

Are We Ready for a Washington “Katrina”?

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Washington Education Association • Washington for Health Care • Washington Rural Health Association
Washington State Association of Local Public Health Officials • Washington State Hospital Association • Washington State Labor Council
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Executive Summary

The recent damage and human suffering that occurred in the Gulf Coast region as a result of Hurricanes Katrina and Rita brought the attention of a nation to the consequences of ignored public health infrastructure. The same sort of tragedy easily could happen here in Washington.

The Working for Health Coalition recently analyzed the potential health impacts of a natural disaster here in Washington State. We looked at various scenarios including a large earthquake—the most likely type of "Katrina" that could affect our state—as well as the potential impact of an influenza pandemic. While local public health experts already have gone to great and even nationally recognized efforts to protect us, there is near unanimous agreement that our public health capacity is insufficient to handle a natural disaster or Washington "Katrina".

Recent studies show the devastation from a natural disaster here could be catastrophic:

- A Seattle fault magnitude 6.7 earthquake could lead to 1,600 deaths, 24,000 injuries, tens of thousands of displaced citizens, and chaos in transportation of goods and people.
- Conservative estimates for pandemic influenza (e.g., possible bird flu outbreak) could kill over 4,000 and hospitalize over 17,000 Washingtonians.

While public health officials in Washington have developed innovative and proactive disaster response plans, Washington still only passed on six out of 10 major indicators for disaster response capabilities in a recent national analysis.

Working for Health Coalition analysis shows that local public health jurisdictions throughout the state have received a steady decline in funding during a time of increased need. Both state and federal investments in public health capacity are urgently needed to help protect Washingtonians. We recommend a \$400 million increase in annual investments of our public health capacity to guarantee a sustainable system that will be there to protect our health and meet minimal standards. And, we also recommend an additional \$50 million for preparedness for emergencies and once in a lifetime threats.

We believe Washington State will be better prepared for a Katrina-like event here if we invest in public health capacity at higher levels. During a time of proposed federal cuts for necessary local public health infrastructure and services, the state should increase funding during the 2006 legislative session.

Introduction

The recent damage and human suffering that occurred in the Gulf Coast region as a result of Hurricanes Katrina and Rita brought the attention of a nation to the consequences of ignored public health infrastructure. Populations of all socioeconomic and racial backgrounds suffered along the Gulf Coast, and many residents died needlessly. The same sort of tragedy easily could happen here in Washington.

The prospect of a large earthquake, for example, brings to mind pictures of human suffering that might occur here with our own most likely natural disaster. One only need remember the recent and relatively mild 2001 Nisqually earthquake that struck Western Washington, creating significant damage. Other possible disasters that could bring our region to its knees include a volcanic eruption or lahar (or landslide) from Mount Rainier, a bird flu epidemic, or bioterrorism event.

Meanwhile, the entire nation, including Washington, is preparing busily for the prospect of a pandemic flu event. While President Bush recently unveiled a \$7.1 billion request to fund a national response plan for a global epidemic of influenza, local officials worry that too little of that money will be devoted to building the local and state public health system capacity necessary for an effective response to a national disaster.

Local and state public health authorities in Washington believe that despite their best, and sometimes nationally recognized efforts to prepare for such disasters, resources and personnel would be stretched beyond their capacities and unable to fully respond to the health dangers faced by our population. Washingtonians likely would be "on our own," without ready federal assistance, for up to one week in the event of a natural disaster, much like the Gulf Coast after Hurricane Katrina. Many people will be on their own for even longer in the event of a flu pandemic because of a shortage of first responders and health personnel who are sick themselves. "There isn't an agency or organization in the nation that can handle a catastrophic event," said Eric Holdeman, director of King County's Office of Emergency Management, in a recent press release.¹

Urgent action is needed to invest in public health work and capacity that will protect Washingtonians. This Working for Health Coalition report examines three areas that will shed light on this important issue:

- Possible real-life scenarios of a natural disaster in Washington,
- Public health benchmarks for emergency preparedness and Washington's performance, and
- An examination of trends for local and state public health funding in Washington.

"Katrina" Scenarios: *We Are All at Risk*

Scenario One: Earthquakes

The Puget Sound Project Team recently projected the potential for damage and loss of life with two major earthquake scenarios, a magnitude 6.7 earthquake along the Seattle fault line and a 9.0 earthquake along the Cascadia fault line. A review of their projections makes it quite clear that the Puget Sound region and Western Washington, with spillover effects into Eastern Washington, easily could experience a Katrina-like event that likely would not come with nearly as much warning.

