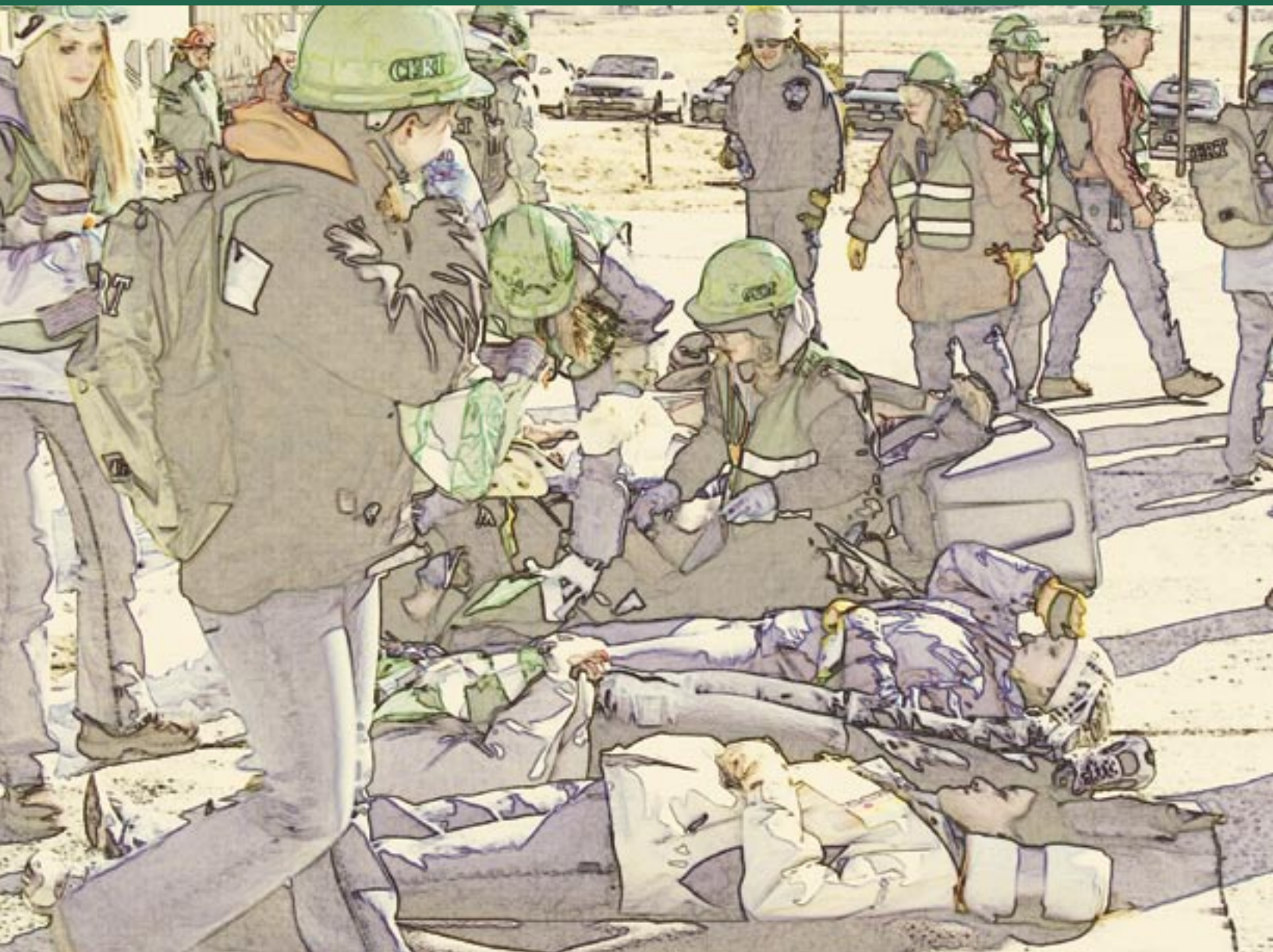


Northwest Public Health

Fall/Winter 2005

Volume 22 Number 2

and after Katrina
**Four years later —
Are we prepared yet?**



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Web Exclusives for this issue can be read at
www.nwcp.org/nph



Ready or Not . . . Here I Come!

That cheery announcement from a child starting a round of hide-and-seek sounds more ominous when referring to natural disasters and other emergencies in our future. Terrorism, including the potential for bioterrorism, is a modern-day reality. That earthquakes, tsunamis, and hurricanes are an unpredictable fact of life was brought home vividly by the widespread destruction across the Western Pacific last December and the recent devastation caused by Hurricane Katrina. And it appears that an influenza pandemic, avian or from another source, is inevitable. Ready or not.

Since we cannot prevent these disasters, we must prepare and protect. This issue of *Northwest Public Health* looks at how our level of preparedness has improved in recent years and where gaps remain. As you will see, there are impressive programs throughout our region to enhance our defenses. Our School plays a significant role in this effort through research and training.

The issue of *Spotlight on Research* inserted in this journal includes an article about the work of Dr. Marilyn Roberts, Professor of Pathobiology. Her team is studying a tetracycline resistance gene, which when present in a bacterium reduces or eliminates the effectiveness of tetracycline therapy. A commonly prescribed antibiotic, tetracycline is an important tool for treating diseases that may be used as weapons by bioterrorists. The genetic manipulation of bioweapons is as scary a prospect as any we face. Only with such research can we begin to prepare.

Our School is also active in preparedness training, primarily through the Northwest Center for Public Health Practice. We just completed our 14th Summer Institute, designed to increase the emergency preparedness know-how of public health professionals in the region. The theme was Public Health Preparedness: Tools for the Frontline, and the training exercises were geared to educating professionals in our public health system to detect, respond to, control, and recover from an emergency incident.

The Northwest Center has developed many other resources, some of which are listed below:

- Tabletop exercises to help participants recognize and respond to suspected SARS and to promote the collaboration necessary to respond to a bioterrorist attack on the food supply
- Monthly Hot Topics in Preparedness Web conferences
- A Web-based series called Public Health Law in the Age of Terrorism
- Disaster Behavioral Health: Tools and Resources for Idaho Emergency Responders, a Web conference covering the psychosocial aspects of terrorism preparedness and emergency response
- Instructional materials on the Strategic National Stockpile—a cache of pharmaceuticals, vaccines, and medical supplies managed by CDC and made available to help states respond to emergencies—and community training on mass dispensing of supplies
- Two courses for Health Sciences students on Bioterrorism Awareness for Health Professionals and an instructional guide for community clinicians
- Training institutes on preparedness in Alaska, Montana, Oregon, and Wyoming

Materials produced by the Northwest Center were also used by Area Health Education Centers in Eastern Washington, which offered bioterrorism preparedness training to rural primary care providers. Those materials also helped Montana State University create a Bioterrorism Education and Training Program.

Our School's goals focus on improving the health of the public through education, research, and practice—in classrooms, laboratories, and out in our communities. By partnering with the Washington State Department of Health, Public Health - Seattle & King County, and numerous other institutions in the Northwest and beyond, we participate in a broad-based, multi-faceted approach to improving our region's preparedness, to being readier than not.

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



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From the Editor



This was a different note a few weeks ago, before Hurricane Katrina laid waste to the Gulf coast. The human and ecological tragedies that we hear of nearly every day now are difficult to comprehend, but certainly we are learning important lessons about what it means to be prepared ... and not.

Since September 11, 2001, the US government has made it a priority for communities to “be prepared” for terrorist attacks or natural emergencies. Four years and at least \$3.7 billion later,¹ how are we doing? This is not an easy question to answer ... “preparedness” connotes the potential to respond appropriately, in a timely manner, with sufficient scale. How does one know if one is “prepared” without having to actually respond to such an emergency and then looking back on one’s performance? Does bioterrorism or public health preparedness mean being able to respond well to a TB outbreak or a shortage (and then glut) of flu vaccines or a chemical attack on a ferry or a nuclear accident? These events are all quite different, and the resources required to respond to them are of very different magnitudes and types.

These are the challenges and questions that public health agencies and officials—and their colleagues in law enforcement, medical care, schools, and transportation—have been grappling with across the Northwest and the country. Katrina made these questions much more than theoretical, the need for answers quite terribly real. This issue of *Northwest Public Health* takes stock of our efforts, progress, and remaining gaps. You can get an inkling of how complex it is to determine our state of preparedness by looking at our Northwest Region at a Glance page, “Preparedness Scorecard 2004,” or reading about Montana’s efforts to measure its state of readiness (Kuntz, et al., p. 6).

Thompson’s Viewpoint (p. 4) deals with one of the more complex relationships that affect preparedness, the connection between a trained workforce and a prepared organization or system. On the other hand, the article on hospital preparedness (Warren, et al., p. 14) seeks to break down an otherwise overwhelmingly complex challenge, emergency communication, into a few simple tenets.

What’s interesting about many of the other articles in this issue is that public health preparedness is not just a big city issue, but rather requires that we attend to potential large-scale emergencies on interstate highways (Conley and Swearingen, p. 10), across international borders (Turnberg and Hofmann, p. 12), in suburbia (Denny, et al., p. 8), in rural counties (Wangsmo, et al., p. 16, and Yarrow and Lee, p. 20), and yes, even on university campuses (Reischl, et al., p. 18).

Another interesting observation from this issue is that preparedness is not just about the dramatic and manmade. Jones (p. 16) reminds us that the bugs that can hurt us jump from animal to animal and sometimes to man, a morphing we still don’t understand well but that could cause greater morbidity and mortality than most imaginable terrorist events. And Snow’s article (p. 22) suggests that we still need to be reminded that the frontline of public health preparedness is sometimes the most basic of hygienic practices—wash your hands and don’t eat from the table on which sick animals were just examined!

Aaron Katz, Editor-in-Chief
Director, Packard-Gates Population Leadership Program

¹ Garfield R, *State Preparedness for Bioterrorism and Public Health Emergencies* (Issue Brief). The Commonwealth Fund, July 2005.

Workforce Development Is Still the Key to Agency Preparedness

Jack Thompson

In an article I wrote for the Spring/Summer 2002 edition of *Northwest Public Health*, I noted how important it was that the Centers for Disease Control and Prevention (CDC) included a specific focus on education and training (Focus Area G, for us preparedness junkies) in its guidance to states for use of preparedness funding. This focus, I noted, offered new opportunities to understand “the direct relationships between workforce training, recruitment, retention, and overall preparedness.” Three years after that article, and four years after the events of September 11, 2001, it’s time to revisit this observation.

The Center and our partners in the Northwest have worked together over the past four years to develop a system to prepare our public health workforce and promote the health and safety of our communities. The logic model underlying our approach was built on the assumption that through needs assessments, trainings and other learning opportunities, and technical assistance, the Center would assist each state and tribal partner, and the region as a whole, in the important job of workforce development. The connection between a prepared workforce and improved organizational performance has been implicit in these partnerships, enhanced by the explicit connection between training and preparedness in the Training and Education Focus Area in the original CDC guidance.

The new renewal guidance from CDC to the states has eliminated all specific reference to focus areas, and now itself makes the assumption that this connection between training and preparedness is implicit across the various goals in the guidance. The absence of a specific focus on education and training (and learning, as our partners often point out to us) has caused concern among many of us. However, this might be an opportunity to make our recognition of the relationship between a prepared workforce and improved organizational performance more explicit.

Virginia Kennedy and colleagues at the University of Texas at Houston, Bernard Turnock at the University of Illinois at Chicago, and others recognized long before 9/11 that the competence of the public health workforce is closely connected to their work setting. Thus we have to think about both individual and agency performance. Currently, interest in evaluation of organizational capacity is becoming an increasing focus in public health, through the

use of performance improvement strategies and the application of new sets of standards, including individual competency development. An underlying assumption in most work on competencies is that commitment to competency mapping and the learning

An underlying assumption in most work on competencies is that commitment to competency mapping and the learning environment can come only from organizations that are themselves committed to lifelong learning.

environment can come only from organizations that are themselves committed to lifelong learning.

