income. They posit, but do not examine, other possible associations between income inequality and health such as lower rates of immunizations or less adequate tuberculosis control programs, fewer public health initiatives aimed at smoking, diet, and exercise, and less strict environmental standards.

Other research suggests a direct connection between health status and the diminished feelings of self-worth, hierarchical position, and control inherent in an environment with large disparities in income across individuals and groups. Whatever the underlying reasons for decreased health status in areas with high income inequality, the relationship is clear: Lynch and Kaplan find a correlation of –.62 (P = .0001) between income inequality and age-adjusted mortality within the 50 states, even after accounting for absolute levels of income.

How We Spend What We Earn

We need look no further than the major causes of mortality to see the connection between what we do with what we earn and how we die. Accidents, chronic lung disease, pneumonia and influenza, diabetes, suicide, cirrhosis, and HIV, along with heart disease, cancer, and cerebral vascular disease, were the leading causes of death in the United States in 1994. Behind these disease categories are the habits and activities of Americans at the turn of a new century: smoking, drinking, drugging, eating unhealthy food, being sedentary, living and playing among toxins and microbes, having unsafe sex, driving on crowded highways, and keeping firearms. Moreover, we are increasingly likely to engage in these activities in isolation as the demands of job and family erode our ability to create and maintain stable and supportive communities.

A Changing World

Predictions about the future are the stuff of reputations made and lost. Nevertheless, numerous changes to our economic structure seem inevitable over the next 10 years. These changes have important implications for our health and health care.

A Global Economy

International trade and tourism will grow. It is unlikely that the United States, despite its size and economic clout, will be able to convince developing nations to adopt similar food safety and environmental standards. Thus, expanding international interactions will bring greater exposure to new infectious and food-borne diseases, and to chemical toxins. Increased economic activity worldwide will also result, at least in the short run, in increased environmental degradation and the accompanying health consequences — both locally and globally.

Burgeoning Information Technology

The electronic information explosion will continue to affect every aspect of our work life (and our play). Among other changes, it fosters individual entrepreneurship. The once nearly universal marriage between work and salaried employment is giving way to a wide range of short- and medium-term arrangements. Contracting and self-employment will become even more common as an expanded Internet connects buyers and sellers easily without the need for a corporate intermediary or the capital costs of a large inventory.

An obvious barrier to these changes is the current link between employment and insurance. In today's economy, workers who leave their salaried employment also leave behind their employer-paid health insurance. Individuals — even healthy ones — who try to replace their group coverage with privately purchased insurance face many obstacles. Prior to the passage of the Health Insurance Reform Act of 2000, all the major insurance carriers had stopped offering new individual policies in most of Washington's 39 counties.

However, the economic gains from restructuring the economy to take full advantage of advances in information technology will be enormous, and they will ultimately result in a new means of delivering and financing health care that is not dependent on an employer/employee relationship. The specifics of these new means will depend upon a variety of factors such as the strength of the economy and the political environment.

The most important feature of health insurance in the year 2010 is that it will be much more accessible to individuals without regard to employment status. One way to achieve this result is increased public financing of people with high risk for medical problems so that private markets can more profitably serve healthy people. Another is mandatory universal coverage through which those at high risk are subsidized by many healthier people who cannot drop their coverage to get better rates in a lower-risk pool. However, these changes in health care financing are not likely to have a large impact on health. Most researchers agree that the gains to the general population from additional health care are small. The health status of certain underserved subgroups of the population may improve, as will the health status of those who cannot get life-saving procedures without adequate coverage.

Information technology will also directly affect health and health care as more consumers are able to gather and assess their own health information and manage their chronic illnesses from their home computers. Electronic medical records will enable restructured health care systems to provide better service, particularly in light of increased research and information dissemination opportunities afforded by electronic record data.

Widening Income Disparities

Rapid technological change has the short-term effect of increasing income disparities as innovators make large profits at the expense of those who cannot or do not change. If, as the work of Kaplan and Lynch suggests, these disparities lead to reductions in investments in social infrastructure (the recent passage of I-695 by Washington voters may suggest that this is already happening), declines in health status for less-favored groups may follow. While the technological gains may ultimately result in an increased standard of living for most economic participants, the transition period involves unequal gains and losses.

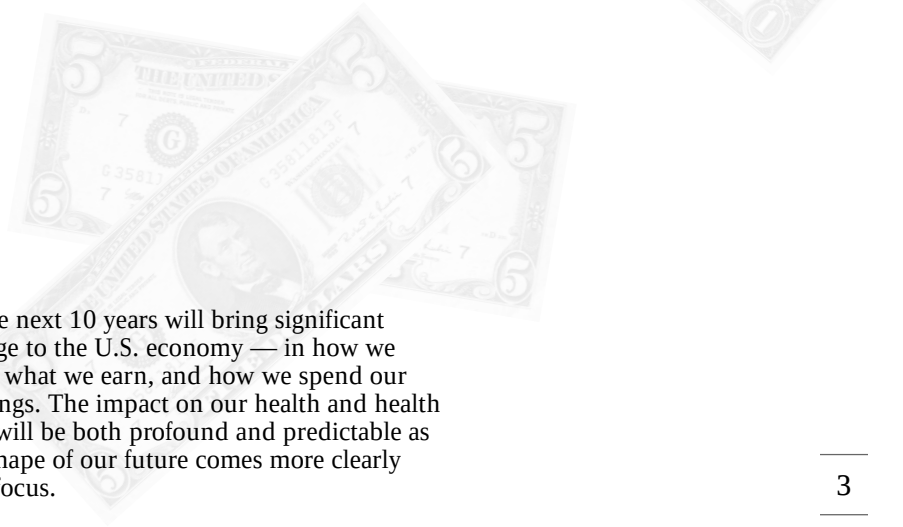
More Stress, Less Community

A rapidly changing world puts pressure on existing social structures that provide stability and a sense of community. New social structures appropriate to the new world will evolve. In the transition, however, people are left with more stress and less support. More stress, according to research findings, means more disease and more demands on the health care system. If these demands come primarily from those at the lower end of the socioeconomic spectrum, our mechanisms for arbitrating social justice will be tested.

Was Malthus Right?

The ultimate question about economic activity and health is the one Malthus posed in 1798: Will our planet be able to support any level of economic activity in which we choose to engage? Our global economy already affects every ecosystem on earth. Just as social scientists are beginning to understand the connection between socioeconomic status and health, natural scientists are beginning to understand the connection between human health and the health of the physical systems on which we depend. If our future economic activity — by either its nature or its volume — unduly taxes these natural systems, the health of all populations will be jeopardized.

New social structures appropriate to the new world will evolve. In the transition, however, people are left with more stress and less support. More stress. . . means more disease and more demands on the health care system. If these demands come primarily from those at the lower end of the socioeconomic spectrum, our mechanisms for arbitrating social justice will be tested.



The next 10 years will bring significant change to the U.S. economy — in how we earn, what we earn, and how we spend our earnings. The impact on our health and health care will be both profound and predictable as the shape of our future comes more clearly into focus.

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Author

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The State and Local Political Environment of Urban Health

Charles T. Royer

Cities cannot take on some of the twenty-first century's toughest problems — growth and sprawl, health and safety, the environment — working solely within political boundaries drawn in the eighteenth and nineteenth centuries.

The state and local political context for addressing urban health problems in the twenty-first century includes issues of federalism, city-state relations, and policy-making processes within cities and the factors that influence them. The underlying assumption — one with which I agree completely — is that government and politics at these levels will play key roles in developing and carrying out such an agenda. My views derive from my professional experience in politics and the press, and, most recently, from helping to develop the Robert Wood Johnson Foundation's Urban Health Initiative, a process that took me to 13 cities around the country.

This article discusses factors that influence public sector capacity and behavior, including changes in the intergovernmental system, politics, and the press, and the divisions of race, class, and culture. It concludes with observations on what might be some essential elements of an urban health agenda.

The Governmental Milieu

A trend called *devolution*, the systematic delegation by the federal government of more and more flexibility and authority to state and local governments, in recent years has changed the general environment in which government must work. To some in Washington, D.C., devolution means cutting taxes and relinquishing many responsibilities that are perceived to be unpleasant, no-win tasks, such as dealing with poor people and big cities. To others in Washington, devolution is a desirable adjustment of the intergovernmental system that recognizes the good sense of moving some authority and decision making to more appropriate levels of government.

Effectively, however, as seen most clearly in welfare reform, devolution simply means putting the bulk of the responsibility for writing the rules of the game on state government. Most public opinion polling endorses that approach in almost every area of government's domestic responsibilities except for civil rights enforcement and Medicare. In fact, a 1936 Gallup survey reported that 56% of those surveyed said that they were more comfortable with "a concentration of power" in the federal government than in state government. By 1995, only 26% of those polled by Hart and Teeter felt that way.

Municipal government has even higher levels of public trust than does state government. However, in many cases, city and urban county governments view with some trepidation the devolution of authority to the state, especially those large cities and counties with large minority and immigrant populations that generally do not enjoy the political support of governors and state legislators. Complicating the local governmental environment, at least for health issues, is the sad fact that not all cities are led by people of compassion and vision. Leadership is spotty, and city government often has little to say about the health agenda. In many places, like California, health and human service issues are the province of the county government.

However, there is good news for local governments faced with the added responsibilities that accrue from devolution. Regional economies are booming for the most part, and state and local governments seem to be out from under — at least temporarily — the harsh fiscal restraints of the late 1980s and early 1990s. The booming economy affords some flexibility for venturing into new service areas, although perhaps only until an attempt is made to raise a tax.

The Political Environment

A powerful perception from the last three or four years of working closely with some distinctly different cities is the poisonous climate that surrounds politics and government. In almost 30 years of reporting on politics and government, teaching it, and serving in it, I have not seen a tougher, meaner, more cynical, more destructive political climate than the present one. It is the enemy of innovation and positive change in government at all levels. It is the prime killer of good public ideas, and it is poised to snuff out, through bad laws and mean-spirited rhetoric, our capacity and will to make smart investments to improve the health of our communities.

It seems that sometimes reporters are the only people in America who are happy about what is occurring. They often treat politics as if it were a blood sport rather than the very business of freedom. So, the press offers too much cynicism, too much negativity, and too little substantive information for citizens to make informed decisions. The bashing of government and politics is taking a heavy toll on the confidence of citizens that their governments can do anything right in these communities. This trend is coming at a time when governing institutions, especially at the state and local levels, are being asked to stretch and innovate on some difficult issues that in the past were left to the federal government — issues such as most forms of public assistance and health care.

Public Attitudes and Perceptions

What people think about children and society affects the formation of an urban health agenda. While visiting the Urban Health Initiative's initial 13 cities, we talked with a broad range of people about the health and safety of children in their communities. Some of the conversations were unsettling.

When we spoke with people about young children — say, aged six and younger — people expressed real fear for their future. When we spoke with them about older children, such as teenagers, they expressed fear of them. They seemed to be talking about two kinds of children: those who needed to be fixed up, and those who needed to be locked up. Indeed, attitudes that support detention seem to be winning over attitudes that support prevention. People obviously are concerned about the health and safety of their own children. But, does that concern extend to the other children in the neighborhood? Or, for families living in relatively stable suburban communities, does concern for children cross municipal boundaries and extend to children in the central city, to immigrant children, or to the children of welfare mothers?

Recent research on this issue may be surprising. The Advertising Council and the Benton Foundation conducted surveys and focus groups around the country, testing approximately 60 different message ideas in an attempt to discern issues that might mobilize communities around efforts to improve conditions for children and youth. The relative well-being of children versus the rest of society — their health and their safety — has worsened over the past 20 years.

When asked why, in a country with a strong economy and a powerful safety net for older people, the health and safety of children has been allowed to worsen, most find ways to rationalize, if not accept it. People see children's problems as symptomatic of the problems of the parents or of society as a whole; the problems are viewed as being a small part of a large, irreversible pattern of economic and moral decay. People blame parents, who may need support, and then stereotype them as uncaring and irresponsible. They want to believe that, if they were in similar circumstances, they would do better for their children. Ultimately, says the research, the public is unable to separate children from their "bad" parents. They view parents as undeserving, so they do not help the children.

It seems that this nation's stereotyping of people on welfare has taken a substantial toll on our patience and our compassion. Some politicians have taken — and can be expected to continue to take — advantage of these attitudes to frustrate public sector intervention, especially with regard to immigrant and minority populations within inner cities.

I have not seen a tougher, meaner, more cynical, more destructive political climate than the present one. It is. . . poised to snuff out, through bad laws and mean-spirited rhetoric, our capacity and will to make smart investments to improve the health of our communities.

Influence of the Nonprofit Service Sector

Any effort at building an urban health agenda will need to consider what I would call the systems environment — the "circuit board" of the public and private nonprofit service delivery system — which today feels totally unloved and unappreciated and seems to be dedicated to continuing to do exactly what it is doing right now, only with annual increases in budget. Most communities simply do not know what they are up against, politically and practically, in trying to make fundamental changes in these systems. These agencies do try to help: myriad nonprofit agencies have made many well-intentioned efforts, but they tend to achieve results that are marginal, more often than not use up an enormous amount of resources, and are unable to move their efforts to scale.

Divisions among Populations

No survey of the policy context for addressing urban health issues can ignore the enormous challenges imposed by the divisions of race, class, culture, and space. As economic and job growth has become, overwhelmingly, a suburban phenomenon, the isolation by race, class, culture, and opportunity in the central city has worsened dramatically.

In Detroit, in a conversation with a business leader who was working hard on these issues with the city's exciting and energetic mayor, Dennis Archer, I asked whether he was optimistic about being able to overcome some of these divisions of race and class.

"No," he said. "It's too much about race. The race riots (in 1967) have left some very nasty scars. As a community, we can't get past 1967."

"Well, I said, "I was just in Richmond, where they are having a hard time getting past 1867."

A hopeful sign is that young people seem to be ahead of their parents and their political leaders in dealing with race. This may be true because they do not know or care about the old wars or, perhaps, because some headway is being made.

Another old war, the one between suburb and central city, continues to impede progress in some regions. The Urban Health Initiative, which tries to be nonprescriptive regarding local strategies, has told these communities that they must develop regional approaches to improve the health and safety of their children. Cities cannot take on some of the twenty-first century's toughest problems — growth and sprawl, health and safety, the environment — working solely within political boundaries drawn in the eighteenth and nineteenth centuries. In any of these isolated places resources are insufficient — in both leadership and wealth — to try to go it alone. This is one area in which the emergence of state government can make a difference.

Suggestions for Developing an Urban Health Agenda

This overview of some important "climatological" factors suggests some essential elements that must be considered in the development of an urban health strategy. Given those realities, what can be done?

I endorse heartily the lessons and approaches Baltimore Mayor Kurt Schmoke has drawn from his experience: expand the search for new and nontraditional partners; increase outreach to "the community"; acknowledge and work to reverse the "tyranny" of certain environmental factors, especially in poor neighborhoods; and take risks. To those, I would add the following, suggested mostly by our effort so far in the Urban Health Initiative.

First, these communities are unique places, having "grown up" differently and having been subjected to different "old wars." They will have a difficult time liking or working with national models. Efforts to intervene, therefore, must be linked to local reality. For example, if economic development is the primary facet of a community's agenda and if significant community leadership is working on economic development, then the health agenda has to discern how to be part of the economic development work. If school reform is the issue, then the health agenda needs to learn how to be a helpful part of that work. Work that generally gets done in communities is work that is linked to what is ready to move, to what is politically salient.

Second, whatever the agenda might be and however well it might be linked with other

continued on page 14

The Urban Health Initiative

The Urban Health Initiative (UHI) is working closely with five U.S. cities — Baltimore, Detroit, Oakland, Philadelphia, and Richmond — to help improve the health and safety of children living in these areas. A goal of this 10-year initiative is to document and share with others strategies that make a difference, and lessons from those that prove less fruitful. UHI is jointly sponsored by the University of Washington's Daniel J. Evans School of Public Affairs and School of Public Health and Community Medicine and funded by a grant from the Robert Wood Johnson Foundation. See http://www.urbanhealth.org.

Demographic Trends Influencing Public Health Practice

Christiane Hale

At the beginning of the twenty-first century, the United States is facing social changes as tumultuous as those of 100 years ago. Like echoes of an earlier era, these current changes impact who we are as a people and how we define ourselves. But, in unprecedented ways they also are altering our family lives and testing the limits of social institutions.

Three demographic trends underlie the social changes of the past quarter century:

- new family patterns catalyzed by high divorce rates and increasing out-of-wedlock childbearing;
- shifts in income distribution with widening income disparities between the poorest and richest households;
- increasing racial and ethnic diversity of the U.S. population.

We can see their impact in health care. As poverty has become a common condition of childhood, health care for children increasingly depends on societal willingness to adequately fund programs like Medicaid, the federal insurance program for low-income mothers and children, and the Basic Health Plan, Washington State's insurance program for the working poor. Adults who lack a high school education — often immigrants and people of color — are usually employed in low-wage jobs or under contract. Such work seldom includes health insurance or at best offers coverage just for the worker but not family members.

Understanding these demographic trends not only clarifies the issues related to health care, but also those that affect education and the relation between families and workplaces. Such trends have been intensifying since the 1960s and seem unlikely to reverse. Adapting our social arrangements — including those for health care — to accommodate the new social realities will be one of our biggest policy challenges in this decade.

Shifting Family and Economic Patterns

The first two demographic changes — new patterns of family formation and shifts in income distribution — are so intertwined that they still cannot be completely disentangled. A generation ago, the dominant family model was breadwinner-husband and homemaker-wife raising their own biological or adopted children. Today many people don't even live in what are generally defined as "families," that is, persons related by legal kinship.

About 30% of Americans live alone or in non-family combinations, such as with housemates, friends, or partnerships outside legal marriage. Even if we restrict "families" to the standard definition, 43% are married couples without children younger than 18, and 35% are married couples with children. Another 10% are female-headed families with children, 3% are male-headed families with children, and 10% are other family types (e.g., siblings living together).

What accounts for this dramatic change? By 1965 divorce rates had risen so sharply that more marriages ended in divorce than in the death of a spouse. Today nearly 50% of marriages end in divorce. One consequence is that before age 18, more than half of children whose biological parents were married will live two or more years in a single-parent household. Another trend is a steady increase in the proportion of births to single women. In 1970, fewer than 10% of women giving birth were single; by 1998 that figure had risen to a third. A similar trend occurred in Washington State where 15% of births in 1980 were to single women, compared to about 28% in 1998.

These changes in family formation have occurred against the backdrop of major economic shifts that have exacerbated income inequality. A measure called "relative income," based on median income, clarifies this trend. Median income is the midpoint value for

Dean Rutz / The Seattle Times, 1998

New Immigrant and Refugee Communities Mean New Challenges for Public Health

Bookda Gheisar and Clancy J. Clark

Health care organizations in the 1990s struggled to meet the needs of increasingly diverse patient populations. Today's immigrants and refugees are not the educated professionals of the 50s and 60s. They are the poverty stricken and the survivors of war-ravaged nations, all seeking a better life in America. Refugees from Cambodia, Vietnam, Somalia, Ethiopia, Eritrea, and more recently Eastern Europe (Bosnia, Kosovo), represent all walks of life from the rural farmer to the diplomatic elite.

Over the past decade, refugees who originally settled in federally targeted regions across the nation have moved to join relatives and loved ones. Strongly identifiable immigrant communities are emerging in cities such as Seattle, Minneapolis, and Washington, D.C. Likewise, immigrants are moving to cities with expanding service industries where low-wage employment abounds. Descendants of these immigrants and refugees represent the largest percentage of the nation's population growth, a trend that will continue well into this new century.

These tight-knit communities, similar to the German, Italian, and Irish communities of the early 1900s, tend to shop at the same stores, seek work in the same locations, and use the same health and social services. Each community brings unique perspectives, beliefs, and expectations of America.

As members of immigrant communities enter health care organizations, both as patients and staff, the need for change within these institutions increases. The lack of linguistically and culturally competent services often leads to disastrous outcomes for patients and for institutions around the country. Expanded federal requirements for providing culturally competent services has forced institutions to reconsider the use of family members and untrained staff as interpreters. The movement to recognize the medical interpreter as a professionally trained medical staff member has grown dramatically over the last decade.

We have also witnessed pioneering efforts by medical institutions to translate health education materials, train their board members and management teams in cultural competency, and design services that are relevant to the needs of the communities they serve.

In this new century, health care organizations not only must consider the diversity of their clients, but identify the communities represented and design products, employment, educational materials, services, and programs to meet the particular needs of each community. As the Census Bureau has recognized, it is time to move beyond broad racial designations — so should health care organizations.

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incomes: 50% of people earn more than the median and 50% earn less. Low relative income is less than half the median, while high relative income is twice the median. In 1969, 18% of people had low relative incomes and 15% had high relative incomes. Although a comprehensive report of current relative income awaits analysis of the 2000 census data, numerous surveys suggest that income disparity continued to increase during the 1990s. One survey found that in 1973, average income for the wealthiest fifth of households was $83,000; by 1994, it had soared to $105,000 (in adjusted dollars). For the poorest fifth of households, average income dropped from $8,100 to $7,800.

The drop in income has been particularly marked among young men, especially those with a high school education or less. In 1993, about a third of men aged 25–34 did not earn enough money to move a family of four out of poverty. Although these men would be potential husbands for women in the same age group with similar educational levels, this demographic group accounts for most of the out-of-wedlock childbearing. Some researchers suggest that women are choosing not to marry because their potential partners do not offer an opportunity for economic enhancement, so they prefer to stay single and depend on the welfare system to meet their needs. However, recent changes in the legislative basis of the welfare system are forcing poor women into the labor force and their children into day care.

Increasing Social and Ethnic Diversity

Just as family living arrangements and economic well-being began to intertwine in the late 1960s, Congress removed U.S. immigration restrictions in place since 1920 and made occupational qualifications and family reunification the joint bases of new immigration policies. After more than 50 years of low immigration, numbers began to rise and now have reached the levels of 100 years ago. About 800,000 legal immigrants entered the country in 1997. Worsening economic conditions in Mexico and Central America in the past 10 to 15 years appear to have increased an always-steady flow of illegal immigrants, although their numbers cannot be determined accurately. Two figures suggest the magnitude of this stream. More than 1.5 million illegal entrants were apprehended in 1997. A year earlier, the Immigration and Naturalization Service estimated that 5.3 million people were illegally living in the United States.

Immigrants influence fertility data in two ways. First, regardless of their countries of origin, they tend to have higher fertility rates than do native-born people. Second, immigrants are concentrated in the 20- to 39-year-old age group, which is also the prime period of family formation. Under conditions of low fertility — such as have characterized the U.S. population in the past 30 years — immigration becomes especially important. For example, although Washington State is not one of the major destinations for immigrants, in 1998 about 19% of residents giving birth were foreign-born. Long-standing fertility differences between racial and ethnic groups contribute to increasing population diversity, in Washington State and nationwide. Table 1 compares the state's racial and ethnic makeup with the distribution of births. ➤

Table 1: *Racial and ethnic distribution of Washington's population and births in 1998**

Racial/Ethnic Group	Percent of State Population	Percent of Births
White, non-Hispanic	83	75
Hispanic	6	12
Asian/Pacific Islander	6	7
African American	4	4
Native American	2	2

*Estimates from State Office of Financial Management

Northwest Tribes Reap Benefits of Health Policy Collaborations

Julia Davis and Joe Finkbonner

Tribes in the Northwest have made great strides in health care policymaking over the past five years by working collectively on health issues. The chronic underfunding of the Indian Health Service and the demise of initiatives for national health reform and Medicaid reform have prompted tribes to become active on state health care issues. Through our health organizations and the Affiliated Tribes of Northwest Indians, tribes have affected health policy in Alaska, Montana, Oregon, Washington, Idaho, and California.

