

Harvard Public Health Review

Winter 2006

Preparing for Disasters

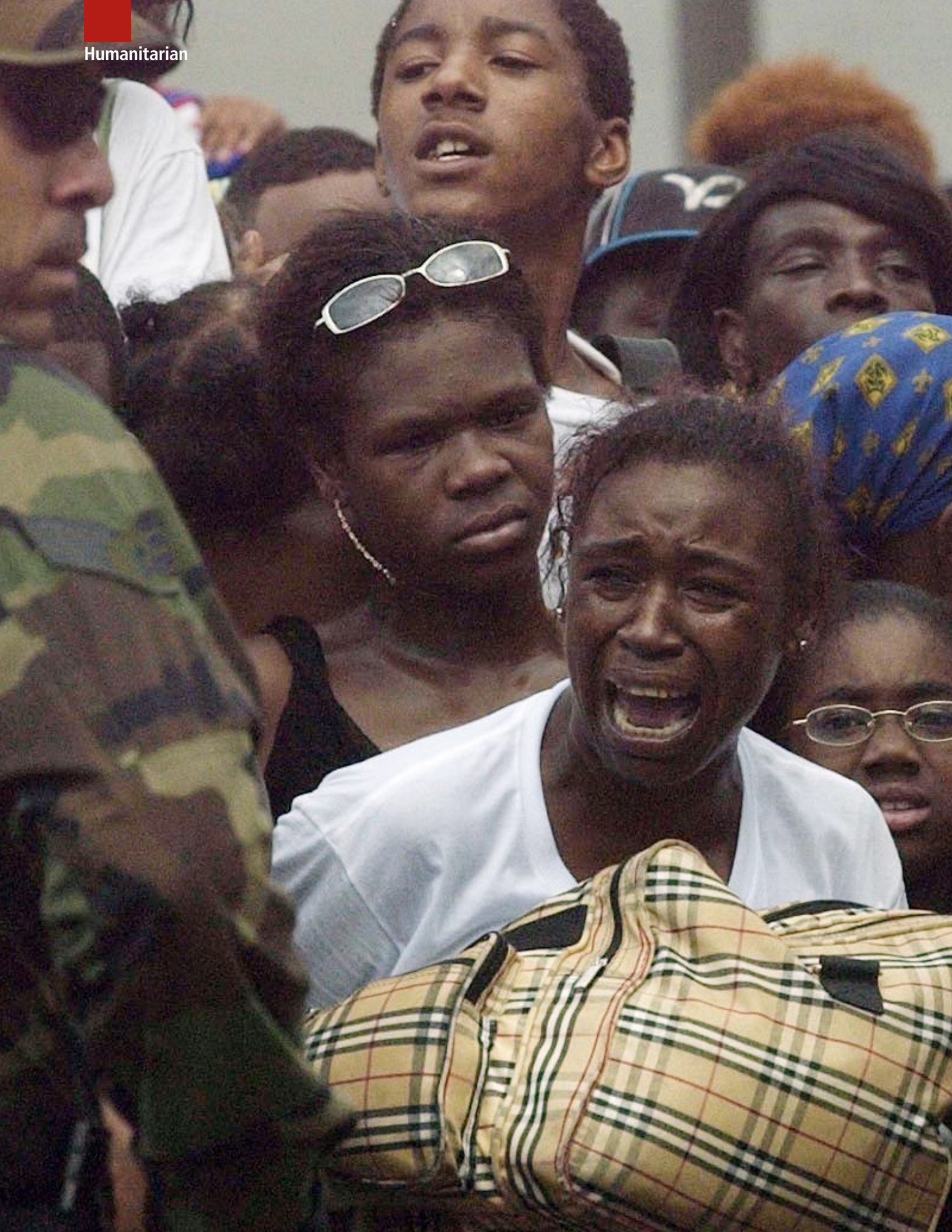
From Hurricane Katrina to avian flu,
what do we know about managing calamity?

