

## **Nine Years Later: Health Effects in World Trade Center Responders, with Philip Landrigan**

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As many as 70,000 volunteers and rescue workers responded to the 11 September 2001 World Trade Center (WTC) attacks, many toiling for months to clear mountains of debris containing a range of toxic compounds. Health effects seen since that time in WTC responders include respiratory, gastrointestinal, chemosensory, and mental health problems; many of these effects have persisted for years. In this podcast, Philip Landrigan discusses his work with WTC responders as a physician and an epidemiologist and how lessons learned from the WTC cleanup may be applied to other disasters. Landrigan is the chair of the Department of Preventive Medicine and dean for Global Health at Mount Sinai School of Medicine in New York.

**AHEARN:** It's The Researcher's Perspective. I'm Ashley Ahearn.

After the September 11th attacks, between 60 and 70,000 volunteers and rescue workers rushed to the site of the fallen towers and spent months clearing away the debris, which contained toxic chemicals.

Many of these responders have since been diagnosed with what's called World Trade Center cough. Some have developed problems with lung function and asthma, while others struggle with gastroesophageal reflux disorder and loss of sense of smell. That's to say nothing of the mental health problems—like post-traumatic stress disorder and depression—which continue to afflict many of these brave men and women.

In the nine years since the attacks Dr. Philip Landrigan has been studying the health problems of the responders. He's the chair of the Department of Preventive Medicine at Mount Sinai medical school in New York and dean for Global Health there.

Hi, Dr. Landrigan.

**LANDRIGAN:** Hi, Ashley.

**AHEARN:** So tell me, how soon after the attacks did you get to Ground Zero? And as an epidemiologist, what was going through your head?

**LANDRIGAN:** Well, what went through my head when I saw the towers come down was that I reacted as a physician. I asked myself, how many people are going to die? How many people are going to be injured? How many people are going to become sick? And then in the first weeks after the attacks we began to see people such as police officers, firefighters, construction workers, transit workers who had worked at Ground Zero and who were coming in with cough, with terrible nasal irritation, with other health problems, and sort of in an evolving way it dawned on us, through the months of October and November 2001, that we were going to be seeing a great many sick people in the months and years ahead.

**AHEARN:** How many people would you say you've seen over the years?

**LANDRIGAN:** There are two big clinical programs in New York that are set up to take care of the responders. The Fire Department of New York program takes care of active duty New York City firefighters and paramedics. They've seen close to 15,000 people. Our program, which is based on a consortium of five New York City and New Jersey institutions, has seen about 28,000 people. So between us we've seen roughly 43,000 of the 60 to 70,000 workers and volunteers who served at Ground Zero.

**AHEARN:** Dr. Landrigan, let's talk about the health impacts that you're seeing. What is World Trade Center cough, I mean, for starters?

**LANDRIGAN:** World Trade Center cough is defined as a cough that lasts at least four weeks in a person who served at Ground Zero.

**AHEARN:** And what are some of the other health impacts that you've seen?

**LANDRIGAN:** Well, basically we think of the health impacts by organ system. So in the respiratory tract people have had severe chronic sinusitis and upper respiratory infection where for years now, for eight or nine years, their upper airways have been chronically swollen and clogged. People have had lower respiratory problems down into the bronchi and into the lungs, and for example, the doctors at the Fire Department had a very important paper published two months ago in the New England Journal of Medicine in which they found that people who were caught in the dust cloud on September 11th suffered a loss of lung volume in one year which is the equivalent of 12 years' normal loss of lung volume.<sup>1</sup> We all lose some lung volume as we age, it's a normal part of aging, but these people suffered 12 years' worth of aging in a single week as a result of their exposures.

We've had a few cases of a condition called sarcoidosis, which is a chronic inflammatory disease of the lungs. Then, in the gastrointestinal tract, we've had many hundreds of cases of GERD—gastroesophageal reflux disease. The third big organ system to be affected is the brain, or the mind, and the characteristic problems there, which afflict about 12 percent of the population of responders today, are depression and post-traumatic stress disorder. Some have one, some have the other, and quite a few have both.