The ability of tribal governments to collaborate on health policy dates to the formation of the Northwest Portland Area Indian Health Board in 1972 (40 of 41 Northwest tribes are members). The main focus of tribal efforts is to ensure that the federal government honors its trust obligation for health care for American Indians and Alaska Natives.

Tribes have increasingly used state-administered Medicaid programs to supplement the funding received from the federal government. The federal medical assistance payment (FMAP) is 100% for services that Indian health programs provide to American Indians and Alaska Natives. Thus, because of the federal trust responsibility, the states are fully reimbursed for the costs of services provided by Indian health programs (except for urban Indian health programs, which are not included in the 100% FMAP). The annual savings for the Medicaid budgets of the states of Washington, Oregon, and Idaho exceeds $20 million.

The opportunity for future successes in health policy is great because Northwest tribes meet regularly with state Medicaid and other health and social service agencies. In Washington, the American Indian Health Commission meets with the Medical Assistance Administration and the Department of Health to identify and work collaboratively on health issues. In Oregon and Idaho, tribes meet quarterly with their respective health agencies. In each state, the Northwest Portland Area Indian Health Board facilitates these meetings. Changes in policies and reimbursement methods have brought improvements in public health and in personal, dental, and mental health. Despite some continuing difficulties, we believe tribes are encouraged with the results and are optimistic that issues raised in these regularly scheduled meetings will be addressed.

The brightest ray of hope arises from Indian Country itself. On reservations across the Northwest, tribes are stepping forward to address health issues directly. The Indian health system is one of the few remaining public health systems that follows the community health care model. In recent years Indian health has been strengthened through the expansion of the cultural and spiritual aspects of holistic health.

The greatest success in protecting the viability of Indian health programs is that tribes and states have established policies that allow tribes to continue to operate their health programs outside the managed care environment. A testament to the success of this model is the number of requests from both tribal and state staffs for information on the model and the issues addressed. We have shared the story of our success and struggles with tribes from Alaska to the Southwest, including the Pueblos of New Mexico and the Navajo Nation.

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Joe Finkbonner, R.Ph., M.H.A., is CEO of the Lummi Nation and chair of the American Indian Health Commission for Washington State.


Jeff Miller

Washington State data also demonstrate how immigration influences the shifting economic well-being of families. Two factors largely determine that well-being: marital status and education. In 1998, 22% of the foreign-born mothers but 29% of native born were unmarried when they gave birth. So, at least in this state, an increasing fraction of immigrants might slow down the rate rise in births to single mothers.

Education is the most important determinant of how both immigrants and native born fare economically. Nationally, education among immigrants is concentrated at the two extremes. In 1997 about 30% of foreign-born residents had at least an undergraduate degree (compared to 24% for the native-born population), but 34% had less than a high school education. Births to Washington State residents in 1998 echo this pattern: 35% of foreign-born mothers had less than a high school education compared with 14% of native-born mothers. However, 21% of foreign-born mothers had at least an undergraduate degree, as did 25% of native born. Whether educational differences predict income differences among the foreign born, as they do among the native born, also must await the results of the 2000 census.

These different educational distributions probably also explain why Medicaid paid for 45% of deliveries to foreign-born women compared to 35% of deliveries to native-born women. Recent studies point out that immigrants represent an economic gain at the national level because they pay federal income tax, but are a net cost in states with large immigrant populations because they use programs, such as Medicaid, that are largely funded with state and local dollars.

How these demographic trends affect health care and public health services depends on the choices we make. As a society, we can continue to meet health care needs with a combination of employer-linked health coverage, Medicare, and subsidized insurance for those defined as the deserving poor (e.g., some poor mothers and children and the disabled). Alternatively, we can examine our current system to determine its appropriateness given the new realities of American family life, and change it accordingly.

Author

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Disability in Washington — *Susan Kinne*

People with disabilities are a large and almost invisible minority group in Washington State. Almost one in five Washington residents is restricted in ability to perform normal activities because of a physical, mental, or emotional condition. The number and proportion of persons with disabilities continue to increase as better health care helps more people survive injuries, low birth weight, chronic disease, and other once fatal conditions.

The increasing prevalence and cost of disability push public health agencies to develop prevention strategies and to promote health and quality of life of people with disabilities. Changing community environments helps to achieve these goals. Disability results when a person's abilities do not match the demands of his or her environment, so someone with a physical or mental limitation can avert disability if the social and physical environment accommodates the person's needs.

Age is the most consistent risk factor for disability, which is more common among older people. About 5% of children have a disability, compared to 15% of persons aged 18–64 and 33–38% of those older than 65. Washingtonians with disabilities tend to be poorer and less educated and to be widowed, divorced, or separated rather than married, compared to the rest of the population, but these differences are mainly due to greater age. As our population ages, disability will increase.

Many people with disabilities enjoy excellent health, but as a group, adults with disability are only half as likely to report excellent or good health as are those without disabilities, and are much more likely to experience fair or poor health. As many as 75% of people with disabilities report depression, chronic pain, and difficulties with fitness and weight control as side effects of their conditions. People with and without disabilities are equally likely to report that they are "satisfied" with their lives, but many more people with disabilities are "dissatisfied" or "very dissatisfied."

Other consequences of disability in adults include restrictions in opportunity, which the 1990 Americans with Disabilities Act (ADA) defines as economic self-sufficiency, independent living, equality, and full participation. People with disabilities are less likely to be employed, to have high incomes, or to take part in social and community activities than are similar people without disabilities. Many of these limitations result from social and environmental barriers — inaccessible buildings and walkways, prejudice against disability, and lack of accommodation — rather than from the person's limitation. Extending opportunity can reduce disability.

Susan Kinne, Ph.D., is a research scientist at the UW Center for Disability Policy and Research.

Information Deluge

The Power and Promise of the IT Revolution

Neil Rambo
Sherrilynne Fuller

Public health is an information-based enterprise. The expanding ability of researchers, educators, policy makers, and practitioners to harness the power of information technologies (IT) is one of the major trends influencing public health in the new century. A few years ago in an article in this magazine, O'Carroll and Bell concluded that the World Wide Web "is one of the most exciting new resources available for public health practitioners. We cannot ignore the tremendous wealth of available public health information and the myriad potential uses of the Web for information sharing, training, research, and data distribution."

They also clearly identified the Web's negative aspects: information overload, lack of organization, technical barriers, and social considerations such as access policies, confidentiality, and liability; and useful but clumsy or difficult-to-work-with aspects such as security systems, interactive submission of data, and network capacity limitations. They had the foresight to realize that the Web would require substantial work before it "becomes an effective and integral part of modern public health practice."

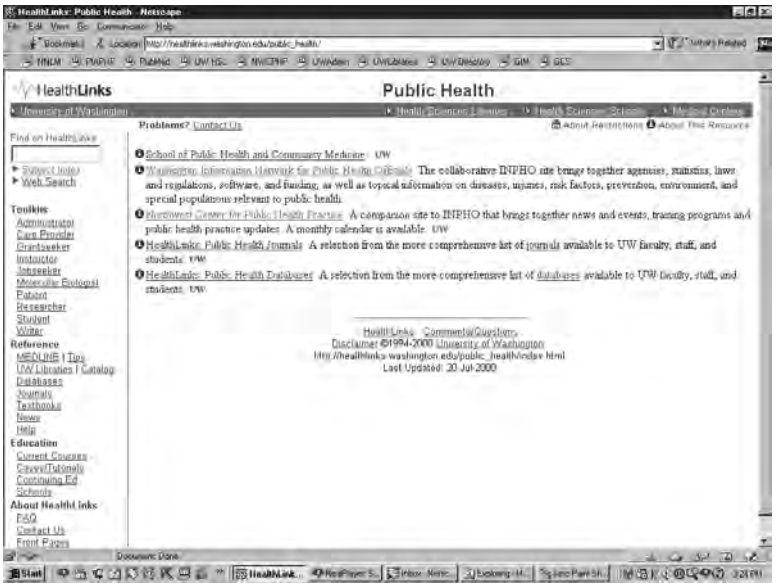
Though written just four years ago, their analysis represents one of many developmental cycles in the still young life of this rapidly evolving technology. Even so, O'Carroll and Bell called it quite accurately. What was good then about the Web remains an enduring strength. In ease of use and relatively low cost, it is unsurpassed as a publishing and dissemination medium. The creative work of technology innovators and others has ameliorated some of the negative aspects during the intervening years. Technical barriers decline as hardware capacity and processing speed increase and prices continue to decrease.

Although much more remains to be done to adequately address issues related to access, including the "digital divide" that threatens to create information haves and have nots, awareness of these problems is growing, along with some efforts to address them. Software and networking solutions have vastly expanded the power and the reach of the Internet. A case in point is e-commerce, which has taken off in the last year or so with the wide deployment of interactive forms and secure data transmission; however, health care use lags other sectors. Sophisticated, interactive public health applications may not be driven by a commercial engine, but they require the same building blocks that have fostered e-commerce.

How to stop worrying about information overload and learn to love the Web . . .

Two problems articulated by O'Carroll and Bell in 1996 persist: information overload and lack of organization on the Internet. The current picture is both better and worse — worse in the sense that the burgeoning spread of online information continues without letup. A recent study estimated more than 800 million publicly accessible Web pages of which only 6%, nearly 50 million pages, are scientific or educational in content. This flood of information is staggering, and information overload seems inevitable.

But there is good news too. Web-based search engines have become more sophisticated. Simple keyword searching — a starting point for most search engines — is a crude instrument in this chaotic information universe. Powerful and creative indexing techniques, combined with enhanced searching features, help improve the performance of these tools. This strategy can lessen the burden of information overload and relegate it to the level of background noise.



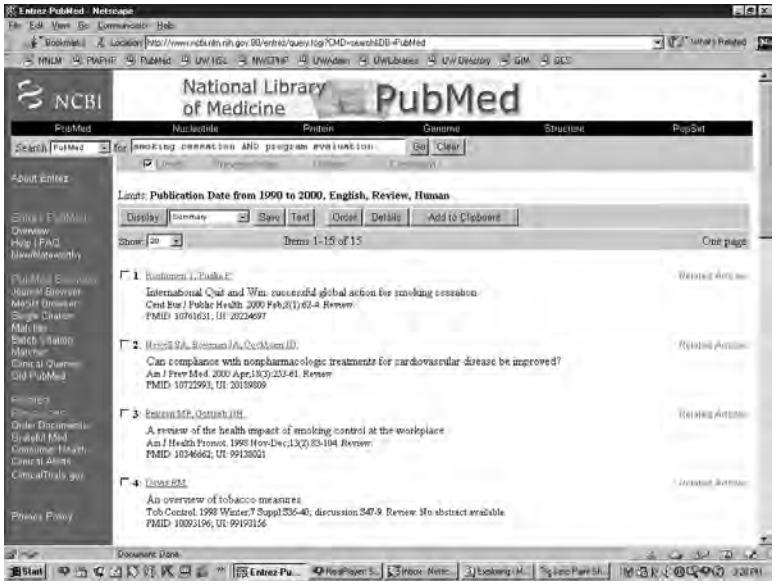


Figure 1 (top): The public health index page on the UW HealthLinks site connects to numerous useful information sources. Figure 2 (bottom): A focused search on PubMed can can identify the most pertinent articles and simplify information retrieval.

In addition to improved search engines, another tool that can help the information seeker manage the Web is a subject directory — a kind of "meta-Web site" that provides a rich organizational feature set and pointers to other sources for relevant, high-quality information. Directories typically perform several useful functions. They provide a gateway to the major sites in a particular subject, a sense of "what is out there," and a conceptual framework for those unfamiliar with the subject or the resources. Perhaps most importantly, directories provide at least some measure of quality assessment and filtering of information. Some directories may perform this function only implicitly, whereas others have explicit criteria for inclusion of sites and systematically evaluate their quality and the information offered. Combined with better and more powerful search engines, the use of value-added services such as subject directories can further decrease the problem of information overload.

Two examples of directories are the public health index page on the University of Washington's HealthLinks site (Figure 1) and the Washington State Department of Health links page located at http://www.doh.wa.gov/Links/links2.htm.

Power Tools

Learning to use these tools — search engines and specialized subject directories — is a useful strategy toward managing the chaos of Web-based resources. In addition, several specialized search engines can provide organized access to journal literature, technical reports, and public data sets. Several such tools developed and supported by the National Library of Medicine (NLM) and the Centers for Disease Control and Prevention (CDC) are useful for public health practitioners (sidebar, page 13).

Figure 2 shows the results of a PubMed search on "smoking cessation and program evaluation" that limits the retrieval to review articles, English language, and publications dated from 1990 to 2000. This search retrieved 15 articles.

Unlike general Web search engines, PubMed does not search for Web pages, although it is Web based. It searches a highly structured and controlled database of biomedical and health-related literature. All the specialized tools listed above provide access to professional knowledge resources. One of the miracles of the Web is that these resources that were once difficult to obtain are now available to anyone (with a computer, Internet connection, Web browser, and skills), anywhere in the world, free of charge. Thus, it is technically possible for a public health practitioner, regardless of

location, to base program decisions on the best scientific evidence available. To achieve this goal, though, requires more than technology. It requires awareness and training.

Information technology (IT) training, when available, often involves learning how to use an operating system or how to use a particular software package, such as to create and manage databases. However, to be most effective, training should occur in the context of real work problems and be related to an immediate need. Schools of public health, in collaboration with state and local health jurisdictions and health sciences libraries, have a vital role to play in providing IT training.

Training focused on using Internet-based tools for information and communication management to support practice is harder to find. One source is the National Network of Libraries of Medicine, which offers training at several regional centers throughout the country (see Information Resources, page 14). Some schools of public health also may offer training.

Despite recognition of the need for effective training in IT, it is difficult for public health agencies to allocate limited resources to provide it. Other barriers are the lack of experienced trainers and the competing demand for training in the core competencies of public health. Reliable sources of distance learning opportunities for the public health workforce — such as the CDC's Public Health Training Network and the Public Health Foundation — are joined through Partners in Information Access for Public Health Officials, an initiative to address the need for IT training. The Partners' Web site describes training programs (see Information Resources).

An Innovative Public Health Application

EpiQMS (Epidemiologic Query and Mapping System), with initial funding from the National Library of Medicine, is a system under development in a partnership between faculty at the University of Washington and epidemiologists and systems developers at the Washington State Department of Health. EpiQMS is a Web-based system allowing Washington State citizens and medical and public health practitioners to access, at several geographic levels, aggregated data sets developed from Department of Health databases. Citizens will be able to determine the health status of their county or community and make comparisons with other areas or the state as a whole. Public health practitioners can use EpiQMS to support assessment and surveillance at several geographic levels to develop efficient and effective interventions. This sophisticated example of a geographic

Web Tools Developed by CDC and NLM

The greatest strength of the following tools is that they compile and organize a vast wealth of information. From a practitioner standpoint, however, the scope and comprehensiveness of these resources can be overwhelming. Each, though, has a sophisticated search interface that can help ease the burden of searching and shield the searcher from a flood of irrelevant information.

- *PubMed* is interface to MEDLINE, the premier biomedical and health care database of nearly 11 million citations and abstracts to medical, nursing, dental, allied health, and public health journal articles: http://ncbi.nlm.nih.gov/PubMed. *Strengths*: a flexible, powerful, easy to use system. *Weaknesses*: a resource of research knowledge designed to be used by other researchers; comprehensive rather than selective, so practitioners need to develop special search and critical analysis skills to use this resource effectively in public health practice.
- *HealthSTAR* is another NLM database, this one focusing on health services research and technology assessment literature. Use the Internet Grateful Med interface to search at http://igm.nlm.nih.gov. IT will be incorporated into PubMed by the end of 2000. *Weaknesses:* same as noted for PubMed.
- *HSTAT* is a full-text database and search system that covers technology assessments and reviews, practice guidelines, consumer guides, and consensus statements: http://text.nlm.nih.gov/. *Strengths*: a full-text (i.e., not bibliographic) resource for decision making; contains selected guidelines, reports, and protocols. *Weakness*: different search interface and method requiring different skills.
- *TOXNET* is a search system to several factual and bibliographic databases in toxicology and environmental health, produced by several government agencies: http://sis.nlm.nih.gov/sis1/. *Strengths*: authoritative source for factual information on toxicity and chemical hazards; estimated toxic chemical releases; and nomenclature, identification, and structural information. *Weakness:* a different search interface to learn.
- *CDC WONDER* is a search system to nearly 20 public data sets. *WONDER* allows you to search, for example, for the most recently compiled mortality data by heart disease and to specify, among other variables, state, county, race, gender, and age range. You can search anonymously or with a user name and password: http://wonder.cdc.gov/. *Strengths*: each data set has a search mask customized to fit specific features of the data; very detailed searching is possible; mix of data and text files, e.g., Prevention Guidelines Database. *Weakness*: time lag between data collection and national-level reporting can be several years.

IT Revolution

(from page 13)

information system is now being tested and refined at the Department of Health.

A practical application of EpiQMS, through its street-level mapping capability, is in disease outbreak investigation. Smaller health departments do not have an epidemiologist on staff. To some degree, EpiQMS can supply this support by allowing departments to determine the location of cases and to calculate rates. This function supports assessment and surveillance activities.

We encourage you to use the tools mentioned in this article to explore the Web.

Recommended Reading

Lawrence S, Giles L: Accessibility of information on the Web. *Nature* 1999; 400:107–109.

O'Carroll P, Bell T: Public health practice and the World Wide Web: the good, the bad, and the ugly. *Washington Public Health* 1996; 14:38–41.

Information Resources

See http://tribalconnections.org for a National Library of Medicine–sponsored project, managed by the University of Washington Health Sciences Library, to increase technology and health information access among American Indian and Alaskan Native communities.

For more information on search engine features and performance, refer to Search Engine Watch at http://www.searchenginewatch.com/facts/. All the search services referred to in this article are free of charge and are available to anyone.

Information about the multi-agency and organization Partners in Information Access for Public Health Officials, sponsored by the National Library of Medicine, is available at http://.nnlm.nlm.gov/partners/.

National Network of Libraries of Medicine: To contact the nearest office to inquire about IT training, call 1-800-338-7657. More information on the program is available at http://www.nnlm.nlm.nih.gov/.

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Urban Health

(from page 6)

efforts, no agenda will move very far in these communities without a well-developed, sophisticated, and strategic communications efforts aimed at influencing both the community's formal and informal networks of communications.

Third, find excellent leadership, pay well for it, and develop new leaders. Our Urban Health Initiative sets high standards, competitive salaries, and high hopes for developing leadership skills among young people. We are developing a fellows program across the cities served by the initiative and will provide extensive leadership training for those involved at the local level, including youth.

Fourth, help to find a positive role for local government that is consistent with the culture of the community. In some places, government needs to play a leading role; in others, it can happily follow, endorse, and support. Ultimately, however, a successful effort will, at some point, need a regulation, an ordinance, or a new public institution, and government is still the only entity empowered to do that.

Fifth, set very high goals. Foundations and other funders want measurable outcomes and are quick to let supported agencies know that they have made little difference. I think people are drawn to higher goals. The worldwide sustainable communities movement, which is gaining currency even among those of us who do not fully understand it, does not say, "We will increase the percentage of the waste stream we recycle by 20%." Rather, it says, "We will eliminate waste."

It will take sustained effort, over an unfairly long period of time, to overcome the challenges of developing and implementing urban health efforts that will make a difference in the lives of the people who live in our cities.

Author

Charles T. Royer is national program director of the Urban Health Initiative, which is supported by the Robert Wood Johnson Foundation and administered by the University of Washington. He was mayor of Seattle from 1982 to 1989.

Adapted from: Royer CT: The state and local political environment of urban health. *J Urban Health* 1998; 5(2):294–299. Reprinted by permisssion of the New York Academy of Medicine.

New Disciplines, Challenges Emerge at Interface of Genetics and Public Health

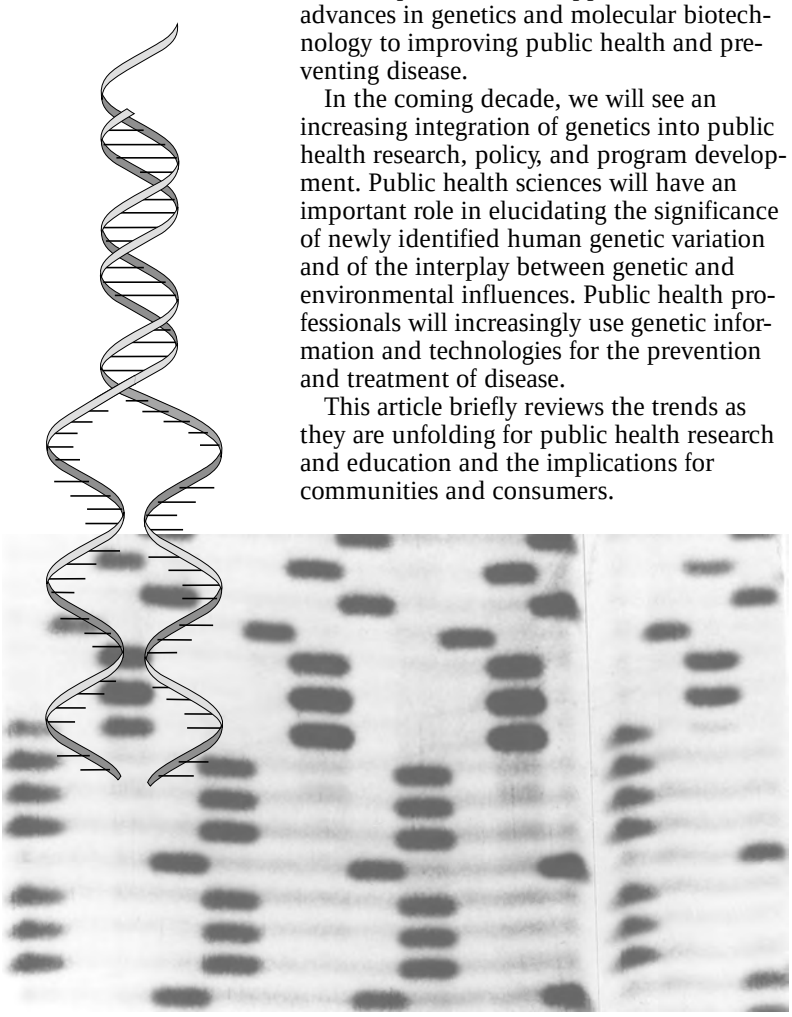
Melissa A. Austin
Patricia A. Peyser
Muin J. Khoury

As the year 2099 turns into 2100, historians will surely consider the completion of the sequencing of the human genome in 2000 as the first significant scientific milestone of the twenty-first century. And we can only begin to imagine the profound revolution ahead for human health.