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HARVARD SCHOOL OF PUBLIC HEALTH



By Karin Kiewra, editor of the Review and
associate director of Development Communications

“We must never forget this picture,”

says Harvard School of Public Health Professor Jennifer Leaning. An expert on humanitarian crises, Leaning has witnessed epic calamities around the world first-hand, from Afghanistan and the West Bank to Rwanda and the Chad-Sudan border. Sadly, the disaster of Hurricane Katrina that took America by surprise was in many ways straight from the textbooks, says Leaning, who directs the Program on Humanitarian Crises and Human Rights within the School’s François-Xavier Bagnoud Center for Health and Human Rights. Exposing the vulnerable, she says, is “what disasters always do, particularly when they’re not well managed.”

Whether speaking of a poorly maintained dam threatening to crumble in Taunton, Massachusetts, or the long, bloody conflict in Darfur, Sudan, the mantra of disaster-response planners is always the same. “Crises show society speeded up,” its evolution compressed into a moment in time, Leaning says. The poor and dispossessed, the weak and the sick, always suffer disproportionately. And how society responds—or doesn’t—is a reflection of its values, “its way of organizing and caring for people.”

Relief from government is almost always slower in coming than victims expect, owing to a combination of insufficient resources, too little advance planning, and logistical hurdles that arise amid chaos. In these respects, many believed the U.S.—the leader of the industrialized world—would perform vastly better than developing nations in a disaster. Yet its response was, as many within and outside the HSPH community noted, a catastrophe unto itself.

continued

in the eye of the storm

LONG WAIT New Orleans evacuees stand in line for buses that will carry them away from their drowned city and the chaos of the Louisiana Superdome to shelters in Houston.

What lessons do Hurricane Katrina and other humanitarian crises teach us about managing calamity?

Hurricane Katrina, perhaps the greatest natural disaster in American history, exposed what Leaning calls a “deep, ugly secret”: the fault line between whites and blacks, rich and poor. It also raised unsettling questions about the country’s ability to protect its own against calamity, be it natural or man-made.

In the wake of the storm, Leaning and HSPH Lecturer Leonard Marcus, another expert in disaster preparedness, reflected on what the U.S. must do next.

BASIC PRINCIPLES

In an address to HSPH supporters at a Leadership Council meeting in October, Leaning outlined key principles in preparing for and dealing with disasters—principles that the U.S. clearly violated. They apply to events large and small, in what she calls their impact and recovery phases.

- **Educate the public.** We Americans have underestimated the extent to which advance education is crucial to population response, Leaning says. A knowledgeable, self-reliant local population will take instructions on the move. In California, people know what to do in the event of an earthquake. But in coastal regions beset by storms and floods, she says, “we have not done nearly as good a job of alerting people to potential risks or how they must behave in an emergency.”

- **The first 72 hours, people must be able to survive on their own.** In the case of Katrina, tens of thousands of Gulf State residents were helpless in the face of delayed rescue efforts. Yet the first three days of any calamity are always chaotic, Leaning says.

- **Preparedness is more than just advance warning.** Rigorous planning can mitigate catastrophe, Leaning says. What are you going to do about the vulnerable? How will you maintain security? Protect human dignity? How will you save the hurt and the stranded? At all levels of government, planners must invest in early warning systems and professional-level training. Planners had run an elaborate training session for a disaster that was eerily similar to Katrina about a year before the hurricane struck. Yet once the drill was completed, one huge question remained: “What will we do about those who are unable to evacuate?” The failure of any and all agencies to address that gnawing question had calamitous results when New Orleans’ levees gave way.

- **Perceptions become reality.** “Even if you feel confused and on the verge of collapse, never show it publicly,” cautions Leaning, referring to televised appearances by some senior officials in the wake of Katrina. Effective public communication depends on clarifying your message, then working with the media. Don’t forget that “the story that unfolds will be remembered as history,” Leaning says. “The world will be watching.”

- **Treat the dead with dignity.** “The long tale of disasters is a

psychological one,” Leaning cautions, recalling lingering images of bodies in the press for days following the hurricane. “The living will be focused on their missing and dead. If you are not careful, survivors will hate you,” Leaning warns.

- **Let the local population take charge of salvage and recovery efforts.** Local people cope, Leaning says. Stranded families climbed to rooftops, forded rivers, banded together. Be it Louisiana and Mississippi or Pakistan, outside help should come in the form of aid to the local economy. “We cannot dictate or run the reconstruction,” Leaning says, because it sets in motion “a cycle of dependency and need, and a cycle of grievance that is hard to come out of.”

