9/11 Study on Cancer Risk May Be Premature

By Merrill Goozner

In the wake of a new study signaling that World Trade Center first responders may face an elevated risk of getting cancer, pressure is mounting on government officials to add the disease to the list of WTC-related health conditions eligible for federal compensation.

As recently as this past July, John Howard, M.D., administrator of the World Trade Center Health Program at the National Institute of Occupational Safety and Health (NIOSH), ruled that “insufficient evidence” existed to add cancer in general or any specific cancers to the list. Yet 2 months later, on the 10th anniversary of the 9/11 terrorist attacks, researchers from the New York City Fire Department and the Albert Einstein College of Medicine published the first comprehensive epidemiological study of 8,927 firefighters exposed to the twin towers’ smoldering ruins in the days and months after the disaster. The study, published in Sept. 3 issue of The Lancet, showed that the first responders—those firefighters directly exposed to 9/11—faced a small but statistically significant risk of getting cancer, compared with colleagues who didn’t rush to the site or work in the rubble over the ensuing months.

Political leaders, unions representing the firefighters and police, and family support groups immediately pounced on the results to demand that the government add cancer to the list of conditions covered by the James Zadroga 9/11 Health and Compensation Act of 2010, which offers compensation to people facing long-term health consequences from the terrorist attack. “We don’t want to wait until all of the evidence is in,” Rep. Charles Rangel, D-N.Y., said at a press conference held near the WTC site the day after the study appeared. He called the study “a tremendous medical bit of evidence.”

Too Soon To Tell?

But the researchers themselves were far more cautious. “It is really too soon to do a definitive study,” said Mayris Webber, Dr.P.H., supervising epidemiologist for the N.Y. Fire Department’s WTC medical monitoring program. “We wanted to get out what we know so far so people would know, but 7 years of follow-up is very early.”

The researchers compared cancer incidence among the exposed firefighters with that of a smaller group of 926 NYFD men who didn’t work at the site. They also compared the exposed group with a reference population of New York City men with similar demographic characteristics drawn from the National Cancer Institute’s Surveillance, Epidemiology, and End Results (SEER) database.

The exposed group had a 19% higher relative risk of cancer than other firefighters, who as a group are healthier than the general population. It was a 10% greater relative risk than that in the general population, with 263 cancer cases in the exposed group compared with 238 cases among a comparable set of New Yorkers. Neither finding crossed the threshold for statistical significance, however.

Moreover, the data required large adjustments to correct for possible surveillance bias. The exposed firefighters actually had a 32% increase in cancer compared with their nonexposed colleagues, and that uncorrected number was statistically significant. Elevated rates emerged for prostate and thyroid cancer, melanoma, non-Hodgkins lymphoma, multiple myeloma, and leukemia.

With the prevalence of cancer in the general population, at least some of the increases were probably an artifact of the intensified screenings that 9/11 first responders in the study received. Screening can turn up tumors that may remain undetected and subclinical in nonscreened groups, the researchers said. Most firefighters who worked at the site were enrolled in an ongoing health monitoring program and receive comprehensive blood screening every 12–18 months. That may help account for the 21% increase in prostate cancer among the exposed firefighters compared with the general population.

The exposed group also receives routine chest x-rays and follow-up CT scans if they have asthma or other respiratory ailments, which were the major health problems documented among the police and firefighters in the wake of 9/11. More than two-thirds of first responders reported new or worsened breathing problems, according to a December 2006 study in Environmental Health Perspectives, and the disproportionate number of CT scans given to that group may have detected the increases in thyroid cancers and lymphoma that the study found.

Research Challenges

The ongoing cancer study of 9/11 first responders is as unique as the terrorist attack itself. It was an effort to monitor a long-term health effect, cancer, from a relatively short-term but massive exposure to a toxic
stew of known and suspected carcinogens. No known previous studies have addressed cancer caused by large short-term chemical exposures. “If you find them, let me know,” said Webber. The only parallel line of research in the medical literature comes from studies of survivors of the atomic bomb blasts in Japan (see sidebar) and the nuclear meltdown at Chernobyl, both of which involved massive short-term blasts of a single known carcinogen: radiation.

Compounding the research difficulties is the fact that the precise composition of the pulverized materials that filled the air and covered the ground in lower Manhattan will never be known. “No one quantified them in the first few days,” said Paul J. Liow, Ph.D., a professor of environmental and occupational medicine at the Robert Wood Johnson School of Medicine in New Jersey and author of Dust: The Inside Story of Its Role in the September 11th Aftermath (2010). “You had a complex mixture, and we don’t study complex mixtures.”