With the new genetic technologies and information available today, we are already in the early stages of a transformation of public health practice, research, and education. A new specialty — public health genetics — has recently emerged at the interface of these two disciplines. It is the application of advances in genetics and molecular biotechnology to improving public health and preventing disease.

In the coming decade, we will see an increasing integration of genetics into public health research, policy, and program development. Public health sciences will have an important role in elucidating the significance of newly identified human genetic variation and of the interplay between genetic and environmental influences. Public health professionals will increasingly use genetic information and technologies for the prevention and treatment of disease.

This article briefly reviews the trends as they are unfolding for public health research and education and the implications for communities and consumers.



Research Trends

The explosion of genetic knowledge and technology has created a growing need for multidisciplinary and cross-disciplinary research related to public health and genetics. We can see these influences at work transforming the following areas of public health science and related fields.

Genetic and Molecular Epidemiology

Genetic epidemiology seeks to identify genetic characteristics, and their interactions with environmental exposures, that influence the distribution of disease among families and within diverse human populations. The goal is to improve early prediction of disease among high-risk persons and families and to design more effective interventions. For example, the tools of genetic epidemiology helped to identify a susceptibility gene for non-insulin-dependent (type 2) diabetes mellitus on chromosome 2 in a study of 330 Mexican-American sibling pairs (Hanis et al. 1996) and on chromosome 20 in a sample of Finnish sibling pairs (Ghosh et al. 1999).

Rapid advances in molecular biology are providing new tools for epidemiologic studies. Molecular epidemiology has increased understanding of the transmission and pathogenesis of infectious diseases. For example, a comparison of the genetic profile of *E. coli* shared between sex partners allows the identification of genes associated with transmission of uropathogens (Foxman et al. 1997). Genetic fingerprinting techniques for *E. coli* O157:H7, developed at the University of Washington, have helped epidemiologists quickly pinpoint food-borne or waterborne sources of contamination and halt spread of disease.

Furthermore, the emerging field of human genome epidemiology (HuGE) applies epidemiologic methods and approaches in population-based studies investigating the impact of human genetic variation on health and disease. Investigators are addressing a spectrum of topics ranging from research on gene variants to risk assessment and evaluation of genetic tests and services.

A recent and intriguing study shows that persons with a genetic trait that decreases the ability to metabolize nicotine were less likely to be tobacco-dependent.

To further these efforts, a collaboration of individuals and organizations recently launched the Human Genome Epidemiology Network (HuGE Net). This global effort seeks to: (1) promote collaboration in developing and disseminating peer-reviewed epidemiologic information on human genes; (2) develop an updated and accessible knowledge base on the World Wide Web; and (3) promote use of this knowledge base by health care providers, researchers, industry, government, and the public for making decisions involving the use of genetic tests and services for disease prevention and health promotion.

Pathobiology and Infectious Diseases

Advances in genotyping technology and sequence analysis hold remarkable potential for better understanding susceptibility and resistance to infectious diseases. For example, a recent report based on five AIDS cohorts revealed a significant association between HLA class I heterozygosity and slower disease progression to AIDS among both Caucasians and African Americans and also identified two specific alleles associated with disease progression (Carrington et al. 1999). These findings demonstrate that host susceptibility and resistance to infectious diseases can be genetically mediated.

Concurrently, genome sequencing of microbes is advancing rapidly and leading to the identification of microbial gene products implicated in the infectious process, the screening for "pathogenicity islands" that influence virulence, and the identification of molecular targets for new therapeutic agents (Jenks 1998). Even more important is the possibility of characterizing the diversity of host-pathogen genomes, their interactions, and their roles in infectious diseases.

Ecogenetics and Pharmacogenetics

In the context of environmental health sciences, ecogenetics focuses on the role of gene-environment interactions in relation to health and disease. A recent and intriguing study shows that persons with a genetic trait that decreases the ability to metabolize nicotine were less likely to be tobacco-dependent (Pianezza et al. 1998). Further, those who were already tobacco-dependent were likely to smoke fewer cigarettes. These results raise the possibility for more effective disease prevention strategies targeted to those with specific genetic susceptibilities.

Pharmacogenetics has recently focused on the apparent interaction between use of oral contraceptives and a specific genetic mutation that causes resistance to a potent anticoagulant protein that limits clot formation. Among women who *do not use* oral contraceptives, those with the mutation have a six times greater risk of thrombosis compared to those who do not have the mutation. For women who *use* oral contraceptives, those with the mutation have a 12 times greater risk of thrombosis compared to those who do not have the mutation (Vandenbroucke et al. 1994). Such synergistic effects between the mutation and oral contraceptive use have implications for screening policies.

Statistical Genetics and Population Genetics

The development of new methods for statistical analysis of genetic data is advancing rapidly and will be essential for understanding the data emerging from the Human Genome Project. These methods include gene mapping and positional cloning based on family studies and linkage analysis. Statistical genetics contributes to optimal sampling designs, to the development of better methods of statistical genetic analysis, and to the application of these methods to specific diseases. Another analytic challenge is the simultaneous consideration of many genes in conjunction with environmental exposures.

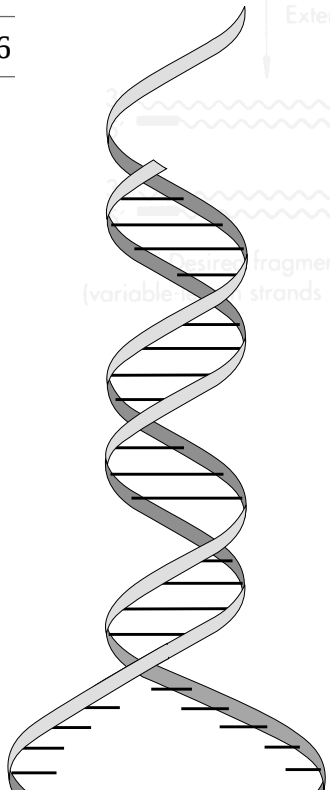
Population genetics is a closely related field that investigates genetic variation due to population structure, migration, mutation, and natural selection. It provides an important tool for identifying regions of the genome involved in disease susceptibility.

Bioinformatics

Acceleration in the volume of data generated by the Human Genome Project and numerous other research efforts will require deciphering genetic information and translating it into meaningful data that can be used in public health settings. Bioinformatics, an emerging field combining molecular biology and computer science, is furnishing the new hardware and providing efficient algorithms for symbolic analysis, scientific computation, graphical interpretation, and data management. These developing tools, along with epidemiologic information on human genes, will help to translate sequences of thousands of genes into functional and clinically relevant information that can advance our understanding of genetic susceptibility to disease.

Consumers, Communities, and Conundrums

Advances in genetic knowledge have generated ethical and legal conundrums involving individuals and communities, both in research and in health care. The basic ethical principles of biomedical and public health research —



respect for participants, beneficence and nonmaleficence, and justice — are applied through the process of informed consent, risk-benefit analysis, and appropriate selection and recruitment of study subjects, respectively. Considerable controversy surrounds the use of DNA samples for genetic research, especially those collected and stored without specific informed consent. Some investigators have proposed the informed consent process consider participants as "limited partners" in research rather than as "study subjects."

Issues of privacy and confidentiality are reflected in recent concern about the publication of pedigrees in biomedical journals, and in the creation of a genetic database for the entire country of Iceland. These issues demonstrate that ethics is not just an abstract intellectual discipline. It is about the conflicts that arise in trying to meet real human needs and values and is of central importance in public health genetics.

Hand in hand with debates on biomedical ethics are questions of tort liability (e.g., medical malpractice, product liability, invasion of privacy, damage to business relationships), regulation of genetic technologies and products, and legal enforcement of "rights" to genetic information and services. For example, given that genotypes provide information about relatives of the patient or research subject, do third parties have a right to know this important information? Does this right gain legal vitality when such critical information might be able to prevent illness or death? What are the ethical and legal duties of the patient or health provider to warn the third party?

Other legal issues include the applicability of antidiscrimination laws (Americans with Disabilities Act, Fair Housing Act, Individuals with Disabilities Education Act), civil rights laws (Title VII of the Civil Rights Act), and common law (divorce and custody laws) to alleged genetic discrimination.

Furthermore, testing for genetic diseases can have profound psychological effects that alter health behavior. Education regarding the role of genetics in health and disease is needed, both for the public and for public health professionals.

Cultural Contexts and Considerations

Genetics research in public health is, by nature, conducted in the context of communities and populations. The commercialization of body tissue, including DNA, as a resource to be "mined or harvested" and the patenting of DNA also create legal issues, but these questions are not merely ethical and legal in nature. They frequently collide with well-developed cultural mores. For example, the recent implementation of a genetic database composed of samples from the entire Icelandic population would be anathema to some Native American tribes, who strongly oppose such comprehensive invasion of their genome.

One proposed and controversial policy solution is the concept of community or group consent for genomic research (Weijer and Emanuel 2000), an approach that will require considerable honing to move from theory to public health practice. In a recent study involving two Native American tribes, the authors concluded that community review facilitates the development of partnerships between researchers and communities, thereby enhancing participant recruitment and retention in studies.

Population Testing and Access to Services

Population-based genetic testing for disease presence and susceptibility is one of the most important potential applications of the advances in molecular biotechnology to public health. Such testing raises difficult policy decisions. For example, an expert panel convened at the Centers for Disease Control and Prevention in 1997 declined to endorse genetic testing for hereditary hemochromatosis due to uncertainties about prevalence and penetrance of gene mutations, the optimal care of asymptomatic people carrying the mutation, and the potential for stigmatization and discrimination (Burke et al. 1998). Such recommendations will need to be reevaluated as new genetic information becomes available, and as specific guidelines are developed regarding the criteria for conducting genetic testing in a population setting.

Each new test for disease susceptibility focuses more attention on issues of access to genetic services, including the availability of genetic counseling. For example, the obligation for genetic service providers to recontact former patients about advances in research takes on new dimensions. A recent survey of geneticists and genetic counselors did not reflect a consensus about the benefits and burdens of such a practice. Although the respondents indicated that it was desirable to recontact patients, they did not perceive it as a practical goal within the current health care system (Fitzpatrick et al. 1999).

. . . the recent implementation of a genetic database composed of samples from the entire Icelandic population would be anathema to some Native American tribes . . .

UW Institute for Public Health Genetics

The Public Health Genetics (PHG) program at the University of Washington, established in 1997, offers both a two-year graduate program leading to a Master of Public Health (MPH) degree in Public Health Genetics and a graduate certificate program. The program is supported by the President's University Initiatives Fund (UIF) and involves the schools of Public Health and Community Medicine, Law, Medicine, Nursing, and Pharmacy, the College of Arts and Sciences, and the Daniel J. Evans School of Public Affairs. In addition, active collaborative relationships involve the Washington State Department of Health and the Fred Hutchinson Cancer Research Center.

The MPH degree track in Public Health Genetics is the only such degree program in the country. In addition to course requirements in all the public health disciplines and a practicum experience, the core curriculum consists of a series of courses that introduce students to each of the disciplines integral to PHG, including genetic epidemiology, legal, ethical, and social issues, and biotechnology, bioinformatics, and ecogenetics. Students are drawn from diverse backgrounds ranging from molecular biology to social science, and can select specially developed electives from numerous university departments.

The graduate certificate program is designed for students in other UW graduate programs who wish to take a set of core PHG courses. To date, students from Environmental Health, Epidemiology, Pharmacy, and Public Policy have earned the PHG certificate.

In addition to academic training, the Institute for PHG has initiated two major projects to facilitate relevant research: "Genetic Testing in the Workplace: Implications for Public Policy," and "Assessing Genetic Knowledge and Attitudes in Two Populations." The first project explores ethical, legal, social, and economic implications of advances in human genetics and molecular biotechnology for occupational health. The investigators have examined how this information is used in the workplace and what public policies promote the use of genetic information to appropriately balance the interests of workers, employers, and the general public. The second project will increase understanding of salient cultural features that may influence individual and family attitudes about participating in genetic research. The investigators developed an assessment tool and tested it through interviews with members of the Japanese American and the Pacific Islander communities.

The Institute for PHG has a multifaceted collaboration with the UW Center for Ecogenetics and Environmental Health (CEEH), funded as a Center of Excellence by the National Institute of Environmental Health Sciences of the National Institutes of Health. CEEH focuses on understanding gene-environment interactions that lead to chronic diseases of public health importance. Thus, the goals of the CEEH are highly complementary to those of the Institute for PHG. The second five-year award for the CEEH includes a new initiative to develop a series of cases studies on the Ethical, Legal and Social Implications (ELSI) of Ecogenetics Research.

The PHG Web address is: http://depts.washington.edu/phgen.

Education and Professional Training

For many years schools of public health have offered courses with genetic content or that address associated ethical, legal, and social issues. Given the broad impacts of expanding genetic knowledge and technology, it is important that more, if not all, public health students be exposed to the fundamentals of public health genetics. Such education needs to address a variety of audiences, including traditional public health graduate students and practitioners, students from related disciplines, and health care professionals.

The University of Washington recently implemented new programs focused specifically on the application of the advances in human genetics and molecular biotechnology (sidebar). These programs differ from past efforts in that they deliberately link courses in a multidisciplinary approach to genetics in public health.

The rapid expansion in knowledge of human genetics strains the ability of the public health workforce, including practitioners, researchers, laboratorians, and policy makers to keep abreast of new information and its potential implications. Systematic, continuing education is needed to provide these varied audiences with the knowledge and skills necessary to use genetics information in public health programs that prevent disease and improve health. The Centers for Disease Control and Prevention offers several training programs, including short introductory and advanced courses in genetics and disease prevention, online training materials, lectures, and newsletters. In addition, faculty of the University of Michigan, the University of Washington, and the Johns Hopkins University are developing a multi-institution effort to plan and implement continuing education courses for genetics in public health.

The emerging field of public health genetics will increasingly involve interactions among a broad range of disciplines. New technologies and information will accelerate scientific advances, which must be evaluated in a societal context. Breslow (1999) proposes that genetic research should include efforts to identify "genetic indicators of longer and better lives," not just markers of disease susceptibility. Such efforts will necessitate collaborations among scientists, social scientists, ethicists, and legal and policy experts. One of the biggest challenges for society and for public health professionals will be to develop policies and procedures that maximize health benefits derived from genetic advances while ensuring that genetic information is not misused.

(continued on page 25)

Viewpoint

Don't Take Liberties with Our Genes

Philip L. Bereano

The Human Genome Project at the National Institutes of Health, according to President Clinton, "will one day in the not-too-distant future enable every set of parents that has a little baby to get a map of the genetic structure of their child. So if their child has a predisposition to a certain kind of illness or a certain kind of problem, . . . they will be able to plan that child's life, that child's upbringing, to minimize the possibility of the child developing that illness or that predisposition (in order to) enable untold numbers of people to have far more full lives than would have been the case before . . . ."[1]

President Clinton's picture of a wonderful technofuture sounds like a threatening Brave New World to many Americans. The confluence of several technical and social trends has greatly enhanced the capacity for genetic surveillance and tracking:

- The science of genetics is a flourishing new industry, nourished in large part by the federally funded Human Genome Project, which recently claimed the almost complete sequencing of the genome's 3.2 billion subunits of DNA. The ultimate goal of this ambitious research endeavor is to identify every gene found in the human body, an unknown number with estimates ranging from about 35,000 to more than 100,000. Spinoff research at biotech companies and universities focuses on genetic diagnostics, developing tests to identify genes thought to be associated with various medical conditions. Scores of new genetic tests have evolved in the past five years alone.
- The increasing speed, sophistication, affordability, and interconnectivity of computer systems allows the rapid monitoring and matching of many millions of genetic records.
- The promotion of an "ideology of geneticization" fosters the belief that genes are determinants of a person's behavior, character, and future. In the words of Nobel Laureate James Watson, "We used to believe our destiny was in the stars; now we know it is in our genes." (The critical role of environment, and the complex interplay between a genome and its surroundings, are largely ignored in the media and public discourse about genetics.)
- Capitalist economic relations have created a mad scramble for venture capital and have intensified pressures to alter patent laws. Many researchers are calling for mass genetic testing.

Values Underlying Genetic Research

The dominant ideology in Western society proclaims that science and technology are value-neutral, and the only problems caused by technologies are either "externalities" (unintended side effects) or abuses. However, technologies are *not* value-neutral; they usually embody the perspectives, purposes, and political objectives of powerful social groups.

[1] *The New York Times*, September 26, 1996, p. A14.

Technologies are the result of human interventions into the otherwise natural progression of activities, and are thus imbued with intentions and purposes. Current technologies do not equally benefit all segments of society — and indeed are not intended to do so.

In the United States, social and economic forces are exacerbating the differential access to wealth and power. Because technologies are intentional interventions into the environment, those with more power can determine which technological developments are researched and implemented. Thus, technologies themselves are not neutral; they are social and political phenomena. Genetic technologies and computerization exhibit these characteristics and reflect power differentials in our society.

Genetic Tests, Class, Consent, and Privacy

The growing mania for testing in the United States is a manifestation of class relationships through new technological possibilities: employers test employees, insurance companies and health organizations test patients, college officials test students, legislators pass bills to test a variety of disempowered groups (welfare recipients, prisoners, immigrants, and the like). The consequences can be devastating:

- The U.S. Department of Defense insists on taking DNA samples from all its personnel, ostensibly for identification of those killed in action or in military accidents. Yet, the department will keep the samples for 50 years, long after personnel have left active duty. The testing also includes civilian employees, and the agency refuses to issue regulations barring all third-party use.
- The FBI has been promoting the genetic screening of criminals to establish state DNA identification data banks to be used in criminal investigations; recent federal legislation penalizes states fiscally if they don't participate. Screening also encompasses those whose crimes have low recidivism rates or don't leave tissue samples; some states even screen those who are merely accused of a crime.

The American Civil Liberties Union (ACLU) advocates that "the decision to undergo genetic screening is purely personal"; it should not be "subject to control or compulsion by third parties" or the government. The ACLU also maintains that a person who has agreed to genetic screening must be informed of the results, which should not be disclosed to third parties without the person's express and informed consent.

The required informed consent should define future allowable uses of the genetic samples so as to deny all future research uses for which such consent is lacking. If some argue that this restriction may compromise the ability to do research, we should remember that upholding civil liberties values often leads to inefficiencies; we could catch more crooks if we did away with the Fourth Amendment prohibition on warrantless searches.

Yet patients' records "are commodities for sale," in the words of *The New York Times*;[2] and a panel of the U.S. National Research Council has warned that the computerized medical records of millions of citizens are open to misuse and abuse.[3]

Authoritarian-minded public officials are trying to extend testing without consent. Louisiana has a statute requiring testing of all persons who are arrested (a provision a recent New York City police chief believed is worth enacting up north; New York City Mayor Rudolf Giuliani thinks everybody should be DNA-tested at birth).

Insurance and Genetic Discrimination

Genetic discrimination is the other major civil liberty issue. Scientists working with the Council for Responsible Genetics (CRG) have documented hundreds of cases where people have been denied insurance or employment based on genetic "predictions," for example:

- A healthy woman who casually mentioned to her doctor that her father had been diagnosed with Huntington's disease, and that she herself was at risk for inheriting this genetic disorder, was later denied disability insurance because insurers found a note about her father's diagnosis.
- A healthy boy who carried a gene predisposing him to a heart disorder was denied health coverage by his parents' insurance company, even though the boy took medication that eliminated his risk of heart disease.
- A pregnant woman whose fetus tested positive for cystic fibrosis was told by her health maintenance organization (HMO) that it would be willing to cover the cost of an abortion but would not cover the infant under the family's medical policy if she elected to carry the pregnancy to term.

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[2] *The New York Times*, November 15, 1995, p. A1.
[3] *The New York Times*, March 6, 1997, p. A1.

Of course, relatively few genetic diseases are deterministic. Most tests (which have inherent limits) cannot tell us if a genetic mutation will become manifest; or if it does so, when in life this will occur or how severe the condition will be. In addition, many genetic conditions can be controlled or treated by interventions and environmental changes; that is why governments mandate testing newborns for PKU (phenylketonuria, a recessive hereditary metabolic disease that, if not treated from birth, may cause severe mental retardation).

Federal legislation, the Health Insurance Portability and Accountability Act (1996), limits genetic discrimination regarding certain medical insurance policies, but does not apply to others, nor to life, disability, or automobile insurance, nor to employment — all areas of documented discrimination. Slowly, state by state, the CRG, ACLU, and patients' rights groups are trying to get legislation passed to reduce or eliminate genetic discrimination; about 40 states have enacted some type of protection.

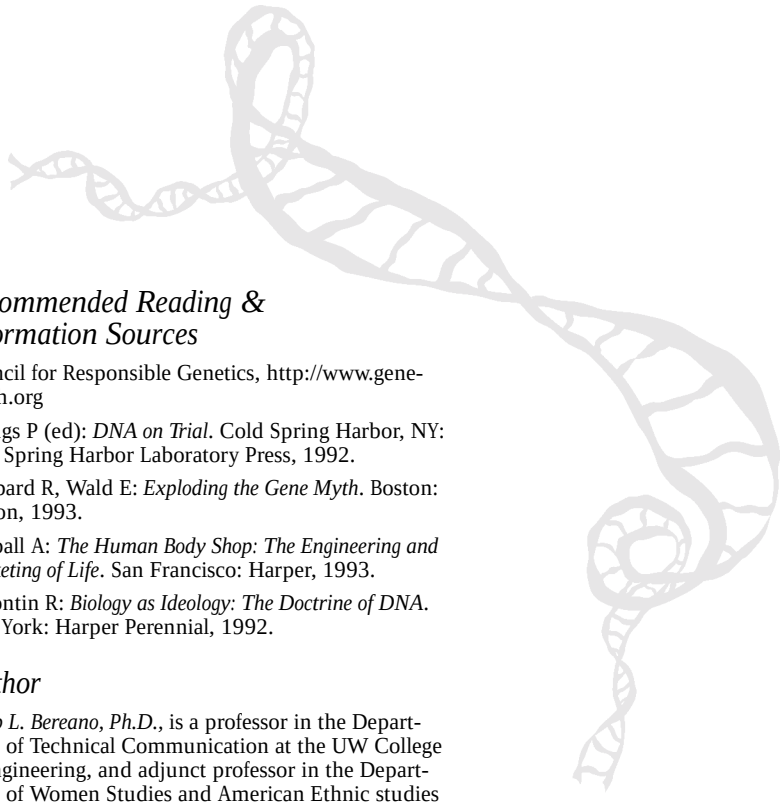
President Clinton announced his support of a federal bill to prohibit health insurance providers from using any type of genetic information for making decisions about whether to cover a person or what premium to charge. This legislation would address some of the recent discrimination problems.