In the scenario of a magnitude 6.7 earthquake along the Seattle fault, it is expected that there would likely be more than 1,600 deaths and 24,000 injuries in the region including King, Pierce, and Snohomish counties. In addition to the death and injuries, the region would be devastated by damage to buildings and roads that would halt commuters and the transport of goods and services.

¹ *Preparing for the Worst*. (October 19, 2005). Valley Medical Center. Retrieved November 19, 2005 from <http://www.valleymed.org/media/PressRelease.asp?id=176>.

Some portions of the region likely would be inaccessible for emergency response, while many residents might be stranded. Tens of thousands of people would need emergency shelter, but space would be limited due to damage to schools, churches, and community centers.²

Dangerous Health Hazards

The combination of building damage and service demand for injuries would create shortages in hospital capacity. We all would be potentially at risk given that many hospitals often are stretched to capacity during even normal times. One-third of households and businesses would be without water

Seattle Magnitude 6.7 Earthquake Projected Losses

- 1,600 deaths
- 24,000 injuries
- 38,700 buildings destroyed beyond use
- 154,000 buildings destroyed with restricted use
- 130 fires
- \$33 billion in economic losses

Source: Earthquake Engineering Research Institute and Washington Emergency Management Division

supply, while many others would lose electricity, natural gas, or telephone services. Hazardous material spills might generate fires, cause human health hazards, and pollute the air and water. The lack of water and untreated wastewater would place many people's health at risk. Communicable disease would likely increase, but a lack of epidemiological surveillance services and a shortage of health care and public health personnel could leave the community at risk for escalating disease burden.

A larger 9.0 earthquake scenario along the Cascadia fault line would likely create similar consequences, with larger injury and death tolls and additional damage from tsunami waves and landslides in the coastal and mountain ranges. Hundreds of thousands of people would need food, water, and shelter, and travel between the coast, inland, and Eastern Washington would be severely if not completely impaired.³

Eastern Washington Also at Risk

Washingtonians east of the Cascades also should be aware of the possible risks. In the scenarios described above, many communities in Eastern Washington would lose access to needed food and medical products because of disrupted utility and transportation lines. In addition, it is likely that a large portion of the displaced population from Western Washington would move, at least temporarily, east of the mountains.

Earthquakes also occur in Eastern Washington. Indeed, the largest recorded earthquake in state history occurred in 1872 near Lake Chelan—a magnitude 7.3 earthquake whose damaging intensities were reportedly felt in the now densely populated Puget Sound region and in the southeast beyond the current Hanford nuclear reservation.⁴

Disadvantaged Populations at Even Higher Risk

As we saw in the aftermath of Hurricane Katrina, many low-income and minority populations in the Gulf Coast disproportionately suffered as a result of an underfunded and uncoordinated emergency response. In disaster situations, special needs populations including children, the elderly, the disabled, the non-English speaking, and the very ill are at increased risk of deteriorated health and death due when the ability of social services and support networks to help them is disrupted. A recent examination in Seattle documented the need for increased disaster planning outreach to poor communities. For example, south Beacon Hill has only two citizen-disaster teams, whereas some wealthier north Seattle neighborhoods have 65 teams.⁵

² Scenario for a Magnitude 6.7 Earthquake on the Seattle Fault. (February 2005). Earthquake Engineering Research Institute and Washington Emergency Management Division.

³ Cascadia Subduction Zone Earthquakes: a Magnitude 9.0 Earthquake Scenario. (2005). Cascadia Region Earthquake Workgroup.

⁴ Largest Earthquake in Washington. U.S. Geological Survey, Retrieved November 16, 2005 from http://neic.usgs.gov/neis/eq_depot/usa/1872_12_15.html. Abridged from Seismicity of the United States, 1568-1989 (Revised). (1993). Stover, C.W. & Coffman, J.L.

U.S. Geological Survey Professional Paper 1527. Washington: United States Government Printing Office.

⁵ Fryer, A. (November 2, 2005). Disaster plan isn't reaching the poor. *Seattle Times*, pp. B1, B5.

Scenario Two: Flu Pandemic Scenario in Washington

A flu pandemic in a worst-case scenario could lead to as many as 198,000 hospitalizations and 38,000 deaths in Washington State.⁶ A smaller pandemic scenario still might lead to as many as 17,000 hospitalizations and 4,180 deaths here. Estimates show that 20 percent of the workforce would be absent for a period of time. The local public health and medical system's capacity would be severely stressed. The high demand for care in emergency rooms often fills hallways even on normal days now—many emergency room physicians question whether patients could be effectively triaged in a pandemic flu situation⁷.