- **Don’t set up shelters far from home.** “By moving people out, you are disrupting the chances for a coherent policy on rebuilding,” Leaning warns. People will have difficulty coming back, and they will be “bereft.” In the aftermath of the evacuation of New Orleans, half the population is setting down roots elsewhere. “There are people in Alaska. Is this a good idea, or not?” she asks.

- **Put the right people in the right roles.** Leadership is partly a gift, but it is also a matter of training and practice, Leaning says. The best-laid disaster plans go awry in the absence of effective implementation. It is on this final point that Leaning and her colleagues linger. Training leaders is, after all, what HSPH, and Harvard, do. With Brigham and Women’s Hospital physician Michael VanRooyen, Leaning recently launched a new Harvard-wide alliance, the Harvard Humanitarian Initiative. Its mission is to further the study and practice of response to major disasters and war, as well as the professional development of emergency responders worldwide.

It is public health’s job to train rapid-response teams that can go out and gather data early on, Leaning says. Without statistically meaningful numbers, you cannot know where the greatest needs are. That’s why Leaning and VanRooyen teamed with the American Red Cross to bring public health expertise to Red Cross teams for the first time, within three days of Katrina’s landing (see sidebar on page 14). Resources must be distributed on the basis of need, not who gets there first, Leaning adds. “When that standard crumbles, there is community outrage,” she says.

THE MAKING OF META-LEADERS

From a U.S. army helicopter above the Superdome and Jefferson Parish in New Orleans early in September, HSPH’s Leonard Marcus got a wide-angle view of the post-Katrina devastation. As the associate director of the Center for Public Health Preparedness, Marcus also took a close-up look at U.S. leaders’ response to the crisis.



CROWD SCENE Hurricane survivors endured disaster of another sort at the Louisiana Superdome sports stadium, where chaos ensued and supplies ran short.

Marcus was on board at the invitation of former Federal Emergency Management Agency (FEMA) Director Michael Brown, gleaned insights during Brown's final days on the job. During a three-week period between hurricanes Katrina and Rita, Marcus sat in on Brown's meetings with senior staff and spoke one-on-one with Pentagon and White House Homeland Security officials, meeting with Secretary of

act—given threats to security akin to Katrina and now, avian flu (see related story on page 16).

Katrina highlights another novel concept—acceptable losses. In the quest to save as many lives as possible, some deaths may be inevitable, Marcus says. “If moving 30 nursing home patients puts 10 frail people at risk, what do you do? What happens if a terrorist attack injures 200,000 people, but the medical system

Katrina exposes an “epic failure of the imagination” on the part of senior officials. Worst-case scenarios, including chaos in the Louisiana Superdome, weren’t even anticipated.

Homeland Security Michael Chertoff; Chertoff's predecessor, Tom Ridge, and Coast Guard Vice-Admiral Thad Allen, special deputy for the Katrina recovery effort, among others.

Looking beyond systems failures and blame-slinging by politicians, Marcus is focused on the failure of leadership—what he calls “the human factor.” With David Gergen of Harvard's Kennedy School of Government, a former adviser to four U.S. presidents, Marcus co-directs the National Preparedness Leadership Initiative (NPLI), a program created in 2004 to train senior government officials to thwart and manage disasters, including acts of terrorism. A chief aim of Harvard's NPLI is to turn out “meta-leaders,” individuals capable of marshalling cooperation across a vast web of local, state, and federal agencies.

A key problem in the response to Katrina was the inability of the federal government to quickly engage the collaboration of local and state officials, Marcus notes. In the U.S., where checks and balances serve to prevent the federal government from becoming too powerful, the idea of the feds' seizing control, even in an emergency on this scale, is “a

can only handle 50,000?”

No amount of planning can compensate for the absence of strong leadership, Marcus believes. Anarchy, a breakdown of the social order, impeded relief efforts. Cultural differences influenced whether people heeded or ignored hurricane warnings. But ultimately, he says, Katrina exposed an “epic failure of the imagination” on the part of senior officials. Worst-case scenarios, including chaos in the Louisiana Superdome, weren't even anticipated, let alone planned for.

Tomorrow's meta-leaders, Marcus says, must be able to envision eventualities “almost too horrible for the mind to grasp,” and of a nature this country has not yet seen. “Those leaders are made, not born,” he adds.