Beyond the risk of discrimination, however, society's fascination with genetic determinism has other social and political consequences. Overemphasis on the roles of genes in human health neglects environmental and social factors. For example, strong evidence points to links between environmental contamination and cancer. Current research priorities, however, are skewed toward identifying genetic predispositions to cancer. If cancer is cast primarily as a genetic disease, then legislators may discard efforts to clean up environmental carcinogens in favor of a search for "cancer genes."

In effect, we encourage a "blame the victim" mindset that condemns people with "faulty" genes. Social conditions such as poverty or environmental pollution, which correlate directly with poor health and higher mortality rates, become less important. And economic and social resources are diverted into finding biomedical "solutions" while societal measures are short-changed.

Although new technologies claim to offer us more "freedom," they can threaten our civic values. This is certainly true of the new biology. As Jefferson warned, "the price of liberty is eternal vigilance" — it isn't genetically hard-wired to happen automatically.

In effect, we encourage a "blame the victim" mindset that condemns people with "faulty" genes. Social conditions such as poverty or environmental pollution, which correlate directly with poor health and higher mortality rates, become less important. And economic and social resources are diverted into finding biomedical "solutions" while societal measures are short-changed.



Recommended Reading & Information Sources

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Expanding Genetics Knowledge Drives Demand for Care Services

Debra Lochner Doyle

For genetics advances to benefit the general population, access to, and quality of, genetic health care services must be ensured.

Sequencing the human genome is opening the floodgates for the identification of thousands of disease-causing genes and ultimately for better risk assessment and diagnosis for genetic disorders. New strategies for prevention, management, and treatment of genetic diseases will benefit those with these disorders and their families.

Information evolving from the Human Genome Project is already significantly influencing medical practices. While some view this revolution in genetics with great promise, others harbor serious concerns. At this relatively early stage, many issues related to genetic testing and counseling have sparked widespread professional and public policy discussions. As the demand for genetic testing grows, what are the implications for Washington's system of Regional Genetics Clinics? What is public health's role in this revolution?

Growing Pains as a Discipline Evolves

Clinicians were able to visualize chromosomes as early as 1957, and most states implemented newborn screening programs in the 1960s. Amniocentesis and ultrasound technologies catapulted prenatal genetic services into the mainstream of medical care in the 1970s. Laboratory techniques such as molecular genetic testing (DNA testing) and fluorescent insitu hybridization (rapid identification of specific DNA sequences located on chromosomes) initiated in the 1980s and 1990s further confirmed that such tests can be cost-effective, invaluable medical tools.

Yet, the American Board of Medical Subspecialties did not formally designate medical genetics as a subspecialty until 1991. Prior to 1997, few genetic diagnostic tests had Current Procedural Terminology (CPT©)* billing codes. Such codes are still lacking for the labor-intensive genetic counseling services that precede and follow most laboratory procedures. This systems shortfall makes it extraordinarily difficult for clinics to bill for their services.

*Current Procedural Terminology is a copyright of the American Medical Association.

Only recently has medical genetics become a mandatory topic for study in medical schools. Many practitioners have little or no training in this subject. Yet, a recent March of Dimes survey reported that over 90% of those surveyed would seek answers to their genetics questions from their primary care provider. A key concern is the readiness of health professionals to recognize when genetic testing and counseling services may be appropriate and to provide such services or referrals.

Initiatives in Washington

The Washington State Department of Health (DOH), with funding from the federal Department of Health and Human Services, worked with genetic service providers and others to develop a statewide system for genetic health care services in the 1970s. The goal was a system accessible to all residents that would prevent premature death or disability related to genetic risk factors.

At Regional Genetics Clinics, Washington residents can receive a genetic consultation from a health care provider certified by either the American Board of Genetic Counseling or the American Board of Medical Genetics. Western Washington has 12 regional clinics and Eastern Washington has four (Figure 1). In addition, 11 clinical laboratories and several specialty clinics provide comprehensive services for complex conditions (e.g., sickle cell anemia [Figure 2], PKU, and hemophilia).

These regional clinics and laboratories are located in and managed by academic, private, and public institutions. DOH oversees and coordinates some clinic functions and funds visits by medical geneticists to clinics in Tacoma, Walla Walla, Yakima, Wenatchee, and Spokane. Each regional clinic compiles data on prenatal services (focused on the fetus), clinical services (for children and adults), and laboratory services. The clinics gather basic demographic data (e.g., county of residence, financial status, and self-reported ethnicity of the family), reasons for referral, and the testing or screening services rendered.

The most common reasons for referral for prenatal services include advanced maternal

age, an abnormal result on a screening test (e.g., ultrasound), and a family history of a genetic disorder or birth defect. Pediatric referrals continue to dominate the clinical visits, with the most common referrals being multiple congenital anomalies, skeletal abnormalities, and mental retardation. An important trend, however, is the increasing number of persons seeking genetic services for adult-onset disorders. For example, the number of families seeking services related to a family history of cancer increased 20-fold from eight in 1994 to 163 in 1998. This increase is likely a direct result of the discoveries of genes for both breast and colon cancer realized through the Human Genome Project's mapping and sequencing efforts.

Another indicator of expanding need for genetic consultation services is the nearly four-fold increase in outreach clinics funded by DOH and conducted by a medical geneticist from Children's Hospital and Regional Medical Center. From 16 outreach clinics in 1991 in Spokane, Tacoma, Yakima, and Walla Walla, the number expanded to 62 in 1999. Nevertheless, some Regional Genetics Clinics have waiting lists of up to two months for services. Complete data for 1999 are still being compiled, but staff at some clinics have already reported a 20% increase over 1998 in the number of families seen. Staffing limitations prevent several clinics from expanding service provision. The number of molecular genetic tests performed (DNA tests) also has risen sharply in recent years.

These data reflect only those services and tests provided through the Regional Genetics Clinics. Health care providers such as obstetricians or oncologists also offer genetic services, but DOH does not compile data on services obtained through individual providers. As scientists continue to identify disease-causing genes and better understand how they affect our health, the demand for genetic services will continue to increase.

The Challenge for Service Delivery

In the next few years the genetics and public health communities need to collaborate to facilitate access for all Washington residents to high-quality, comprehensive genetic health care services. In September 1999, the State Genetics Advisory Committee, composed of geneticists, consumers, teachers, and public health staff, identified the following priority issues to be addressed in the coming years:

- *Education* — Educational endeavors are needed for diverse audiences, including policy makers, teachers, adoption workers, the media, health care providers, and consumers.

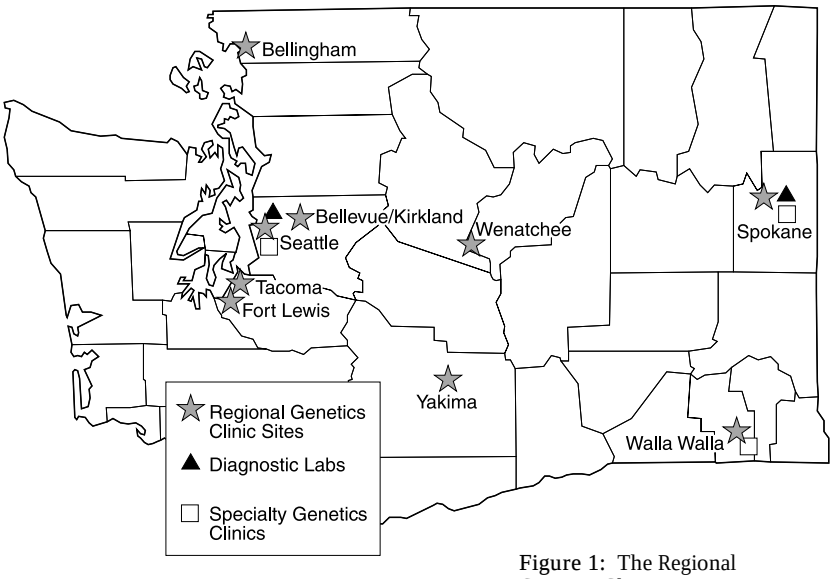

Figure 1: The Regional Genetics Clinic system.

- *Quality assurance* — Mechanisms are needed to allow monitoring of both clinical and laboratory genetic services to improve their quality. Approaches might include proficiency testing for laboratories providing genetic testing or continuing medical education (CME) credits to health care providers who receive additional training in genetics.
- *Economic stability of the Regional Genetics Clinic system* — If health care payers treated medical genetics like all other mainstream medical services and reimbursed genetic services accordingly, then genetics clinics would be less dependent on state support. In turn, these public health resources that now ensure access to genetic services could be redirected to studies of genetic epidemiology or to policy development.
- *Confidentiality/privacy regulation* — Policies that ensure the privacy and the confidentiality of genetic information have been introduced at both the state and federal level, but none have passed. Policy makers will need to balance consumer concerns with public health needs and legitimate research interests. They must consider both a person's right to privacy and the societal benefits that can be derived from genetic epidemiology rresearch.

Educational Concerns

The lack of genetics knowledge among consumers and professionals poses several hazards. Especially significant are missed health promotion opportunities or missed preventive strategies if a patient or health care provider fails to recognize genetic risk factors. Incorrect genetic information may raise undue alarm and prompt ill-advised decisions. For

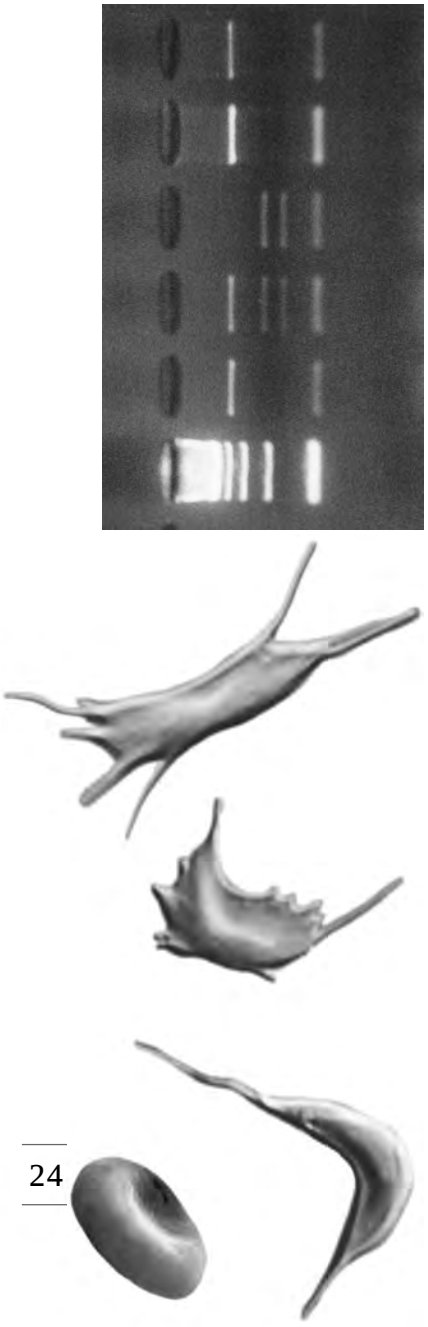

Figure 2: *Top*: DNA fragments amplified through polymerase chain reaction are visible on an electrophoresis gel. A pair of highlighted bands indicates a person homozygous for sickle cell anemia, as seen (top row down) in rows 1, 2, and 5. Row 4, with four highlighted bands, indicates heterozygous for sickle cell anemia. Row 3 shows the normal beta globin genotype with three highlighted bands.

Above: An electron micrographic photo of a normal, donut-shaped red blood cell (lower left) and irregularly shaped sickled cells.

example, in a 1997 study published in the *New England Journal of Medicine,* Francis Giardiello and his associates found that nearly 32% of physicians ordering genetic testing for familial adenomatous polyposis (a form of colon cancer) from a commercial laboratory misinterpreted the test results. While the study does not comment on the outcomes of these cases, clearly the potential exists in such circumstances for individuals to be informed that they have a gene for colon cancer when in fact they do not and perhaps to receive unnecessary treatment.

Increased awareness about genetic conditions and genetics issues may also decrease social stigmatization sometimes reported by adults and parents of children with genetic disorders. They frequently describe a lack of sensitivity toward affected family members in health care settings, in media coverage of genetics issues, and in general societal attitudes.

In 1997, the Department of Health convened a group of professionals active in genetics education to help develop a plan for addressing the broad educational issues. This group identified 14 target audiences along with recommendations and information needs for each. Target audiences ranged from adoption workers, lawmakers, and attorneys, to health care professionals, teachers, and the general public. Given the number of audiences and the varied educational goals set for each, the educational needs are vast. Full implementation of this plan will require the cooperation of the public health community and numerous community partners.

Quality Assurance

Laboratories providing genetic testing should be able to demonstrate that they have the capacity to perform the tests requested and report accurate results. The Clinical Laboratory Improvement Act (CLIA) does require extensive documentation of quality assurance and quality improvement plans and outcomes, but proficiency testing is not part of this federal regulation. The College of American Pathology offers proficiency testing for molecular genetic tests (DNA tests), but laboratory participation at present is entirely voluntary.

Genetic service providers should also demonstrate a commitment to quality care. For example, Regional Genetics Clinics in Washington have written mission statements and policies and procedures concerning the privacy of their patients and the confidentiality of patient information. Most public and private clinics have developed programs to monitor the quality of their services; these quality improvement efforts should be encouraged and supported by public health entities and others. In addition, clinics should routinely solicit consumer input (e.g., regarding patient satisfaction) to aid planning and evaluation services, especially given the rapid advances in medical genetics.

Economic Stability

The Regional Genetics Clinic system is witnessing a rising demand for genetic services. Yet, several factors threaten the continued viability of clinics with this specialized expertise. Many regional clinics heavily depend on state support for their basic infrastructure because health care billing and reimbursement practices have failed to keep pace with advances in genetics. Mandated benefits for prenatal genetic services have allowed prenatal specialty clinics to be fairly self-reliant. Genetics clinics offering both pediatric and adult services must rely on institutional, state, and local support because it is virtually impossible for them to be self-sustaining based on billable services.

Besides the lack of CPT© codes mentioned previously, many third-party payers continue to deny coverage for genetic services by claiming that they are “experimental” or because they deem “counseling” services nonessential. Patients frequently must cover the costs, although none are turned away due to inability to pay. When services are reimbursed, the amount paid is typically too low to cover the clinic's actual costs. Therefore, the dependence of the regional clinics on public health funding limits the ability to conduct other core public health functions such as assessment, policy development, and quality assurance, including health education.

Confidentiality and Privacy Policy Issues

Every person has genes that carry the risk or certainty of eventual disease or disability. Many people are concerned that misuse of genetic information could exacerbate discriminatory practices in insurance and in employment. Over the past four years, both state and federal legislative proposals have attempted to address this issue of “genetic discrimination.” However, to date, no federal or state protections specifically bar the misuse of genetic information. In public hearings conducted in 1998, residents from around Washington State reported that without comprehensive protections covering both employment and health care, they would be fearful of possible discriminatory practices and would be reluctant to participate in clinical genetics studies. This potential decrease in patient participation would slow medical and scientific progress.

For genetics advances to benefit the general population, access to, and quality of, genetic health care services must be ensured. Furthermore, health and social service providers and the general public should be educated about genetics issues. The public health community is in the unique position to help move the discoveries gained through sequencing the human genome into appropriate medical and public health practice. Public health professionals have a long track record of working with partners in the health care system, community groups, higher education, local government, schools, and business to improve people's health. It is exactly these types of partnerships and opportunities for dialogue that will help to resolve some of the complex issues already confronting our health care delivery system as a result of the Human Genome Project.

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Interface (from page 18)

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Infection and Chronic Disease

The Divide Blurs as Mounting Evidence Shows Links

George E. Kenny
Cho-chou Kuo

As technological advances have expanded our understanding of disease causation, the divide between infectious diseases and chronic, apparently noninfectious conditions has begun to dissolve. An infectious component is suspected, or in some cases proven, in some well-established chronic diseases (Table 1). Liver cancer is strongly associated with chronic infection with hepatitis virus B or C. Most stomach ulcer cases can be linked to infection with *Helicobacter pylori*. Now it appears that coronary artery disease has an association with *Chlamydia pneumoniae*. These findings have drawn wide attention from the press, as witnessed by a recent article in *Forbes* magazine, a general business publication. These three diseases share common features: long incubation periods, interaction of multiple risk factors, and occurrence of disease among only a fraction of all those with the infection. What are the implications for public health prevention measures?

Table 1: *Microbial agents associated with chronic diseases, hepatitis B and C liver cirrhosis, and liver cancer*

Hepatitis virus B and C	Liver cirrhosis and liver cancer
Helicobacter pylori	Stomach ulcers, stomach cancer
Chlamydia pneumoniae	Coronary heart disease, stroke
Human papilloma virus	Cervical cancer
Epstein-Barr virus	Burkitt's lymphoma B-cell lymphoma Nasopharyngeal cancer
Human herpes virus 8	Kaposi's sarcoma
Human T-cell leukemia virus	T-cell leukemia
Mouse mammary tumor-like virus	Breast cancer?
Borna virus	Schizophrenia?

Natural History

Liver Cancer and Hepatitis

Liver cancer (hepatocellular carcinoma, hepatoma) has a high prevalence in southeastern Asia, Taiwan, and sub-Saharan Africa, with annual incidence rates as high as 5 per 1000. In contrast, liver cancer is rare in the United States and northern Europe. This disparity across countries prompted many studies postulating a relationship between diet (focusing on aflatoxins) and the prevalence of liver cancer.

Development of diagnostic tests for hepatitis B infections in the 1970s led to the observation that areas with high prevalence of hepatitis B infections also had high prevalence of liver cancer. In a prospective study in Taiwan, Beasley found that chronic carriers of hepatitis B were at least 250 times more likely to develop liver cancer than were people who had not been infected or who had been infected but were now immune. This relative risk was one of the largest ever measured. In Taiwan, a 40-year-old male hepatitis B carrier had a 50% lifetime risk of developing liver cancer. Figure 1 depicts the hepatitis B virus.

In some countries, the incidence of liver cancer did not always parallel hepatitis B infection; in Italy, for example, liver cancer showed only a small association with hepatitis B positivity. The discovery of hepatitis C in 1989 and development of serological tests in the 1990s expanded views on the causes of liver cancer. Studies showed that chronic carriers of hepatitis C developed liver cancer in the absence of hepatitis B, again after a long incubation period. The relatively high prevalence of hepatitis C infection explains the high liver cancer rate in Italy.

Carrier factors, including age at infection, affect the progression from infection to liver cancer. It is widely thought that chronic destruction and regrowth of liver cells is the prime mechanism in the multistep derivation of cancer cells from normal liver cells. This slow progression would explain the long and variable incubation period between infection and cancer (Figure 2). It also explains why

only chronic carriers are at risk. Age at infection influences manifestation of hepatitis B; infected infants rarely show symptoms whereas most adults are symptomatic. Age also influences carriage; infected infants nearly always become chronic carriers compared to only 20% of newly infected adults.

Less is known in hepatitis C, but it appears that 80% or more of those infected become chronic carriers. The time from development of the carrier state to cirrhosis, liver cancer, or chronic liver disease ranges from years to many decades. Many carriers die from other causes before their liver disease becomes critical. What might be the role of other factors? Alcoholism has long been associated with liver cirrhosis and liver cancer. Alcoholics who are hepatitis C carriers are far more prone to develop cirrhosis and liver cancer than are those who have one factor but not both. Aflatoxins may have a similar role in liver cancer. Hepatitis C is becoming a major problem in the United States among persons who share needles; 80% or more of such persons are positive in Seattle.

Helicobacter and Stomach Ulcers

The stomach is an organ that gets little respect except when it fails to function properly. The lining of the stomach secretes a high concentration of hydrochloric acid. This acidity promotes digestion and protects the digestive tract from infections with many bacteria and viruses. The wall of the stomach is protected from acid attack by a mucous layer. When this barrier is breached, ulcerations of the stomach wall develop. The lifetime prevalence of stomach ulcers is 10% in Western countries. Several blockbuster drugs that inhibit acid production in the stomach have come on the market in recent years. These drugs do not cure ulcers but alleviate the symptoms if they are taken often for many years. Consequently, these agents have been major contributors to pharmaceutical company profits since the 1970s.

Numerous etiologic factors have been implicated in ulcers including stress, smoking, coffee, diet, anxiety, and attitudinal behaviors that essentially put the blame on the patient. In the 1980s, Warren discovered *Helicobacter pylori* growing in the stomach and proposed the radical hypothesis that stomach ulcers resulted from infection with this organism. This hypothesis was not well received by physicians accustomed to conventional treatment. It also posed a major threat to profits of some drug houses. Not till the mid-1990s did the medical profession generally accept that *Helicobacter* infections had a major role in stomach ulcers, convinced by studies showing

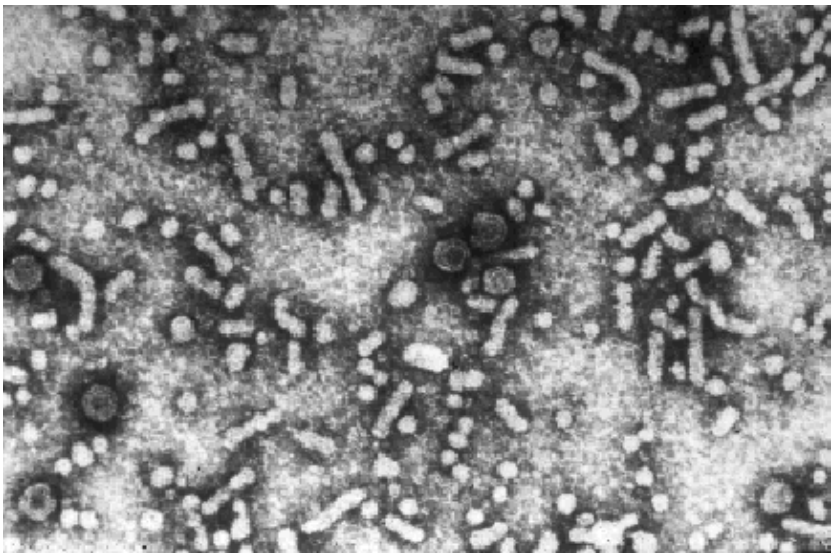

Figure 1: Electron micrographic photo of hepatitis B virus.

Source: Centers for Disease Control and Prevention.

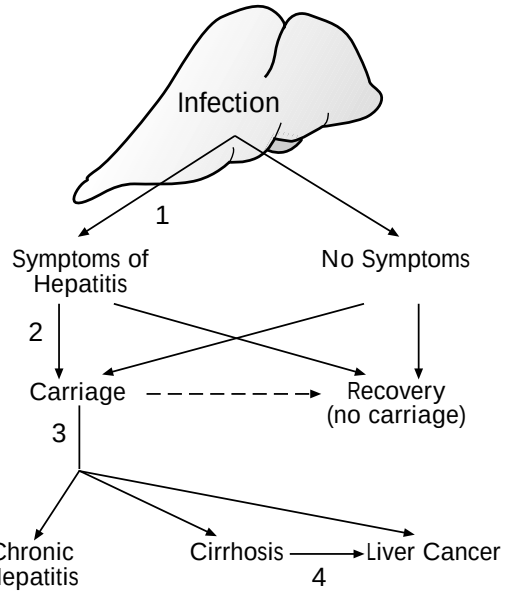

Figure 2: Possible outcomes of infection with hepatitis B or C virus. (1) The incubation period from infection to symptoms is 2–4 months. (2) Carriage can last for decades. A small percentage of hepatitis B carriers convert to noncarrier status each year. (3) The incubation period to serious liver disease is highly variable, taking decades. Many carriers die from other causes before their liver disease becomes critical. (4) Cirrhosis usually but not always precedes liver cancer.

that eliminating the organisms with chemotherapy cured ulcers, and reinfection frequently led to reoccurrence.

