9/11 HEALTH EFFECTS: THE SCREENING AND MONITORING OF FIRST RESPONDERS

HEARING

BEFORE THE

SUBCOMMITTEE ON GOVERNMENT MANAGEMENT, ORGANIZATION, AND PROCUREMENT

OF THE

COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

HOUSE OF REPRESENTATIVES

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9/11 HEALTH EFFECTS: THE SCREENING AND MONITORING OF FIRST RESPONDERS

MONDAY, SEPTEMBER 10, 2007

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON GOVERNMENT MANAGEMENT,
ORGANIZATION, AND PROCUREMENT,
COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM,
Brooklyn, NY.

The subcommittee met, pursuant to notice, at 10:45 a.m., at the Brooklyn Borough Hall, Ceremonial Courtroom, 209 Joralemon Street, Brooklyn, NY, Hon. Edolphus Towns (chairman of the subcommittee) presiding.

Present: Representatives Towns and Maloney.

Staff present: Rick Blake, professional staff member; and Cecelia Morton, clerk.

Mr. TOWNS. The hearing will come to order.

As we begin the business of today, we should remember 6 years ago, when toxic clouds of smoke from the World Trade Center hung above lower Manhattan and Brooklyn. On that day and in the weeks that followed, first responders, construction workers and volunteers came to Ground Zero to work on the rescue and recovery effort, and we salute them for that.

Many of them have become victims of 9/11, facing health challenges such as pulmonary fibrosis, post-traumatic stress disorder and more. In February, we learned about all the work that New York City and New York State have started. We asked the Federal officials at Health and Human Services for more support of these programs.

At that time, we questioned the Assistant Secretary of Health Agwunobi, who told us the administration was working on a report from a task force which would come up with a plan. We pressed for more details from HHS and basically got what only can be called, in my neighborhood, the runaround.

Now, more than 6 months later, we still don't have a final report or a plan from the administration for dealing with the long-range health consequences of 9/11. It was this subcommittee's intent to call Dr. Agwunobi back to testify and ask him about his plan. But instead, we learned that he quit.

But, someone needs to produce it. Even 6 years later, New Yorkers are still dealing with the long-term health effects from this tragedy. And, we intend to hold the administration accountable. And, let me put it this way. We are not going away.

I don't mean to be overly critical, but the lack of a long-range plan has become a pattern in this administration. 9/11, no plan.

Katrina, no plan. Iraq, no plan. They simply don't deal with large-scale adversities too well.

Today, we will get an update from witnesses who are the experts on 9/11 health, both the Government Accountability Office and our expert witnesses from New York City, have new reports concerning the health screening and monitoring of our first responders, and information concerning what has really happened in terms of their physical and mental health. Doctors and first responders will tell us how health care is being delivered.

I would, at this point, like to thank my colleague and friend, Congresswoman Carolyn Maloney, for the outstanding work that she has been doing on behalf of the project, in terms of 9/11 health care and, of course, responding to the issues and concerns. Congresswoman, you are doing a superb job. And, at this time, I would like to yield to you for an opening statement.

Mrs. MALONEY. Thank you so much.

First and foremost, I want to thank you, my good friend Congressman Towns, for holding this very important hearing on the eve of the sixth anniversary of 9/11. This is the third in a series of hearings on the health effects of 9/11, and I commend you for your unwavering efforts to bring this issue to the forefront.

I also want to thank my good friend, Jerry Nadler. Working together, we will not rest until everyone exposed to the toxins at Ground Zero is monitored, and all who are sick are treated as a result of their exposure, that they get the medical treatment that they need and that they deserve.

The collapse of the World Trade Center towers took nearly 3,000 lives in an instant and released a massive cloud of asbestos, concrete and other poisons. Due to those toxins, we now know that thousands more have lost their health.

Six years later, more than 6,500 responders, truly the heroes and heroines of 9/11, are being treated for 9/11-related health problems through the federally funded World Trade Center Monitoring and Treatment Program. And, more than 4,500 have been referred for mental health care, often for conditions like post-traumatic stress syndrome.

Every month, another 500 to 1,000 responders sign up for health monitoring. And, those coming in are more sick than ever before.