Public health organizations at all levels, as well as their boards of health and other governing and funding bodies, must continue to prioritize this connection between prepared workers and well-performing organizations regardless of external priorities. The Washington State Public Health Improvement Partnership (PHIP) provides a great example of this connection. The PHIP has recognized that if the public health system is to work well it needs appropriately trained and skilled workers. And once on the job, these workers need ongoing support—job orientation, mentoring, and distance learning opportunities—to keep working effectively.

The National Association of City and County Health Officials Project Public Health Ready initiative, which links worker preparedness to organizational performance, has provided us with a model that can work well beyond a specific focus on bioterrorism preparedness. The public health system should also learn from the example of our first responder partners (police, fire fighters, and emergency medical services), who place a very high priority on training to ensure an effective organizational response to emergencies.

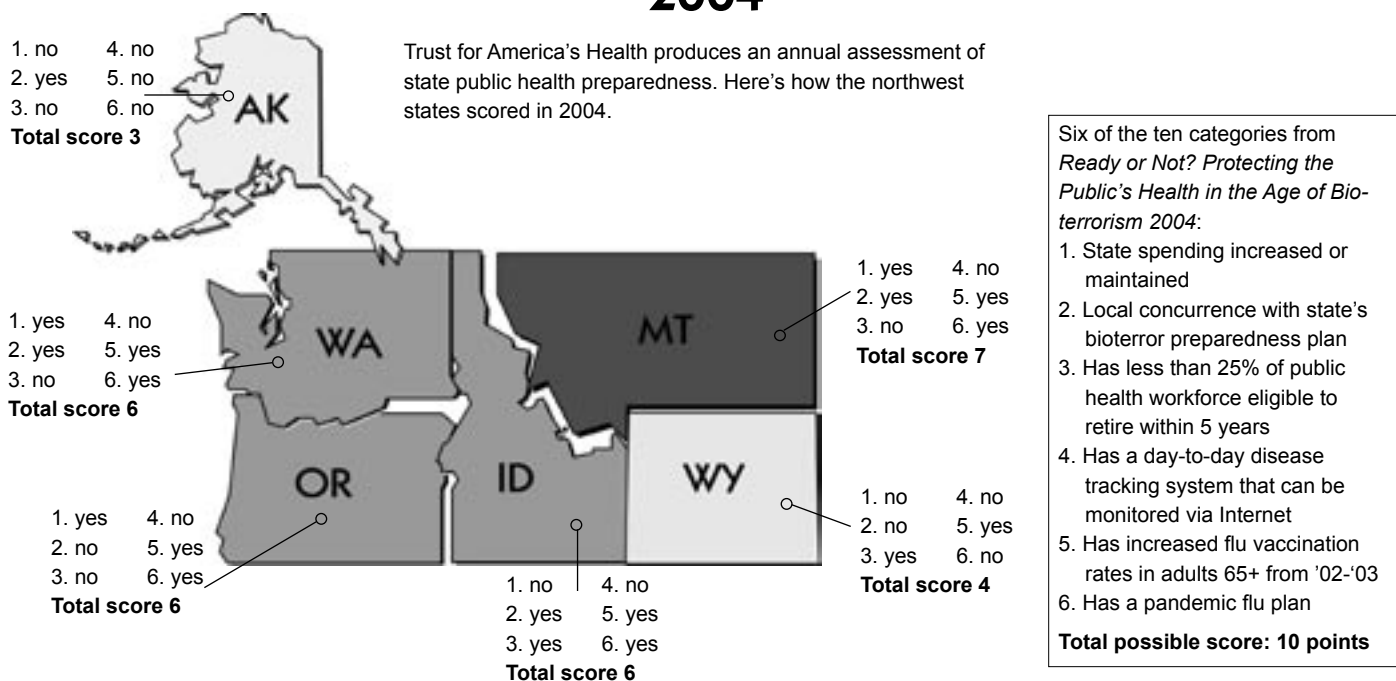
The past four years have seen remarkable advancement in the Northwest and across the nation in workforce preparedness. Today, the major driver behind such work should remain the same as four years ago—the need to prepare public health workers and the organizations that employ them to do the important work of population-based public health improvement, disease prevention, and emergency response. ■

Author

Jack Thompson, MSW, is director of the Northwest Center for Public Health Practice, UW School of Public Health & Community Medicine.

See related bibliography and logic model online at www.nwcphp.org/nph/.

Preparedness Scorecard 2004



Source: Trust for America's Health. *Ready or Not? Protecting the Public's Health in the Age of Bioterrorism*. 2004. <http://healthyamericans.org/reports/bioterror04/>.

Preparedness Funding

	Alaska	Idaho	Montana	Oregon	Washington	Wyoming	USA
BT preparedness funding (CDC/HRSA) FY 2003 (millions) ¹	\$8.24	\$10.67	\$9.20	\$18.30	\$27.21	\$7.75	\$1,368.0
BT preparedness funding (CDC/HRSA) FY 2004 (millions) ²	\$7.16	\$9.24	\$8.15	\$17.15	\$27.05	\$6.66	\$1,196.0
BT preparedness funding (CDC/HRSA) FY 2005 (millions) ³	\$6.70	\$9.20	\$7.64	\$17.05	\$27.15	\$6.17	\$1,333.5
Change in BT funding 2003-2005 ⁴	-18.8%	-13.8%	-17%	-6.8%	-0.2%	-20.4%	-2.5%
BT preparedness funding per capita, 2005 ⁴	\$10.32	\$6.73	\$8.33	\$4.79	\$4.43	\$12.30	\$4.59
CDC funds for non-BT state, local, and public/private agencies, FY 2004 (millions) ²	\$28.67	\$22.65	\$20.92	\$55.70	\$100.07	\$14.13	\$4,202.0

Sources: ¹US Department of Health & Human Services. (News Release) HHS Announces Bioterrorism Aid for States, Including Special Opportunity for Advance Funding. March 20, 2003. www.hhs.gov/news/press/2003pres/20030320.html; ²*Shortchanging America's Health: A State-by-State Look at How Federal Public Health Dollars Are Spent*. Trust for America's Health. 2005. www.healthyamericans.org/reports/budget05/; ³US Department of Health & Human Services. (News Release) HHS Announces \$1.3 Billion in Funding to States for Bioterrorism Preparedness. May 13, 2005. www.hhs.gov/news/press/2005pres/20050513.html; ⁴Calculations based on sources listed above.

Data researched and compiled by Jennifer H. Lee

How Ready Are We?

Measuring Montana's Statewide Public Health Preparedness

Sandra Kuntz
Jane Smilie
Janet Wang

In late fall 2001, a rural county sheriff attempted to contact the local health department after a citizen reported receiving a letter with white powder in the envelope. It was a weekend, and the health department message machine indicated the hours of business—8 a.m. to 5 p.m. Monday through Friday. The sheriff contacted his neighbor, a local public health nurse, who then tried to reach the county health officer. The health officer, who did not have a cell phone or a backup person assigned to his volunteer position, was hiking in a nearby national park for the weekend and was unavailable for three days.

At the time of this event, most tribal and local public health agencies lacked 24/7 capacity and few had protocols in place to deal with potential anthrax events or other public health emergencies. Emergency readiness (preparedness and response capacity) did not become an urgent issue requiring the attention of local, state, and national agencies until the September 11, 2001, attacks and subsequent anthrax events.

When Congressional funding for preparedness was allocated in 2002, the Montana Department of Public

Prevention (CDC) critical capacities and critical benchmarks and established basic preparedness key indicators for each focus area: preparedness/planning/readiness (Focus A), epidemiology/surveillance (Focus B), laboratory capacity (Focus C), communications/technology (Focus E), risk communication (Focus F), and education/training (Focus G).

Academic-practice partnership

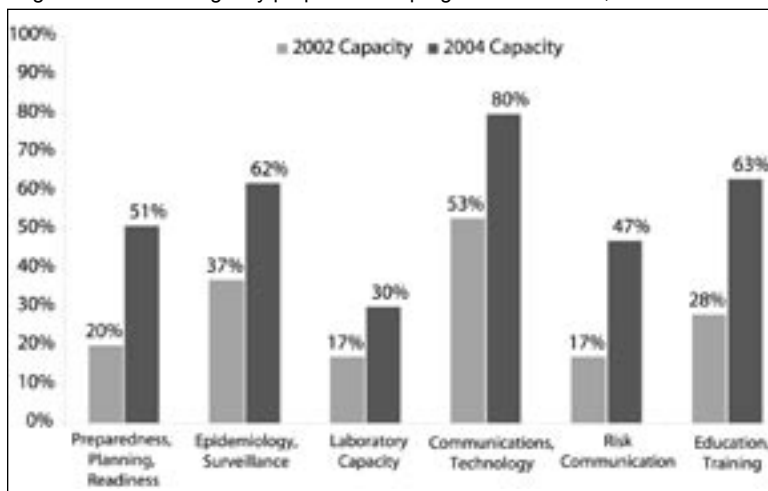
The need for public health systems research is well established in the literature. Bialek, for example, in an article in the *Journal of Public Health Management and Practice* (June 2000, p. 52), defines this field of inquiry as “using quantitative or qualitative methodology to examine the impact of the organization, financing, staffing, and management of systems on the access to, delivery, cost, outcomes, and quality of population-based services.” He goes on to call for practice-based research and examines the need for approaches to measure public health system performance. Conducting public health systems research to determine preparedness progress requires a systematic and preplanned approach. Although extensive, standardized guidance was provided by CDC as states applied for preparedness funding, specific measures for demonstrating critical capacity and critical benchmark outcomes were left to individual states.

To measure outcomes, DPHHS established an academic-practice partnership with Montana State University-Bozeman College of Nursing and endorsed a tool developed to gauge baseline preparedness (2002) and progress made (2004) during the first two years of funding. Designed as a report card, the Emergency Preparedness Scoring Matrix (EPSM) extrapolated a point-in-time measure (a single numerical score) and gave tribal and county agencies a baseline/starting point (2002) preparedness score. The initial data were collected through the CDC Public Health Emergency Preparedness Capacity Assessment modified for Montana by the Northwest Center for Public Health Practice at the University of Washington. Tribes and counties contracted with DPHHS to complete the assessment, as well as other preparedness deliverables. The state provided technical assistance workshops and individual assistance to tribes and counties throughout the assessment process.

Local emergency preparedness progress

The scoring matrix for the EPSM assigned numerical values to selected preparedness indicators and repeated the same measures in 2004. Each participating county

Figure 1. Local emergency preparedness progress in Montana, 2002-2004



Health and Human Services (DPHHS) recognized the importance of directing efforts toward two important needs: 1. developing local basic infrastructure and 2. measuring outcomes related to the preparedness initiative. With limited funding for public health in rural states, establishing flexible and full use of available resources becomes an important component of infrastructure improvement. To identify basic infrastructure components crucial for rural public health preparedness, DPHHS leadership examined the Centers for Disease Control and

and tribe identified its capacity by self-report on specific indicators important for infrastructure improvement and emergency preparedness. The index of preparedness (the report card score) was based on a total of 50 points distributed among the six focus areas. Statewide results indicate that local jurisdictions doubled their overall capacity and improved to approximately 50 percent of basic preparedness capacity between 2002 and 2004. Figure 1 summarizes the change in statewide capacity in each focus area.

The results of this study indicate that tribes and counties are most prepared in communications/technology, with the statewide average equaling 80 percent in 2004, and least prepared in laboratory capacity, with the statewide average equaling just 30 percent of basic preparedness. The greatest improvement between 2002 and 2004 is seen in the area of education/training, with this focus area moving from 28 percent to 63 percent over the two-year period.