Helicobacter infections also have been associated with stomach cancer, but the association is weaker than that for ulcers. In the United States, the incidence of stomach cancer dropped markedly from 1900 until the present, while incidence in the developing world has remained high. Decreased incidence in the United States could be related to older age at infection, whereas infection still occurs at an early age in the developing world. This finding has led to the hypothesis that infection in childhood is a risk factor for stomach cancer whereas infection in adolescence and early adulthood is a risk factor for stomach ulcers. Interestingly, the U.S. Environmental Protection Agency has classified *H. pylori* as a major carcinogen.

Chlamydia pneumoniae and Coronary Artery Disease

Chlamydia pneumoniae is an obligate intracellular pathogenic bacterium (Figure 3). It causes pneumonia, bronchitis, and sinusitis, but two-thirds of infections are asymptomatic or limited to the upper respiratory tract. The prevalence of antibodies rises from 50% in young adults to 70% in old age, which suggests that most people are infected and reinfected throughout life. The possibility that *C. pneumoniae* might have a role in cardiovascular disease was first described by Saikku et al. (1988), who demonstrated a correlation of antibodies against *C. pneumoniae* and acute myocardial infarction. Several other studies have confirmed these findings with relative risk factors of two.

More strikingly, the organism has been detected in the foam cells in the lesion in atheromatous plaques. In some 50 studies, the organism has been detected in an average of 50% of atherosclerotic lesions from persons with coronary heart disease, carotid artery stenosis, aortic aneurysm, and occlusion of the lower extremity arteries (claudication), but not in normal arteries from healthy persons. It has been most difficult to isolate the organism from lesions, which is not surprising because the organism is difficult to isolate from any site.

How will we be able to separate the effects of infection from the other known risk factors such as smoking, high cholesterol, and hypertension and other less well-defined factors such as diabetes and family history? In rabbit and mouse models of hypercholesterolemia, infected macrophages spread from the lungs to the aortic atherosclerotic lesions, and infection appears to accelerate development of disease. Three of four pilot studies reported a favorable effect of short-term treatment with macrolides or tetracycline. Two multicenter studies in the United States are using azythromycin for long-term therapy in persons at risk for coronary heart disease.

Prevention and Public Health Implications

In these long-term infections, prevention has three major aspects. The best approach is to prevent initial infections. Preventing disease in carriers depends upon our ability to devise therapies to terminate carriage. Finally, treatments can be devised for those who have disease.

The blood supply is screened for both hepatitis B and hepatitis C to eliminate transmission by that route. Needle exchange programs would be useful to prevent spread of these viruses. Hepatitis B infections can be controlled or even eliminated because we have an effective vaccine and no apparent animal reservoir. A vaccine for hepatitis C may be difficult to devise because nearly all infected persons become carriers.

Early detection is critical in liver cancer. By the time clinical symptoms develop, the prognosis is poor. Early diagnosis can be accomplished by population screening to detect those who are antigen positive and at risk for liver damage and cancer. Persons who are positive for hepatitis B antigen are monitored for development of increased alpha-fetoprotein levels, an early marker for liver

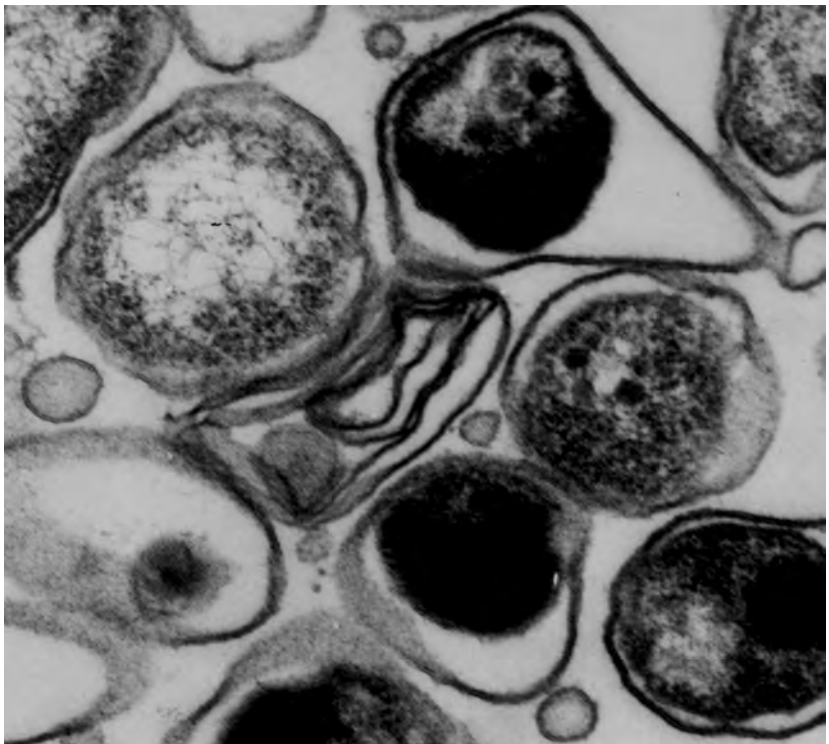

Figure 3: A transmision electron micrograph shows the distinctive pear-shaped cells of *C. pneumoniae.*

cancer. Those with elevated levels are then monitored by acoustic scan to detect small excisable tumors. This approach for early detection of tumors in hepatitis B infection has enhanced survival. Similar data are not available for hepatitis C carriers. Progress has occurred in using interferon and ribavirin to terminate carriage of hepatitis C, but toxicity of treatment is a problem.

The high prevalence of *Helicobacter* infections in children in developing countries indicates that infection control is clearly related to sanitation and crowding. The infection route is oral but the source of infecting material is unknown because the organism apparently does not survive its trip to the colon. Helicobacters have contaminated local well water supplies. Animals also carry *Helicobacter* species, but those characterized so far are distinct from the human strains. A major public health goal would be to find the mode of transmission of these infections.

Treatment is critical to patients with ulcers because some 70% of ulcers appear to be caused by *Helicobacter*. Vaccines may be difficult to develop given the chronic character of the infection. Variability in pathogenicity of *H. pylori* strains might explain the relatively high ratio of infection to disease. Control of ulcer disease itself could be accomplished by the detection and treatment of infections. A major campaign to eliminate carriage nationwide or worldwide by antibiotic treatment is an interesting possibility. However, antibiotic resistance is already being observed in helicobacters.

The situation for *C. pneumoniae* in coronary artery disease is much more complex. We need carefully defined studies of respiratory disease to determine the incidence of infection by age and the prevalence of chronic infection. Large etiologic studies of respiratory disease have been largely unfundable in the past decade. Eliminating infection by treatment is probably impossible because infection is asymptomatic. Development of a vaccine is important but most likely will be difficult if we find that *C. pneumoniae* infections are frequently chronic. If such a vaccine becomes available, it should be administered before five years of age when infection is rare. In the meantime, control measures may require the screening of persons at high risk for chronic chlamydial infection, and their subsequent treatment might be a reasonable method for preventing some coronary artery disease.

The immediate practical goal is to investigate whether antibiotic therapy is beneficial for persons at risk for coronary artery disease. On a more fundamental level, we need to know the natural history of chlamydial infections to determine when they begin and if persistent infection is typical of *C. pneumoniae*. To achieve this goal, a marker (or a laboratory test) is needed to detect persistent infections in atherosclerotic lesions.

Advances in medicine have gradually enhanced understanding of the links between infectious and chronic disease. Interestingly, as early as the 1920s, spiral-shaped organisms (probably *H. pylori*) were detected in the stomach, and technology available at the beginning of the twentieth century could have allowed culture of this organism on agar. For each of the diseases reviewed, investigators used classic epidemiologic approaches to establish relationships. Molecular technologies (immunocytochemistry, polymerase chain reaction, or recombinant DNA) were critical to detection of agents for hepatitis C and *C. pneumoniae*. They were not needed for detecting hepatitis B, but were necessary to develop the vaccine. A mid-century advance, the development of antibiotics, permitted the recent treatment studies.

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Ecological Health, Public Health, and Societal Well-Being

James R. Karr

The history of medicine is punctuated by changing health risks driven by radical shifts in human ecology. Threats to health changed, for example, as humans developed agriculture and established permanent settlements. Contagious diseases jumped from domesticated pets and livestock to humans. Cities were both birthplaces of modern civilization and incubators of pestilence and disease. Inadequate sanitation, combined with crowded conditions in towns and cities, spread diseases more rapidly while expanding trade spread diseases over longer distances (Table 1).

Industrialization, especially rapid in the twentieth century, added new threats even as it reduced others. Most technologies were two-edged swords. Wonder drugs controlled common pathogens while natural selection strengthened the ability of those pathogens to resist the drugs. Reservoirs in the tropics made water supplies more reliable for humans, but also created ideal environments for human parasites. Industrialization exposed human society to a remarkable array of chemicals — natural (e.g., heavy metals) and synthetic (e.g., chlorinated hydrocarbons) — with diverse health consequences (acute or chronic toxicity; carcinogens and teratogens; and immune suppressants and endocrine disruptors).

As each new challenge arises, medical practice must adapt, typically in a five-step process: (1) awareness that the problem exists; (2) understanding of its cause; (3) capability to control the cause; (4) sense of values that the problem matters; and (5) political will to conquer the threat. John Snow's meticulous study of the spread of cholera from wells in London in the 1840s is a classic example that eventually included all five steps. It provided the theoretical and empirical foundation for modern epidemiology and was instrumental in the eventual control of "filth diseases."

But past medical and public health advances should not make us overconfident. The activities of modern society continually present new dilemmas. New variants of old diseases continue to plague us (tuberculosis), as do newly emerged pathogens such as HIV, and the causes of Ebola fever, and mad-cow disease. From antibiotic resistance to rising exposure to endemic diseases at home (Lyme disease) and abroad (Lassa fever), classic diseases persist and even expand their range.

Furthermore, threats to public health are not constrained to bodily diseases. An increasingly important class of risks to individual health and societal well-being derives from declining ecological health, that is, the disruption of Earth's living systems. Depletion and degradation of the biosphere introduce health problems to human society that range from rising asthma rates to limited (or variable-quality) food supplies, global climate change, and stress diseases caused by overcrowding or the pace of modern life. Living systems are critical to maintain mental health and social stability. Failure to maintain ecological health increases human susceptibility to many diseases and increases the likelihood of crime and civil unrest, from burglary to murder, terrorism, and war.

The foundation of these health challenges is alteration of the supply of goods and services that human society draws from living systems. One recent study of so-called ecological services (e.g., soil formation, amelioration of climate, pollination) estimated the total

Table 1: *Shifting array of health challenges faced by human society in the past 200,000 years*

Years Before Present	Major Events	New Challenges
200,000	Modern humans appear	Combat and accidents Vector-borne infection Periodic famine
10,000	Towns and cities Agriculture	Nutritional deficiencies Contagious diseases Local ecological disruption
150	Industrial revolution	Chemical toxins
30	Modern affluence	Overnutrition Global ecological disruption

Modified from McMichael (1993).

annual economic benefits of biodiversity for the United States at $319 billion. Another study estimated the current global economic value of 17 ecosystem services for 16 biomes at $33,000 billion per year.

This new scourge — collectively declining ecological health — requires a new vision, one that no longer restricts health practices to treating symptoms. It also requires a changing view of what a "patient" is. Individuals and populations will always be patients, but the living systems of Earth, or the biosphere, must also be considered patients. Societal neglect or misunderstanding of this fact must be overcome. Until modern society and especially health practitioners become aware of the problem (step 1), we are unlikely to take the additional steps necessary to protect societal well-being.

Narrowly applying the methods of curative medicine to protect ecological health carries certain dangers. Instead of the typical emphasis on curing acute infections and traumatic conditions, it would be more appropriate to adopt a public health preventive approach — to protect and promote health. Too often modern medicine deals with problems after they arrive rather than preventing them. Snow's lesson from the London cholera outbreak shows the merit of a preventive approach.

Another important lesson from medicine's past is the need to anticipate unintended consequences, thereby averting iatrogenic, or doctor-caused, disease. Such diseases, inadvertently provoked by physicians or, more broadly, by modern medicine, may be clinical, social, or cultural. Anyone familiar with natural resource or environmental management is well aware of this sort of unintended consequence. Miracle "cures," such as pesticides to control crop pests or hatchery fish to supplement overharvested wild salmon populations, have led to unexpected "illnesses" ranging from stronger pests to extinct fish.

Efforts to bridge the gap between human and ecological health require new cooperation and collaboration among members of the human health community (medicine, epidemiology, public health) and the ecological health community (protection of life-support systems, pollution control). Improved communication with all citizens must be a central goal of that collaboration.

The success of public health in the twenty-first century depends on a movement that strengthens public health systems and understands that human health is a subset of a broader ecological health. Absence of disease in individuals is good, but overall public health is better. Both depend on ecological health. In short, a healthy biosphere is a prerequisite for healthy humans and for societal well-being.

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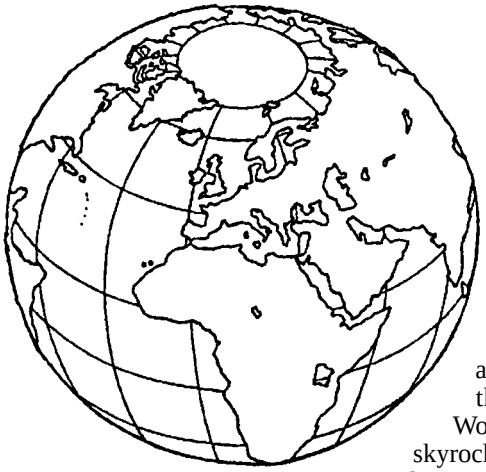
Failure to maintain ecological health increases human susceptibility to many diseases and increases the likelihood of crime and civil unrest . . .

Dan Lamont

The Incredible Shrinking Planet

Globalization Unites Humanity . . . for Richer and for Poorer, in Sickness and in Health



Ann Marie Kimball

Globalization has been heralded and maligned in the media as a force that is changing the way we live. Since World War II, global trade and travel have skyrocketed to unprecedented levels. The human community has surpassed six billion and has become more closely linked than ever through communications, travel, and trade. At least 400 million people travel across international borders each year. Global trade in food and animals has increased each year for the past four decades (Figure 1). Washington is the most trade-dependent state in the Union. In 1999 our state economy topped $106 billion in total two-way trade (included goods passing through the state for other destinations, but excluding services and software).

Washington State has a substantial "stake" in things foreign. We have become home to many new arrivals from war-torn economies, and they have enriched and diversified our population. An estimated 16,000 immigrants have joined our state's population rolls annually over the past decade. These new residents bring a perspective that encompasses people and cultures beyond our shores. Through this in-migration, we have become more connected to other countries.

So what is "globalization"? The term literally means "to make global, *especially* to make worldwide in scope or application." Transnational corporations applying this concept as a business strategy have accumulated historically unprecedented corporate and personal wealth. "Mitsubishi is bigger than Indonesia, Ford is bigger than Turkey and Wal-Mart is bigger than Israel," trumpeted a report from the Institute for Policy Studies. In a parallel fashion, human activities of all genre have become globalized: travel, employment, investment, diet, fashion, art, music, and so on.

The World Trade Organization talks held in Seattle in November 1999 and their attendant protests brought these realities home to our community. Among the proliferation of publicity were thoughtful discussions of how the current international trade agenda impacts health. Is trade an "engine of development" or purveyor of economic inequity? One message came through with clarity — health and disease can no longer be thought of as "local conditions."

As difficult as it may be to address local population health problems in the Pacific Northwest, they are just a small piece of the fabric of global human health and disease. Our piece cannot be isolated from the fabric as a whole. Globalization is a crosscultural, interdisciplinary phenomenon. The challenge to public health is to address globalization in a similar interdisciplinary manner. This article touches briefly on three areas of globalization: health determinants, emergent infections, and issues of intellectual property in pharmaceuticals. Finally, the implications for the State of Washington and its potential for leadership abroad will be discussed.

The search for determinants of population health is central to the history of public

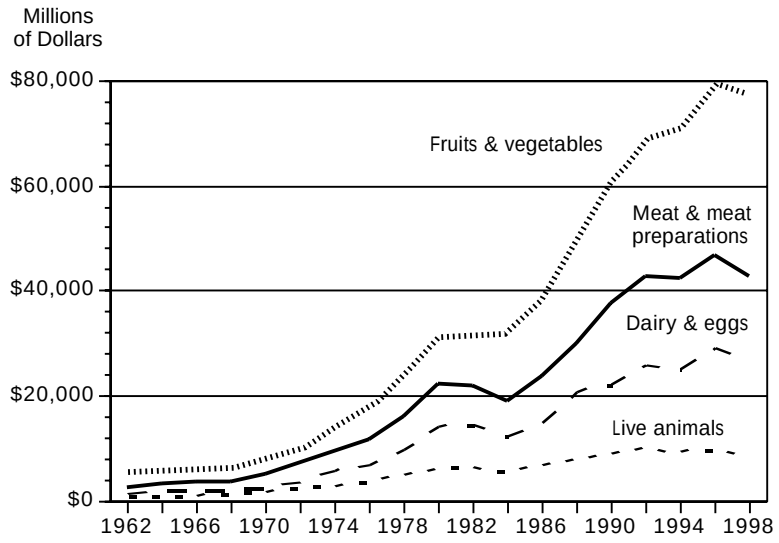


Figure 1: Global trade in agricultural products, 1962–1998.

Source: U.N. Food and Agricultural Organization (dollar amounts not adjusted for inflation).

health. It is beyond the scope of this article to chronicle the work done to date; however, paradigms have included the "population carrying capacity" resource concept of the 1970s, the postcolonial political construct, the concept that absolute poverty determines health, and the more current thinking that distribution of wealth within societies determines overall population health. Cross-national comparative studies have attempted to demonstrate the validity of the paradigm under study.

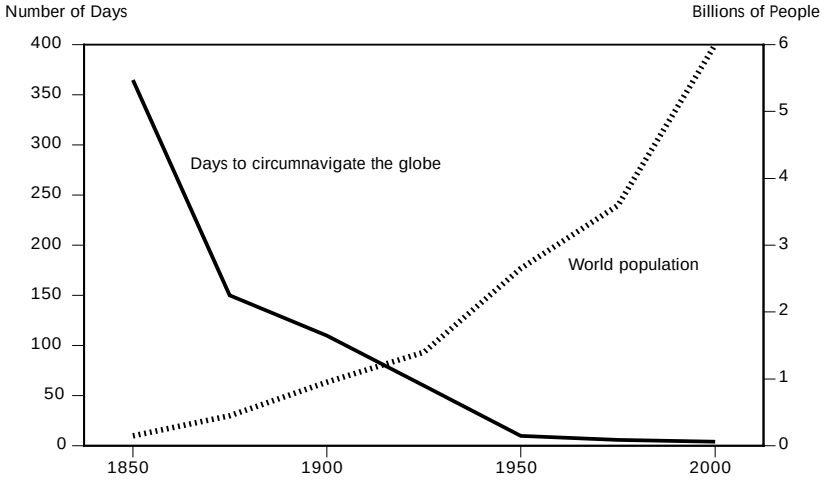
In this sense, the search for determinants of population health is an early example of "globalization" at work in public health. However, the globalization of action based on these paradigms has been more challenging. With the definition of health adopted at the 1978 World Health Organization meeting in Alma Ata, U.S.S.R., came the recognition that health is an intersectoral event. However, the tools for improving health outlined in the declaration's 10 components of primary health care are limited and leave public health practitioners searching in their toolbox as globalization of human activity presents new realities. Changing the distribution of wealth or focus of economic activities within societies has not traditionally been the purview of public health.

Trade and travel are two areas of human activity that have been "globalized." The 1992 Institute of Medicine Report *Emerging Infectious Diseases* chronicles the role of trade and travel as conduits of infectious disease and factors in the emergence of new diseases. A half billion people travel by air every year, and jets can carry anyone halfway around the globe in only a day (Figure 2). Nevertheless, the quarantine system of the United States languished as a national priority and only recently has it received new attention. However, traditional quarantine at borders is no longer a useful approach. Airport-based strategies were applied to detect and prevent the incursion of plague into the United States during the outbreak of putative pneumonic plague in Surat, India in 1993. More often than not, potentially infected individuals were located after they had already returned to their workplaces and homes, which demonstrates the ineffectiveness of this approach. Newer efforts focus on international cooperation and technical collaboration to ensure the safety of food and travelers.

Food-borne outbreaks of disease now are being traced to tainted products with international distribution. However, only a few cases may become apparent in any locality, so this new type of outbreak can defy normal "shoe leather" epidemiologic methods that traditionally rely on numerous cases to pinpoint a common exposure. The "smart" application of laboratory methods and molecular techniques to surveillance is becoming more important. Advances in pulsed-field gel electrophoresis developed at the University of Washington and the Washington State Department of Health offer a powerful method for "DNA fingerprinting" to quickly identify dispersed domestic and international outbreaks. This technology relies on computer storage of standardized laboratory-generated gel patterns in a national computer network called PulseNet, maintained by the Centers for Disease Control and Prevention (CDC). Sophisticated computer analysis allows rapid comparison of bacterial isolates, such as for *E. coli* 0157:H7, to determine whether a widely distributed contaminated food product is the source of illness among persons in different regions of the country. Several Asian trading partners, including Korea, have expressed interest in PulseNet.

Epidemiologic investigation is becoming more rather than less important in the brave new world of globalization. Japan is setting up an Epidemic Intelligence Service training program similar to that run by the CDC in Atlanta. The University of Washington enjoys a unique collaboration with the local and state health authorities that has strengthened outbreak investigation in the public health curriculum. As large epidemics caused by new agents occur around the Pacific Rim, epidemiologic skills are becoming more valued. Historically, this state-local-university partnership has served us well in meeting the

Figure 2: The past 150 years have told a saga of booming world population and shrinking travel times to circumnavigate the globe.



Source: Murphy FA, Nathanson N: The emergence of new virus diseases: an overview. *Semin Virol* 1994; 5(2):87.

challenges of detection and control of infectious diseases. Such cooperation occurs in few other economies around the Pacific Rim and has potential to become our new "export."

Globalization also presents opportunities in biotechnology and pharmaceutical endeavors, but from the public health perspective proffers obstacles along with advances. Lack of market potential has slowed or halted development of new drugs for traditional infectious disease scourges. The rapid evolution of antimicrobial resistance among pathogens has also tempered enthusiasm for investment in new therapeutic agents. Finally, intellectual property restrictions have hampered access to needed treatments in poor regions, as has a lack of inexpensive production alternatives.