Editor's note: On April 26–28, HSPH will host an international conference on preventing disasters and minimizing their consequences, intended for decision makers and researchers from government, business, universities, and other organizations. To find out more, email brain@hsph.harvard.edu or visit www.hsph.harvard.edu in January for a link to updated information.

Giving Voice to the Dispossessed

A poll of evacuees shows that poverty and health problems beset the stranded

Why didn't they leave? The question rang out on TV and talk-radio stations across the U.S. in September. Why did so many people fail to leave New Orleans ahead of Katrina? The mayor's mandate was clear—or was it? Were most of those who stayed homeless? Just plain stubborn? As Congress prepared for hearings on a rescue effort gone wrong, the answer would prove critically important.

Why people stayed is no mystery, thanks to a survey of evacuees in Houston shelters conducted by the *Washington Post*, the Kaiser Family Foundation, and the Harvard School of Public Health in mid-September. Deep poverty—a simple lack of means—held many back; serious health problems also stood in the way. Communication was yet another hurdle: about one-third of those rescued say they never heard the order to flee.

Of the 61 percent who did not leave before the storm, 38 percent were

either too sick or disabled to do so, or were caring for a disabled person, interviewers found. Forty-one percent had a major chronic illness or disability.

Fifty-five percent of respondents had no car or way to leave. Buying a way out was not realistic, the survey found, particularly for 59 percent reporting a household income of less than \$20,000 a year.

LEARNING FROM MISTAKES

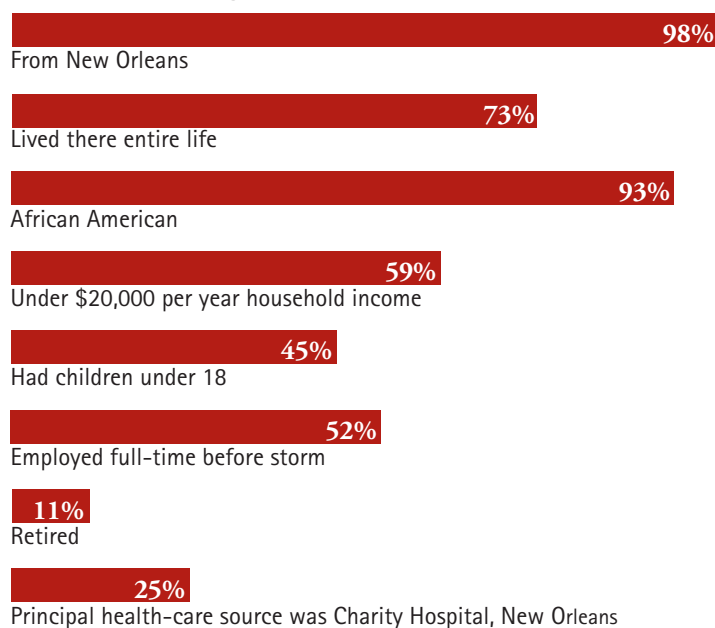
Working with the *Washington Post* on the survey's design and analysis was Robert Blendon, HSPH professor of health policy and political analysis in the Department of Health Policy and Management. As director of the Harvard Program on Public Opinion and Health and Social Policy, Blendon uses opinion polls to study attitudes shaping the country's health care agenda. In the absence of data, misinformation prevails, he says. Operating in

the dark, decision makers cannot learn from past mistakes.

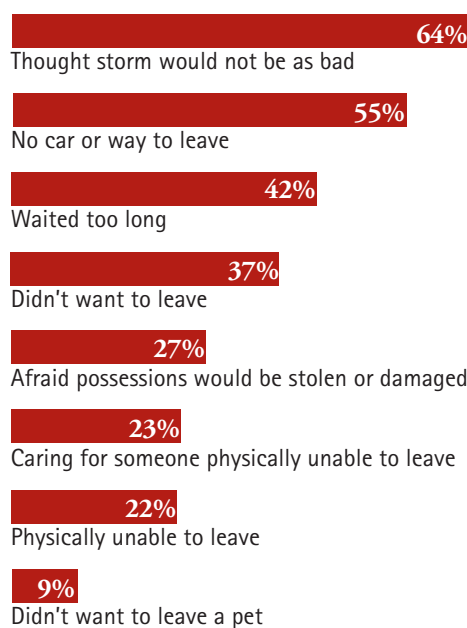
Giving evacuees a chance to speak out was the aim of the survey, Blendon says. Poor, politically disenfranchised, and 93-percent African American, this constituency would otherwise have no voice in the Congressional hearings, and no impact on officials' handling of future disasters. In the space of 11 days (and with a green light from FEMA and the Red Cross), the survey team met a self-imposed goal: to publish their findings on page one of the *Washington Post* by September 16, in order to capture the attention of powerbrokers on Capitol Hill before their agenda could shift to the rebuilding of New Orleans.