Final thoughts and next steps

Capacity is the first critical element of preparedness. However, performance, during an actual or simulated event, is the next and more important indicator of progress toward ensuring the public's health during all stages of a natural or human-caused disaster. Although 24/7 system surveillance availability and coverage is a critical detail that has improved 57 percent since 2002, the effective use of this capacity (performance) during an event will, in the end, determine the strength and durability of the system improvements. Next steps should include the continued development of capacity (to reach 100 percent of basic preparedness in all areas) and performance tests and simulations to further develop the public health system's timely, reliable, and continuous all-hazard response. ■

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Basic Preparedness Indicators

DPHHS focus leaders used the CDC critical capacities, and leaders' knowledge of rural public health needs, to establish the specific indicators and the numerical scoring for each indicator. Researchers entered the local agency responses into SPSS 11.0 to establish the preparedness score for each local and tribal health jurisdiction. The 42 indicators included the following:

Preparedness/Planning/Readiness (Focus A)

- Agency staff includes an Emergency Response Coordinator.
- Strategic emergency preparedness planning is a part of agency activities.
- Emergency plan is in place; emergency staffing plan for 24/7 coverage.
- Job descriptions for emergency; written plans include roles and responsibilities.
- Emergency contact directory accessible 24/7; updated at least annually.
- Key personnel/external partner test: acknowledges contact within 30 minutes.
- Emergency plans tested through an exercise or real event.
- A local Strategic National Stockpile plan in place.

Epidemiology/Surveillance (Focus B)

- System for 24/7 receipt, evaluation, and sending of reports is operational.
- Agency is strengthening relationship with reporting sources (physicians, hospitals).
- Protocols exist for initiating and conducting surveillance during an emergency.
- Surveillance system for notifiable conditions: assessed for timeliness, accuracy.
- Written protocols exist for investigating communicable disease, chemical threats, etc.
- Agency designates person to initiate and maintain contact with DPHHS.
- Risk/vulnerability assessments are conducted on food, water, air distribution systems.
- Agency has surge capacity and formal agreements with neighboring jurisdictions.

Laboratory Capacity (Focus C)

- Level A lab is in the jurisdiction—can begin investigation within 4 hours of notification.
- Agency has an assigned, trained safety and dangerous-specimen officer.
- Written protocols exist for specimen handling and packaging.
- Specimen transport agreement exists with another agency or commercial courier.

Communications/Technology (Focus E)

- Health alert operates 24/7; has send/receive potential; tested every 3 months.
- Agency personnel have access to personal computers; high-speed Internet connections.
- Staff are skilled with computer (research through Internet, download PDF files).
- Redundant communication capacity exists in the agency.
- Written computer policies exist; virus protection exists on all computers.
- Routine data backup schedule exists.

Risk Communication (Focus F)

- A public information officer works for or is shared by the health department.
- Response/crisis communication plan addresses triage, responses for media information.
- Directory of emergency contact information for local media can be accessed 24/7.
- Information materials developed for Level A biological agents.

Education/Training (Focus G)

- Staff education/training coordinator assigned and has written job description.
- Agency conducts an internal training needs assessment of employees.
- Education/training needs of employees undergo progress review at least once a year.
- Health department uses satellite program downlinks or Web streaming.

Mass Dispensing in a Suburban County

Lessons in a Full-Scale Bioterrorism Exercise



Justin Denny
Eric Aakko
Robin Holm
John Wiesman

In May 2005, hypothetically thousands of Southwest Washington residents were exposed to tularemia, a bacterial pathogen considered by CDC to be a “Category A” agent (posing the maximum risk to public health and welfare). In this scenario for a bioterrorism exercise, terrorists had used a primitive dispersal device on a boat to cause sickness and death in people across four counties sharing a common waterway.

The mock terrorist activity was part of a full-scale bioterrorism exercise known as the Washington State Annual Bioterrorism Exercise (WASABE) undertaken in Clark, Cowlitz, Skamania, and Wahkiakum counties. The exercise focused on the coordinated response, decision-making process, and integration and communication among local and state public health agencies, emergency management, local hospitals, first responders, and law enforcement. This exercise also tested the use of the Strategic National Stockpile (SNS) and mass prophylaxis dispensing clinics in an emergency response. The SNS program coordinates the rapid shipment of large quantities of medicine, vaccine, and other supplies to states facing a catastrophic emergency and at risk of exhausting local and state supplies.

During the exercise, the Clark County Health Department discovered that activating and operating a mass prophylaxis dispensing clinic presented different challenges than running a traditional public health clinic, such

as a flu vaccination clinic, due to the difference in numbers of people prophylaxed, need for collaboration with state partners and law enforcement, time dependence, and unfamiliarity with the agent at play.

POD selection and organization

As part of emergency preparedness activities, each local health jurisdiction identified and selected the appropriate number of “point of distribution” (POD) sites. A county with a large population will

have multiple sites, whereas a less populated county may require only one POD. In Clark County, the sites were selected in collaboration with local fire department and law enforcement, and memorandums of agreement (MOA) with the various POD locations were obtained. For the WASABE exercise, the Clark County Health Department tested only one POD for the general public mass dispensing clinic. A local hospital and emergency responders also established their individual sites to test their medication dispensing plans for their staff. The POD site used by public health was the gymnasium of a centrally located public high school in the city of Vancouver. More than fifty health department personnel and a few volunteers staffed this mass dispensing clinic.

Job action sheets and just-in-time training instructions, both components of the health department’s emergency response plan, served to quickly train POD staff about their job responsibilities and duties at the clinic.

To simulate prophylaxis with antibiotics, M&M candies were used to represent doxycycline or ciprofloxacin, with the choice depending on age, risk factors, and contraindications. Prior to receiving the “medication,” patients filled out a form that collected their name, demographic information, contact information, and a brief health history. Local law enforcement provided site security at the POD.

POD operation and challenges

As health department staff set up the POD, hundreds of student volunteers playing the role of the general public lined up outside the school gymnasium. The students were recruited with help from the school principal; an incentive, provided by the school, was offered if they chose to volunteer. A few students were preselected to display signs and symptoms of illness, while others from a college mass media class played reporters, demanding interviews and answers. The sense of urgency generated by these conditions coupled with a lack of preparatory time for the POD staff to thoroughly read the job action sheet details prior to the start of the clinic fueled a sense of frustration and disorganization early in the process. As a result, staff became confused as to their specific duties, while the POD manager struggled to untangle the confusion as it escalated.

What is a POD?

A “point of distribution” (POD) site is centralized location to distribute medicine to large numbers of asymptomatic people who may be at risk for illness during a large-scale public health emergency. Medicines or other health-protecting supplies are dispensed from one or more PODs. By establishing various POD sites throughout a community, healthy people can efficiently access preventive treatments while freeing hospitals to treat the injured and ill. Potential POD sites include community centers, schools, and churches.

Another stressor facing POD staff was the artificially compressed time frame of the exercise to quickly set up tables, place signage, and direct traffic flow in order to efficiently and quickly move people through the dispensing process (Figure 1).

When the only cell phone available at the clinic quit working, communication with the departmental operations center (DOC) became impossible. One should therefore not depend on cell phones, as under the best of circumstances they often fail, and planning should expect this to happen. Fortunately, a volunteer team of short-wave radio operators located at the POD and the Department Operation Center (DOC) restored communication. This example of a communication breakdown emphasizes the importance of redundant communication systems between the POD and DOC.

During a large-scale public health emergency, law enforcement will face a particular challenge in protecting POD staff, equipment, and supplies. The public's fear and frustration may incite rioting or excessive traffic congestion at the POD. The establishment and management of multiple POD sites across a community, including operating them for 24 hours a day over several days, further complicates law enforcement and POD management duties.

Key lessons learned

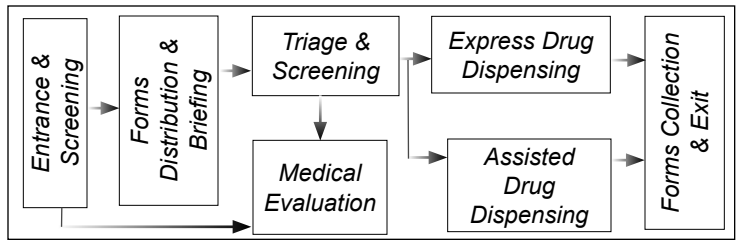
This exercise provided three key lessons learned. The first is that all staff need to understand and be proficient in the basic incident command system (ICS). Without applied practice, classroom or Web learning of ICS is inadequate preparation for applying ICS during a real event. Communication breakdowns and uncertain lines of authority created problems in the clinic operations. At times, staff was uncertain about their specific duties, and this led to second-guessing established protocols.

Second, individuals designated as POD managers should have applied and advanced training and experience with ICS and possess the ability to delegate responsibilities within this system, including having individuals monitor the medicine inventory, anticipating staffing needs, and maintaining communication with the DOC. Essential POD manager duties during the exercise include: site set-up, staff management and just-in-time-training, traffic management, security coordination, communication coordination, and inventory management. Frequent communication with the DOC is critical in order to stay informed about new developments, monitor clinic inventory, redeploy the SNS assets to other locations, and request additional supplies as needed. Had we held more frequent briefings, staff would have better understood the circumstances and, consequently, their response roles. A debrief at the conclusion of the exercise to share lessons learned and recommendations for improvement further highlighted the need for such exchanges throughout the event.

Finally, agencies should institute and exercise a core POD team that is charged with setting up the POD prior to the arrival of the mass clinic staff. This action would allow clinic staff to focus on dispensing preparations,

rather than being stressed about setting up chairs, tables, and signs in the proper sequence. Routine exercises that involve the activation of one or more POD sites would help to increase staff proficiency, while also identifying ways to improve the mass dispensing plan.

Figure 1. Traffic flow in a POD.



Conclusion

What Clark County Health Department learned during its POD activation—the unexpected challenges and lack of anticipation, resource limitations, and staffing needs—is transforming the department's approach to planning for emergency preparedness and response. The discovery of our insufficiencies and the brief experience of the stress evoked during an emergency demonstrated the importance of practicing and revising plans.

The health department's next step is to hold quarterly drills on smaller components of the mass dispensing plan in collaboration with other health departments in the region. The drills may range from as little as ten minutes—such as locating the plan and identifying who to begin contacting, to several hours—which may include reviewing the procedure to set up a POD. These smaller drills will improve on efficiencies and competencies without the enormous time demands of a large event exercise.

Public health has entered a new world of emergency preparedness and response, and we need to make rapid progress in order to meet these challenges and minimize community morbidity and mortality in the event of a natural or intentional disaster. One way to accelerate this process comes from participating in a full-scale exercise. The time devoted to such an event will undoubtedly focus and direct emergency preparedness efforts in productive and useful ways. We may want to consider changing the concept of emergency “planning” to one of emergency “practicing,” as the latter holds the key to moving us significantly further ahead in the process. ■

Authors

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The Longest Mile

Preparing for Disasters on the Interstates of the West

Virginia Conley
Connie Diaz
Swearingen

In fall of 2004 a 33-vehicle pileup occurred on a foggy stretch of I-80 between Laramie and Cheyenne, with 33 injuries reported and two deaths confirmed. Emergency response teams from the F. E. Warren Air Force Base, the Wyoming Air National Guard, and municipal and rural fire departments from both Laramie and Albany Counties responded. Injured persons were taken to hospitals in Laramie, Cheyenne, and Ft. Collins, Colorado. The incident resulted in road closure, and road damage caused eastbound traffic to be confined to Laramie or diverted south through Colorado and north on US 287 and US 220 to I-25 until repairs were completed. This accident gave emergency planners a small foretaste of the potential chaos that could result from a natural emergency or a terrorist attack on a Wyoming interstate highway.

Wyoming is the ninth largest state (97,914 square miles) with the smallest population (493,782, 2000 US Census). This expansive area and sparse population density leads to unique considerations when it comes to natural and intentional disaster preparedness. The three major interstate highways (I-80, I-90, and I-25) that run 914 miles through Wyoming serve as trucking routes and major arteries for both interstate and intrastate transportation. On various portions of these interstates, average daily traffic is as high as 26,115 on I-80, 23,780 on I-25, and 9,370 on I-90. Not surprisingly, the state's population density is higher along the interstate routes, which traverse seven of the state's largest counties with 60 percent of the state's population. The state's eight largest cities also lie along or at the intersection of interstates.