So what do these trends mean for Washington State and its 34 health jurisdictions? Public health regulation and enforcement occurs primarily through local government. State law gives most of the authority for control of epidemics and quarantine to the county public health officers. Globalization potentially pits David (local health) against Goliath (the international trade community) if conflicts occur between the authority of county government and the global agenda for open and free trade and transport. What if a county wants to restrict the sale of unpasteurized juice because of recent outbreaks of infection with *E. coli* O157:H7? Is such a restriction on trade allowed? What are the roles of county and state governments? Of the United States government? Of the World Trade Organization? Where is the "muscle" to back up local government decision making about the welfare of consumers in that county? This example may seem far afield, but mirrors some issues raised before the WTO regarding environmental protections enacted by the United States on gasoline importation.

Local public health systems surely will feel the impact of the expanding global marketplace. Interestingly, for a state as trade dependent as Washington, local health jurisdictions have shown little evidence of an international perspective. As national frontiers further dissolve through travel and trade, local health officials will find that knowledge of the global marketplace is increasingly germane to their work. In fact, the global marketplace affects the price of apples, the picking of crops, the housing of migrants, and other local issues. Yakima County and the Tri-Cities already host a major influx of migrant workers each picking season, and have done so for decades. King, Snohomish, and Pierce counties are struggling to meet the demands of their new multilingual and multi-ethnic populations in schools and services. Integrating the local and global perspective in health service delivery and planning is becoming increasingly central to success. Integrating these areas of expertise is a challenge, but also an opportunity for which the partnership of academia and government in Washington is uniquely poised.

That public health institutions need to change to meet the challenge of globalization is clear. A recent series of articles by Yach and Bettcher (1998) highlight the prospects for change and assert that "Transnational actions must be built on firm local and national foundations." The complexity of issues raised through a global approach to health is evident in the range of disciplines touched upon by the foregoing examples: economics, business, law, international studies, infectious diseases, and pharmacy, to mention just a few. The challenge will be to preserve and strengthen valued local partnerships and to apply "lessons learned" across borders by drawing upon the expertise of diverse disciplines.

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Bioterrorism

When No Place Is Immune, Public Health Agencies Must Prepare

Julie Wicklund

Over the course of the twentieth century, the scope of public health practice expanded in step with societal changes, emerging threats to health, and medical and technological advances. As the twenty-first century opens, public health agencies again confront a new and especially difficult challenge — the threat of bioterrorism. Events of the last decade, such as the World Trade Center bombing, the Oklahoma City bombing, and the sarin nerve gas release in the Tokyo subway, have heightened concern about potential terrorist attacks in general and bioterrorist attacks in particular. Bioterrorism is the intentional or threatened use of viruses, bacteria, fungi, or toxins from living organisms to produce death or disease in humans, animals, or plants.

The easy movement of people across borders, global communication networks, and the difficulty of identifying potential terrorists, particularly those operating alone, mean that no place is immune from these frightening acts. Early this year a member of a terrorist group was arrested after entering the United States at Port Angeles, Wash. In the past year or so, local public health leaders in more than a dozen communities across the United States have had to deal with claims of release of dangerous biological agents.

Pictured with the article headline is an electron micrographic photo of the smallpox virus.

In response to this emerging issue, Congress authorized the Centers for Disease Control and Prevention (CDC) to coordinate the effort to upgrade national public health capability to counter bioterrorism. Following this mandate, the CDC established the Bioterrorism Preparedness and Response Program to facilitate collaboration, not only within CDC but also with international, state, and local health agencies and with nontraditional public health partners, such as military and law enforcement organizations. Additionally, CDC is working to establish a National Pharmaceutical Stockpile to ensure the ready availability of drugs, vaccines, prophylactic medicines, chemical antidotes, medical supplies, and equipment that might be needed in a medical response to a biological or chemical terrorist incident.

In September 1999, the CDC awarded federal money to state and large metropolitan health departments, including $1 million to the Washington State Department of Health (DOH), to respond to the threat of bioterrorism. DOH received funding to upgrade public health infrastructure in three areas: epidemiology and surveillance, laboratory support, and health alert network and training. Specifically this funding will be used to:

- reinforce and enhance public health surveillance to detect unusual or covert events;
- build epidemiologic capacity to investigate and control health threats from such events;
- enhance public health laboratory capacity to manage specimens submitted for testing or to confirm biological agents possibly associated with bioterrorism;
- develop and coordinate rapid and secure electronic communications systems with other government agencies and the general public to disseminate critical information; and

Anthrax: A Potential Bioterrorist Agent

Antrax, caused by a spore-forming bacterium, *Bacillus anthracis*, is a naturally occuring disease that is acquired through contact with infected animals or animal products.

Transmission: by cutaneous contact, eating undercooked, infected meat, or through inhalation of aerosolized spores. Inhalation anthrax will be the most likely consequence of an intentional (bioterrorist) exposure.

Symptoms: usually develop within 1–5 days; initial symptoms of inhalation anthrax resemble those of influenza (low-grade fever, nonproductive cough, malaise, fatigue); if untreated, symptoms progress after several days to severe respiratory distress, shock, and death.

Treatment: Antibiotic prophylaxis should be initiated when exposure to aerosolized anthrax spores is suspected. Prophylaxis should continue for at least 30 days (and possibly up to 60 days) if the exposure is confirmed.

Although the possibility of a bioterrorist attack is remote, the implications of not preparing could be catastrophic.

- coordinate distance learning opportunities to provide bioterrorism preparedness information to local health jurisdictions (LHJ).

A state coordinator, along with coordinators working in Public Health Seattle & King County and the Spokane Regional Health District, will develop materials to assist other LHJs with local surveillance and preparedness efforts.

In contrast to an obvious terrorist attack such as a bomb, or the release of nuclear or chemical agents, the initial detection of an unannounced release of a biological agent would rely on both the diagnostic capabilities of health care providers and clinical laboratorians, and the ability of public health surveillance to detect unusual patterns of disease. Early recognition of an event may be critical to minimizing its impact, especially if prophylaxis can be administered to others exposed or if the illness can be spread person-to-person.

Health care providers and public health officials need to be aware of the threat of bioterrorism and be familiar with the classes of agents used or potentially used in biological weapons and their symptom profiles. The CDC has listed several potential agents of particular concern including *Bacillus anthracis* (anthrax), smallpox virus, *Yersinia pestis* (plague), *Clostridium botulinum* toxin, and *Francisella tularensis* (tularemia). Many of these agents have nonspecific presenting symptoms (influenza-like prodrome), so it is also important for health care providers to understand the epidemiologic clues of a bioterrorism event. The following situations could represent possible bioterrorism events and should be reported to your LHJ:

- A single diagnosed or strongly suspected case of disease caused by an uncommon agent or a potential bioterrorist agent occurring in a patient with no known risk factors.
- A cluster of patients presenting with a similar syndrome that includes unusual disease characteristics or unusually high morbidity or mortality without obvious etiology.
- An unexplained increase in a common syndrome beyond seasonally expected levels.

In addition to partnerships with the medical community, public health officials should enhance interagency coordination and communication with the FBI, police, fire, and emergency management agencies. Public health must work with these groups to integrate bioterrorism preparedness plans with existing emergency management and disaster response plans.

Although the possibility of a bioterrorist attack is remote, the implications of not preparing could be catastrophic. Preparing for bioterrorism will also improve the ability of public health agencies to respond to other naturally occurring biological disasters and emergencies such as an influenza pandemic or large outbreaks of endemic diseases and newly emerging diseases.

On-line Information

The Association of Professionals in Infection Control (APIC), in cooperation with CDC, has created a reference document to raise awareness and facilitate preparation of bioterrorism readiness plans. It includes an overview of infection control activities and disease-specific information on smallpox, anthrax, plague, and botulism. This document is available at: http://www.cdc.gov/ncidod/hip/Bio/13apr99APIC-CDCBioterrorism.pdf.

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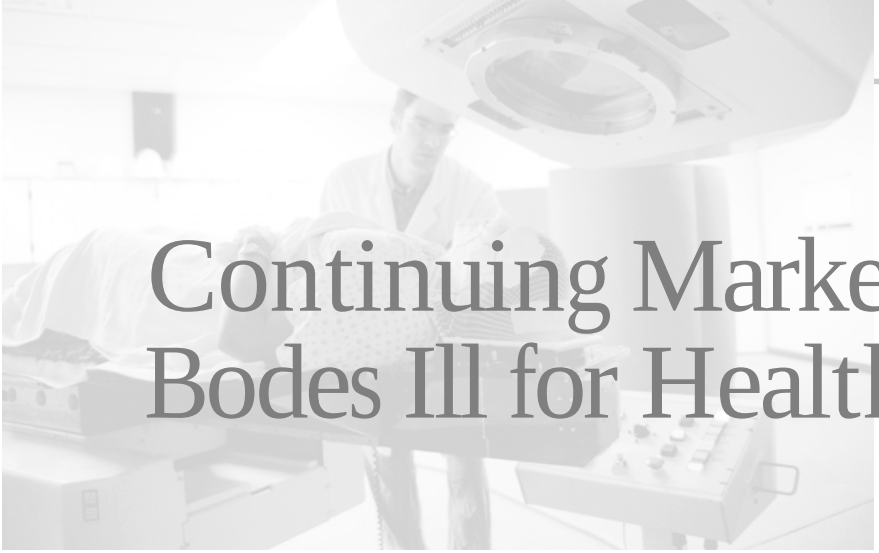

Continuing Market Turmoil Bodes Ill for Health Care System

Lance Heineccius

With the 1995 repeal of comprehensive health reform in Washington State, the local health care system entered an era in which competitive market forces, rather than government planning, have become the dominant influences shaping the health system's future. After five years of this paradigm, the results are discouraging. Growing market turmoil seems likely to further disrupt access to health care for vulnerable populations such as the uninsured, rural residents, and people with serious illness or chronic conditions. Such disruption could increase the challenges facing public health services.

The health care "market" is defined by the interactions among patients, providers, consumers, insurers, purchasers of insurance (mainly employers and government), and the complex federal and state regulatory structure. Access to health insurance is decreasing while health insurance premiums rise; nearly all health plans have lost money in recent years and some smaller insurers have gone under; hospital margins are shrinking and expected to get worse; physicians are frustrated with health plan interference, administrative burden, and constraints on their income; and consumer trust in the health care system is steadily eroding. Government, at both the state and national levels, has shown little leadership on health care in the past five years — although the campaign rhetoric for 2000 increasingly includes some health issues.

Consolidation has become a major trend for health-related businesses: mergers, acquisitions, and re-formations of business entities that, for the most part, are designed to achieve economies of scale, expand market share, and make health-related companies more competitive. Health plans have consolidated dramatically (Table 1), and additional consolidations may raise antitrust concerns.

The benefits of health plan consolidation have yet to become clearly evident. The hoped-for economies of scale have not been realized thus far, as system integration challenges continue to increase overhead costs. To date, major health plans are not experiencing postmerger market share growth, while new market entrants such as First Choice and Community Health Plan of Washington have shown respectable growth.

Competition has increased, but the major visible effect has been abandonment of unprofitable lines of business or geographic areas. For example, many managed care plans have discontinued serving rural counties, and individual insurance remains unavailable in most Washington counties (as of September 2000). Many health plans are also discontinuing their participation in government programs such as Healthy Options, Basic Health, and Medicare + Choice. Few health plans in Washington have reported an underwriting surplus in recent years.

Figure 1 presents health plan losses in

Table 1: *Consolidation in health plans in Washington since 1994*

1994	2000
Blue Cross of Washington and Alaska Medical Savings Corporation QualMed (Eastern WA)	Premera BlueCross
Network Health Plan Pacific Health Plan QualMed (Western WA)	PacifiCare of Washington
Ethix (later NYLCare) Virginia Mason Health Plan Aetna Health Plan	Aetna US Healthcare
King County Medical Pierce County Medical Good Health Plan of WA Clallam County Physicians Grays Harbor Medical Walla Walla Valley Medical	Regence BlueShield
Skagit County Medical Whatcom County Medical	Northwest Medical

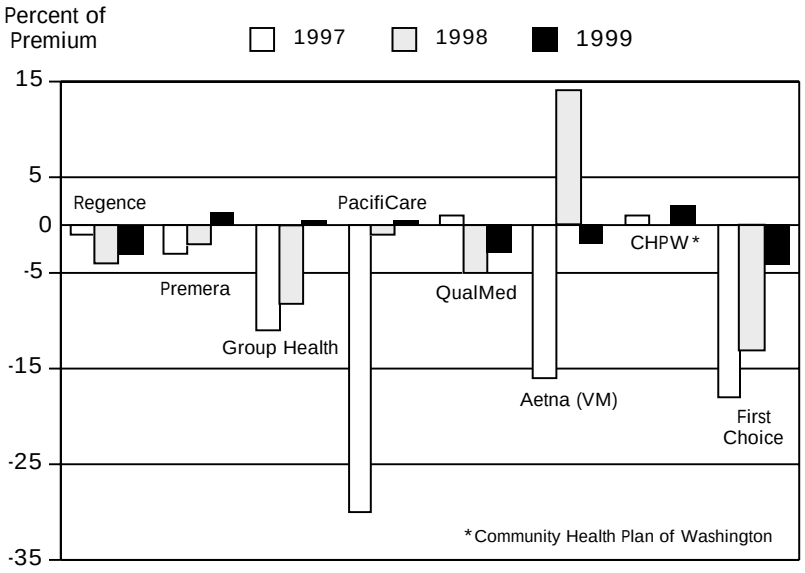

Figure 1: Underwriting margins for Health Plans in Washington State, 1997 to 1999.

Source: Health plan filings with the Office of the Insurance Commissioner.

1997, 1998, and 1999 for the major insurers in Washington State. Midyear data for 2000 indicate minor improvement, but most plans still had slightly negative underwriting margins at midyear. These underwriting losses do not reflect interest earnings on reserves and other income, which allowed most health plans to operate in the black in recent years. The net worth-to-losses ratio for several plans is problematic, however, so additional plan failures and forced consolidations may occur.

Hospitals in Washington have not yet seen major consolidations, with the exception of the Swedish takeover of Providence Hospital in Seattle. Worsening financial status may force further consolidations (or closures) in coming years. Through 1998 hospitals were actively purchasing primary care physician practices, a form of vertical rather than horizontal consolidation. The new trend appears to be for hospitals to divest or restructure physician-business relationships, primarily for economic reasons. Another major economic trend for hospitals and other providers is declining Medicare revenues due to cuts imposed by the federal Balanced Budget Act of 1997. Figure 2 shows the estimated reductions in Medicare revenues for Washington hospitals. Cuts will be phased in over five years ending in 2002, with the largest reductions scheduled for the last three years. One estimate suggests these cuts will represent roughly 2% of annual hospital expenses each year. Recent congressional action has moderated or deferred some of those expected cuts.

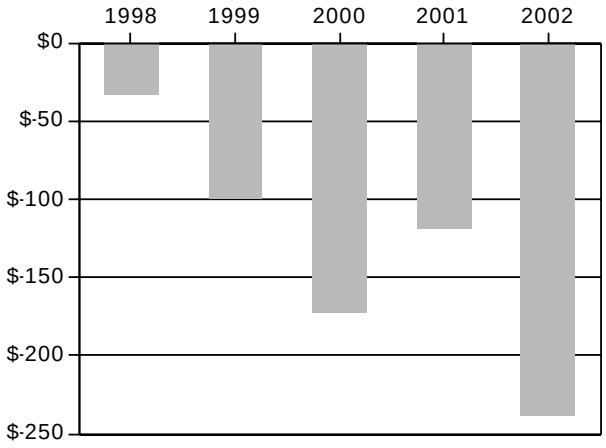

Figure 2: Expected reductions in Medicare revenues for Washington State hospitals due to the Balanced Budget Act of 1997.

Source: Washington State Hospital Association.

Health insurance purchasers (employers and government) are viewing the most recent round of health plan premium increases with alarm. After relatively low annual increases in the mid-1990s, most health plan premiums are now increasing at double-digit rates. One strategy that many purchasers are considering, or have already adopted, is a "defined contribution approach." The purchaser sets a fixed amount to contribute annually toward the purchase of employee health benefits (the defined contribution) and the employee or beneficiary must make up the difference to purchase insurance coverage that costs more than the contribution. In a robust economy with a tight labor market, few employers have been willing to shift a major portion of premium costs to employees, but many are already setting up the infrastructure to be able to do so in the event of an economic downturn.

Smaller businesses are more likely to simply discontinue health benefits altogether in an economic downturn. One additional factor worth following is whether proposed federal regulations for a patient bill of rights will allow employees to sue self-funded employer health plans. If this occurs, some experts predict that most self-funded plans will be eliminated and that employers may instead offer their employees a voucher for purchasing health insurance (or possibly even health services) on the open market.

In Washington State, this voucher approach may prove difficult given the instability in the individual health insurance market following the repeal of universal access in 1995. Adverse selection, a short preexisting condition exclusion period, and a requirement for guaranteed issue made this market unprofitable. Citing excessive losses, the few health insurers offering individual health insurance policies froze enrollment in 1998 and 1999 and refused to sell new policies. The 2000 Legislature has provided at least a temporary fix for these problems, but the longer term financial viability of individual and small-group health insurance for higher-risk (sicker) persons remains uncertain.

Implications for the Public Health System

What does this market turmoil mean for the public health system in Washington? Four potential impacts seem likely in the coming years:

- *More uninsured:* Health plan abandonment of unprofitable business lines and geographic areas, combined with rapidly escalating premiums and employers shifting more of the premium costs to employees, are likely to result in an increasing number of uninsured persons in many areas of the state. To the extent the uninsured need primary medical care, they may seek services from local public health programs and local emergency rooms. Handling this increased but unfunded demand for direct service delivery could pose a serious challenge to many local public health jurisdictions, especially in the wake of I-695, the voter initiative that repealed the motor vehicle excise tax and cut state revenues.
- *Barriers to access in rural areas:* Even without the insurance problems, more rural residents are expected to encounter access difficulties if rural hospitals are forced to close due to insufficient payment levels from Medicare. Again, this scenario may place unanticipated and unfunded demands on local health jurisdictions to deal with residents who have no local source of medical care.
- *Less money available for community health programs:* Many not-for-profit hospitals support a wide range of community health programs that could be jeopardized by financial difficulties. Current programs may be discontinued and new programs appear unlikely given the decreases in net revenue anticipated at most Washington hospitals.
- *Opportunities and challenges for joint efforts in prevention and health promotion:* Given the increasing focus of health care businesses on the immediate financial bottom line, the longer-term benefits of prevention and health promotion are often ignored and sometimes refuted altogether. The challenges for public health programs are, first, to get the attention of hospitals, physicians, and health plans during these difficult times and, second, to convince them that keeping their enrolled population healthier and identifying illness earlier will be financially advantageous. This will be a tough sell in the near future, as providers and health plans look for new ways to cut costs and avoid higher-than-average-risk patients.

Strains on the Rural Health Care Safety Net

Vickie Ybarra

Progressive health care policy has placed safety net providers in rural Washington State in a somewhat better position than rural providers in other states. From my perspective, however, serious access issues remain for rural residents of our state. The three primary issues I see as most pressing to the survival of the rural health care safety net are Medicaid managed care, rural hospital viability, and health profession development.

Medicaid managed care has created unique challenges in rural areas. Even in areas that have health plans willing to contract with Medicaid, the lack of sufficient specialty providers needed to create competition on fees can be a serious problem. While employers and government purchasers are trying to reduce what they pay to health plans, plans operating in rural areas may not be able to pass those rate decreases along to specialty providers and so are at increased financial risk.

Nationwide, small rural hospitals are closing at an astounding rate. Their disappearance is a concern because these hospitals represent a vital resource for local primary care. Without a local hospital, many primary care and specialty providers are simply not willing to practice in rural areas. For example, it is difficult to recruit a physician to provide primary prenatal care without the opportunity to deliver babies.

Although recruiting physicians may be somewhat less difficult than 10 years ago, provision of primary care (especially in a managed care environment that emphasizes prevention and continuity of care) requires a broad range of other health care professionals. Nurses, pharmacists, dentists, dental hygienists, and lab technicians are also difficult to recruit to rural areas. To solve this problem we need new and creative partnerships that move beyond simplistic clinical placements in rural areas and arrangements with schools to educate these professionals. We know that health profession students from rural areas are much more likely to practice in rural areas. Sites that offer clinical placements for health profession students should have an opportunity to require the health profession school to actively recruit students from their community.

Washington State has made strides in shoring up the rural health care safety net, but to maintain it, health policy must support small rural hospitals and the health plans operating in these areas. Health policy also should encourage health professions schools to recruit from rural areas.

Vickie Ybarra, R.N., M.P.H., is director of planning and development at the Yakima Valley Farm Workers Clinic in Toppenish and a member of the Washington State Board of Health.

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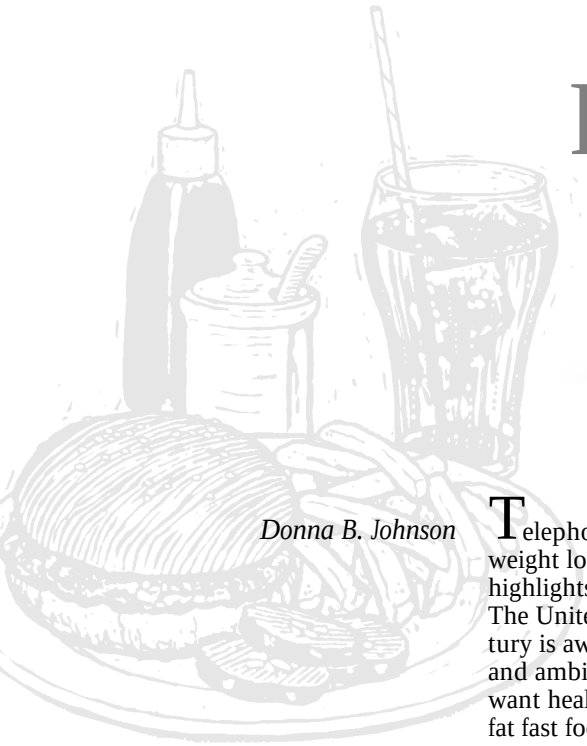


Fast Food, Fast Forward

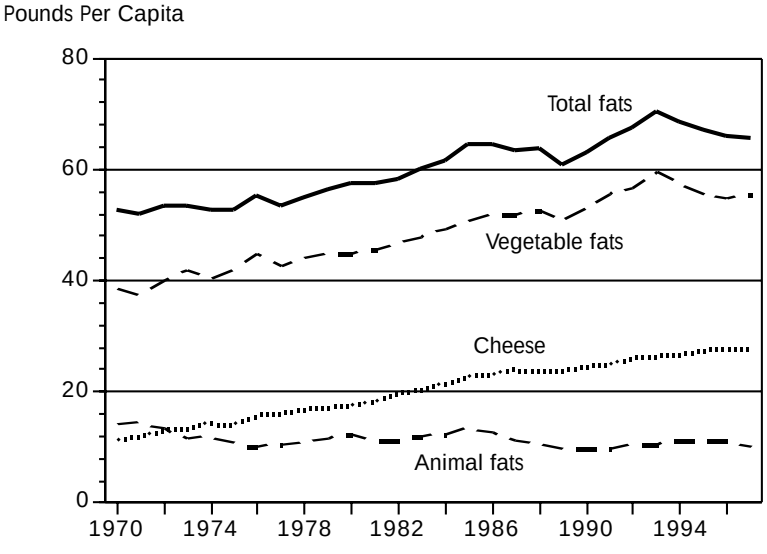
Can Health Promotion Goals Keep Pace with Nutrition Trends?