The survey threw a harsh spotlight on the lack of coordination among local, state, and federal agencies, Blendon notes. "It is striking how many days people went without medi-

What was the background of evacuees in the Houston shelter?



Why did evacuees stay?



All charts, pages 12 and 13, courtesy of the *Washington Post*/Kaiser Family Foundation/Harvard School of Public Health Katrina Evacuee Survey, September, 2005



NO WAY OUT As flood waters rise, stranded New Orleans residents plea for rescue by helicopter.

...ine, food, and water, and without help from any agency of government or volunteer group,” he says.

Thirty-nine percent of evacuees got no aid at all from such groups. One-third were trapped in their homes and had to be rescued. Of these, over half waited three or more days for help. Far more people received help from the Coast Guard, National Guard, and military (41 percent) than from local police and fire fighters (14 percent). And public leaders—President Bush, Louisiana Governor Kathleen Babineaux Blanco, New Orleans Mayor Ray Nagin—earned low marks for their handling of rescue operations.

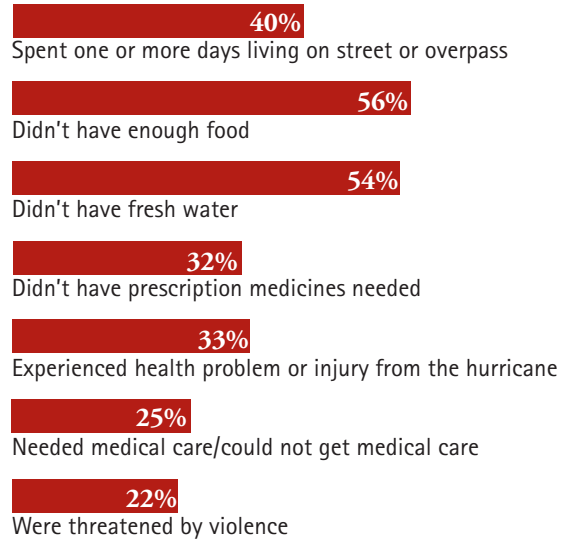
COMPLICATIONS AHEAD

Going forward, the survey offers a reality check for government planners. Serious health problems will complicate efforts to resettle about 8,000 evacuees, fewer than half of whom plan to return home. One-third reported injuries or health problems resulting from the hurricane; over half had no health insurance. In the longer term, the U.S. has much to learn about disaster management across all levels of government, Blendon says. Among the greatest challenges will be mobilizing populations severely hobbled by poverty and illness—those who most need help.

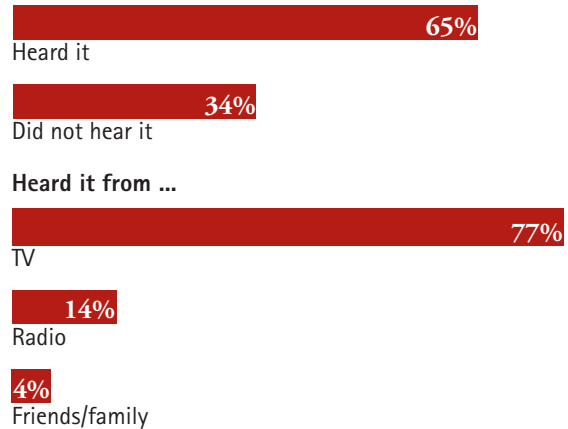
The most difficult task of all? Narrowing the divide between Americans black and white. Sixty-eight percent of evacuees felt race and income were factors in the government’s fumbling response. *