Building Public Health Capacity in Washington will Benefit All of Us

Many natural disasters over the past decade, large and small, national and international, should instruct us in how to better manage responses and minimize injuries, illnesses, and death. The scenarios above demonstrate the tremendous needs that our region will have in a natural disaster.

After Hurricane Katrina and other disasters such as the recent earthquake in Pakistan, the population's needs for health services became apparent quickly. Unfortunately, the response to all of these disasters was not enough to prevent mass casualties. Population displacement in a setting of inadequate power, food, and communications presented tremendous challenges, while survivors face a double threat from a lack of both water for safe drinking and sewage treatment.⁸ Meanwhile, toxic contaminants and infectious diseases have become a problem as people return to their mold and water-infested homes.

The Development of Public Health Standards to Measure Capacity for Disaster Response

In order to protect us and our health, we will need to invest and build capacity into a public health system that is poised to respond to a natural disaster. One recent report suggested examination of the following areas:

- **How much manpower do you have?** For example, New Orleans was caught off guard when many police officers did not or could not report for duty after Hurricane Katrina.
- **How will you communicate?** Often local agencies do not have the funding to invest in the technology that will be necessary if a disaster overwhelms office phone, cell phone, and computer services.
- **How do you get the word out to the public?** Other cities such as New York City are experimenting with an emergency system that would text-message critical instructions directly to cell phones.
- **What's your hospital capacity?** During the 2001 Nisqually earthquake, public health officials attempted to use a hospital capacity website to help triage injuries and admissions, but it was not always accessible and had inadequate information. Another recent report predicted that during a severe flu pandemic, hospital bed capacity nationally would be less than half than what would be necessary (anticipated 2.4 million hospitalizations).⁹

⁶ *HHS Pandemic Influenza Plan*. (2005). U.S. Department of Health and Human Services. Retrieved November 16, 2005 from [http://www.hhs.gov/pandemic flu/plan](http://www.hhs.gov/pandemic%20flu/plan).

⁷ Stobbe, M. (November 7, 2005). Many ER's ill-prepared for major disaster. *Seattle Times*, pp. A13.

⁸ *Katrina's Aftermath: Public Health Concerns*. (September 6, 2005.) Public Health News Center, Johns Hopkins Bloomberg School of Public Health. Retrieved October 27, 2005 from http://www.jhsph.edu/katrina/katrina_health.html.

⁹ *A Killer Flu?* (June 2005). Trust for America's Health. Retrieved October 27, 2005 from <http://healthyamericans.org/reports/flu/Flu2005.pdf>.

- **Are you ready for the secondary impacts?** Hurricane Katrina became a humanitarian crisis when fires, a lack of power, broken communications, and a lack of water and sewer service prevented the stranded population from accessing needed public health services.¹⁰

A more robust public health system with improved surge capacity will be essential to keep us as safe as possible. One group suggests that our emergency preparedness should include 24x7 emergency and ongoing response capabilities including:

- **Rapid detection** of emerging diseases and ongoing tracking of ongoing health threats.
- **Intensive investigative** capabilities to determine causes or contributing factors of diseases and illnesses.
- **Mass containment, control, and treatment strategies**, including planning, surge workforce capacity, equipment, and pharmaceuticals to meet potential wide scale vaccination, antidote, and treatment needs.
- **Streamlined and clear communication** channels so that health care workers are communicating at all levels (including emergency responders, hospitals, and local, state, and federal health agencies) and the public is swiftly and adequately informed of health concerns.¹¹

It will take a lot to achieve adequate preparedness:

- **Leadership, Planning, and Coordination:** An established chain of command and well-defined roles and responsibilities for seamless operations between different medical and scientific functions.
- **Expert and Comprehensive Workforce:** Highly trained and full staffs of experts, scientists, and other health professionals.
- **Modernized Technology:** State-of-the-art laboratory equipment, information collection, and health tracking systems.
- **Pre-Planned, Safety-First Rapid Emergency Response Capabilities and Precautions:** Tested plans and safety precautions to mitigate potential harms to communities and public health professionals and first responders.
- **Immediate, Streamlined Communications Capabilities:** Coordinated, integrated communication among all parts of the public health system and with the public.