Donna B. Johnson

Telephone pole flyers promise 30-pound weight loss in 30 days, and the evening news highlights the latest study about vitamin E. The United States at the turn of the new century is awash in information, misinformation, and ambivalence about nutrition. Consumers want health and longevity, but sales of high-fat fast foods continue to climb. School mission statements endorse health promotion, but school programs are funded by soft drink and candy sales.

The latest Centers for Disease Control and Prevention (CDC) report on *Chronic Diseases and Their Risk Factors* states: "Three risk behaviors in particular — tobacco use, lack of physical activity, and poor nutrition — are major contributors to cardiovascular disease and cancer, our nation's leading killers. These behaviors also exacerbate the life-threatening complications of diabetes." In reality though, nutrition sometimes struggles for recognition as a compelling issue in community-based health when problems such as communicable diseases and violence demand more immediate attention.

Figure 1: Total fat intake and consumption of cheese have risen steadily over the past 30 years, while overall consumption of animal fats has declined.



Source: Economic Research Service, U.S. Department of Agriculture.

Food Consumption Trends

Food consumption patterns have changed — for better and for worse — throughout the twentieth century. Compared to 1970, Americans now eat more grain products and fruits and vegetables. However, most of the increase in grain products has been in refined, rather than whole-grain products, with large increases in pizza, lasagna, crackers, popcorn, pretzels, corn chips, and ready-to-eat cereals.

Total fat intake has increased, but the average percentage of calories from fat has declined as energy intake has increased. Americans are drinking lower fat milks, but total consumption from dairy fat has remained fairly constant because we now eat two times as much cheese as we did in 1970 (Figure 1). The most dramatic changes in consumption focus on sweeteners and carbonated soft drinks. Annual nondiet soft drink consumption increased from 28 gallons per person in 1986 to 41 gallons in 1997, for a mean intake of 14.5 ounces per person per day. In 1997 Americans consumed an average of 154 pounds of caloric sweeteners per person (Figure 2).

Nutrition Knowledge and Attitudes — and the Media

In consumer surveys, television is the most frequently mentioned source of nutrition information. The International Food Information Council examined nutrition information provided on TV, in newspapers, and on the Web. Between 1995 and 1999, coverage of food issues increased, with considerably more emphasis on positive aspects of food for disease risk reduction and the benefits of specific foods such as soybeans and garlic (Table 1).

Some American consumers are making dietary changes. The latest *Nutrition and You: Trends 2000* survey of 792 adults found that 28% of respondents had made significant changes in their eating behavior to achieve a

healthy, nutritious diet; 40% knew that they should eat a healthy diet, but hadn't done so; and for 32% diet was not a concern. Since the first *Trends* study in 1991, the percentage of respondents eating a healthy diet or contemplating doing so has gradually increased. The most frequently noted barriers to a healthy diet included "not wanting to give up the foods I like," "time to keep track of diet," and "need for practical tips to eat right."

The *Trends 2000* survey found that about half of adults are taking vitamin supplements daily and 12% are taking an herbal supplement daily. Twenty-eight percent of respondents felt that herbal supplements are safe because they are "natural." Those who use nutritional supplements tend to have higher education levels, to have existing health problems, and to use "alternative" treatments along with more traditional medical therapies. Allopathic medical providers are seldom aware of the supplement practices of their patients, even when supplements may have potent interactions with other drugs and therapies. Evidence-based knowledge about these therapies often is not available, and consumers usually don't know that few regulations govern their safety.

Trends in consumer understanding vary. Compared to 1990, more consumers now know that they should consume at least five fruits and vegetables a day, but few understand dietary guidelines about saturated fats. This may reflect the difficulty in projecting a simple, easily understood message about saturated fats and the complexity of the dietary changes needed to meet the guidelines.

Many consumers continue to believe that thinness is equivalent to health. This confusion can lead to restrictive diets that do not meet nutrient needs and to disordered eating behaviors. The latest flurry of commercially successful "diet" books indicates that the public maintains a strong faith in "dieting" for weight loss, despite consistent evidence that restrictive dieting is not an effective long-term weight control method.

Food Purchasing

Perceived lack of time has contributed to increases in the percentage of food eaten away from home and to changes in the kind of foods purchased to prepare at home. Almost half of family food expenditures are for food and beverages served outside the home, with 34% for fast foods. Another trend is to combine eating with activities such as travel, shopping, or work, and fast-food outlets are now located in service stations, stores, office buildings, and schools. Over half the sales at McDonald's and Burger King occur at the drive-thru. Countering these trends, however, is a fledgling revolution, the "slow foods" movement, which encourages diners to replace drive-by food encounters with a slow and thoughtful approach to food preparation and leisurely meals with friends and family.

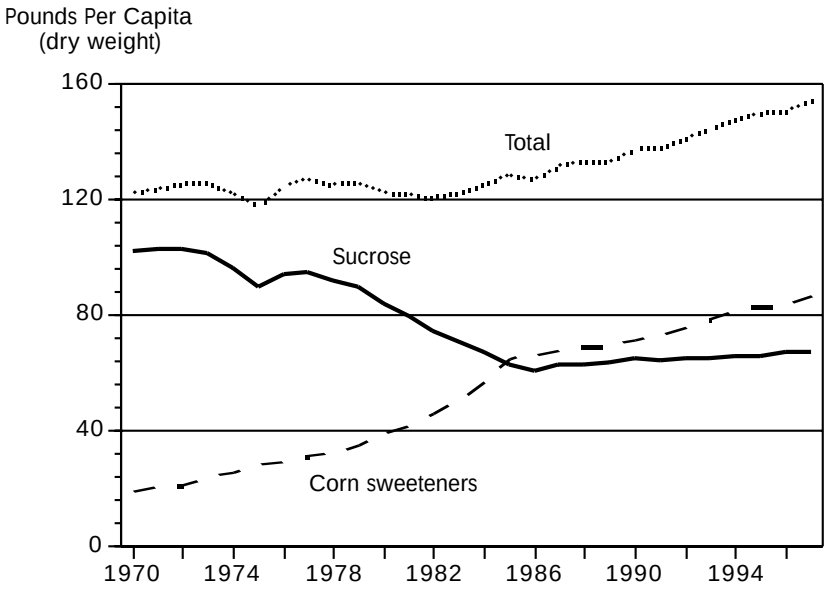


Figure 2: Total annual per capita consumption of sweeteners continues a steady rise.

Source: Economic Research Service, U.S. Department of Agriculture.

Yet another trend is increasing segmentation of markets for food products. Baby Boomers want foods that will help them defy age. Consumption of tofu-based foods, salads consumed as a meal, and products with functional ingredients such as probiotic cultures and calcium are expected to increase. Generation X consumers want foods that simulate the taste of home cooking they feel they missed during their childhoods. Products

Table 1: *Changes in frequency of media coverage of nutrition topics, listed in order of times mentioned*

	1995	1999
1	Fat intake	Disease prevention
2	Disease prevention	Food-borne illness
3	Food-borne illness	Biotechnology
4	Vitamin/mineral intake	Fat intake
5	Disease causation	Functional foods
6	Caloric intake	Disease causation
7	Antioxidants	Vitamin/mineral intake
8	Cholesterol intake	Fiber intake
9	Sugar intake	Antioxidants
10	Fiber intake	Caloric intake

Source: International Food Information Council, 2000.

such as gourmet blends of shredded cheese, precooked meats, and ready-to-cook stir-fry meals are aimed at Generation Xers.

The nature of the food-purchasing experience itself appears to be entering a state of rapid change. Many traditional grocery stores have added ready-to-eat prepared foods. Web-based food purchasing is gaining a foothold in many markets.

Changes in family structure have significantly altered food purchasing and preparation. Children now prepare an increasing portion of their own meals and snacks. Children and youth impact food-purchasing behavior, both through direct purchases and influences on parental purchases. Over half of adolescent girls in the United States shop for part or all of the family's groceries. Total annual food purchasing influence of just 9- to 11-year olds has been estimated at $80 billion.

A parallel trend toward the "commercialism" of youth presents a challenge for nutrition and health educators. Commercialism is described as "ubiquitous product marketing that leads to a preoccupation with individual consumption to the detriment of society." Market researchers know that children and youth respond to different messages and media than do adults. Marketers target messages to reach kids in school, at the mall, at movies, on the Web, and most powerfully, on television. Observational studies in grocery stores find that young children are more likely to ask for foods by product name than by type of food and that parents respond to these requests. Families choose fast-food restaurants based on the playgrounds and toys offered with the meals. Youth choose soft drinks based on celebrity endorsements. These promotions have a strong impact on American food consumption patterns.

Trends in Washington State

Nutrition data for Washington State are limited. Table 2 presents Behavioral Risk Factor Surveillance System (BRFSS) data. In general, Washington residents have followed national trends for increased prevalence of overweight and increased fruit and vegetable consumption.

The Current Population Survey Food Security Supplement found that Washington has high rates of hunger and food insecurity. In a comparison of states with combined data from 1996 through 1998, Washington State had the eighth highest rate of food insecurity and sixth highest rate of hunger in the country. In 1998, nearly 12% of Washington residents reported experiencing "food insecurity" — not having enough food to meet basic needs — and 4.6% of families reported experiencing outright hunger in the past 12 months. The national average is 3.5%. Recent studies have found associations between food security and behavioral and cognitive outcomes in children and higher rates of obesity in families that experience food insecurity.

Recommendations for Public Health Practice

What should a public health practitioner do in light of these trends? The public health approach is based on evidence that modest shifts in population-based dietary intakes — changes that would have minimal clinical significance for any one person — can have substantial impact on morbidity and mortality in the population. Successful interventions build on existing interest in nutrition, are evidence-based, and do not contribute to consumer guilt and confusion about nutrition. Key elements include:

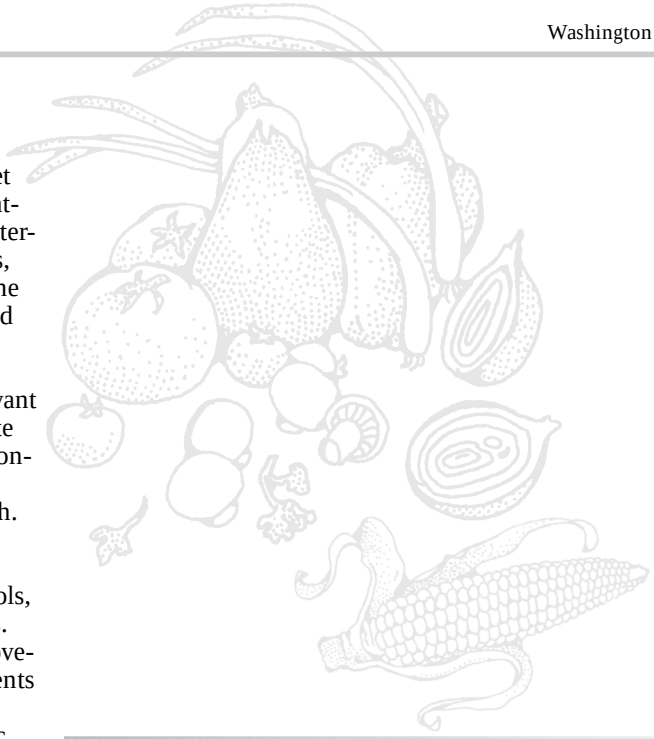
Consumer perceptions: Base interventions in the reality of a culture that perceives that time is limited, and ensure that the pleasure associated with eating is maintained or enhanced.

Consistent messages: Develop more consistent, effective nutrition messages like "5-a-Day" that can be heard against the din of conflicting and misleading nutrition information. Messages can be channeled through mass media, health care providers, food assistance programs, schools, clinics, community centers, and places where food is purchased.

Table 2: *Health behavior trends in Washington State*

	Percent of Respondents	
	1996	1998
Prevalence of overweight in adults	27	32
Trying to lose weight	36	37
Eating fewer calories or less fat to lose weight	30	31
Using physical activity to lose weight or keep from gaining weight	62	64
Reporting regular exercise	53	NA
Consuming five or more servings of fruits and vegetables per day	23	26

Source: Washington State Behavioral Risk Factor Surveillance System



Marketing and media: Effectively market these consistent messages about healthy eating and fight commercialism with media literacy. For both individuals and communities, the most effective interventions consider the specific needs of the intended audience and consumer readiness to adopt changes.

Emphasis on young families and youth: Providing today's young families with relevant information, adequate access to appropriate foods, support for parenting, and an environment that reinforces positive lifestyles will promote long-term improvements in health.

These approaches call for broad-based support from public health agencies, schools, universities, and community organizations. They will require adequate funding, improvements in policy, and changes in environments that influence food choices. The strong relationship between nutrition and chronic disease provides an outstanding opportunity for public health to improve health outcomes by promoting healthy food behaviors.

Recommended Reading & Information Sources

Americans' Food and Nutrition Attitudes and Behaviors: Nutrition and You — Trends 2000. American Dietetic Association, http://www.eatright.org/pr/2000/010300a.html

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Chronic Diseases and Their Risk Factors: The Nation's Leading Causes of Death. December 1999. National Center for Chronic Disease Prevention and Health Promotion, http://www.cdc.gov/nccdphp/statbook/statbook.htm

Food For Thought III: A Quantitative and Qualitative Content Analysis of Diet, Nutrition and Food Safety Reporting, 2000. International Food Information Council, http://inficinfo.health.org

Frazão E (ed): *America's Eating Habits: Changes and Consequences.* Food and Rural Economics Division, Economic Research Service, U.S. Department of Agriculture. Agriculture Information Bulletin No. 750 (AIB-750), 1999, http://www.econ.ag.gov/epubs/pdf/aib750/

Geographic Distribution of Food Insecurity and Hunger. Economic Research Survey, 1999. U.S. Department of Agriculture, http://www.econ.ag.gov/whatsnew/issues/foodinsecurity/#fig1

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Author

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Debate Over Genetically Modified Foods

Genetically modified (GM) foods are a controversial topic. The players in this controversy include scientists, farmers, consumers, and of course the biotech industry. The scientific advances that have produced the new crops have developed much faster than the information base for the general public. Thus, the discourse on the benefits and risks is unfortunately often framed by perceptions rather than evidence. We encourage the public health community to build a reference base and check Web sites regularly. Government sources such as the U.S. Department of Agriculture and the Food and Drug Administration are useful, but to appreciate the various positions you may want to check industry sites such as the Council for Biotechnology Information or consumer sites such as Greenpeace.

This debate is especially heated in the United Kingdom and elswhere in Europe. *The Times of London* (http://www.the-times.co.uk/) presents news and opinions regarding the importation of GM seeds and crops. We can expect many of the arguments that have been advanced in the U.K. to receive more publicity in this country in the coming months. Proposed legislation on labeling of GM foods will be introduced in the next Congress. Considering the extent of labeling that may be required, is the purpose to alarm consumers and destroy the biotech market or is the purpose to inform and empower the consumer? Can we adequately summarize the unknown risks for an informed choice? Public health professionals need to be well informed to participate in this more than lively discussion.

Barbara Breumer, Ph.D., R.D., is director of the Dietetics Program in the UW Department of Nutritional Sciences.

Selected Web Sites:

FDA: http://vm.cfsan.fda.gov/~lrd/biotechm.html
USDA: http://www.aphis.usda.gov/biotechnology/
Council for Biotechnology Information: www.whybiotech.com/main.html
Greenpeace: www.greenpeace.org/~geneng/

The Turning Point Initiative

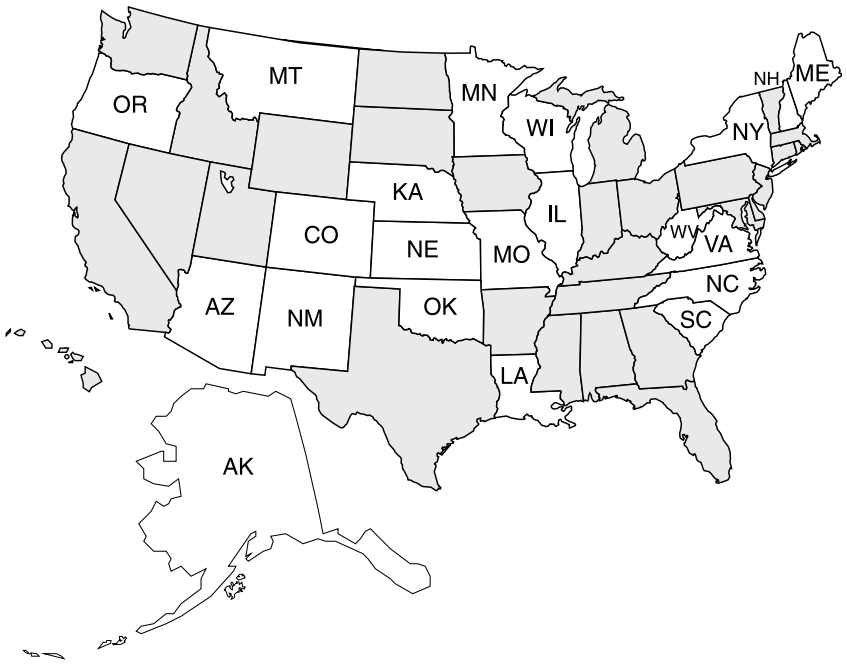
Responding to Challenges in Public Health

Bobbie Berkowitz
Jack Thompson

Rapid changes in the economic, social, and political environments are affecting the ability of public health agencies to protect and improve the health of communities. Moreover, fierce competition and fundamental structural changes in the health sector are challenging the relationship between public health and medical care systems. In response, the Turning Point Initiative created by The Robert Wood Johnson Foundation (RWJF) and The W.K. Kellogg Foundation (WKKF) seeks to prepare public health systems for the challenges of the twenty-first century.

Under the aegis of Turning Point, 21 diverse states (Figure 1) and their even more diverse community partners have engaged in a variety of exciting and challenging activities. Turning Point was initiated in January 1998 with 14 state-level grantees funded by RWJF and 41 community-level grantees funded by WKKF. Seven additional RWJF-funded grantees joined the initiative in June 1999. In phase 1, the funding has supported a strategic planning process designed to improve and transform the public health infrastructure. An implementation phase will follow.

Figure 1: The 21 states (white) with Turning Point programs.



This article focuses primarily on the planning phase of Turning Point and the following specific aims, which are to:

1. Create an environment where state agencies and organizations and their community partners can plan collaboratively to analyze the issues and challenges related to public health system improvements and link those to health status improvement.
2. Develop a strategic planning document that communicates the state of the public health system and the strategies required to address the gaps in system capacity. The goal is to highlight strategies that will sustain a public health workforce, develop information and communication systems, provide stable financing, formulate and implement health policy, and institutionalize links with communities.
3. Establish a network of public health partners who agree to contribute to an agenda that addresses issues of public health importance such as:
   - the elimination of health disparities
   - access to quality care
   - prevention of infectious disease
   - reduction of chronic disease, and
   - protection from hazards and toxins in the environment.

Within each state a coalition of statewide partners and coalitions of community partners are working on priorities for system change specific to their own community or state. In addition, the states and community-wide coalitions work together on issues of joint interest.

Collaboration as the Key to Success

Turning Point has sites in states with diverse political and organizational structures. For example, New Hampshire (with 1.2 million residents) has a house of representatives with 400 members. Nebraska (with 1.7 million residents) has a nonpartisan unicameral legislature. Such political structures affect the organization of public health services. Given this diversity, it has been crucial to under-

stand the key elements in developing functioning collaborations.

The literature on collaborative models developed to promote health identifies elements for creating successful partnerships and building the required capacities and infrastructure. *Healthy People 2010* defines infrastructure as "the systems, competencies, relationships, and resources that enable performance of the essential public health services in every community." (*Healthy People 2010 Objectives*: Conference Edition, 2000). Examples of adequate infrastructure include a skilled and competent workforce, stable financing, information systems, leadership, the capacity to collaborate with communities and strategic partners, and a system for policy development and implementation. Successful collaboration is often community based and influenced by community values and beliefs. Data, narrative, and anecdotes about critical health problems often inform and motivate the collaboration. An essential step is creating a governance structure with clear decision-making processes. In most Turning Point states governance is vested in a representative steering committee.

Turning Point grantees have built these elements into the state and community collaborative models. Focus groups and surveys have revealed how community members think and feel about local health problems and how they would prioritize implementing programs to resolve the problems. A variety of instruments have been used to gather data on the health status of the population, capacity gaps, and infrastructure needs. For example, collaborators in Alaska developed a survey of public health and environmental health staff at the federal, state, and local levels and in tribal health organizations to gather data on the gaps in public health capacity.

Turning Point grantees have formed multiple task forces and work groups to assess the status of public health systems. They have examined the traditional roles and responsibilities of government public health agencies and evaluated how these roles could be strengthened or changed to address core functions and essential services. They have formulated new ideas about what public health activities may be better suited for implementation by other partners. Grantees have analyzed their public health statutes and financing structures to identify gaps. A review of how policy is developed and adopted has led to the involvement of elected officials at every level of government within the Turning Point states. As planning activities have progressed, Turning Point grantees in each state have kept a critical eye on the health status of their population.

The first two years of the grant were spent assessing and building capacities in the system including leadership, commitment of stakeholders, communication systems, planning processes, and plans for sustainability. In the current environment characterized by both fiscal constraints and limited public awareness of the role of public health, the Turning Point grantees will be challenged to sustain these capacities.

The planning process for an improved public health system will be a long-term effort. At the end of 1999, the first cohort of states completed their strategic plans with recommendations that move Turning Point from planning to active change in how public health systems are funded, designed, constructed, linked with communities, and fueled with an expert workforce. Several strategies will be tested during implementation of the Turning Point strategic plans.

Priority Areas for Implementation

Three major themes have emerged through the strategic planning process as priority areas for implementation: public health law reform, performance measurement, and leadership development. Turning Point states in our Northwest region provide examples of these implementation strategies.

Public Health Law Reform

Many states have identified the central importance of basing public health initiatives on modern public health statutes. In many states, the legal basis for the public health system is founded on diverse laws and ordinances without a general statement of principles regarding the purpose of public health. Many states have identified the need for a comprehensive analysis of the structure, financing, and appropriateness of current statutes. Alaska, for example, commissioned an extensive report that reviewed the laws supporting its public health system and recommended reforms to improve the relationships among federal, state, local, and tribal public health agencies and organizations. The next step in the implementation phase of Turning Point will be the development of a model public health statute that could be used to further national, state, and local reform activities.

Turning Point is a new idea for a new age in public health. As our public health problems change, so too must our solutions.