REUTERS/David J. Phillip

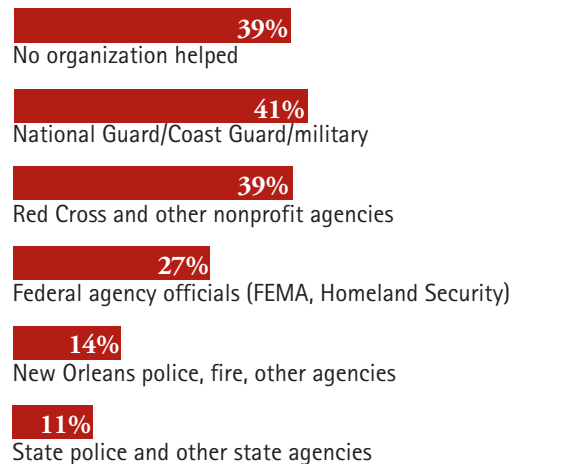
What problems did evacuees face after the hurricane hit?



Did those who remained in New Orleans hear the government evacuation orders?



Which organizations helped you during the flood and evacuation?



A Virtual Academy of Disaster Responders HSPH alumni, Red Cross forge ties through the Harvard Humanitarian Initiative

Water, shelter, food, and basic medical care—the American Red Cross has been delivering these essentials to survivors for 124 years, ever since its founding by nurse Clara Barton. But last September, Red Cross teams formally included public health expertise for the first time, when nearly 100 Harvard School of Public Health graduates signed on as volunteers in response to Hurricane Katrina.

The morning Katrina struck, HSPH Professor Jennifer Leaning and Michael VanRooyen—both emergency physicians at Brigham and Women's Hospital, in Boston—called Red Cross headquarters in Washington, DC, with a proposal. Given widespread flooding and crowding in Red Cross shelters, the risk of epidemic infectious diseases was high. Why not enlist School alumni trained in disaster response to survey the shelters, keeping tabs on disease outbreaks and collecting data to guide resource allocation in the days ahead? Their job would be to assess needs at 126 sites, educate health providers, and take a statistical snapshot of evacuees' physical health and mental health.

A call for volunteers went out by e-mail under the aegis of the Harvard Humanitarian Initiative (HHI), a new University-wide program co-directed by Leaning and VanRooyen that includes several of Boston's elite teaching hospitals as well as HSPH and Harvard's schools of

medicine and government. Within three days, alumni were on the ground with a survey in hand designed by Hilarie Cranmer MPH '04, another Brigham and Women's physician.

Among them were two MPH '05 graduates of HSPH, Christian Arbelaez and Basram Kasravi, both BWH physicians who study racial and ethnic disparities in health. Instead of cholera and dysentery, "there were cots and cots full of people with acutely exacerbated chronic illnesses," Arbelaez says, a reflection of survivors' low-rung status on the socioeconomic ladder.

Between them, the pair traveled to 15 shelters—churches,

warehouses, schools—in Lafayette, Louisiana, and central and northwest parts of the state. There they met a young mother whose seven-year-old boy had asthma, but no inhaler ... an elderly woman with dementia whose name no one knew ... a lady with a history of stroke, her health endangered for want of a daily aspirin ... a man with liver failure, his abdomen bloated with fluid. Many suffered from high blood pressure and heart disease. In one large shelter, 40 percent of adults had insulin-dependent diabetes.

Says Kasravi, a family medicine physician, "Many of these disadvantaged people didn't even have a primary care doctor. Few had prescriptions, let alone medical records." Mental health was a huge issue, he adds.

Kasaravi and Arbelaez call themselves "foot soldiers" for the

HHI, a program dedicated to advancing research, practice, and policy in the field of humanitarian assistance. In addition to doing field work, HHI's affiliated professionals will in the future assist in tactical planning, managing the news media, and forging links with local, state, and federal public health agencies.

Through the HHI, Leaning and VanRooyen say they hope to bring a public health presence to all Red Cross operations. One goal is to build a "virtual academy of responders," says Leaning, a board member with the Red



TEAM WORK Answering the call for Red Cross volunteers were (third and fourth from left) HSPH alumni Basram Kasravi and Mike Lappi, both MPH '05, and physician-colleagues from Massachusetts, New York, and Maryland (left to right): Nilantha Lenora, Jake Lekan, David Miller, and David Weinstock.