Separately, more than 70,000 Americans reported to the World Trade Center Health Registry. Although most are from New York, New Jersey and Connecticut, more than 10,000 Americans came from outside the tri-State area and are registered. Amazingly, every single State in the Union had representatives at 9/11, including Hawaii and Alaska. This is a health emergency on a national scale, and it requires a strong Federal response.

Two days ago, at a labor rally at Ground Zero, I joined the New York AFL–CIO president, Denis Hughes, Representative Nadler, our Senators and Congressman Rangel, in announcing the 9/11 Health and Compensation Act, which we will be introducing this week in Congress.

The 9/11 Health and Compensation Act will ensure that everyone exposed to the Ground Zero toxins has a right to be medically monitored, and all who are sick as a result have a right to treatment. It will build on the expertise of the Centers for Excellence at

Mount Sinai, Bellevue and other sites, which are currently providing high-quality care to thousands of responders, and ensuring ongoing data collection and analysis, and expanded care to the entire exposed community.

The bill also includes care for area residents, workers and school children, as well as the thousands of people that came from across the country to assist with the recovery and clean up efforts.

Finally, the bill provides compensation for economic damages and loss by re-opening the September 11th Victims Compensation Fund.

I have been fighting for years to make sure that all these things happen. And I am very proud to be working with representatives Nadler and Rangel and Towns and many others, with very strong support of the New York AFL–CIO, to move this comprehensive package forward.

Only the Federal Government has the resources and the reach to properly address the health and compensation needs. Only the Federal Government can take care of the thousands and thousands who responded to help at Ground Zero. But often, it feels like we in Congress are fighting the Bush administration every step of the way.

Let me give you just one of many examples. In my very first hearing of the year of the subcommittee, we heard from Dr. John Agwunobi, who was Assistant Secretary of Health at the Department of Health and Human Services and who also acted as Chair of the Department's World Trade Center Task Force. Many of us left that hearing feeling like there were many more questions left than good answers given. Since then, we have learned that the World Trade Center Task Force briefed HHS Secretary Leavitt with their recommendations. Remarkably, still no action has been taken on these recommendations. And, Dr. Agwunobi has resigned, effective September 4th, without releasing the plan of action he promised, and that has been promised to us repeatedly, over and over and over again, from the administration.

So, along with Senators Clinton, Schumer, Nadler, Pallone, Towns and many others, we have written to Secretary Leavitt to request a meeting to find out when he intends to appoint a new Chair for the World Trade Center Task Force.

Let me close by saying that I look very much forward to the hearing and the testimony of our witnesses today. I thank each and every one of you for being here and for doing your part to help others. And, you are here really doing important work to ensure that those exposed to the toxins are monitored and those who are sick are treated. That is the least we can do, as the wealthiest nation on Earth, take care of the people who rushed selflessly into burning buildings to help others.

I yield back the balance of my time.

Mr. TOWNS. Thank you, very much, Congresswoman Maloney.

We have been joined by Congressman Nadler, who, of course, represents Manhattan and Brooklyn and who has been very, very involved in this issue over the years. Ladies and gentlemen, Congressman Nadler.

Mr. NADLER. Thank you, Mr. Chairman.

Mr. Chairman, let me begin by thanking you for holding this hearing, by thanking Congresswoman Maloney for the work she has done on this issue, and thanking the AFL–CIO for the work that they have done on this issue, in particular on helping us craft the bill that Congresswoman Maloney and I and some others will be introducing shortly.

When the Twin Towers came down on September 11, 2001, our first responders—firefighters, police officers, EMTs, steel workers and countless others—selflessly put their lives in danger so that they might save the lives of others. Workers and volunteers came from all five boroughs, from New Jersey and Connecticut and from every other State in the Union. At the moment when our country was under attack, these responders were on the front lines, sifting through the rubble of the World Trade Center searching desperately for survivors.

Many of them did this without proper protective equipment, because government officials—the EPA, OSHA and the White House—told them it was safe. Now, 6 years later, many of them are sick.

At the Pentagon, OSHA enforced regulations requiring the use of respirators. No workers became sick. At Ground Zero, Con Edison made sure that its workers wore respirators, and none of the Con Edison workers became sick. But, OSHA failed to enforce its own regulations at the World Trade Center site, as did the EPA, as did the city of New York. Someone made the deliberate decision not to enforce the OSHA laws, and 70 percent of the first responders who worked on that site are sick, and some others have already died.