Potential for disaster

Wyoming's natural resources, agriculture production, and the geographical placement of its three major interstates places the state at risk for natural and intentional disasters. Major highways pass near military installations and mineral extraction sites that provide energy sources including coal, natural gas, coal bed methane, and crude oil for areas throughout the US. Additionally, attention has recently increasingly focused on the potential for terrorist attacks on major highway intersections in Cheyenne, which houses state and federal government offices. Therefore, disaster planning in Wyoming must incorporate preparedness plans for intentional highway-related disasters perpetrated by foreign or domestic groups that aim to disrupt the state's infrastructure or nation's transportation system or that oppose the expansion of various mining and energy industries.

Distinctive emergency planning considerations along Wyoming highways need to include preparedness related

to the transportation of hazardous materials, especially munitions and radioactive or biochemical materials; road hazards and closures because of extremes in weather; and the potential for a major earthquake, which can affect a large geographical area and result in subsequent natural disasters including rockslides, fires, and flooding. In addition, I-80, in the southern portion of the state, runs along the transcontinental railroad corridor and may be secondarily affected by a leakage or spill of radioactive or biochemical material carried on nearby railroad cars.

Disaster planners also recognize the potential for an influx of people resulting from a real or perceived threat along the densely populated Colorado Front Range area just to the south. A general panic and mass exodus of people from Colorado could quickly overwhelm Wyoming's infrastructure and emergency management capacity. Public health responses to such circumstances include addressing capacity for adequate food, shelter, and sanitation, and coordinating resources, including ensuring availability of adequate medical services and supplies.

Capacity for public health response

Rural Wyoming communities' responses to natural disasters such as snowstorms, rockslides, fires, and floods have resulted in a population that is self-reliant and knowledgeable about personal, family, and community preparedness. Wyoming communities have long been prepared to function somewhat self-sufficiently. Their relative isolation resulting from geographic separation by distance or mountain ranges and exacerbated by frequent snowstorms has led to a spirit of cooperation that serves Wyoming well in planning for and responding to disasters. As early as 1949 when flooding shut down Eastern Wyoming, its communities worked together to respond and protect their citizens and visitors. More recent opportunities to assess and exercise local response capacities occur when seasonal snowstorms result in highway closures stranding truckers and tourists.

Customarily, however, weather-related highway closures last up to 12 hours, rarely up to 24 hours, and almost never beyond 24 hours. If a disaster required closure beyond 24 hours, it is unlikely that hotels and motels, grocery stores, and restaurants in more rural areas would have sufficient capacity to support large numbers of stranded travelers. Such a disaster, with the potential to increase local populations several-fold, would almost certainly challenge the resources and infrastructure of local communities to meet suddenly expanded safety and public health needs.

Since 2001, Wyoming has recognized that public health professionals are integral to effective emergency re-

response. Specific public health roles in disaster planning, response, and recovery continue to be more precisely defined as public health workers develop this area of responsibility. In the highway-related disasters such roles may include disease surveillance, hazard assessment, shelter management, management of pharmaceuticals and medical supplies, health and safety education, and volunteer coordination.

The public health system in Wyoming is centralized. Each county has a Public Health Nursing (PHN) office and most PHN managers are employees of Wyoming Department of Health (WDH). To increase public health's participation in disaster planning, the state PHN office has established an All Hazard Response Coordinator (AHRC) position in every county that did not already have one. Most of these positions are funded through the state's Bio-terrorism Preparedness Program. AHRCs report to the local PHN Managers, and they also closely coordinate their efforts with each other, the WDH nursing office, and state emergency planners. At a more local level, public health employees actively participate with other first responders on Local Emergency Planning Councils (LEPC) to define roles and responsibilities for emergency response based on local resources and need. Recently strengthened ongoing relationships with law enforcement, first responders, and the community at large, mean that public health is better placed than ever to serve as an effective partner during emergency response.

Collaborating at all levels

The means for addressing large-scale, interstate-related disasters are incorporated into Wyoming's homeland security and disaster plans, coordinated by the state's Office of Homeland Security (OHS). In Wyoming, as in other states, OHS standard operating procedures specify that initial response authority rests with the local emergency manager in consultation with local government officials. At the local level, emergency managers working with LEPCs are responsible for developing plans and coordinating response and recovery efforts in each county. If a disaster response requires resources beyond those available in the community, local officials appeal to the governor. Depending on the magnitude of the disaster, the governor calls a meeting of the crisis management team, and may activate the Crisis Command Center (CCC). The CCC includes, as appropriate to the situation, representatives from the Department of Transportation, Office of Homeland Security, military, the state Health Officer, law enforcement, volunteer disaster response agencies, and so on. If state resources become overwhelmed, a disaster declaration may be made, and FEMA coordinates federal response and assistance. The overall plan enhances the capacity of various local, state, and federal programs to coordinate efforts when working to prevent or when responding to and recovering from natural or man-made disasters.

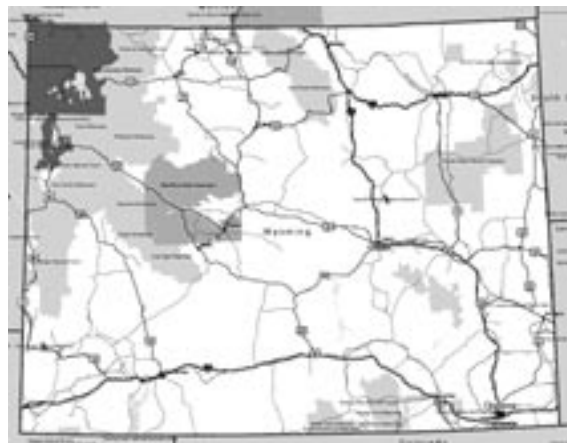
Response planning in Wyoming is characterized by strong collaboration between local responders and local law enforcement, and locals coordinate well with OHS. According to Jim Case, chief of the Plans Division of the Wyoming OHS, "Local folks (planners and responders) have come from the field, and are ready to go" in respond-

ing to community disasters. One local EMS responder concurs that most major incidents, especially if relatively short-termed, could be handled at the local level because of the innate hardiness of rural Wyoming residents and because of well-coordinated local emergency plans and the sense of community cooperation seen in rural areas.

In the past public health representatives have not been involved in the state-level highway hazard mitigation planning process. However, participation in planning will be critical as local procedures and protocols are developed to implement state policy. Future considerations should include planning for public health and safety needs along potential highway by-pass routes, as well as contingency planning for delivery of core public health services in communities affected and isolated by a transportation disaster.

In Wyoming, a sparse population and a citizenry that often wears several hats require that all phases of disaster planning be conducted in the spirit of cooperation. Collaboration at all levels is critical. State and local emergency planners continue to assess, develop plans for, and exercise our emergency response system. All hazards emergency response is a relatively new

role for public health professionals. However, it is increasingly recognized that public health is a critical player in emergency planning if communities are to effectively respond and recover from natural or man-made disasters. In recent years, public health professionals have actively participated on exercise design teams, and specific roles are refined, practiced, and critiqued with each exercise. Wyoming hasn't conducted statewide exercises specifically to test plans for intra- and interstate highway disasters, but county, state, and regional disaster preparedness exercises coupled with response to smaller-scale emergencies have afforded the opportunity to refine Wyoming's transportation-related emergency planning and response. ■



USDOT Federal Highway Administration

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Wyoming Department of Health, Public Health and Terrorism Preparedness Program <http://wdh.state.wy.us/hazards/index.asp>.

Wyoming Office of Homeland Security wyohomelandsecurity.state.wy.us.

Wyoming Division of the Federal Highway Administration www.fhwa.dot.gov/wydiv/index.htm.

Diseases Don't Respect Borders

Cross-Border Response and Collaboration in the Pacific Northwest

Jo Hofmann
Wayne Turnberg

On March 7, 2003, a 55-year-old man who had recently traveled to Hong Kong was admitted to a Vancouver, British Columbia, hospital with pneumonia. Emergency room staff immediately placed a facial mask on the patient, and he was quickly admitted to a respiratory isolation room in the intensive care unit. This heightened attention to infection control was prompted by recent health alerts issued by the British Columbia Centre for Disease Control (BCCDC) about human cases of avian influenza reported in Hong Kong. On March 12, 2003, the World Health Organization issued a global alert regarding an outbreak of severe acute respiratory illness of unknown cause in China and Southeast Asia, and BCCDC followed this alert with one of its own reminding provincial health care providers to carefully screen patients with respiratory symptoms for recent travel to Southeast Asia.

When the Vancouver patient's condition deteriorated the following day, the hospital informed BCCDC that they suspected their patient was connected to the outbreak of respiratory disease in Asia. Rapid action by health care and public health agencies in British Columbia in response to a suspected case of a highly contagious disease was critical in preventing the spread of severe acute respiratory syndrome (SARS) in the Pacific Northwest. A routine after-hours heads-up call from BCCDC to the Washington State Department of Health about the suspected Vancouver case enabled the department to rapidly prepare and distribute information about this emerging disease to local health jurisdictions in Washington.

Recent events such as the international outbreaks of SARS, salmonella, and the cases of bovine spongiform encephalopathy (mad cow disease) in Canadian and American cattle have clearly demonstrated that communicable diseases do not respect international borders. Public health partners on both sides of the US-Canada border must be ready to quickly and effectively respond to events such as these. A key step in developing this capability is establishing collaborative relationships among the agencies most likely to be called on to respond to a public health emergency.

Forming a cross-border partnership

In the summer of 2004, the Washington State Department of Health, with funding from the US Department of Health and Human Services, held the first of a series of Pacific Northwest cross-border workshops in

Bellingham, Washington. The goal of the first workshop (*Emerging Public Health Threats: Tracking Infectious Disease Across Borders*) was to formalize relationships between US and Canadian public health and emergency management agencies responsible for control of communicable diseases and response to public health emergencies in the region. More than 200 participants attended the workshop, including epidemiologists, laboratorians, emergency managers, and public health lawyers. They represented Alaska, Alberta, British Columbia, Idaho, Montana, North Dakota, Oregon, Washington, and the Yukon Territories, as well as Canadian and US federal governments and tribes. Participants formed a plan for building and strengthening relationships across the US-Canadian borders; developed a framework for formal agreements to track communicable diseases that cross jurisdictions; and developed a work plan describing the steps needed to complete and execute those agreements.

In the best of times, understanding the intricacies of a government agency may be trying—and the onset of a pandemic is not the time to Google “Health Canada” to see what pops up. Effective cross-border response in a public health emergency will require planned, coordinated activities by multiple agencies. Barriers to effectiveness include lack of familiarity with the roles and identities of appropriate responders, lack of established lines of intra- and interagency communications and data sharing, lack of planning and agreements for sharing scarce resources, and failure to address legal or jurisdictional issues that may restrict international cooperation. To explore these barriers, four priority issues were identified for discussion during the workshop: establishing and maintaining 24/7 communication between agencies, enhancing the ability to share data about cross-border health threats, establishing agreements for sharing regional resources, and understanding jurisdictional and legal barriers that might prevent us from achieving our goal of creating a system for cross-border tracking and control of regional public health threats.

To maintain momentum, participants committed to formalizing workgroups, updating existing contact lists and directories, planning and executing cross-border exercises, advocating for support of preparedness at appropriate policy levels, and planning the next conference on cross-border preparedness.

Workgroup members from Washington, Oregon, Alaska, Idaho, and British Columbia updated and

distributed a contact list for 24/7 communicable disease emergency response in their jurisdictions. Partners from British Columbia Centre for Disease Control signed on to the US Centers for Disease Control and Prevention's Epi-X electronic alert system and are also working to develop connectivity between Epi-X and the Canadian Network for Public Health Information as an enhancement to cross-border communication. Work was begun on a public health annex to the Pacific Northwest Emergency Management Arrangement—a compact that will allow sharing of materials, supplies, and staff between regional agencies in the US and Canada.