Cross's Massachusetts Bay chapter. Volunteers will be vetted for their managerial ability and expertise, she notes, then strategically matched to specific roles. A major HHI goal, VanRooyen stresses, is research—analyzing epidemiological data to aid huge numbers of people in crisis. "Research is what we do here at Harvard, and we do it better than anyone else in the world," he says.

Within 18 months, the HHI will have 300 members, Leaning predicts. "People are coming up to us and saying, 'We want to be part of this.' When the next big disaster happens somewhere in the world, we'll pull up the roster and call them." ✱

Mold, Mold, Everywhere

Scientists see no precedent for the potential hazards in New Orleans.

Mold has attacked what remains of New Orleans, engulfing the city in slime.

Typically, clean indoor environments show mold spore concentrations of less than 1,000 per cubic meter of air. But in Katrina's wake, the numbers have hit several million due to widespread, persistent flooding.

That's the preliminary report from Christine Rogers, a senior research scientist in the Department of Environmental Health at HSPH. In September, Rogers led a hands-on investigation of mold contamination so extensive that the health hazards are unknown. "Our fear was that city residents returning home might experience massive exposures, simply by retrieving belongings and doing minor clean ups," she says.

Tapped by the National Institute of Environmental Health Sciences (NIEHS) Center at Harvard to come up with recommendations as part of a national NIEHS working group, Rogers had searched the literature. But she could find no data applicable to the situation in New Orleans, where water has stood motionless in closed-up buildings, several feet deep, for weeks.

Symptoms of mold sensitivity range from flu-like symptoms to shortness of breath to skin irritations, Rogers says. People at elevated risk include anyone with allergies or breathing problems. Those who are immunosuppressed—on cancer chemotherapy, for example, or have HIV/AIDS—are at especially high risk for fungal infections in the lungs.

High mold levels can change a person's immune status. "Once you generate antibodies, subsequent exposures can elicit symptoms," Rogers explains. In asthma, attacks can become life-threatening; lung inflammation can also set in. "But even your average person is at risk for symptoms at this level of exposure," she notes. "Anyone who is genetically predisposed can develop mold allergies down the road."

As New Orleans residents began trickling back home, Rogers set to work.

New Orleans air samples show mold spore concentrations of several million per cubic meter of air.

With her were HSPH research associate Michael Muilenberg; Ginger Chew, an assistant professor at Columbia's Mailman School of Public Health; and Tanya Santiago and Rob Maestretti, students from the Tulane School of Public Health and Tropical Medicine who had fled Louisiana for a semester at HSPH. Using Maestretti's dry apartment as a base, the team roamed the streets for three days, obtaining consent to explore sodden homes.

What they found amazed them: Wall-to-wall mold colonies. "It was biological warfare, with all these fungi fighting for space," Rogers says.

Colors ran riot—corals, pinks, rusty browns, powdery whites, including fungi they'd never seen before. (Of an estimated 1.5 million species of mold, only 70,000 or so have been characterized.) Familiar types included blue-green *Penicillium*, one species of which is the well known antibiotic; *Aspergillus*, ranging from blacks to greens to orange; and surprisingly few colonies of *Stachybotrys*, a.k.a. "black toxic mold."



KEEP OUT Mold contamination in New Orleans has rendered thousands of homes unsalvageable.

Team members distributed "mold kits" to residents: rubber gloves, N95 respirators resembling surgical masks, and a sheet of health warnings and clean-up instructions. Bleach can be used to kill mold spores; however, spores must not merely be killed, but also removed, since allergens and toxins remain. Furnishings, dry wall, and floorboards must be discarded.

Outdoor air quality is also a concern. Given an estimated 22 million tons of mold-contaminated debris, there is "no such thing as fresh air," Rogers says.

Thanks in part to the HSPH team's effort—and with an assist from Harvard NIEHS Center Director Joseph Brain, HSPH Cecil K. and Philip Drinker Professor of Environmental Physiology—30,000 respirators are now being distributed through the Red Cross. In the near future, Rogers will expand her research, correlating spore concentrations with New Orleans residents' health status.

For details on mold management, see the Environmental Protection Agency website at <http://www.epa.gov/mold/moldresources.html>.