Public Health Responsibilities in the Event of a Natural Disaster

- Food and agriculture safety
- Water safety
- Investigation and lab testing of disease outbreaks
- Environmental health and vector control
- Isolation and quarantine
- Medical surge capacity
- Medical supplies management and distribution
- Mass prophylaxis/immunizations
- Fatality management/burials
- Hazardous materials response and decontamination (sewage, garbage, toxics, etc.)
- Community triage and pre-hospital treatment
- Mass care for displaced populations, e.g., shelter, food, water, and related services
- Care for special needs populations, e.g., children, elderly, disabled, immobile, etc.
- Stray animal management/animal bites

Source: U.S. Department of Homeland Security, 2005

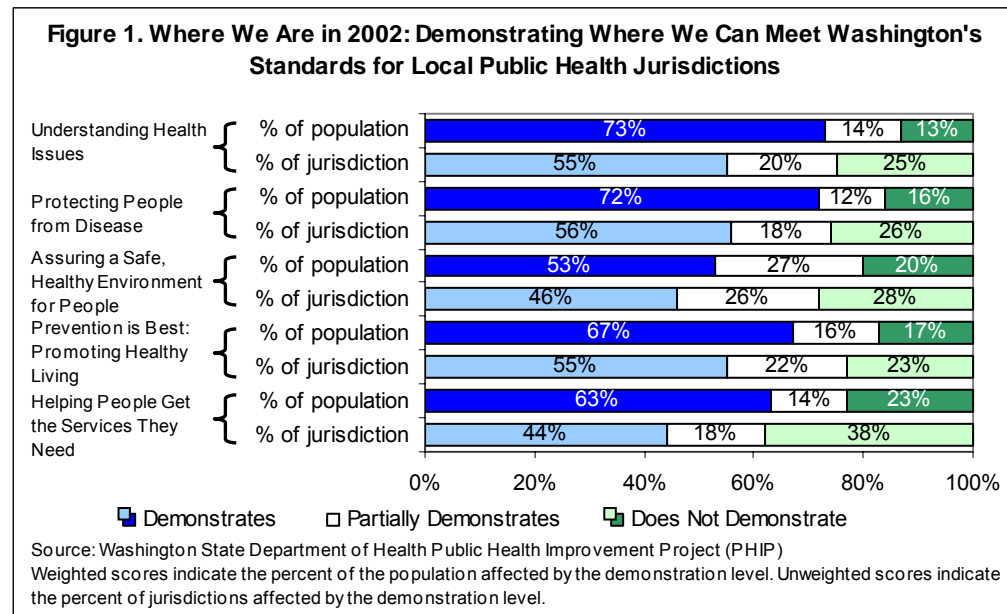
Measurement of How Washington Will Meet Public Health/Disaster Response Standards

A substantial number of Washingtonians live in communities that do not meet standards. Local and state public health officials have been measuring health performance and there are many

¹⁰ Swope, C. & Patton, Z. (October 2005). Disaster's Wake. *Governing*. Retrieved October 29, 2005 from <http://governing.com/articles/11disast.htm>.

¹¹ *Shortchanging America's Health: A State-by-State Look at how Federal Dollars are Spent*. (February 2005) Trust for America's Health. Retrieved November 17, 2005 from <http://healthyamericans.org/reports/budget05/StateHealthSpending05.pdf>.

communities that do not meet national standards.¹² For example, almost half of the Washington population was determined to be inadequately protected in the category of "Assuring a Safe, Healthy Environment for People," which includes disaster response standards (see Figure 1).



Environment for People," which includes disaster response standards (see Figure 1).

A different national study showed that Washington State scored 6 out of possible score of 10 in a recent state-by-state analysis of disaster and public health emergency preparedness,¹³

better than our Northwest neighboring states, but still behind eight other states across the nation.¹³

Washington **successfully met** the following criteria for evaluation of effective disaster response preparedness:

1. Has a sufficient number of public health labs for disease surveillance.
2. Has a sufficient number of lab scientists.
3. Has a plan or is part of a state/local planning effort to care for patients at non-health care facilities.
4. Has an infection control professional available within 15 minutes 24 hours per day/7 days per week.
5. Has worked with state or local health department to ensure receipt of vaccines and antivirals by hospital professionals.
6. Has additional equipment and supplies available for a surge in patients that would need ventilators.

The state **did not meet** the following criteria for effective disaster response preparedness:

1. Lacks an electronic disease outbreak registry that would enable rapid reporting and warning of disease threats.
2. Has not achieved public "green" status for the Strategic National Stockpile, meaning that the state currently is not recognized as being prepared to distribute sufficient vaccines and antidotes in the event of a disaster/health emergency (this was not one of the ten criteria).
3. Does not have sufficient capabilities to respond to a chemical terrorism event.
4. Does not have enough plans, provisions, and incentives to ensure continuity of care in the event of a major outbreak.

¹² *Public Health Standards: Essential Programs for Improving Health*. Washington State Department of Health Public Health Improvement Partnership. Retrieved October 27, 2005 from <http://www.wa.gov/PHIP/documents/PHIP2002/2002PHIP6.pdf>.