Continuing progress

The second Pacific Northwest cross-border workshop (*Emerging Public Health Threats: Pandemic Influenza Preparedness—a Public Health Perspective*) focused collaborative efforts of the workgroups on preparation and response to pandemic influenza. The British Columbia Ministry of Health Services hosted the workshop in Vancouver, BC, in April 2005. Again, more than 200 participants attended from Canadian and US Pacific Northwest jurisdictions and federal agencies.

During the two-day workshop, topics ranged from the state of vaccine manufacturing and vaccine supplies to British Columbia's response to the 2004 outbreak of avian influenza in the Fraser Valley. To explore each nation's approach to pandemic planning and response, break-out groups examined the Washington and British Columbia plans in order to compare methods for disease tracking (surveillance), containing the spread of infection in the community and health care settings, identifying surge capacity, and developing risk communications. Additional dimensions of these themes were identified in tabletop exercise scenarios that focused on response to the introduction of a pandemic influenza strain into the Pacific Northwest.

The discussions again identified potential obstacles to our goal of creating a system for cross-border tracking and control of regional public health threats: lack of clarity on the legal challenges of sharing data and resources across the border; lack of consistent recommendations and procedures for disease control in health care settings, in communities, and at the borders; and lack of consistent public messages from both nations that will inspire trust and appropriate actions to prevent the spread of infection.

Because international disease tracking requires sharing confidential information across international borders, the most significant barriers are legal and jurisdictional. Although sharing identified medical information among public health agencies in the US is allowed by the Health Insurance Portability and Accountability Act (HIPAA), there is no equivalent document regarding data sharing between the US and Canada. In particular, some Canadian participants expressed concern about the potential effect of the US Patriot Act on the confidentiality of identified medical information, particularly in the event of a cross-border outbreak that could represent a bioter-

rorism incident. The workgroup concluded that it may be difficult to resolve this regionally, but they will explore the issue of regional data sharing with the legal and policy staff who are developing and reviewing the public health annex of the Pacific Northwest Emergency Management Arrangement compact.

Workshop participants emphasized the importance of establishing formal collaboration among US and Canadian public health and emergency management partners. Commitment to continue that work is evidenced by progress on developing the emergency management assistance compact and the continued collaboration of workgroups focused on epidemiology, disease surveillance

Effective cross-border response in a public health emergency will require planned, coordinated activities by multiple agencies.

and laboratory issues, infection control, surge capacity, risk communications, legal/jurisdictional issues, and US-Canadian border and port quarantine. When avian influenza or another equally serious pathogen arrives by plane in Seattle or Vancouver, we believe our collaborations will pay off. ■

Authors

Jo Hofmann, MD, is the state epidemiologist for Communicable Disease, and Wayne Turnberg, PhC, MSPH, is the cross-border surveillance workshop coordinator. Both are with the Washington State Department of Health.

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For more information about the Cross-Border project, contact Dr. Turnberg at 206-522-0132 or Wayne.Turnberg@doh.wa.gov.

When Hospitals Respond to Disasters

Emergency Communications Networks

Samuel A. Warren
Duane Mariotti
Anne Newcombe
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Organized communication over distances and to appropriate entities is crucial in responding to an overwhelming emergency in a community. This is not easy when power is lost, telephone circuits are disrupted or overwhelmed, or other hardware problems arise. An emergency is not the time



Dr. Michael Copass in the Harborview Emergency Department radio room.

for physicians and nurses to learn their emergency communications system and back-up communication plan.

From a hospital's perspective, a disaster is an emergency that is locally overwhelming. The additional resources required to provide necessary medical care might come from neighboring hospitals or from other agencies farther away. The hospital designated as Disaster Medical Hospital Control (DMHC) is charged with providing communication and dissemination of field information to involved hospitals and agencies in the brief but important period between the onset of a disaster and when Emergency Operations Centers (EOC) reach full operation. DMHC facilities are identified prior to a crisis (typically on a regional basis) and have equipment installed and staff trained to manage the event. In practice, the activities of Disaster Medical Hospital Control during these first hours often determine how well-coordinated the rest of the response will be.

Emergency communications—no small task

A hospital serving as Disaster Medical Hospital Control in the early hours of a disaster may be operating several lines of communication at once: EMS field triage and allocation of patients, notification to hospitals receiving patients, aero-evacuation control, and communications with agencies with wider scopes of influence, such as the

regional level one Trauma Center, public health authorities, public safety dispatch centers, and the county and state EOCs. In the case of a disaster, upon notification by EMS or the local hospital, the DMHC's role includes initiating contact with the appropriate county EOC and, when necessary, the state Emergency Operations Center (*see box on next page*) to give early notice of any disaster with a potential to overwhelm the hospitals in the region, especially when a disaster has potential to spread geographically.

Harborview Medical Center

Over the past decade, Harborview Medical Center, in Seattle, Washington, has served as Disaster Medical Hospital Control for a number of events, including the 1995 Auburn Boeing plant chemical cloud (150 patients transported), 1996 Christmas winter storm (50 patients transported), 1998 Thanksgiving Day Aurora Bridge metro bus accident (42 patients transported), 1999 power failure at Valley Medical Center (180 patients relocated), and 1999 World Trade Organization protests (75 patients transported).

The heart of the Harborview emergency communication network is the Emergency Department Radio Room, which holds 11 phones, 12 radios, 3 computers, and 2 fax machines. Each of those phones and radios has its own dedicated purpose in the array of communications with Medic One medics, fire, police, aeromedical response, public events staff, public health personnel, and King County EOC. The radios cover almost every frequency from 30 to 900 megahertz. Four separate amateur radios are also installed. The goal is to ensure a redundancy in communications methods and technology.

Hospital emergency communications

When evaluating their hospital's emergency communication plan, hospital staff should consider three basic planning points:

1. Who are you going to call in the case of a locally overwhelming event? This does not have to be a government-declared disaster. It can be a water main break in the basement.
2. Who are you going to call at 2 a.m.?
3. How do you contact Disaster Medical Hospital Control if the phone lines are down?

Who are you going to call?

Staff in local hospitals should know which hospital serves as Disaster Medical Hospital Control for the region and call this hospital first. (If calling DMHC's Emergency

Department, ask for the charge nurse.) This important phone call helps ensure the shift in responsibility for communication and dissemination of field information to the DMHC from the hospital affected by the disaster. Drills of such communications scenarios between prehospital EMS systems, local hospitals, and Disaster Medical Hospital Control help establish orderly communications during a real event.

The axiom “call early, call often” applies here. The disaster literature has many examples in which medical backup support was delayed by local overconfidence that the situation was under control.

Who are you going to call at 2 a.m.?

The local hospital should be able to reach their region’s DMHC 24 hours a day, seven days a week. Of course, local emergency departments should keep a list of all key emergency phone numbers posted and updated regularly.

How do you contact Disaster Medical Hospital Control if the phones are down?

A little local planning can organize back-up radio or satellite phone systems to contact the region’s Disaster Medical Hospital Control or at least make contact with the next town over.

In the 1960s most hospitals had Hospital Emergency and Administrative Radio (HEAR) systems installed. HEAR systems remain the backbone of many local EMS communications systems but, in general, they no longer have the capacity to communicate hospital to hospital. If the local hospital has a HEAR system, hospital staff should seek out those familiar with it and figure out if it can be used to reach the next town’s hospital or the regional DMHC. If other radio systems are in place, hospital staff should get to know their capabilities and limitations. Related information should be posted in the Emergency Department along with the names of local radio experts for each system and their emergency contact information, including their home addresses and phone numbers. A list of all amateur radio operators in the community can be helpful. They have technical skill and enjoy talking on the radio, which frees up clinical staff to provide bedside care during an MCI or disaster response.

Some hospitals, especially those designated as DMHC, have expanded their radio communications to surrounding regions. In King County, for example, a public safety 800 MHz trunked radio system (a radio standard used by police, ambulances, and law enforcement) was approved by voters in 1992, with levy collected in 1993, 1994, and 1995 to total \$57 million. The “800 system” provides emergency radio communications to all police, fire, EMS, public school districts, and hospitals in the county. In the mid-1990s, region-wide talkgroup (a group calling mode) strategies extended King County’s inter-agency communication to much of the emergency response network of Pierce County to the south and Snohomish County to the north. Within this three-county region, hospital-to-hospital communication is ensured via “Hospital Common” talkgroups monitored around the clock by hospital radios having no other functions, channels, or talkgroups. Every

EOC Involvement, in a Disaster

Washington State Emergency Operations Center (EOC) maintains the Incident Command System structure. It is run by the Washington Military Department, Emergency Management Division, around the clock, year-round. Located at Camp Murray, near Tacoma, the state EOC is no small operation. It has a two-story 28,000-square-foot building with a 3600-square-foot operations room that comes alive in the event of a disaster, accommodating some 310 individual responder roles. State employees, designated relief organizations, and professional groups have reserved seating under the three 10 x 12 foot multimedia screens. Phone, radio, satellite, and Internet feeds are piped in, backed up by shortwave radio. A policy room overlooks the EOC operations room. If power goes down at the EOC, it can fall back on three 500 kilowatt emergency power generators each with its own dedicated fuel supply. The EOC also has additional water and food stores.

hospital in the region, along with designated partners such as Public Health-Seattle & King County, Puget Sound Blood Center, and the Washington State Poison Center, monitors one channel at all times, something like a huge intercom. When an announcement is made, everyone hears it and is able to plan and act accordingly.

Coordinated regional radio systems don’t have to be limited to the most populated area of the state. Homeland Security funding has allowed many rural county emergency management agencies to purchase radio equipment previously outside their limited budgets.

A satellite phone is another good backup system. Washington State EOC has a Mitsubishi ST-121 satellite terminal and several transportable terminals positioned strategically around the state. More details about this satellite phone system, including how to request local support from one of the transportable terminals, can be found on the state EOC’s Web site (emd.wa.gov/site-general/end-of-era/eoc-idx.htm). As part of recent federal funding the Washington State Department of Health has provided most hospitals with dedicated satellite phones installed in areas so that they are answered around the clock.

Regardless of the communication systems and plans in place, they will be effective in an emergency only if all staff know how to use them. As Harborview’s disaster preparedness motto says, “Practice how you play.” ■

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Unified Health Command

Strengthening Public Health's Response in Montana

Ellen Wangsmo
Kathryn Woodward
Doug Moore

At the time of the terrorist and anthrax attacks of 2001, no single medically oriented entity in Yellowstone County, Montana, had been designated to respond to these types of crisis. Citizens and the media looked to both the public health department and the local hospitals for advice and information. The need for a unified response to these bioterrorism threats quickly became imperative, and representatives from the health department, both hospitals, the department of disaster and emergency services, and fire and law enforcement personnel convened to discuss and coordinate public health strategies for the county. These agencies, which were also involved in the region's Local Emergency Planning Committee (LEPC), agreed to work together to coordinate communications in the community.

Yellowstone County, the most populous county in Montana, is home to 130,000 residents. Billings, the county seat, is the state's largest city with more than 90,000 citizens. Billings serves as a regional medical hub for a 600-mile radius, spanning eastern Montana as well as portions of the Dakotas and Wyoming. The region's major health care players include Deaconess Billings Clinic and St. Vincent Healthcare, both Trauma Two-level hospitals with a combined capacity of more than 500 beds. A third component of the region's health care triad is Yellowstone City-County Health Department (YCCHD), a 250-employee organization that oversees 22 programs and services, including a community health center, the statewide Healthcare for the Homeless network, a hospice program, and a broad range of public health-related services.

The Unified Health Command (UHC) grew out of this coordinated emergency response and is now a subcommittee of the LEPC. In this capacity, the UHC is prepared to participate in the county's Unified Command during activation of the county's Emergency Operations Center (EOC), which, by federal mandate, operates under the National Incident Management System (NIMS). The UHC also uses NIMS for processes, procedures, and systems. All core members of the UHC are NIMS compliant, as is Yellowstone County's EOP (emergency operation plans), which directs the UHC operations in an emergency.