As Chair of the Subcommittee on the Constitution, Civil Rights and Civil Liberties, I held a hearing in June where we heard for the first time from the former head of OSHA, who testified under oath that OSHA had properly protected the health and safety of workers at Ground Zero.

He also testified that OSHA's breathing zone samples showed exposures were below the agency's permissible levels, even though independent tests showed otherwise.

Back in 1986, under the Reagan administration, EPA concluded that there are no safe levels, no minimum safe levels of asbestos. The former head of OSHA—the same former head—even signed a letter explaining that all World Trade Center dust would be considered to contain asbestos, and that, therefore, triggered all the laws regarding cleanup of asbestos. And yet, OSHA handed out paper filament masks on 9/11 that were clearly marked, "Warning: This mask does not protect your lungs."

OSHA claims that it conducted safety and health inspections to ensure that standards were followed and the workers were properly protected. Had this been the case, the agency should have alerted workers to the grave health and safety violations at the World Trade Center site and enforced regulations that required that all workers wear respirators. If all workers had been wearing respirators, first responders like Marvin Bethea, for example, who has testified at many hearings, would not be suffering from 9/11 health effects.

In 2002, EPA issued a report called "Lessons Learned in the Aftermath of September 11, 2001," which states that, "EPA's mis-

sion was to protect front line responders and residents from dust and contaminants released when commercial aircraft were deliberately crashed." It goes on to say, "Mission accomplished."

If EPA's response to Ground Zero indeed constituted "mission accomplished," then first responders like John Sferazo, who has testified at many hearings, would not today be suffering from 9/11 effects.

The response of the Federal Government is totally inadequate. Indeed, I have often said that the Federal Government has betrayed our first responders. The brave men and women who worked seemingly endless days at the World Trade Center site deserve answers to their questions and deserve help for their afflictions.

Why did OSHA not enforce the law in New York, with respect to the non-city or State employees on the site, despite repeated requests from the city to do so? The OSHA head testified at our hearing in June that they had no jurisdiction to force city workers to comply with those regulations. But, they did have jurisdiction to enforce the law with regard to non-city and State employees. Why did they no do so, despite repeated requests from the city to do so.

Why did OSHA hand out inadequate paper masks that did not protect against asbestos or ultra fine particulates to workers? Why did EPA shirk its responsibility to warn all those people in New York, in Lower Manhattan, that the air was not safe to breathe? Indeed, why did they knowingly and deliberately lie, telling people the air was safe to breathe, when there were ample tests results that showed to the contrary?

In the meantime, we have been forced to go hat in hand, begging for health care for the first responders. Despite all the published scientific reports and all the 9/11 community rallies, we still find ourselves shouting that we need help.

The Federal Government put these men and women in harm's way on 9/11 and is now treating them like pests rather than heroes. Doctors at Mount Sinai and at Bellevue have been doing a fantastic job. Mount Sinai is doing a fantastic job of treating those responders, and Bellevue is treating local residents who need care. But, doing so has been a struggle, as they receive only a fraction of the funding their program needs.

A July GAO report found that efforts by the Federal Government to provide services to first responders have been intermittent and haphazard, at best.

Abraham Lincoln said, in his second inaugural address that we must "care for him who shall have borne the battle." And so we should. I am pleased that Congresswoman Maloney and I and others will soon be introducing legislation to provide long-term healthcare to all those with 9/11-related illnesses. Our legislation would build on the efforts of the Centers of Excellence in New York City and would extend to people who came from all over the country to aid in the massive rescue and recovery efforts after 9/11. I encourage all my colleagues to support this bill and to pass it without delay.

Dr. Joan Reibman of Bellevue has prepared testimony on behalf of the New York Health and Hospitals Corp.

I ask, Mr. Chairman, that it be submitted in whole for the record.

Mr. TOWNS. Without objection.