¹³ *Ready or Not?* (December 2005). Trust for America's Health Issue Report. Retrieved December 5, 2005 from <http://healthyamericans.org/reports/bioterror05/bioterror05Report.pdf>.

These recent assessments demonstrate that while Washington State is taking these threats seriously, more investments should be made to make us ready. Let's take a look at how we're currently underfunding public health and the ability to protect our communities and ourselves during a natural disaster.

Are We Investing Enough?

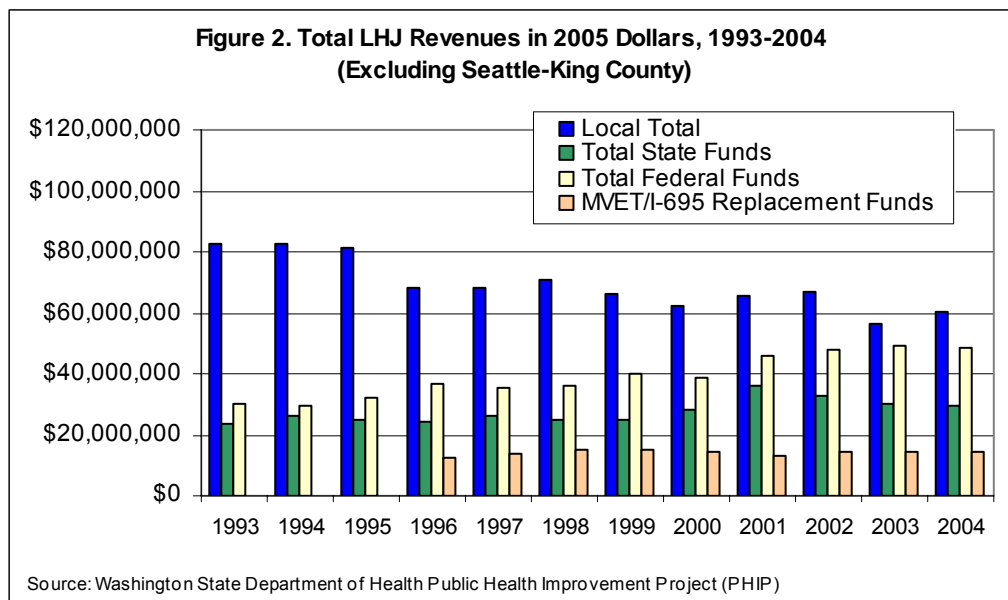
Funds must be allocated correctly

Our state's public health system is made up of 35 local health jurisdictions (LHJ's). They provide the bulk of most communities' public health services, and we will depend on them for care in the event of a natural disaster such as an earthquake or pandemic flu. They rely on a combination of local, state, and federal funding, but those funds have increasingly eroded.

Meanwhile, those funds that do exist increasingly have been tied to expanding responsibilities and more specific conditions such as bioterrorism training. These issues were reiterated in a report from the Trust for America's Health: "States have been left to manage shifting and competing priorities for limited public health resources, without enough support to focus on fixing the fundamental, tried-and-true basics that are the backbone of a well-functioning public health system."¹⁴

Figure 2 demonstrates steady erosion by 27 percent of LHJ revenues over the past 10 years. In the 34 LHJ's outside of Seattle/King County, funding for local public health agencies has declined from \$82.7 million to \$60.4 million (2005 dollars) between 1993 and 2004.¹⁵

Meanwhile, large disparities exist in funding for public health throughout the state. This raises concern that where you live may determine how safe you are in a natural disaster. These funding discrepancies



result in real problems. For example, both Snohomish and Yakima Counties suffer from very low public health staff to population ratios of 1:3,000 and 1:5,500, respectively.¹⁶

Unfortunately, most local health jurisdictions throughout the state have suffered the same fate of reduced funding over the past several years. Recent cuts in federal and state funding have led to a 33 percent reduction in dollars spent per person in King County on core public health services over

¹⁴ *Ready or Not?* (December 2005). Trust for America's Health Issue Report. Retrieved December 5, 2005 from <http://healthyamericans.org/reports/bioterror05/bioterror05Report.pdf>.

¹⁵ *Financing Local Public Health in Washington State: Challenges and Choices*. (July 2005). Washington State Department of Health PHIP Finance Committee, Berk & Associates.