The Unified Health Command coordinates plans to address the region's immediate and ongoing health problems. Its purpose is to prevent disease, prepare for events that may affect the health of Yellowstone County residents, and respond to such events in an organized way. Prior to the creation of the UHC, the hospitals and health department met on an informal, ad hoc basis, and although cooperation across the agencies was strong, communication was not always clear. The result was inconsistent information dissemination across the community.

YCCHD and the two hospitals are the heart of the UHC. Other core players include Yellowstone County Disaster and Emergency Services, the American Red Cross, Billings Public Schools, and surrounding county public

health nurses. In instances where public health concerns involve other agencies or community organizations, they too are invited to participate in UHC activities. The UHC is chaired by a representative from the health department or the hospitals, and the health department provides staff support services. Under normal circumstances the UHC convenes once a month; however, during crisis situations, the UHC members can request more frequent meetings, on a weekly or even daily basis if necessary.

Over time, the UHC has evolved to address community concerns and issues beyond bioterrorism. While working on the county's terrorism response planning guide, community leaders recognized the need for a more focused approach to the public health effects of natural and intentional disasters. In the past two years, the UHC's successful response to and resolution of a variety of health issues has resulted in improved visibility, credibility, and coordination of public health activities in Yellowstone County.

In 2003, smallpox vaccination issues served as one of the first tests of UHC functioning. As policies and procedures came down from the federal and state government, members met to outline a smallpox vaccination plan and determine which health care workers should receive and administer the vaccine. Collectively, the UHC decided to delay vaccinating health care workers and first responders—a decision which later reflected the national consensus.

More recently, the UHC handled the flu vaccine shortage, developing a three-tiered system to prioritize who would receive a flu shot. Members collaborated to create standardized guidelines and to distribute available vaccine based on a predetermined priority list. Throughout the flu season, the UHC refined guidelines and developed preventive community education measures, such as the Cover Your Cough campaign. Other activities addressed by the UHC have included a West Nile virus 4-Ds campaign, a coordinated response to a regional pertussis outbreak, and participation in emergency readiness and tabletop exercises. In all of these cases, media messages were jointly released, ensuring consistent messaging from the three core organizations.

Working collaboratively, the UHC has addressed a variety of pressing public health issues, while increasing its credibility among colleagues and the community at large. By presenting a unified front, the UHC has become a trusted entity and the voice for public health in Yellowstone County. ■

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Pandemic Influenza

How Worried Should We Be?

Joshua D. Jones

For most people, the destruction and upheaval caused by the 1918-19 flu pandemic is an obscure historical event, but the 2003 SARS epidemic and the smoldering H5N1 avian influenza epizootic in Asia have renewed interest in a flu pandemic and brought dire predictions of its imminent recurrence.

In the fall and winter of 1918-19, a novel H1N1 strain of influenza virus spread so rapidly and with such virulence that it killed between 20 and 50 million people. Up to 20 percent of the world's population was infected, and an estimated 675,000 people died of influenza in the US alone. Unlike a typical flu year when most deaths occur in infants and the elderly, this pandemic disproportionately affected the young and healthy. Current theories attribute the high mortality to the lack of population immunity to the strain as well as the vigorous immune response produced by the virus in the respiratory tract, resulting in rapid development of acute respiratory distress syndrome (ARDS), highly lethal in this era before mechanical ventilation.

The large percentage of the population affected in each country overwhelmed the capacity of health care systems as well as the ability to safely dispose of the large number of dead. In the US, the war propaganda effort and official denial of the problem in many areas prevented a rapid response to the epidemic. Eventually widespread, and widely unpopular, authoritarian measures were implemented, including banning public gatherings, closing schools, and limiting funerals to 15 minutes.

Why worry?

Pandemic influenza is caused by a strain of influenza A virus that is new to humans and to which, therefore, there is almost no pre-existing population immunity. The strain must also possess the ability to produce sustained human-to-human transmissions.

Much of the concern about a looming pandemic arises from the steady increase in epizootic activity with avian influenza strains in the past few years and the accompanying increase in human infections. The first dramatic H5N1 epizootic, in 1997 in Hong Kong, resulted in 18 human cases with six deaths and was only interrupted through the culling of millions of chickens. The H5N1 epizootic recurred in 2003 in eight Asian countries and was again slowed by mass culling, but it has recurred in those countries. As of August 2005, 109 human H5N1 infections have been confirmed, with 55 deaths (50 percent mortality).

It is impossible to predict all of the features of the next pandemic, but some features can be anticipated. As with all recorded flu pandemics, it is likely that the disease will come in waves, with the contagiousness and severity of illness varying over time. In the best case scenario, this

may also allow enough advanced warning to put resources in place and possibly develop an effective vaccine that will reduce the extent of the pandemic. It is nearly certain that in the early phases, existing flu vaccines will not be effective, since the strain is likely to be too different from the currently circulating strains that comprise the yearly vaccine.

Will our response be effective?

As in 1918, we can expect that the capacity of the health care system will be overwhelmed. US hospitals do not have nearly the beds and ventilators to care for the number of people with respiratory failure that would accompany a repeat of the 1918 event. Mathematical models using current population figures have estimated the number of US deaths could range from 88,000 to 227,000.

Current US preparedness also has some critical shortcomings. The timely availability of an effective vaccine, for example, cannot be guaranteed, given the reliance on a labor- and resource-intensive, egg-based viral culture method. In addition, the current supply of neuraminidase-inhibitors is inadequate to protect even a small percentage of the population and would likely need to be limited to the public safety and health care sectors.

Another area of concern is the role of isolation (of cases) and quarantine (of contacts) during a pandemic. Other than during the SARS epidemic, where these techniques were used with varying success, there is little precedent in recent decades for the US political system supporting public health in implementing these politically unpopular measures.

Given the history of influenza, it is certain that there will be a pandemic. Whether it will have the plague-like severity of 1918-19, with the accompanying social upheaval, is impossible to predict. In the US we were spared much of the disruption caused by SARS, but countries with large numbers of SARS cases experienced a taste of the chaos that will likely accompany a severe influenza pandemic. Fortunately the possibility of a pandemic is being taken seriously on an official level. But it remains to be seen if we are willing to expend the resources necessary to even start to prepare for a true influenza pandemic. ■

This article is an excerpt of a longer article, which you can read online at www.nwcp.org/NPH/nph_f2005.html.

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The views expressed by the author may not represent the official position of the Indian Health Service or the US Department of Health and Human Services.

Pandemic Preparedness on Campus

Uwe Reischl
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Many institutions of higher learning actively promote programs that bring foreign students and scholars to their campuses. These institutions also encourage their own students, faculty, and staff to travel internationally in order to foster professional growth and advancement. University campus populations, especially those located in smaller communities can represent significant proportions of the total population of a community and may influence the dynamics and progression of an epidemic. Therefore, it is important that community emergency response plans include their local campuses.

Disease epidemics have caused more deaths throughout the millennia than all the death resulting from war. Continued global population growth and worldwide ecological degradation are creating conditions that promote the emergence and spread of new diseases. It is becoming obvious that the ability of microbes to adapt and overcome our traditional defenses, coupled with changes in society, technology, and the environment, can lead to global epidemics reminiscent of the worst in history. In addition, terrorists with some basic knowledge of molecular biology and available funding to produce weapons of mass destruction can wage biological warfare on cities, regions, and even the entire planet. It is important that we begin developing systematic, community-based, response strategies and emergency preparedness plans that will allow us to counteract such dangers in a well thought-out, timely, and effective manner.

Potential for infection on campus

In general, current community plans pay special attention to events normally associated with industrial or commercial accidents or natural disasters such as earthquakes, floods, wildfires, hurricanes, tornadoes, and severe weather conditions. The probability of major disease epidemics has always been considered somewhat remote. However, with threats of bioterrorism and the recent international experience involving severe acute respiratory syndrome (SARS), community emergency plans are beginning to address regional epidemics as well as global pandemics.

The role of universities in potentially "importing" pathogenic disease agents from different parts of the world through students, faculty, or staff traveling abroad is not widely appreciated or understood. As a result, academic institutions are often, unintentionally, excluded from matters of community planning.

The risk of transmission and subsequent propagation of a virulent microorganism to a significant portion of the campus population during an influenza epidemic, SARS outbreaks, or a bioterrorist attack will be high because of potentially close interaction among students and faculty in a broad spectrum of classroom and instructional settings, contact in food service areas, and poor hygiene habits in toilet facilities. Therefore, university campuses may serve as important points of introduction of diseases transferred by persons returning from domestic as well as international travel. Not only can these students infect their classmates or colleagues but they can take the disease agents home to their families and to the community at large.

Foreign students and scholars are likely to visit their home countries during vacations, or have friends and relatives visit them during the normal academic year. These dynamics further increase the likelihood for importing potential disease agents and should, therefore, be specifically addressed in the emergency preparedness planning process.

Campus preparedness

In 2003, the American College Health Association (ACHA) Vaccine-Preventable Diseases Task Force developed guidelines to prepare universities for a SARS pandemic. The task force recommended that universities:

1. Establish a multidisciplinary emergency response team including student health services, upper management such as the provost, vice presidents, and deans, mental health professionals, and representatives from local and state health departments. The emergency response team should be responsible for developing the internal and external communication protocols that will allow members of the response team to communicate during an emergency with each other and with other organizations on and off campus. Also, the team should be responsible for identifying facilities that could be used for screening infected persons and identifying where stockpiles of appropriate personal protective equipment would be needed.

2. Establish an additional university-wide workgroup that would include representatives from units such as international studies, housing office, food services, human resources department, representatives from the local police department, and additional academic deans. The workgroup would address issues related to quarantine and isolation procedures and policies, student insurance

and support matters, and many of the other challenges associated with the management of a campus disease epidemic. The workgroup should also be assigned the responsibility of formulating campus policies regarding electronic, phone, and written communications within the campus, the community, and the news media.

3. Address policy issues related to hosting visitors to campus from SARS-affected regions as well as to travel of university students, faculty, or staff to SARS-affected countries.

Strategies for preparing

Effective and timely decision making during emergency events is usually hierarchical and centralized. Emergency preparedness plans try to delineate the most effective and most appropriate channels of communication and subsequent lines of responsibility (authority). The disease epidemic preparedness planning process at the universities and colleges should integrate these principles.

1. University policies and procedures designed to protect the well-being of a campus and requiring significant staff resources and financial support are usually initiated and promoted by the president's office of a university. A disease epidemic or an act of bioterrorism adversely affecting the lives of students, staff, or faculty, has major legal, administrative, political, and financial implications for the institution. During emergencies, task forces and committees are generally not in a position to make decisions effectively and are often slow in reaching consensus, especially on complex matters. Task forces are excellent in providing recommendations and advice. However, the responsibility for making decisions during an emergency must rest with the chief executive officer.

2. Campus disease surveillance activities must occur quickly and should be carried out in a participatory manner. Whenever possible, collection of health-related data should include students, faculty, and staff. It is important that timely information be available on an ongoing basis to allow the university to evaluate the effect, if any, that a specific intervention activity might have on the progression of the disease on campus. Teaching faculty could report health conditions within their classrooms in terms of student attendance. Simple Web-based surveys would allow ongoing updates of absenteeism. Each campus could establish "standard" (non-epidemic) attendance rates. This would be similar to the approach used by primary and secondary schools in monitoring student attendance on a daily basis.

3. University facilities and staff should be seen as potential resources when responding to a disease epidemic within a community. Especially on campuses with health science programs, faculty and staff could assist in data collection and monitoring, students could assume leadership in community surveillance activities, and health departments could utilize campus laboratory equipment and facilities in support of their work.

Recommendations

The guidelines and recommendations provided by ACHA are consistent with current public health preparedness planning practices. However, it is important to recognize that management and academic staff at most college and university campuses are not familiar with the principles of epidemic preparedness planning. Committees and task groups established for the purpose of developing emergency response plans would probably not be able to carry out their assignments. Additionally, university presidents generally do not have experience in managing such events. Therefore, we recommend that training be provided for the university administration and faculty as part of an epidemic preparedness planning process not only for use on campuses but also for local communities.