[The prepared statement of Dr. Reibman follows:]

Statement of

Joan Reibman, MD

Associate Professor of Medicine and Environmental Medicine
Director NYU/Bellevue Asthma Center
Director of Bellevue Hospital WTC Environmental Health Center

Bellevue Hospital
New York University School of Medicine

9/11 Health Effects: Federal Monitoring and Treatment of Residents and Responders

September 10, 2007

Before the

Subcommittee on Government Management, Organization, and Procurement

Oversight Hearing entitled, "*9/11 Health Effects: The Screening and Monitoring of First Responders.*"

Thank you Chairman Towns

My name is Joan Reibman, and I am an Associate Professor of Medicine and Environmental Medicine at New York University School of Medicine, and an Attending Physician at Bellevue Hospital, a public hospital on 27th Street in NYC. I am a specialist in pulmonary medicine, and for the past 15 years, I have directed the Bellevue Hospital Asthma Program. I understand that this hearing is appropriately targeted at the heroic individuals involved in rescue and recovery, however I am pleased to be invited to talk about other affected populations.

As you well know, Lower Manhattan is replete with office towers and hundreds of thousands of individuals work in the area every day. It is also a major residential community; almost 60,000 residents of diverse race and ethnic backgrounds live south of Canal St. alone (US census data). The residents are economically diverse; some living in large public housing complexes, others in newly minted coops.

The destruction of the WTC towers resulted in the dissemination of dust throughout Lower Manhattan. The dust settled on streets, playgrounds, cars, and buildings. Dust entered apartments and office buildings through windows, building cracks, and ventilation systems. The WTC buildings continued to burn through December. Individuals living and working in the communities of Lower Manhattan had potential for prolonged exposure to the initial dusts, to re-suspended dusts and to the fumes from the fires. As pulmonologists in a public hospital, we naturally asked whether the collapse of the buildings posed a health hazard and first monitored the effect on the local residents.

With funds from the Centers for Disease Control, we collaborated with the New York State Department of Health to examine whether there was an increase in the rate of new respiratory symptoms. The study was designed, implemented and completed 16 months after 9/11/01 and the results have been reported in two publications in 2005, and a recent analysis published in May of 2007 (Reibman et al. The World Trade Center

residents' respiratory health study; new-onset respiratory symptoms and pulmonary function, Environ. Health Perspect. 2005; 113:40-411. Lin et al. Upper respiratory symptoms and other health effects among residents living near the world trade center site after September 11, 2001, Am. J. Epidemiol. 2005; 162:499-507, Lin et al., Reported respiratory symptoms and adverse home conditions after 9/11 among residents living near the World Trade Center. J. Asthma 2007; 44:325 – 332). We surveyed residents in buildings within one mile of Ground Zero, and, for purposes of control, other lower-risk buildings approximately five miles from Ground Zero. We oversampled the exposed population on purpose, because at that time, this was the only study of the residents. Analysis of 2,812 individuals revealed that approximately 60% of individuals in the exposed area compared to 20% in the control area reported new onset respiratory symptoms such as cough, wheezing, or shortness of breath, following 9/11. The more important question, however, was whether these symptoms resolved over time, or persisted. New-onset and persistent symptoms such as eye irritation, nasal irritation, sinus congestion, nose bleed, or headaches were present in 43% of the exposed residents, more than three times the number of exposed compared to control residents in the month preceding completion of the survey. New-onset persistent lower respiratory symptoms of any kind were present in 26% (26.45) versus 8% (7.5%) of exposed and control residents respectively; a more than three fold increase in symptoms. This included an increase in new onset, persistent cough, daytime shortness of breath, and a 6.5-fold increase in wheeze (10.5 % of exposed residents versus 1.6% of control residents respectively). These respiratory symptoms resulted in an almost two-fold increase in unplanned medical visits and use of medications prescribed for asthma (controller and fast relief medications) in the exposed population compared to the control population. Our most recent analysis of the data suggest that residents reporting longer duration of dust or odors or multiple sources of exposure had greater risk for symptoms

compared to those reporting shorter duration. These data suggest that WTC-related contamination in the home after 9/11 was associated with new and persistent respiratory symptoms among residents living near the site.

As in all studies, there are some potential limitations to our studies. Because of the unexpected nature of the disaster, we had to rely on self-reported health information. Reporting bias, always a potential problem was minimized with questions about non-respiratory health issues. Finally, we had a low response - but one must keep in mind that during the time of the study, the postal service was not functioning in Lower Manhattan, mail did not reach residents and we had to resort to hand delivery. One also has to remember that residents were moving in and out of the buildings, were emotionally distraught, and were being bombarded with a variety of forms for housing services, clean-up services etc. Our response rate, though low, is comparable to that of the US Census. We also confirmed our data by targeting a few buildings in the exposed and control areas in which we performed more intense outreach and obtained a better response rate (44%). Data from this group was similar to that from the overall study.

