DIRECT FROM CDC ENVIRONMENTAL HEALTH SERVICES BRANCH

Approaching a Perfect Storm: Responding to New Challenges Without Losing Critical Core Capacities

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Editor's Note: **NEHA strives to provide up-to-date and relevant information on environmental health and to build partnerships in the profession. In pursuit of these goals, we feature a column from the Environmental Health Services Branch (EHSB) of the Centers for Disease Control and Prevention (CDC) in every issue of the Journal.**

In this column, EHSB and guest authors from across CDC will highlight a variety of concerns, opportunities, challenges, and successes that we all share in environmental public health. EHSB's objective is to strengthen the role of state, local, and national environmental health programs and professionals to anticipate, identify, and respond to adverse environmental exposures and the consequences of these exposures for human health. The services being developed through EHSB include access to topical, relevant, and scientific information; consultation; and assistance to environmental health specialists, sanitarians, and environmental health professionals and practitioners.

The conclusions in this article are those of the author(s) and do not necessarily represent the views of the Centers for Disease Control and Prevention.

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Life expectancy in industrialized countries like the United States increased 30 or more years in the 20th century, resulting primarily from public health efforts in areas such as sanitation and immunization. Ensuring availability of clean water and safe food was a primary contributor to approximately 80% of this impressive improvement in life expectancy (Koplan & Fleming, 2000). Unfortunately, the U.S. environmental health (EH) system and the workforce that is its primary engine may become a victim of its own success—the ratio of public health workers to population served shrank from an estimated 220/100,000 in 1980 to 158/100,000 in 2000 (Merrill, Btoush, Gupta, & Gebbie, 2003); 10% of these workers are in EH. Given projected resource and demographic trends, this shrinking per capita public health workforce is unlikely to be reversed; at best it may only be stabilized. Because of past successes and current economic realities, the EH system may be heading into a perfect storm.

As highlighted in this column recently by Rob Blake (Blake, 2009), some elements of this perfect storm may include

- shrinking financial resources (Figure 1),
- increasing health costs (Figure 2),
- shrinking pool of experienced human capital (Table 1),
- expanding pressures from traditional EH issues (Table 2), or
- emerging nontraditional EH challenges and knowledge areas such as those called for by the Institute of Medicine (Table 3).

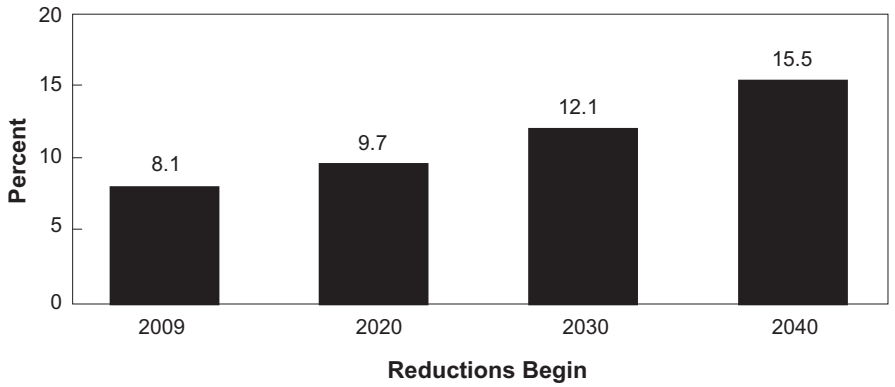
These emerging challenges are the focus of this column.

Emerging EH challenges include built environment impacts on health, potential impacts of climate change, and shifting demographics (significant increases in potentially vulnerable populations such as persons with a disability and elders or in populations with language or cultural challenges). These challenges present unavoidable demands on the EH system, requiring expanded training/cross-training and development/deployment of new toolsets and best practices. Responding to these new issues, however, could lead to neglecting historical core competencies such as basic environmental epidemiology and environmental health services (e.g., restaurant inspection, rodent control). Such a shift is understandable but would be a mistake—as has been demonstrated in areas such as tuberculosis elimination and vector control.

A successful EH system will build on existing capabilities and deploy new skill sets (e.g., GIS analysis, health impact assessment [HIA]) toward both traditional and nontraditional challenges rather than replacing knowledge and skills. Accordingly, the EH system must begin to seek ways to optimize use of its current and future workforce.