¹⁶ Personal communication. (November 28, 2005). Rick Mockler. Snohomish County Health District.

the past six years,¹⁷ with similar, even larger reductions in Snohomish County (35 percent) and Spokane County (41 percent) (see Figure 3).¹⁸

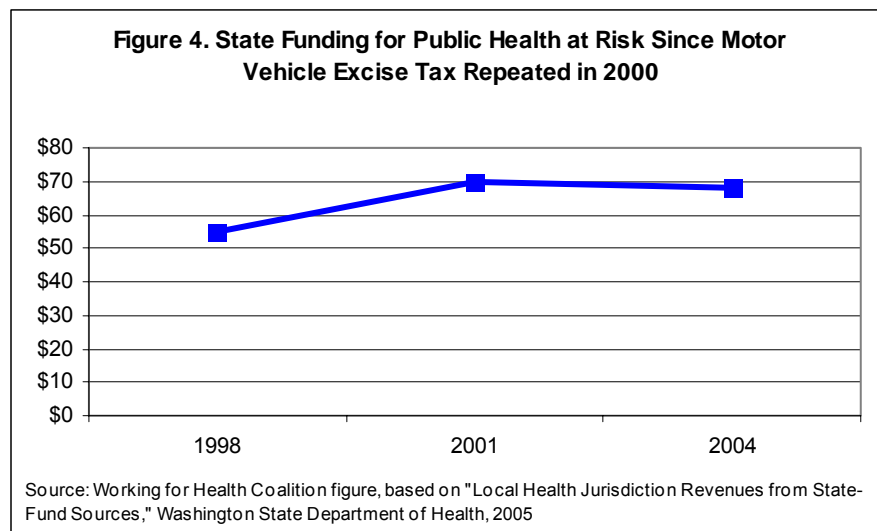
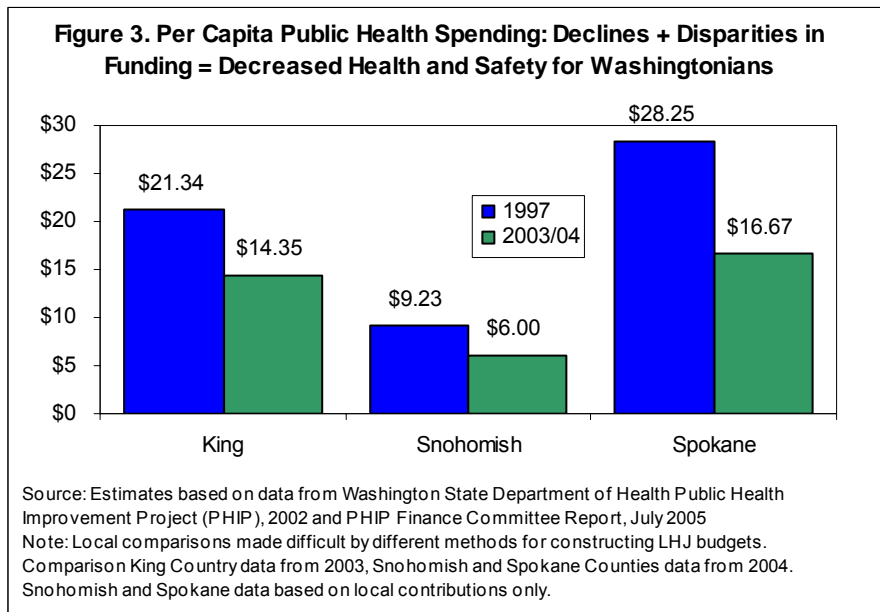
Local per capita spending on public health has declined because of cuts at both the state and federal levels. Most recently the state contribution to local health jurisdictions decreased between fiscal years 2001 and 2004 from 70 to 68 million dollars (see figure, next page). The state has not had a dedicated funding source for public health since the motor vehicle excise tax was repealed in 2000.

Meanwhile state officials, including Governor

Christine Gregoire, point out that the President's flu plan includes \$100 million for local public health planning, but his 2006 budget proposal includes a \$130 million cut for local public health disaster preparedness—a net \$30 million cut during a time of increasing needs.¹⁹ Federal preparedness plans show a reliance upon local public health officials to distribute federally provided supplies such as vaccines, antibiotics, and other medications within one to two days of their provision.

Unfortunately, many local officials believe this will be difficult task because their local public health

budgets do not currently support the personnel and infrastructure necessary to execute these plans.



What Would be Required to Optimally Protect Washingtonians' Health?

A sustained annual investment of \$400 million beyond current resources would be required to meet basic public health standards throughout the state for all Washingtonians, 95 percent of the time AND an addition \$50 million is

¹⁷ *Budget Cuts Strain State, County and Municipal Health Departments.* (July 28, 2003). OMB Watch. Retrieved November 2, 2005 from <http://www.ombwatch.org/article/articlereview/1688>.

¹⁸ Smallpox planning detracts from core public health, Washington officials say. (April 8, 2003). *The Body*. Provided by Centers for Disease Control and Prevention. Retrieved November 25, 2005 from http://www.thebody.com/cdc/news_updates_archive/2003/apr8_03/washington_public_health.html.