Unfortunately, this study was and remains one of the few studies, and particularly one of the few with a control population, to describe the incidence of respiratory symptoms among residents of Lower Manhattan after 9/11/01. It suggested that many residents had new onset symptoms in the immediate aftermath, with persistence of symptoms in the year after the event.

Every year I am asked, do these symptoms persist today? When it comes to residents and local workers, we have little information. As you have just heard, the NYCDOHMH WTC Registry, which was implemented after our study was completed, and closed in 2004, found a similar pattern of symptoms in responders and evacuated office workers, but has not yet answered the issue of persistence. This question is now

being addressed with the second study implemented by the NYCDOHMH WTC Registry and we anticipate the results, which will help shed light on this question.

While we await more survey information, we are cognizant of what we are seeing in our clinics. After 9/11, we began to treat residents who felt they had WTC-related illness in our Bellevue Hospital Asthma Clinic. We were then approached by the Beyond Ground Zero Network, a coalition of community organizations, and together began an unfunded program to treat residents. We were awarded an American Red Cross Liberty Disaster Relief Grant to set up a medical treatment program for WTC-related illness in residents and responders, which began functioning in September 2005. In September 2006, we were funded by the City of New York to provide for evaluation and treatment of individuals with suspected World Trade Center-related illnesses and this city funding of $16 million over 5 years has allowed us to expand the program.

To date, we have evaluated and are treating over 1600 individuals. We receive anywhere from 100 to 300 calls each week about the program. We have a wait list of hundreds and a 1-2 month delay for an initial visit. These requests are from local residents of diverse socioeconomic status, some of whom were evacuated, but others who were left in their apartments, with no place to go. We also receive calls from office workers, many of whom were caught in the initial dust cloud as the towers disintegrated. Many of these individuals returned to work 1 week after the destruction. And we have a large contingency of clean-up workers, the individuals who removed the layers of dusts that had infiltrated the surrounding commercial and office spaces in order to allow the city to function.

An individual has to have a physical symptom to enter our program; we are not a screening program for asymptomatic individuals. Most of our patients have symptoms that began after 9/11 and consist of upper respiratory symptoms such as sinus

congestion (45%), or lower respiratory symptoms, such as cough (52%), shortness of breath (65%) or wheezing (36%), for which they are still seeking care, five years after 9/11. Whereas many of these individuals have symptoms that can be treated like asthma, others have a process in their lungs that we do not fully understand and may consist of a granulomatous disease of the lung like sarcoid, or fibrosis, which is a scarring in the lungs. And although we call ourselves a "treatment" program, many questions remain. We do not know how best to evaluate and monitor the symptoms. We do not know which medications work best. We do not know how long we will need to treat these individuals and if the symptoms will completely resolve. We do not understand the underlying mechanism or pathology of the symptoms. Only rare individuals, those with atypical presentations or a failure to respond to treatment, have had invasive tests, which may help reveal the underlying pathology. Finally, we do not know whether other diseases will emerge, the threat of cancers, particularly those of the blood or lymph nodes, remains a concern. We know that many residents and workers of downtown Manhattan were subjected to environmental insults on a large scale and many will require continued screening and treatment for years to come. Our unanswered questions suggest the continued need for epidemiologic, clinical and translational research studies to help answer these questions.

I thank Mayor Bloomberg and Members of Congress for their efforts to provide funding for monitoring and treatment and Members present for having this hearing. We need continued support for treatment programs for residents, local workers, and individuals involved in rescue, recovery, and debris removal. To paraphrase a local resident responding to the recent New York Times article, we need continued, stable funding for the development of sound health-based policy and data collection and analysis.

Mr. NADLER. And I again thank the AFL–CIO for its help and leadership in preparing this legislation.

Tomorrow, we mark 6 years of incompetence and malfeasance on the part of the Federal Government. I would call it more malfeasance than incompetence. I call on EPA to stop covering up its harmful and illegal actions in response to the attacks of 9/11. I call on EPA to conduct a proper testing and cleanup program in Lower Manhattan, in Brooklyn, in Queens, and to fulfill its legal mandate to clean up indoor air, not just in Lower Manhattan, but also in Brooklyn and in any other areas that were contaminated by the World Trade Center dust.