**AHEARN:** How about cancers? Are you seeing higher rates of cancers or certain types of cancers in rescue workers?

**LANDRIGAN:** A few months ago we published a paper where we reported on the occurrence of four cases of multiple myeloma in relatively young responders.<sup>2</sup> Myeloma is typically a disease of older adults, but these four cases all occurred in people under the age of 45, all of them who happened to be police officers. We were very careful in that paper to say that we didn't know if this was cause and effect or not, but we reported the cases because we wanted to alert practicing doctors to the possibility that they might be encountering more cases of myeloma.

What we've done now, or I should more accurately say what we're in the process of doing, is working very closely with the Health Department of New York City, working closely with the New York Fire Department, to set up a very robust system for tracking cancer cases as they occur in the population of responders. We know that they were exposed to carcinogens— asbestos, polycyclic aromatic hydrocarbons, a whole slew of toxic organic compounds. We just don't know yet, at this point in time, what may be the consequence for their health of those exposures. We're certainly watchfully waiting. We're worried that there may be cancers, but at the present time we've not yet seen any true excesses.

**AHEARN:** What are your predictions? What do you think you may see as the years go by?

**LANDRIGAN:** Well, I suppose we'd be most worried about lung cancer and mesothelioma because those are the two cancers that are typically associated with asbestos and other forms of airborne dust. There is some concern that we might see increased numbers of leukemia or other hematologic malignancies because of the fact that the responders, especially those who were there in the first 24 hours, were exposed to benzene, which is a known cause of hematologic malignancies. But I want to emphasize that to date we've not seen any excesses of any of those malignancies—we're just keeping our eyes open.

**AHEARN:** Are there lessons from 9/11 that could be applied to rescue workers in the Gulf of Mexico now?

**LANDRIGAN:** I think one very big lesson that comes out of 9/11 concerns the importance of having clinical resources in occupational medicine and environmental medicine already set up in advance of the disaster that can serve as a resource for people who might become sick, might become injured in the course of responding to the disaster.

We were lucky here in New York in that the clinical center in occupational medicine that we have at Mount Sinai is a big center, gets core funding from the state of New York, had been in existence already for the best part of two decades before September 11, 2001, and so we had doctors, nurses, industrial hygienists, environmental specialists, other trained people, who were able to swing into action immediately after the attack without having to get up and move. They just basically expanded their operations and added additional staff, and within weeks we were rolling and seeing patients. When one of these disasters takes place in a part of the country that doesn't have that resource, it's much more difficult because you have to bring doctors, nurses, and other people there. It's just not as efficient.

Another important lesson that came out of 9/11 is the importance of measuring exposures at multiple points after the disaster takes place so that you know what people are being exposed to in the course of their response work. Without that knowledge, you're flying blind.

A third lesson, something we did not do very well in New York City, is to take attendance—in other words, to know the names, the addresses, the Social Security numbers, the contact information of people who respond. We talked earlier in this interview about the notion that there were somewhere between 60 and 70,000 people there, and through various statistical techniques we feel pretty comfortable with that number, but I'd feel even more comfortable if I knew exactly who had been there and who they were, because then I would be in a position to see if there were any systematic differences between the 43,000 who've come in for examinations and the 15 or 20,000 whom we've never yet seen.

**AHEARN:** Why do you study this, Dr. Landrigan? What do you hope your research accomplishes?

**LANDRIGAN:** One reason for following these brave men and women and for documenting their diseases is simply to preserve history. The illnesses that are taking

place in these people and that will probably take place in the years ahead are part of the story of the attacks on the United States of America that took place on September 11, 2001, and we feel we have a responsibility to document the full magnitude of the consequences of those attacks. A second reason is to learn what we can from this episode so that the lessons learned here can inform the response to future disasters.

**AHEARN:** Dr. Landrigan, thanks so much.

**LANDRIGAN:** Ashley, thank you.

**AHEARN:** Dr. Philip Landrigan is the chair of the Department of Preventive Medicine at Mount Sinai medical school in New York, and dean for Global Health there.

Coming up in our next podcast we'll take a closer look at the toxic chemicals in the dust and debris at Ground Zero when we talk with Dr. Paul Liroy.

And that's *The Researcher's Perspective*. I'm Ashley Ahearn. Thanks for downloading!

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<sup>1</sup> Aldrich TK, et al. *N Engl J Med* 362(14):1263–1272 (2010); doi:10.1056/NEJMoa0910087.

<sup>2</sup> Moline JM, et al. *J Occup Environ Med* 51(8):896-902 (2009); doi:10.1097/JOM.0b013e3181ad49c8.

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