

## Disease in the aftermath of 9/11

Around 8am on the morning of Tuesday 11<sup>th</sup> September 2001, everything appeared normal on the streets of Manhattan. Sadly, a number of hijackers and a couple of commercial aircraft were about to change all that. Within the hour, the north and south towers of the World Trade Centre (WTC) had been hit. By 10.30 that morning, the skyline of New York City had been transformed forever when both towers collapsed under vast clouds of dust that blanketed lower Manhattan (Figure 1). In less than two hours, more than 2,500 people had perished including several hundred emergency responders. The search and rescue operation at Ground Zero, the area where the WTC once stood, began with workers carefully removing debris in the hope of finding survivors. Thousands of personnel eventually became involved in the rescue, recovery and cleanup operation during which 1.8 million tons of pulverized concrete and debris was removed (Figure 2). The waste contained high levels of asbestos dust as well as other toxic agents such as polycyclic aromatic hydrocarbons and dioxins, by-products of the fires which burned around the area for many weeks.



**Figure 1. Toxic dust clouds following the collapse of the twin towers**



**Figure 2. Search, rescue and recovery operation at Ground Zero**

The WTC Health Registry estimated that up to half a million people in the surrounding area were exposed to the toxic dust that fateful day. In the months following the attacks, dust from the collapsed buildings continued to fill the air and many workers and residents were experiencing debilitating health problems. While many of the conditions such as asthma and silicosis were of a respiratory nature, others included both physical and mental health disorders. Furthermore, within years of the disaster, many recovery personnel had developed cancers that were believed to have arisen from exposure to the toxins. Although studies have shown that the incidence of all cancers among workers at Ground Zero was not significantly elevated, the frequency of mesothelioma and cancers of the thyroid, prostate and blood were considerable.

Mesothelioma is an asbestos-related cancer that develops from the mesothelium, a thin tissue layer that covers many of the internal organs. During the implosion of the twin towers, the asbestos within them was pulverized to a fine dust, contaminating the air around the WTC. Because of the pronouncement from the Environmental Protection Agency declaring that the air was safe, countless responders at Ground Zero were not given adequate respiratory protection following the disaster. As a result, many were ill-prepared for the toxic dust that blanketed the site. Within five years of the attack, several responders had already died from mesothelioma, even though the disease commonly occurs several decades following first exposure to asbestos.

Another interesting finding was that many first responders were found to have the pre-cancerous condition called monoclonal gammopathy of undetermined significance (MGUS). This disease often progresses to multiple myeloma and is found among those who have been exposed to known and suspected carcinogens. One of the most common blood cancers in adults, multiple myeloma is often diagnosed between the ages of 65-75 years. Recent studies of recovery and clean up personnel have suggested an early onset of the disease occurring 12 years earlier and 1.8 times higher than the control population. However, by screening at risk workers for MGUS, it is possible to both monitor and predict the development of multiple myeloma.

Since the attacks on that fateful day in 2001, more than 1,800 first responders have been diagnosed with WTC-linked cancers. Continuous studies are being performed on the effect that exposure to these toxins have on the health of those affected. In 2010, the Zadroga act (named after James Zadroga, a police officer and first responder who died as a result of exposure to the toxic dust)

recognized that victims of the disaster should be able to receive compensation. The WTC Health Program and Victim Compensation Fund (VCF) both help provide that support with free annual medical screenings and health care to those certified with WTC-related illnesses. To date, the WTC Health Program has provided screenings, monitoring and treatment to more than 70,000 responders and 12,000 survivors that have enrolled on the scheme. However, with around half a million people in the vicinity of lower Manhattan at the time of the attack it begs the question why so few people have registered with these programs.

For those who have yet to become ill, they may be unaware that they were at risk. For those who are already ill, they may not be aware that their illnesses are linked to the collapse of the WTC. Cancer clusters are still appearing in many schools, offices and homes that were in the vicinity of the dust that emerged from the collapse. With cancers often having latency periods that extend many decades following exposure to toxic agents, only by screening at risk populations can monitoring and early diagnosis of these diseases be sustained and successfully treated.

### **Further Reading**

1. Asbestos, 9/11 and the World Trade Center. Matt Mauney, February 2018  
<https://www.asbestos.com/world-trade-center/>
2. Multiple myeloma and its precursor disease among firefighters exposed to the World Trade Center disaster. Landgren O, Zeig-Owens R et al. JAMA Oncology - published April 2018  
<https://jamanetwork.com/journals/jamaoncology/fullarticle/2678962>
3. Why people are still getting sick 16 years after 9/11. Lydia Ramsey, September 2017  
<http://uk.businessinsider.com/911-anniversary-health-effects-2016-9>
4. World Trade Center Health Program  
<https://www.cdc.gov/wtc/conditions.html>

**Dr Phil Bryant**

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