Environmental samplings in the weeks after 9/11 identified at least 287 chemicals and chemical groups in the surrounding air and wreckage dust, including asbestos and glass fibers, crystalline silica, various metals, volatile organic compounds, polychlorinated polycyclic compounds, and polycyclic aromatic hydrocarbons. The samplings were the residues of more than 200 acre-stories of pulverized human remains, concrete, glass, plastics, synthetic fibers, electronics, and many other materials that go into modern office buildings, some of which were vaporized in the combustion of thousands of gallons of jet fuel, which only added to the toxic stew of aerosolized hydrocarbons.

Some chemicals in the mix, such as polycyclic aromatic hydrocarbons, polychlorinated biphenyls, and dioxins, are known carcinogens, lending biological plausibility to the link between WTC first responders and cancer. Moreover, the WTC exposures also triggered many cases of chronic inflammation, stress, and depression, which several studies have associated with oncogenesis.

Still, the study’s authors, citing surveillance bias and other potential unmeasured confounders, warned against reaching firm conclusions in making the link. “The overall risk at this point is modest,” said Webber. “We really don’t know if it is due to exposure or other factors. We’re continuing to do as thorough a job as we can in understanding and following this over time.”

**Government Skepticism**

An enduring frustration for first responders was the government’s initial response—that air monitoring at the site did not turn up excessive concentrations of known or suspected carcinogens. On Sept. 14, 2001, then assistant Secretary of Labor for Occupational Safety and Health John Henshaw claimed, “Our tests show that it is safe for New Yorkers to go back to work in New York’s financial district.” Then Environmental Protection Agency administrator Christine Todd Whitman added, “The good news continues to be that the air samples have all been at levels that cause us no concern.”

In his most recent report, NIOSH’s Howard, who did not respond to requests for an interview, echoed those claims. “The peer-reviewed, published assessments suggest that responders and others in the nearby area were potentially exposed to one or more of the substances designated by IARC [the International Agency for Research on Cancer] and NTP [the National Toxicology Program] as known or reasonably anticipated human carcinogens, although generally not in excess of applicable occupational exposure limits.”
But he added that individual exposures among first responders—many of whom during the immediate event or in the first few weeks failed to use adequate protective equipment—were largely unknown. “These limitations in the exposure assessment literature make scientific analysis of a causal association between exposure and health effects, such as cancer, quite challenging,” he wrote. “Furthermore, the science of conducting risk assessments of complex mixed exposures . . . adds another dimension to the challenge.”

Although the occupational safety and health studies used to regulate workplace exposures lend biological plausibility to concerns that first responders will experience higher levels of cancer, these studies focus on only one chemical or hazardous substance at a time. “When we look at any carcinogen, like asbestos or benzene, we’re typically looking at exposures over a lifetime with a dose–response curve,” said Celeste Monforton, Dr.P.H., a lecturer at the George Washington University Medical Center. Government regulators usually set a maximum allowable dose measured in parts per million over an 8-hour day or within, say, 15 minutes.

The safety standards either are determined by long-term epidemiological studies of workers exposed to those individual chemicals or are derived from animal toxicology studies. “The standards for both long-term and acute exposure to individual chemicals are based on exposures over 40 years,” she said. “We know nothing at all about what happens to someone’s body when [the person is] exposed for a brief period to a very large smorgasbord of contaminants.”

“None of the known carcinogens were there in high quantities,” said Lioy. “Most of this stuff was in the air for less than a week, or 2 weeks, or a month in some cases. They had measurements of the polycyclic aromatic hydrocarbons, benzene, and other compounds, and [the concentrations] were relatively low after the first couple of weeks.”

Further Study Needed

Because the exact makeup of the mixture will forever remain unknown, “There can’t be toxicological studies to determine if there will be increased rates of cancer,” he said. “We can only determine through epidemiological studies whether there is going to be an increase over time. The science has to rule the day on this.”

But that means it will be many years before definitive conclusions can be drawn. “Given what we know, it will probably be a minimum of 20 years,” said Jonathan Samet, M.D., M.S., professor of preventive medicine at the University of Southern California School of Medicine. “We need to collect the data so we can provide answers to the questions as they come up, and even then, the answers may not be definitive.”

NIOSH’s World Trade Center Health Program must report annually on the state of the science linking increased cancer incidence to exposures from 9/11 and its aftermath. The next report is due in mid-2012.