FIGURE **1**

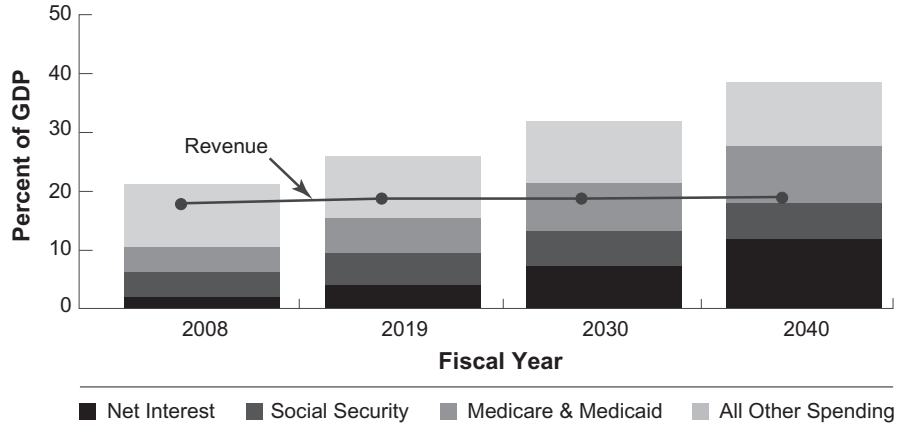
Reduction in Federal Noninterest Spending Needed to Close the Projected Fiscal Gap



Percentage of Gross Domestic Product (GDP). *Source:* Congressional Budget Office, 2009.

FIGURE **2**

Revenues and Composition of Spending as a Share of Gross Domestic Product (GDP)



All non-Social Security–related health costs will be beyond projected available revenue. *Source:* Congressional Budget Office, 2009.

Collaboration to Address Emerging EH Challenges

The Centers for Disease Control and Prevention (CDC) and its partners are analyzing the challenges facing the EH workforce. Their work includes

- a report titled "Strategic Options for CDC Support of the Local, State, and Tribal Environmental Public Health Workforce" (http://www.cdc.gov/nceh/ehs/Docs/Strategic_Options_for_CDC_Support.pdf);
- a project titled "Innovative Environmental Public Health Workforce Practices" (http://www.neha.org/research/Workforce_Development/innovativepractices.html); and
- a workshop called "Environmental Health Undergraduate Curriculum Development" (Institute of Medicine) (http://www.iom.edu/en/Activities/Environment/EnvironmentalHealthRT/2009-JUL-22.aspx).

CDC is increasing and improving collaboration inside and outside the agency. Within-agency efforts include partnering of EH and CDC staff in areas such as chronic disease prevention, disability and health, and injury and violence prevention to increase access to various resources. Examples of these efforts are

- ensuring that built environment interventions were allowed in proposals for American Recovery and Reinvestment Act funds (http://www.cdc.gov/nccdphp/recovery/index.htm);
- including EH and built environment guidelines, tools, and best practices in the Community Health Resources database (www.cdc.gov/CommunityHealthResources); and
- developing HIA tools and training for a variety of practitioners (http://www.cdc.gov/healthyplaces/hia.htm).

Outside the agency, CDC is collaborating with academic and professional association partners to

- collect and analyze commonalities in built environment assessment tools focused on issues such as walkability/bikeability, accessibility for elders and people with a disability, and injury/violence prevention (http://www.uic-chp.org/CHP_A9_UDHP_01.html);
- convene research-to-practice conferences integrating areas such as EH and urban planning with health aging and gerontology (http://www.prc-hanconferences.com/2009-conference); and
- develop and disseminate recommendations and resources that integrate and leverage the efforts of other professional areas:
  - urban design and land use: street-scale and community-scale urban design/land-use policies promoting physical activity (http://www.thecommunityguide.org/pa/environmental-policy/streetscale.html and http://www.thecommunityguide.org/pa/environmental-policy/communitypolicies.html, respectively);
  - parks and recreation: creation of or enhanced access to places for physical activity (http://www.thecommunityguide.org/pa/environmental-policy/improvingaccess.html); and

TABLE **1**

Retirement Eligibility of U.S. Public Health Workforce in Government

Level	Percentage Eligible to Retire by 2012	Percentage of Total Workforce	Number Eligible to Retire
Federal	44	19	37,620
State	29	33	43,065
Local	19	34	29,070
Total Eligible to Retire			109,755

Note. Total workforce = 450,000. Adapted from "Confronting the Public Health Workforce Crisis" (ASPH, 2008).