With the certainty that major disease epidemics will occur in the near future, communities are obligated to develop plans that will allow them to respond effectively. Departments of public health have traditionally taken the leadership role in coordinating such planning activities. However, college and university campuses have usually not been considered integral components of that planning process. Given the relatively large populations that many campuses represent to a community, we recom-

Annual influenza outbreaks could be used for training purposes, allowing colleges and universities to establish campus-wide flu information dissemination strategies.

mend that college and university campuses be considered essential components of any community epidemic emergency response plan.

We recommend that university presidents and chancellors assume the leadership role in promoting and developing disease epidemic preparedness plans for their campuses and subsequently be ready to coordinate activities with the local and regional public health agencies during an epidemic. Annual influenza outbreaks could be used for training purposes, allowing colleges and universities to establish campus-wide flu information dissemination strategies, to test ways of including students, faculty, and staff in data collection activities, and to allow the administration to become knowledgeable about the dynamics of disease epidemics and subsequent management strategies. ■

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Rural Readiness Depends on Teamwork

Regional Partners Help Each Other Stay Prepared

Judith Yarrow
Jennifer H. Lee

In 2003, several cases of Norwalk virus sprang up at the YMCA's Camp Orkila in Seabeck, Washington. Seabeck is a small vacation and retirement community in Kitsap County on Washington's Olympic Peninsula. The Camp hosts 3,000 campers every summer. Working across county lines and jurisdictions, public health officials stopped the Norwalk outbreak within two days. In the past, such an outbreak would have swept through the Camp and out into the community before the local public health department had realized what was happening. How did they manage to identify and stop the outbreak this time? Regional planning and regional partnerships.

Regional planning

When the Washington State Department of Health (DOH) began receiving federal funding for Public Health Emergency Preparedness and Response in 2002, it divided the state's 39 counties into nine emergency preparedness and response regions. For some counties, especially small, rural counties with limited financial and human resources, the planning requirements attached to bioterrorism funding were daunting. In response, the counties in Region 2—Clallam, Jefferson, and Kitsap—turned to

innovative methods for building local capacity.

The three counties are home to more than 335,000 people and cover nearly 4,000 square miles. County populations range widely, however. For example, Kitsap has nearly ten times the population of rural Jefferson County, in less than a quarter of the area.

The three counties all have small public health budgets and staff. "We're all thinly spread," said Dr. Tom Locke, health officer Jefferson Counties. "We

didn't have the staff to produce a draft of the emergency plan from scratch," said Lisa McKenzie, a nurse in the Jefferson County Communicable Diseases Program. Since much of the preparedness funding is allocated by population, these counties also received less financial support

than bigger counties to produce the same deliverables the state required.

Regional partnerships

Rather than allowing these constraints to keep them from providing necessary emergency preparedness and response services to their communities, public health officials in Region 2 have developed innovative strategies to maximize what resources and capacities they do have.

A key strategy early on was to contract with a former Washington State epidemiologist, Dr. John Kobayashi, now at the UW Northwest Center for Public Health Practice, to provide epidemiology training to a core team of health officials in the region. The counties identified the people who would make up and be trained together as an Emergency Response team. Kobayashi then trained the heterogeneous group of health workers, who had varying degrees of epidemiology skills, using a series of case studies and tabletop exercises. The team instituted conference calls one Tuesday a month on epidemiology trends and practices in the region. The calls were valuable enough to be continued after the formal training concluded.

Another innovation was the development of a regional duty officer (RDO) system, in which a single pager number serves as the public health after-hours phone number for the entire region. A team of about 10 public health officials, who have been trained and are equipped with a duty officer handbook, take turns answering the region's pager for a week at a time. "Being able to respond in a 24/7 manner has been important," said Locke about the RDO system.

Region 2 responders have used the RDO system to report various emergencies, such as animal bites or a sewer main explosion that contaminated surface water, that might typically have had to wait until the next working day to be reported and addressed. Locke also credits the RDO system for an increase in notification of unusual disease clusters, such as the Seabeck Norwalk virus outbreak. "It seems to have lowered the threshold for reporting notifiable conditions, even things that are not officially reportable. When providers see unusual clusters they call it in," Locke said.

Region 2 has also borrowed strategies from other regions and professions. For example, based on models in Spokane and Tacoma-Pierce County health departments, Region 2 is sending out community liaisons to provide training and outreach to health care providers. "We're reaching out to our providers as we've never done before," said Dr. Scott Lindquist, director of the Bremerton-Kitsap County Health District.

Norwalk Virus

Norwalk infections occur when fecal matter contaminates food or water, often when people don't wash their hands properly after using the restroom, and then touch something that others later put in their mouths. The virus can be transmitted by close contact with infected persons or the things they have touched. Symptoms include vomiting, diarrhea, fever, and abdominal pain. They occur one to two days after contact with the virus and usually last one to three days. The virus causes no long-term health problems.

Most importantly for the region's public health partnerships to work, Region 2 health officials won approval from the boards of health and county commissioners of the three counties to cross-deputize their health officers. Region 2 officials knew that fire and police departments have used similar agreements for years and argued that an agreement to allow the health officers to fill in for one another was crucial for emergency preparedness. The cross-deputizing arrangement and the regional duty officer system both faced considerable administrative hurdles. The different counties and health providers were covered by different insurance carriers, and the new systems raised complex malpractice liability concerns. "Insurers are very nervous with anything related to health," Locke said, "We had to really convince them that this was a valuable service we were providing."

Partnerships with the region's hospitals, boards of health, and health providers have also added to the cooperative spirit in Region 2. Regional activities have also been made possible by the administrative and policy changes made by boards of health and county commissioners. "We are very fortunate," said Locke, "that the politicians are supportive of us working together and have given us the authority to do so. If you don't have that, it is difficult."

Regional results

Regional health officials have identified numerous benefits of their approach to emergency preparedness and response. Among these benefits are a unified public health message, epidemiological methods training, and improved communication among and within counties.

"Particularly related to the emergency planning piece," Locke said, "the whole regional approach allows counties to do some quality planning that they might not otherwise do."

When the counties were required to develop response protocols, they did so together at the regional level first, and tailored them to county needs second. Not only did this save the counties time and money, it improved cooperation, as well. "We are also able to understand how each other will respond," said McKenzie, "because the plans and protocols were developed by the same group of people and are essentially the same."

The region's health officials have observed a marked difference in the relationships between the counties. "There's a lot more relationship building, now. They see us at the table and as a partner and know what we have to offer," said McKenzie. Meeting together, for example, in the monthly epidemiology conference calls and in discussion of each week's RDO report is "the way you learn to work with each other," said Kobayashi.

Staying prepared when not much happens

Region 2 health officials report the usefulness of emergency planning when responding to food borne illnesses, such as the Seabeck outbreak, and when investigating events such as a plane reported to be dispersing an unknown aerosol over Kitsap County and alleged con-

tamination of baby foods in Port Angeles grocery stores. But no large-scale emergencies have occurred in the region.

"There is a problem of maintaining expertise in these small counties. Things don't happen all the time, maybe once a year, or only once in a while," said Kobayashi. McKenzie agrees, "It is more difficult in small counties to keep a team of communicable disease nurses prepared because there is less opportunity for practice."

Health officials in the three counties are confident, however, that they will be able to maintain an adequate level of preparedness through the mechanisms they have already created. The regional partnerships have built on a history of collaboration in the region. Also helpful is that the region's two health officers had worked together in a clinical setting and teamed together in an informal mentorship program for health officers.

In building preparedness capacity, the region's priority has been to deal with the daily capacities that will also be useful in a large-scale scenario. Every staff member is trained and expected to be ready to play a vital role in an emergency. The region's surge capacity also involves a large retired population that includes doctors and nurses, who serve on advisory boards.

Partnerships are crucial. Not just cooperation or participation, but real partnerships among providers and among communities.

"We don't necessarily need to anticipate all contingencies, but for preparedness we need skilled people in contact with one another," Locke said. "And partnerships are crucial. Not just cooperation or participation, but real partnerships among providers and among communities. Most small counties probably already do this, but trying to share regionally so that we're not all reinventing the wheel is good. It's helpful to feel like we're part of a bigger team," Locke concluded.

Seabeck would agree on the value of that teamwork. The Camp Orkila Norwalk virus made only 89 of the 360 campers ill, and the health officials' quick action and access to shared resources quelled the outbreak before it spread beyond the Camp. Thanks to the cross-county teamwork, residents of Seabeck and the surrounding rural communities can eat their burgers and drink their water with the confidence that they are well-protected by their public health system. ■

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Infection Control in Veterinary Clinics

Jamie Snow
Jeff Rice

A veterinarian and her staff sit around the animal treatment room having lunch, their sandwiches, chips, and soda cans spread out on the exam tables and counter tops. Earlier that day a puppy with a four-day history of diarrhea was examined on the same surfaces. After sending a stool sample off for testing, the puppy was diagnosed with a *Salmonella* infec-

tions include SARS, West Nile virus, and monkeypox. All of these examples are considered zoonotic diseases. In fact, 75 percent of emerging infections have been classified as zoonotic in nature.

An emerging zoonotic disease could first be seen in a veterinary clinic and could subsequently spread to the human population. For example, monkeypox was first seen in rural veterinary practices, with twenty veterinarians and staff members infected with the novel virus by the end of the national outbreak. Controlling emerging zoonotic diseases is one of the reasons veterinarians need to have infection control guidelines in place and why they must practice good infection control procedures at all times.

Survey on practices

Despite the obvious need for infection control guidelines by the veterinary community, a survey of Wyoming veterinarians conducted in April 2004 by the Wyoming Department of Health (WDH) revealed that only one quarter (25 percent) of veterinary clinics have such guidelines in place. Furthermore, several principal infection control practices are not part of Wyoming veterinarians' daily professional routines.

Seventeen out of 23 Wyoming counties are considered rural or frontier, with populations of less than 25,000 people. The state has approximately 160 veterinary clinics and just under 300 veterinarians, who mostly belong to the Wyoming Veterinary Medical Association (WVMA).

The Department of Health staff created a two-page written survey and mailed it to all veterinarians in the state. The survey questions focused on infection control practices of veterinarians. A total of 41 percent of Wyoming veterinarians and 56 percent of Wyoming veterinary clinics responded. Twenty-one out of Wyoming's 23 counties were represented by the number of veterinarians who replied to the survey.

The survey results

Hand hygiene is considered paramount to reducing the spread of infection among susceptible populations. The Centers for Disease Control and Prevention (CDC) listed hand washing as the number one recommendation to reduce the spread of infectious disease transmission during the 2003 monkeypox outbreak in the Midwest. Most of the Wyoming veterinary clinics appear to be doing well in this area of infection control. Of the veterinarians who responded to the survey, 74 percent had hand-washing facilities in every exam room. Additionally, 77 percent of the veterinarians reported always washing



UC Davis School of Veterinary Medicine, © 2005, University of California Regents

Veterinarian and veterinary student with patient.

tion, a bacterial disease that can cause gastrointestinal illness. A few days later, several members of the veterinary staff come down with severe watery diarrhea. After testing, many of the veterinary staff also tested positive for *Salmonella*.

This scenario could occur at many veterinary clinics in the United States. Many clinics do not have a separate break room for their employees so they often eat in animal treatment areas without thoroughly disinfecting the area prior to eating. This is just one practice that may make veterinary clinics a source for the spread of a zoonotic disease.

A zoonotic disease is defined as a disease that can be transmitted from a vertebrate animal to humans. There are many commonly known zoonotic infections, such as *E. coli* O157:H7 and *Salmonella* but there are also a number of lesser-known infections. Many emerging infections—which refers to infections that are newly identified, have recently been reported in a new geographic region, or have recently undergone some type of change to make them seem like they are reemerging in an area—can cause severe disease in humans and can even lead to death. A few examples of recent emerging infec-

their hands between patients, and 22 percent reported sometimes washing their hands between patients.