¹⁹ Gregoire C. Letter to President George W. Bush. November 9, 2005.

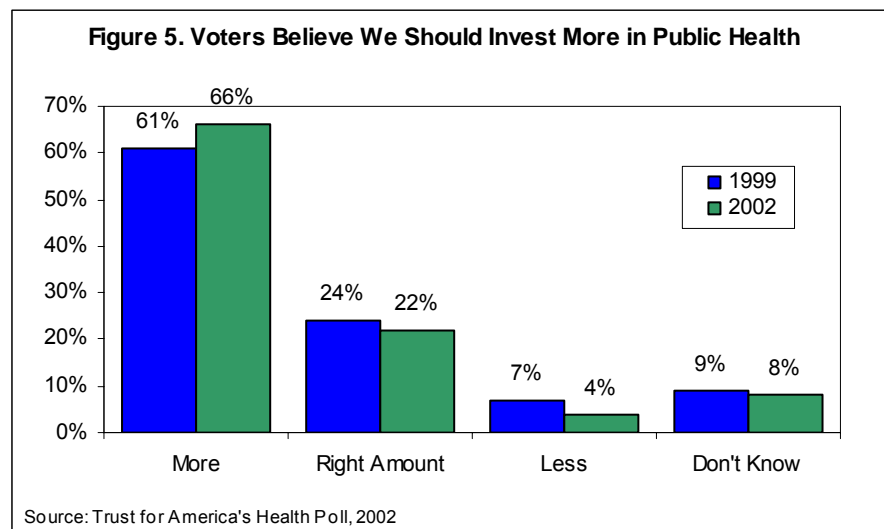
needed to be prepared for a disaster.²⁰ The state's Public Health Improvement Partnership, previously established by the Legislature, determined this. Public health officials also recommended the following practices for determining local funding:

- Facilitate funding decisions based on objective standards that recently have been created.
- Provide stable and dedicated funding that will be reasonably predictable (similar to law enforcement or fire protection).
- Support public health consistently across the entire state.
- Employ efficient structures and systems.

Conclusion: The Public Supports Increasing Public Health Investment and Capacity

The increasing frequency of large-scale natural disasters both in the U.S. and throughout the world have brought new attention to the consequences of a poorly equipped public health and disaster response system. We believe that public health protection is an essential government function that deserves appropriate funding, similar to fire or police protection. Investments at both the local and federal levels must be made.

A large majority of Americans also favor increased spending for public health, while even larger majorities (near 80 percent) approve of and understand the function of important public health services such as childhood immunization programs, food safety, and drinking water inspections (see Figure 5).²¹ We believe Washingtonians support and approve of wise investments that improve our health and safety. Indeed, the recent rejection of a repeal of the gas tax (Initiative 912) in Washington State demonstrated that the public recognizes the importance of investing in necessary public services to keep us safe and the economy moving ahead.



At the state level, in order to meet the PHIP standards (as described above) at least 95 percent of the time, an investment of at least \$400 million beyond current resources would be needed, AND an additional \$50 million is needed to be prepared for a disaster. The vast majority of this money (\$385 million) should be targeted toward local health jurisdictions, with a

²⁰ *Financing Local Public Health in Washington State: Challenges and Choices*. (July 2005). Washington State Department of Health PHIP Finance Committee, Berk & Associates.

²¹ Majority of Americans see value of public health: new poll data. (October 2005). *The Nation's Health* (publication of American Public Health Association). Retrieved November 10, 2005 from http://www.apha.org/tnh/index.cfm?fa=ADetail&id=139&issue_id=12005.

smaller amount targeted to the state Department of Health to support and coordinate best practices. Meanwhile, action must be taken at the federal level as well to help protect Washingtonians. Both local public health officials and Governor Gregoire have protested a net \$30 million cut in federal funds for LHJ's during a time of increased need and responsibilities placed upon local officials.²² Hurricane Katrina's aftermath also made it clear that the Federal Emergency Management Agency must devote more of its attention to preparation for the inevitable prospects of more natural disasters instead of focusing only on terrorism.

Improving the public's health is not only in the domain of government. Effective private/public partnerships are occurring in several areas to improve public health, and these should be expanded. Recently, Seattle-King County Public Health worked with local businesses to develop plans for continuing services and the economy moving in the event of a flu pandemic that keeps much of the workforce home for a long period of time.²³

By increasing public health capacity and performance, we simultaneously will improve the ability of local officials to respond to both daily health challenges and natural disasters. This will allow public health professionals to ensure better health for our communities, whether we are facing a devastating earthquake, a pandemic flu outbreak, or the more insidious daily challenges of immunizations, asthma, obesity, cancer, or Mad Cow disease. We should invest in a more robust public health system that will serve all Washingtonians, protect us, and prevent disease.