TABLE **2**

Estimated Morbidity, Mortality, and Economic Burdens from Selected Traditional Environmental Public Health Threats

Environmental Health Threat	Morbidity	Mortality	Economic Costs
Food Safety	76M cases of foodborne illness occur annually (CDC, 2007a)	5,000 deaths annually (CDC, 2007a)	$6.9B (estimate including only five bacterial pathogens) (Partnership for Food Safety Education, 2006)
Water Quality	4.26–11.69M annual cases of acute gastrointestinal illness from waterborne pathogens (CDC, 2007b)		$19B annually due to waterborne disease (Ronchi & Wald, 1999)
Air Quality	• 12M people experience an asthma attack annually (CDC, 2004) • 1.5M emergency department visits are made for chronic obstructive pulmonary disease (COPD) annually (CDC, 2003)	• 4,261 asthma deaths annually • 119,000 COPD deaths annually • 17% (60,000) of sudden cardiac deaths attributable to particulate air pollution	• $14B (direct and indirect cost of asthma annually) • $37.2B (direct & indirect cost of COPD annually)

  - housing: tenant-based rental assistance to allow families to move to safer neighborhoods (http://www.thecommunityguide.org/social/tenantrental.html) and public health resources for health and housing professionals (http://www.cdc.gov/HealthyHomes/ByAudience/Professionals.html).

If the EH system is to build on the successes of the 20th century, the emerging challenges facing the workforce must be recognized and prepared for and proactive preparations must be made to address these potential threats. For example, because the EH workforce likely is unable to re-expand to historical levels, workers must be encouraged to seek and have access to

- educational opportunities throughout their careers (to remain at the cutting edge of both traditional and emerging knowledge areas);
- tools/best practices (to be as efficient, effective, and productive as possible, whether doing a restaurant inspection or an HIA); and
- cross-training and collaborative activities in new areas such as urban planning, housing, transportation, disability, aging, and other built and social environment practice areas where critical resources, knowledge, and authorities exist.

These educational and other resources are vital in ensuring that

- the specifics and measurable value of everyday activities of the EH workforce are widely understood by citizens and policy makers;
- the EH workforce remains at the cutting edge of both traditional and emerging areas; and
- the EH workforce is fully empowered by knowledge, tools, and information so they are simultaneously highly effective and highly productive.

If successful, a comprehensive and integrated effort will ensure that, as resources become scarcer, EH is the last thing cut, not the first. This effort will also improve the odds that, if we have gained another 30 years of life expectancy at the end of the 21st century, EH will have contributed significantly to another century's greatest public health achievements.

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TABLE **3**

Examples of Emerging, Nontraditional Knowledge/Practice Areas Recommended by the Institute of Medicine (IOM) for Public Health Professionals

IOM Report and Date	Recommendations
Who Will Keep the Public Healthy? Educating Public Health Professionals for the 21st Century, 2003	Content areas for inclusion in graduate-level public health education programs: • Informatics • Communication • Global health • Public health ethics • Genomics • Cultural competence • Policy and law • Community-based participatory research
The Future of the Public's Health in the 21st Century, 2002	Local government officials and agencies with important but less obvious roles in health: • City councils • Housing authorities • Police and fire departments • Cooperative extension services • Public schools, colleges, and universities • Zoning boards • Parks and recreation agencies
Improving Health in the Community: A Role for Performance Monitoring, 1997	Entities that can influence the health of the community can include many that do not explicitly see themselves as having a health-related role: • Social services • Schools • Justice • Housing • Transportation
Promoting Health: Intervention Strategies from Social and Behavioral Research, 2003	Efforts to address the fundamental social and behavioral causes of illness will require broad thinking that goes beyond traditional disease categories, focal points of interventions, and disciplinary lines. Social, behavioral, and life scientists must collaborate to engage a biopsychosocial model. Interventions are likely to be more successful when applied in coordinated fashion across multiple levels of influence.
Health and the Environment in the Southeastern United States: Rebuilding Unity: Workshop Summary, 2003	We need to embrace an attitude of collective solutions to problems and collective action to address them. We have to join forces across disciplines: • Environmental health • Planners • Developers • Architects • Engineers • Health professionals • General public

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