Performance Measurement

The need to develop basic standards for accountability in public health has emerged as a second priority area in the strategic plans. Montana, for example, recommends the development of "accepted standards for system capacity and performance to enable improved quality of services and system accountability." Alaska proposes to "develop public health performance measurement systems" and to "create a statewide entity responsible for reviewing performance and ensuring accountability in the system." Such efforts will be critical to secure and expand resources for community work in an environment in which accountability is a key to credibility. The Turning Point implementation phase will focus this energy on developing a performance measurement system. This work will be coordinated with other national efforts such as the National Public Health Performance Standards Program of the CDC and APEXCPH (Assessment and Planning Excellence through Community Partners for Health).

Leadership Development

The importance of a trained and engaged public health workforce has emerged as a third key area. Nearly all states reflect the need for workforce development in their preliminary strategic plans. Alaska, for example, has a major strategy to "ensure a well-trained, competent public health workforce" and develop "a public health training network with an emphasis on building distance learning capacity."

Similarly, Montana has identified workforce development as a core strategy, including the establishment of a Montana Public Health Institute, a project in which the University of Washington School of Public Health and Community Medicine is providing assistance. The important element is to ensure that the public health workforce develops skills in both leadership and basic areas of public health such as epidemiology and communications. The focus is on current and future public health leaders. The Turning Point implementation phase will coordinate efforts in partner states to develop institutes for best practices and leadership development.

In addition to public health law reform, performance measurement, and leadership, substantial change is expected in these areas:

- Formalize communication links among cabinet-level state agencies related to a health agenda.
- Establish health information systems and technology that track the determinants of health.
- Create social marketing strategies that enhance the awareness and value of using public health strategies to improve the health of the public.
- Develop a stable and performance-based mechanism for financing public health programs.
- Develop systems that effectively link population-based prevention, health promotion, and health protection programs with health care delivery.
- Implement a formal and sustainable process for ongoing health improvement planning at the state level.
- Develop new incentives in the health care delivery system that would reduce the reliance on local or state public health departments for acute care services and would improve access to care for those who are under- or uninsured.

A National Movement for the Twenty-first Century

Turning Point is a new idea for a new age in public health. As our public health problems change, so too must our solutions. The implementation phase of this initiative will provide an exciting opportunity to coordinate the energy of the Turning Point states and their strategic planning processes into a national movement. By harnessing the creativity of 21 states and their local partners, Turning Point will work to influence public health policy at the national level through the creativity and coalition-building that only works at the national and local level. This true definition of partnership will help direct the course of public health practice.

Recommended Reading & Information Resources

Berkowitz B: Collaboration for health improvement: models for state, community, and academic partnerships. *J Public Health Manage Pract* 2000; 6(1):67–72.

U.S. Department of Health and Human Services, Office of Public Health and Science: *Healthy People 2010 Objectives.* Conference Edition, 2000.

National Association of County and City Health Officials: http://www.naccho.org/project30.htm

Turning Point Program: http://www.turningpointprogram.org

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The Community as a Full Partner in Public Health Initiatives

Seattle Partners Community Board discusses projects that addressed community concerns.

Jim Krieger
Sandy Ciske

Public health practitioners have increasingly turned to community-based public health (CBPH) as an important approach to health promotion and disease prevention. A convergence of several trends has contributed to the growing interest in CBPH. First, many health issues of greatest concern, such as chronic diseases, violence, and teen pregnancy, are not easily solved by technological, "magic bullet" fixes provided to individuals. Rather, these issues are deeply embedded in the fabric of communities, and communities must participate in their solutions. Second, the social and community factors that affect health status have gained increased recognition as major forces affecting personal well-being. Third, communities are increasingly mistrustful of governmental and other external "experts" coming to them with preformed agendas of how to "help" them improve local health. CBPH provides a framework to address these trends and an opportunity for public health practitioners to work with communities in a more democratic and egalitarian manner.

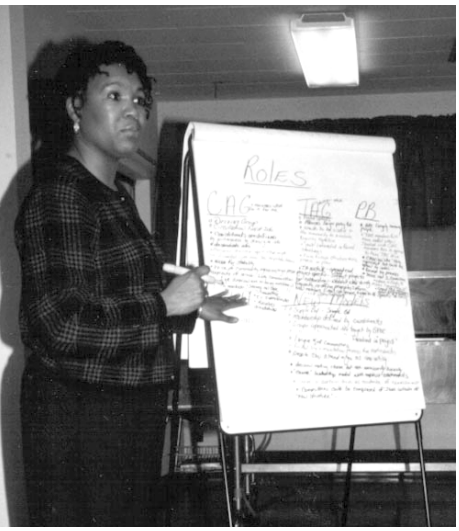
Defining CBPH

The essence of the notion of "community" is a group of people who have relationships based on common interests and shared identity. The commonalties that create the sense of community can be geographic, ethnic, religious, political and ideological, or based on gender, sexual identity, or any of the many other mutual interests that bring people together. Community-based public health practice occurs in the context of such communities.

CBPH is also characterized by partnership and close, genuine collaboration between communities and health professionals. Such collaboration does not come easily. A wide gap often separates health professionals from communities, especially urban and minority communities. For example, Gambel (1997) has documented a history of programs tainted by professional arrogance, opportunism, and racism, which has generated skepticism and mistrust among African-American community members.

To overcome this legacy, public health practitioners and community members must develop trust through partnerships that mature over time. Partnership indicates joint participation in all aspects of project planning and execution, especially decision-making, and falls in the middle of the spectrum of community-professional engagement (Table 1).

Partnerships draw on the complementary assets of professional and community members. Both groups may bring technical skills (e.g., data analysis, policy and program planning, organizational development, fundraising, media advocacy), training expertise (e.g., leadership development), and resources (e.g., staff support, equipment and supplies, liaisons with public officials and agencies). Both may contribute knowledge of the community, experience with community-based initiatives, and links to other community members.



Dialogue and training is important to the success of community-public health-academia partnerships.

Implications for Public Health Practice

CBPH implies that public health practitioners seek out communities as collaborative partners in their work to improve the health of the public. Seattle Partners for Healthy Communities is an Urban Research Center funded by the Centers for Disease Control and Prevention and sponsored by Public Health – Seattle & King County. It has used the CBPH approach to improve health in low-income and minority communities in central and south Seattle. Seattle Partners has developed principles for community-professional collaboration to guide its work (Table 2).

CBPH is most effectively practiced by a multidisciplinary team with a mix of skills including community organization, qualitative and quantitative assessment, public health nursing, environmental health and health education, and also content expertise in specific areas.

CBPH is especially suited to address the fundamental "upstream" factors that affect the health of communities, factors that community members often identify as priorities for action. For example, the community board of Seattle Partners has singled out developing strong communities and building social support as two areas for productive collaboration.

Community building as a public health approach has been gaining increasing visibility (Minkler 1997; Kaplan 1999). A set of key components characterizes community building projects:

- "Starting where the people are" by beginning with "felt needs" and community assets. Felt needs are community goals on which community members are willing to work.
- Ensuring cultural competence of the project staff and cultural appropriateness of the program plan.
- Using a broad community assessment process that draws upon qualitative and quantitative approaches in a continuing effort to define needs and assets as projects are carried out.
- Evaluating process, impact, and empowerment to provide feedback to participants regarding successes and deficiencies of their projects.
- Creating a high level of community participation in the project.
- Strengthening social networks among community members and organizations.

Table 1: *Spectrum of community-professional engagement*

Feature	Professional-Dominant	Negotiated Partnership	Community-Dominant
Assessment/ issue definition	Done by professionals	Issues defined jointly	Done by community
	Issue often defined as needs/deficits	Issue often viewed in terms of assets/strengths	
Goals	Narrow, predefined	Broad predefined goals with room for modification and specification	Broad, include community capacity development; may change during the process
Community definition	Population with a health problem	Blend	Existing social/identity networks
Leadership	Professionals and socio-political elites	Community as "senior" partner	Emphasis on grassroots leadership development
Participants	Limited, exclusive, selected by professionals	Joint selection of initial members, open to additions	Open, inclusive, self-selected
Organization	Structured and linear	Blend	Flexible and fluid
Decision-making	Agency/professionals	Joint, but who has "last word" is negotiated	Community decides
Accountability	Hierarchical and political	Blend	Community

- Increasing community competence. Cottrell (1976) defines a competent community as "one in which the various component parts of the community: (1) are able to collaborate effectively in identifying the problems and needs of the community; (2) can achieve a working consensus on goals and priorities; (3) can agree on ways and means to implement the agreed upon goals; and (4) can collaborate effectively in the required actions." Empowered communities have the capacity to influence the social determinants of health and thereby improve the health of the community and its members.
- Increasing community empowerment to improve conditions in marginalized communities. Community empowerment is the product of community competence and leads to successful projects in which participants see the results of their own contributions (Labonte 1994; McKnight 1992, 1995; Wallerstein and Bernstein 1994).
- Increasing social capital — the network of affiliations, information, and reciprocal obligations and expectations that develop among people with common interests, and which may be drawn upon as a resource.

Growing evidence suggests that more developed communities are associated with better health (Kawachi et al. 1997). Public health professionals have contributed to community building through staffing coalitions, assisting with community mobilization, promoting leadership development, and other community organizing activities.

Social support also is associated with improved physical and mental health outcomes. Public health practitioners have a long tradition of developing social support. Public health nurses, health educators, and outreach workers directly provide social support through their contacts with clients. Public health workers also organize support groups (e.g., parenting support groups, exercise groups) or engage community members in peer outreach.

One Approach to Public Health Practice

Many CBPH projects start with a small-scale effort, then expand incrementally. A first step is to identify a community partner. Systematically interviewing local leaders can reveal issues of concern to each community and whether the community sees value in partnering with public health organizations to address these concerns. Next, community members and technical staff from public health agencies can use mixed qualitative and quantitative methods to jointly perform a community assessment. Then they can develop a strategy to address the issues, and public health and community representatives can work together to implement this strategy.

CBPH is one of several approaches to public health practice. The issue at hand and the context will determine the most appropriate approach. CBPH offers certain benefits. It allows interventions to tap into a major community asset: social capital. It facilitates active participation by community partners, thus leveraging public health resources. It respects democratic values and community autonomy. It may therefore be the approach of choice for addressing social determinants of health and behaviors shaped by social and community forces, for working with populations marginalized by discrimination and poverty, and for reducing economic and ethnic health disparities.

Youth leadership training.

Examples of CBPH

This article can present only a few of the many examples of CBPH. Seattle Partners has worked with community collaborators on numerous projects, including increasing immunization rates among Seattle's Central Area seniors (Krieger et al. 2000), monitoring the impact of welfare reform, promoting academic success and integration into public schools for Somali immigrant families, developing mutually beneficial relationships between seniors and children though a Summer Grandparent program, and promoting positive interethnic relationships through youth leadership development among Seattle Public Housing residents. The following examples summarize several CBPH projects.

Table 2: *Community-based public health principles*

Community is involved in plans and development from the beginning.

Community partners have real influence on program direction and activities.

Community is involved with:
- selecting program priorities and objectives
- planning program activities
- implementing the program
- evaluating the program

The values, perspectives, contributions, and confidentiality of everyone in the community are respected.

Programs will serve the community by:
- sustaining useful projects
- producing long-term benefit for the community

The Senior Immunization Project addressed a community concern for low adult immunization rates in central Seattle. A partnership of the Central Area Senior Center, the University of Washington, Public Health – Seattle & King County, Seattle Partners, the Health Care Financing Administration, and the Visiting Nurse Services of the Northwest developed a program to increase influenza and pneumococcal immunization rates. Senior Center members reached out to their peers and encouraged them to receive immunizations. These volunteers tracked the immunization status of participants and addressed attitudinal barriers to vaccination. A randomized, controlled study showed that influenza vaccination rates rose by 117% and pneumococcal vaccination rates by 68% among unimmunized subjects (Krieger et al. 2000).

The Reality Check Project is a community outreach and data-gathering effort to monitor the impact of welfare reform in Washington State (WorkFirst) and to provide information to families about changes in welfare laws and programs. Reality Check is a collaborative effort involving Seattle Partners, the Fremont Public Association, the Washington Welfare Reform Coalition (a statewide coalition of community agencies), Public Health – Seattle & King County, and the University of Washington Schools of Public Health and Community Medicine and Social Work. Volunteers and paid community interviewers (who are current or former welfare recipients) meet with current and former welfare recipients and provide information to families. Advocacy groups working on behalf of welfare recipients used the first report to bring problems with WorkFirst to the attention of the State Legislature. A second report is in progress.

The Interdisciplinary Neighborhood Team Project (INTP) of the Snohomish Health District conducted community mobilization projects using the CBPH approach during 1995–98 (Snohomish Health District 1998). An interdisciplinary team discussed the possibility of collaboration with 33 communities, and projects were developed with 17 of them. Each community identified an issue of concern and received technical support from the INTP. Projects included promotion of the "youth asset" approach to healthy adolescent development through the faith community, organizing residents of senior housing units into mutual support groups, mobilizing residents of public housing around community safety issues, working with teens to improve a drug prevention program, developing a coalition to address lice infestation among schoolchildren, and developing a support network for isolated parents.

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Interdisciplinary Collaboration: Old Ideas with New Urgency

Pamela H. Mitchell
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Although we try valiantly to differentiate public health and personal health care, the near collapse of health care reform and the blurring of lines between individual and population-based health are forcing practitioners to understand and negotiate both worlds.

The notion of interdisciplinary collaboration is enjoying a resurgence in hospitals, in community health care settings, and in public health programs. Why now, and what good does it do?

Over the past decade, an increasingly complex health care system has led to transformations in service delivery. These transformations emphasize:

- generalist and primary care
- managed care that links inpatient and outpatient services
- continuity of health care services in partnership with communities
- cost-effective care and population approaches
- accountability for outcomes
- explosion of information technologies.

Although we try valiantly to differentiate public health and personal health care, the near collapse of health care reform and the blurring of lines between individual and population-based health are forcing practitioners to understand and negotiate both worlds. Such trends reinforce the need to improve education and training in interdisciplinary collaboration both for individual care and for health initiatives aimed at communities and population groups.

Most health care professionals associate the specific term "interdisciplinary collaboration" with teams that provide individual, personal health care. This approach was formalized in specialized ways in the 1970s with, for example, the geriatric teams providing community or acute-care assessment. The concept enjoyed a resurgence in the late 1980s with some evidence that lives were saved with better coordination and collaboration. Interdisciplinary programs linked with public health practice today are almost uniformly primary care teams working in community clinics or settings, but not necessarily focused on the health of a population.

Although interdisciplinary collaboration is one of the original cornerstones of public health practice, it traditionally has involved collective partnerships among governmental agencies, private-sector groups, and communities. With the health care system confronting difficult challenges and often wrenching changes, interest is greater than ever in developing skills that enhance the effectiveness of interdisciplinary services.

What Good Does It Do?

In the medical care system, some evidence indicates that health outcomes improve for patients in special care units, inpatient units with interdisciplinary rounds, and in long-term care. Reorganizing specialty ambulatory care to a primary and preventive care service provided by interdisciplinary teams has measurably improved continuity of care and expanded preventive care counseling, and has increased patient satisfaction and decreased hospitalizations and death rates.

Despite the general sense that interdisciplinary collaboration in public health is a "good thing," few well-designed studies evaluating public health outcomes have compared the effects of high-quality interdisciplinary collaboration versus multiple disciplines working side by side. Even the evaluations of community care networks tend to describe how they were established, rather than reporting variations in public health outcomes related to interdisciplinary processes.

The move to greater clinical integration and service delivery networks across the continuum of care has spawned an evaluation of the nationwide Community Care Network demonstration program* that could become a model for evaluating the impact of community collaboration. This network has drawn private and public sector institutions such as health departments, private health providers (hospitals and payer plans), managed care

*Community Care Network (CCN) is a demonstration program funded by the W.K. Kellogg Foundation and the Duke Endowment. It involves 25 partnerships nationwide (see Bazzoli et al. 1997).

organizations, business coalitions, and educational institutions into partnership to focus on the health of communities, seamless continuum of care, management within fixed resources, and community accountability.

Process evaluations released to date indicate that collaborations across disciplines and partners are concentrated most heavily in seven areas: preventive health and education, traditional acute and chronic services, behavioral health, community reporting, cost-effectiveness and expenditure control, community assessment of health needs, and coordination of services. These areas clearly blend the traditional public health and individual care arenas and provide a framework for evaluating the impact of collaborative activity on the health of the public. Yet, they do not address the societal and ecological determinants of health as does the framework for collaborative interventions proposed by Tarlov (1999), who suggests five areas of intervention that should correct health disparities and improve population health. They are: improve child development, strengthen community cohesion, enhance opportunities for self-fulfillment, increase socioeconomic well-being, and modulate hierarchical structuring.

Interdisciplinary Education

Coincident with the waxing and waning of enthusiasm for interdisciplinary care teams is a 30-year history of efforts to develop programs for interdisciplinary education. Earlier models formed multidisciplinary groups of students who provided care in community clinics, rehabilitation, geriatric, and rural settings, or project development in a service-learning format.

Yet, as noted in a recent *Partnerships for Quality Education* call for proposal:

"Few of America's future primary care providers are learning the skills they need to deliver high-quality care in the 21st century. Few are prepared to practice where the measure of excellence is the ability to deliver the best possible care to an identified population within fixed resources. Most receive little or no education in dealing with the potential ethical conflicts among patients, providers, and insurers, or in new methods of engineering the delivery and improvement of care. . . . The complexity of health care today often requires that clinical services be effectively managed and coordinated across the continuum of care. No one provider can do it all. Now, and in the future, primary care clinicians need to know how to draw on the expertise of a variety of health professionals and how to practice as part of interprofessional collaborative teams."

Only a tiny percentage of academic health centers, the leaders in educating the next generation, have ANY interdisciplinary course work, let alone organized clinical experience in interdisciplinary settings and teams. At the University of Washington Health Sciences Center we are seeking to remedy this situation for students from the six health science schools and the School of Information Science through the Health Sciences Partnerships in Interdisciplinary Clinical Education (HSPICE).

Our experience in developing interdisciplinary education at the UW and the literature in interdisciplinary collaboration in acute and long-term care suggest a core set of competencies necessary to blend the individual and public health worlds in effective collaboration (Table 1). In brief, to be effective in this new environment, health care professionals must understand:

- health care financing, organization, and management of care delivery to keep pace with the rapidly changing systems;
- how to work with population groups as well as with individuals to affect health;
- how to draw on the expertise of diverse health professionals and how to practice as part of interprofessional collaborative teams across the continuum of care.

We believe that early in their training, students from the participating schools should engage in a variety of educational experiences that lead them to appreciate and value the interdisciplinary teamwork needed in the current and future environment. Educational experiences should require collaboration among disciplines and coaching in conflict resolution and negotiation of effective and efficient division of labor. Students must understand the societal determinants of health. Increased accountability for individual

Table 1: *Core competencies for interdisciplinary collaboration*

- Be competent in a clinical practice discipline.
- Understand and respect how other disciplines approach clinical and social problems.
- Understand the context and complexity of population health and interdisciplinary strategies for cost savings and cost-effectiveness.
- Demonstrate basic group process skills including communications, negotiation, time management, and assessment of group dynamics.
- Understand the broader determinants of health including housing, social, and economic issues influencing the health problems of a population or group.
- Understand community links essential to providing integrated services to a population group, and participate with community partners in creating and maintaining viable solutions to health issues influencing the target population.

patient outcomes and also for the health of specific populations requires training in the use of information services to continually evaluate and improve the quality of collaborative care.

Further, these health care providers-in-training need to understand the concepts of working with population groups to truly impact the health of communities. We believe that this project is innovative among interdisciplinary initiatives in health professional schools by its integration of a public health, population, and community focus with immediate one-to-one clinical care, by its inclusion of librarians and library science students as integral members of the team, and by the range of disciplines included.

HSPICE has focused on both the process and content skills needed in interdisciplinary teams, including problem-based learning experiences, seminars, and community-based field work that nurtures leadership and communication skills. Students and faculty work together to solve complex problems that come from real experiences, or are faced by community partners. They assess community needs and assets, develop local approaches to these needs, and assess the impact of the partnership interventions. Issues addressed have included alcohol and substance abuse, violence, chronic illness management, and obesity, to name a few. The constant in all presentations and work sessions is that solving these real-world problems requires the participation of a broad range of people working together. The public health professional needs to work hand-in-hand with other professionals and with community partners to solve these problems, and to increase the assets of a given population.

Collaboration for Survival

Interdisciplinary collaboration must expand beyond the acute care, individual health arena to achieve our national goals of improved public health. Why now? Because health care is too complex for any solo practitioner to handle it all; because the determinants of health are beyond the capacity of any one practitioner or discipline to manage; because information is overwhelming us and is beyond the management ability of any one practitioner or discipline. We must collaborate to survive, as disciplines and as professionals attempting to help our communities and each other to achieve better health now and in the future.

Recommended Reading

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Web Sites

Partnerships for Quality Education:
http://www.pqe.org/cfp/CITE/

University of Washington Health Sciences Partnerships for Interdisciplinary Education (HSPICE):
http://healthlinks.washington.edu/courses/hspice/

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Web Sites

UW School of Public Health and Community Medicine

http://depts.washington.edu/sphcm

Departments

Biostatistics	http://www.biostat.washington/edu
Environmental Health	http://depts.washington.edu/envhlth/
Epidemiology	http://depts.washington.edu/epidem/
Health Services	http://depts.washington.edu/hserv
Pathobiology	http://depts.washington.edu/pathobio/

Northwest Center for Public Health Practice

http://healthlinks.washington.edu/nwcphp

Washington State Department of Health

http://www.doh.wa.gov/

A Northwest Mission

The UW School of Public Health and Community Medicine is launching several new initiatives to strengthen the public health workforce in the northwestern states of Washington, Oregon, Alaska, Idaho, Montana, and Wyoming. The School's Northwest Center for Public Health Practice (NWCPHP) is working in partnership with public health colleagues in practice and academic settings around the region to create workforce development strategies and training opportunities. These will range from short-term, distance learning training for frontline public health workers via a regional partnership, to a practice-based education resulting in an MPH degree through the University of Washington.

Plans include establishment of a Northwestern Regional Public Health Leadership Institute that builds on a strong base of experience with the national Public Health Leadership Institute and similar regional institutes elsewhere in the country. Workforce development activities will focus on the priorities and strengths of the state partners and will foster peer assistance, identify and support existing best practices, and develop training programs and curricula. Educational initiatives will include student practicum opportunities outside the Puget Sound area and a new undergraduate environmental health program to be launched in partnership with the Northwest Indian College. Grants from the Health Resources and Services Administration's Public Health Training Center program and the Centers for Disease Control and Prevention's Public Health Preparedness Center program will launch these new efforts.

For more information, visit the NWCPHP Web site (http://healthlinks.washington.edu/nwcphp) or contact Jack Thompson (206-616-1061; jackt@u.washington.edu) or Betty Bekemeier (206-616-9567, bettybek@u.washington.edu).

Beginning in 2001, *Washington Public Health* also is going regional to support the expanded mission of the Northwest Center for Public Health Practice. The magazine will be published twice a year under a new name — our working title is *Northwest Public Health* — to reflect the regional emphasis.