Public Health Benefits Everyone

Your Country: *The system that protects us from disease and epidemics has been dangerously neglected for the past three decades, leaving our nation at risk. Until we make disease prevention a national priority, this continued neglect will exact an extraordinary toll.*

Your Community: *When health emergencies arise – whether it's an outbreak of SARS, a bioterrorist attack, or skyrocketing asthma rates – health professionals need to be prepared, trained, and equipped to respond rapidly and effectively. Lives depend on it.*

You and Your Family: *With more than 90 million Americans living with chronic disease, chances are someone close to you suffers everyday. From asthma and AIDS to cancer, heart disease, and diabetes, most of these diseases – and many of the millions of resulting deaths – could be prevented.*

Your Move: *Picture a country where...*

- ◆ *Diseases and injuries are prevented, not just treated.*
- ◆ *People are protected against health threats of all kinds.*
- ◆ *Strong, responsive communities help their citizens to lead healthier lives.*
- ◆ *By working together, we can have a healthy nation and save lives by stopping health threats in their tracks.*

Source: Trust for America's Health, 2005

For more information, visit the following Web sites:

- *Washington state Department of Health Public Health Emergency Preparedness*
<http://www.doh.wa.gov/phepr/default.htm>
- *King County Public Health Emergency Preparedness*
<http://www.metrokc.gov/health/portal/prep.htm>
- *U.S. Centers for Disease Control and Prevention Emergency Preparedness and Response*
<http://www.bt.cdc.gov/planning/>
- *American Public Health Association Public Health Preparedness and Emerging Threats*
<http://www.apha.org/preparedness/>

²² Paulson, T. (October 27, 2005). U.S. tactics on bird flu misguided, experts say. *Seattle Post-Intelligencer*. Retrieved November 3, 2005 from http://seattlepi.nwsource.com/national/246101_birdflu27.html.

²³ Solomon, C. (October 4, 2005). Sims warns of flu epidemic. *Seattle Times*. Retrieved November 9, 2005 from http://seattletimes.nwsource.com/html/health/2002538085_fluforum04m.html.

Appendix A Further Discussion of Public Health Capabilities and Needs for a Natural Disaster

Critical Public Health Interventions Necessary after a Natural Disaster²⁴:

- *Environmental health*: Poor water supplies, inadequate sanitation, and disease vectors such as mosquitoes and rats all can lead to increased incidence of diarrhea, respiratory infections, and other communicable diseases. Post-disaster interventions must include the delivery of adequate clean water and the collection, disposal, and treatment of waste products.
- *Shelter*: Temporary living spaces and diminishment of water and wind penetration for those living in damaged housing must be supplied.
- *Disease control and epidemic management*: Public health professionals monitor disease outbreaks and communicate risks to health care providers and the public.
- *Immunizations*: The recent earthquake disaster in Pakistan demonstrated the need for adequate supplies of tetanus toxoid as medical teams treated many cases of tetanus from trauma wounds. Children's immunizations must be updated in mass shelter situations.
- *Nutrition*: Arrangements must be made in the event of food shortages that may result as a result to damage to both crops and stock or to distribution centers.
- *Disposition of dead bodies*: Precautions must be communicated and undertaken on behalf of both survivors and rescue workers.

Washington State Standards for Natural Disaster Response²⁵:

- Information is provided to the public on how to contact local jurisdictions to report environmental health threats or public health emergencies, 24 hours a day.
- Appropriate stakeholders are engaged in developing emergency response plans.
- Procedures are in place to monitor public access to services during an emergency response.
- There is a plan that describes local health jurisdictions/Department of Health roles and responsibilities for environmental events or natural disasters that threaten the health of the people. This plan should be linked with other local emergency response plans. All local public health staff members are trained in the local health jurisdiction emergency response plan.

²⁴ Noji, E. (January 2005). Public health issues in disasters. *Critical Care Medicine*. 33(1) Supplement: S29-33 and *WHO Health Briefing from the Earthquake Emergency in Pakistan*. World Health Organization. Retrieved October 27, 2005 from <http://www.who.int/mediacentre/news/briefings/2005/mb9/en/index.html>.

²⁵ "Public Health Standards: Essential Programs for Improving Health." *Standards for Public Health in Washington State: Baseline Evaluation Report*. (2001). Retrieved October 29, 2005 from <http://www.doh.wa.gov/phil/Standards.htm>.