Disinfection of exam rooms between patients is also essential to prevent the spread of an infectious disease. Here again, Wyoming clinics are doing quite well. Of the responding Wyoming veterinarians, 89 percent disinfected exam rooms between patients all of the time, and 9 percent reported they sometimes disinfect rooms between patients. Despite compliance by most practices, however, even a small number of non-compliant clinics could cause a large-scale outbreak.

The most concerning data obtained from the survey, however, was that nearly half (48 percent) of the veterinarians and their staff eat in animal treatment areas.

Eating in animal treatment areas is a particular concern because a number of bacterial and parasitic intestinal infections of animals can routinely result in human infection.

Best practices

Several procedures can be implemented by veterinary clinics to improve infection control practices, minimizing the spread of zoonotic diseases in veterinary clinics. Having infection control guidelines or written protocols in place is one item the American Animal Hospital Association (AAHA) requires for accreditation. CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC) have created an extensive document entitled *Guidelines for Environmental Infection Control in Health-Care Facilities*. Many items in these guidelines may also be applicable to veterinary clinics.

One key element in infection control is hand hygiene. Simple hand hygiene prevents cross-infection. However, adherence to guidelines is often poor among health care workers. Additionally, failure to perform appropriate hand hygiene has been recognized as a substantial contributor to outbreaks as noted by the Hand Hygiene Task Force of the HICPAC in an article published in the *Morbidity and Mortality Weekly Report*. To improve hand hygiene the committee recommends signs be placed in appropriate areas to remind workers of the importance of hand hygiene, and alcohol-based hand disinfectant should be made available in areas where hand-washing stations are absent.

Additionally, it has been shown, as noted by CDC, that wearing disposable gloves when handling contaminated wounds, soiled bandages, fecal material, or bodily fluids can reduce hand contamination by 70 to 80 percent, prevent cross-contamination, and protect patients and health care workers from infection.

Basic rules for the disinfection of equipment that could be contaminated by fecal material or body fluids should also be implemented. These instruments should be thoroughly disinfected between uses. Additionally, a disinfectant should be used in all exam rooms between every patient regardless of the procedure performed. A bottle of disinfectant should be kept in an easy-to-access location in each room, and all workers should use the disinfectant as part of their daily routine. These general precautions

are defined in the Biosecurity Standard Operating Procedures of Colorado State University's Biosecurity Web site.

The Occupational Safety and Health Administration recommends that food for human consumption of any kind should not be allowed in medical rooms, the kennel area, or bathrooms of a veterinary hospital. Therefore, if possible veterinary practices should have a separate break area for employees. This could be as simple as providing a picnic table in an outdoor courtyard or an area separate from the clinic. If a separate area is not possible, it is recommended that employees wash and disinfect counters and other surfaces where food contamination could occur, prior to eating.

If an outbreak is suspected, local veterinarians should

The most concerning data obtained from the survey, however, was that nearly half (48 percent) of the veterinarians and their staff eat in animal treatment areas.

notify the state or federal veterinarians and the department of health immediately. Urgent response time to an infectious disease outbreak can help prevent further animal infection as well as prevent human infection. Currently in Wyoming, as revealed in the survey, only 83 percent of the responding veterinarians know whom to contact if they suspect an infectious disease outbreak. Educating veterinarians about whom to contact and when needs to be a primary focus of state agencies and federal agencies. Health departments and state veterinary departments must work together on these issues, as well as on maintaining open lines of communication. ■

Authors

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Resources

Centers for Disease Control and Prevention. *Monkeypox Infections in Animals: Updated Interim Guidance for Veterinarians*. www.cdc.gov/ncidod/monkeypox/animalguidance.htm. Accessed 11/23/2004.

Hancock DD, Besser TE, Rice DH, et al. Multiple sources of *Escherichia coli* O157 in dairy farms in the northwestern USA. *Prev Vet Med* 1998;35:11-19.

National Association of State Public Health Veterinarians. Compendium of measures to prevent disease associated with animals in public settings. *Morbidity and Mortality Weekly Report* March 25, 2005;54. <http://s94745432.onlinehome.us/AnimalsInPublic.pdf>.

Pittet D. Compliance with hand disinfection and its impact on hospital-acquired infections. *J Hosp Infect* 2001;48(suppl A):S40-S46.

Sanchez S, Hofacre CL, Lee MD, et al. Zoonoses update. *J Am Vet Med Assoc* 2002;221.

Taylor LH, Lathaam SM, Woolhouse, ME. Risk factors for human disease emergence. *Philos Trans R Soc Lond B Biol Sci* 2001;356:983-9.

Find more resources related to this article online at www.nwcp.org/nph/f2005/.

Emergency Preparedness

Laura Larsson and Yuki Durham

Improvising in an emergency. Peter Holden. *NEJM*. 353:541-543, 8/11/05, Number 6. <http://content.nejm.org/cgi/content/full/353/6/541>

This family physician working at the British Medical Association, describes how 14 doctors with no equipment, no communications, and no personal protective clothing set about maximizing the victims' chances of survival following the bus explosion in London, England on July 7, 2005.

Epidemic! The Natural History of Disease, San Diego Natural History Museum. www.sdnhm.org/exhibits/epidemic/resources.html

This useful and entertaining site covers microbes, diseases and prevention tips, epidemics, and interactive sites for students, describes a career in public health or medicine, and offers teaching resources and other links.

FluSurge. Centers for Disease Control and Prevention. May 6, 2004. www.cdc.gov/flu/flusurge.htm

FluSurge is a spreadsheet-based model that provides hospital administrators and public health officials estimates of the surge in demand for hospital-based services during an influenza pandemic (whose length and virulence are determined by the user).

The Flu Wiki. www.fluwikie.com/index.php?n=Main.HomePage

A Wiki is a form of collaborative software that allows anyone to edit any page on the site using a standard Web browser. The purpose of the Flu Wiki is to help local communities prepare for and cope with a possible influenza pandemic. Rich with resources covering basic scientific information, local and regional issues including personal and family preparedness, national and international influenza plans and surveillance, and a timeline.

Imagined Scenarios. www.fluwikie.com/index.php?n=Consequences.ImaginedScenarios

An amazingly extensive and chilling scenario covering two years of pandemic flu outbreak in a Canadian town.

Project ER One: Scenarios of the 21st Century. http://er1.org/docs/Risks%20Scenarios/EROneScenerio_files/frame.htm



This set of ten real-life-based risk scenarios focusing on emergency room preparedness includes transit accident, police station, white powder, bus explosion, high school assault, union station, warehouse party, mall attack, hostage, and flu.

Symposium 2005: Best Practices in Risk Reduction for Colleges and Universities. University of Washington, 2005. www.washington.edu/admin/business/oem/symposium/

Presentations and handouts from a two-day symposium/workshop for emergency professionals serving colleges and universities.

Multimodal Transportation and Bioterrorism Defense, March 1, 2005. <http://nsfsecurity.pr.erau.edu/MMBT/>

This site provides an interactive model for understanding intermodal transportation networks and determining patterns for travelers subjected to a bioterrorism release. Java applets allow the learner to set pathogen, day and time of release, transporter, and mode of transportation.

Rural Communities and Emergency Preparedness, U.S. Health Resources and Services Administration (HRSA); sponsoring organization: Office of Rural Health Policy. April 2002. www.mipt.org/pdf/ruralemergencypreparedness.pdf

This document discusses rural public health and EMS preparedness issues.

More Resources Online

See more annotated resources online at www.nwcphp.org/nph/f2005/.

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Northwest States Receive Public Health Ready Recognition

In July 2005, the National Association of County and City Health Officials awarded Public Health Ready recognition to the following nine Northwest local health jurisdictions for their ability to respond to public health emergencies:

- Public Health - Seattle & King County, WA
- Panhandle Health District, Coeur D'Alene, ID
- North Central District Health Department, Lewiston, ID
- Southwest District Health Department, Caldwell, ID
- Central District Health Department, Boise, ID
- South Central District Health Department, Twin Falls, ID
- Southeast District Health Department, Pocatello, ID
- District Seven Health Department, Idaho Falls, ID
- Gallatin City-County Health Department, Bozeman, MT

For more information on all Project Public Health Ready sites and the tools and resources they have developed, go to www.naccho.org/topics/emergency/pphr.cfm.

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Northwest Center for Public Health Practice

The Northwest Center for Public Health Practice was established in 1991 to coordinate outreach activities for the UW School of Public Health and Community Medicine. The Center has expanded significantly in response to community needs throughout the Northwest. Its activities are geared to enhancing public health workforce development and practice-based research through partnerships that encompass teaching, research, and service in the public health community.

Web site: www.nwcp.org/

University of Washington School of Public Health and Community Medicine



The UW School of Public Health and Community Medicine has five departments—Biostatistics, Environmental Health, Epidemiology, Health Services, and Pathobiology—and multiple interdisciplinary programs, centers, and institutions. The School's emphasis is on strong academic programs in the public health disciplines and extensive multidisciplinary collaboration. The combination of discipline-oriented academic programs, strong interdisciplinary research, and community-based public health activities provides a setting for faculty and students to apply in-depth expertise to important public health problems.

Web site: sphcm.washington.edu/

UW SPHCM Departments

Biostatistics: www.biostat.washington.edu

Environmental &

Occupational Health: depts.washington.edu/envhlth/

Epidemiology: depts.washington.edu/epidem

Health Services: depts.washington.edu/hserv

Pathobiology: depts.washington.edu/pathobio/

Find UW SPHCM research center Web sites at:

sphcm.washington.edu/research/centers.asp

Letter to the Editor

Dear Editors:

In the weeks and months to follow the catastrophic events of Hurricane Katrina, I am reminded that public health preparedness means not only community preparedness for emergency situations, but also educating ourselves to minimize the potential dangers to the community and the damage and disruption that might lie ahead for us and our families.

I am sure many in Washington and Oregon are already prepared for emergency situations. Certainly I see many individuals who are prepared for winter emergencies such as being stuck in three feet of snow on the freeway. (Obviously not a disaster, but a commuting emergency nonetheless). My partner and I keep chains, small shovels, and a backpack filled with bottled water, power bars, and warm (dry) clothing. . .just in case we get stranded for an hour or two. Of course, that is winter in the gorge where I live...where the main thoroughfare, I-84, might be closed for a day or two.

As I think about how prepared I am for other potential dangers, the family and I began to consolidate items for an emergency kit that we might need. . .just in case. It may not hold everything we need, clothing or things like that, but it does provide emergency notification telephone numbers, people/places to call, and certainly is a beginning.

Janis Johnson

Medical Staff Coordinator/Student UOP

Hood River, OR

Web Exclusives

Wyoming Program Trains Student Nurses in Disaster Planning

How Much Do Environmental Diseases and Disabilities Cost?

Pandemic Influenza: How Worried Should We Be?

Annotated Preparedness Resources

Public Health Questions

Look for these articles, published exclusively on the journal's Web site, at www.nwcphp.org/nph

What questions are you asking yourself about public health?

In the press of daily business, it's easy to lose sight of the larger issues facing public health. To bring those issues into view, we asked public health professionals and academics what big questions they have on their mind.

How do we best let the public know what public health is?

—Bud Nicola, Member, King County Board of Health, Seattle, Washington

There is growing understanding about the impact social determinants, such as income inequity, have on the health of populations. How do we use this growing knowledge base to influence public health policy and develop interventions that will improve the health of the public?

—Jack Thompson, Director, Northwest Center for Public Health Practice, UW SPHCM, Seattle, Washington

How do we transform and change systems to achieve results for the health of the public? What transformation is needed to align community assets and official public health agencies to achieve this main function? What do our policy leaders need to know and do to make this happen?

—Paul J. Wiesner, Clinical Assistant Professor, UW SPHCM, Seattle, Washington

Why can't we talk about public health?

—Lawrence Wallack, Dean, College of Urban and Public Affairs, Portland State University, Portland, Oregon

Send your questions to the editor at nph@u.washington.edu.

See the complete list of questions online at www.nwcphp.org/nph/.



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