And, I call on Congress to pass the bill that Congresswoman Maloney and I will be introducing to provide comprehensive healthcare benefits to all those who are suffering the health effects of 9/11.

And, I call on the Bush administration to take their heads out of the sand, stop denying the obvious and start treating the first responders as heroes and stop treating them as pests.

I thank you, and I yield back.

Mr. TOWNS. Thank you, very much, Congressman Nadler.

We have been joined by the deputy borough president of Brooklyn. And I want to just sort of first thank them for allowing us to come in and use the facility here. And I am always happy and anxious and eager to introduce the deputy borough president of Brooklyn, because some of you might not know that I served as a deputy borough president of Brooklyn for many, many years. So, I have a special kind of feeling when it comes to deputy borough president.

So, it is my honor and my pleasure to present to you Yvonne Graham, the deputy borough president of Brooklyn.

Ms. GRAHAM. Thank you, Congressman Towns. It is my honor to present these remarks on behalf of borough president Marty Markowitz.

Good morning, Chairman Towns and members of the Subcommittee on Government Management, Organization, and Procurement.

Tomorrow, of course, marks the sixth anniversary of the tragic events of September 11, 2001. The scars of 9/11 are still fresh, and that horrific event continues to harm the collective memory of all New Yorkers. So, I thank you for organizing this hearing on the health impacts of 9/11 particularly as they relate to the brave men and women who came to our city's aid on that terrible day and who worked for so many months afterwards to help us heal.

I am extremely grateful to the New York delegation for working in bipartisan cooperation to secure Federal funding for monitoring, research and treatment programs that 9/11 responders both need and deserve. Our city and Nation must help those who volunteered so selflessly during and after the attack.

According to an article in last week's Village Voice, statistics indicate that 3.6 percent of the 25,000 Ground Zero workers have reported symptoms of asthma after working at the site. The article also reports that more than 3,000 firefighters have sought medical treatment for respiratory conditions since 9/11, and more than 25 percent of all New York City's firefighters show symptoms of asthma.

We must address these health issues now and continue that commitment well into the future. Since these respiratory ailments and cancers can develop over time and appear years later, it is critical that everyone who worked at Ground Zero be monitored for health conditions and be given access to long-term healthcare programs, if need be.

We all know that mistakes were made. The air was not immediately tested after the disaster. And, residents and responders were told that the air was safe to breathe. Although it may be too late to change that history, it is not too late to address the short and long-term health effects that may have resulted.

As elected officials, our No. 1 priority is ensuring the well-being of our residents. Our call to action should be making sure that New Yorkers who are suffering from complications as a result of the attacks get the healthcare and services they need. Our mandate must be securing Federal funding for research, monitoring and long-term treatment, so that all victims can be treated now and in the future.

Tomorrow, the halls of government will echo with the phrase "Never forget," referring to those we lost. We honor their memory. And, we must also never forget those who, without regard to their own safety, hurried to the site of the tragedy to help a city in need.

Thank you all for refusing to forget.

Mr. TOWNS. Thank you, very much, Deputy Borough President Graham. Thank you for your statement and also, again, thank you for allowing us to come in.

And, to those of you who might not know, she was very, very involved in healthcare herself, before becoming deputy borough president of Brooklyn.

Thank you, so much, for coming.

At this time, we would introduce our witnesses.

We have Cynthia Bascetta, Director of Health Care, U.S. Government Accountability Office. Thank you for coming.

Dr. Lorna Thorpe, deputy commissioner of health, New York City Department of Health and Mental Hygiene, and director of Division of Epidemiology.

Dr. Spencer Eth, senior vice president and medical director, Behavioral Health Services, Saint Vincent's Medical Center of New York. Welcome, and thank you for coming.

And, of course, Dr. James Melius, administrator of New York State Laborers Health and Safety Trust Fund.

And, Thomas McHale, detective with the Port Authority of New York and New Jersey Police.

Thank you all for coming. It is our longstanding policy that we swear in our witnesses. So, if you would stand and raise your right hands?

[Witnesses sworn.]

Mr. TOWNS. Let the record reflect that the witnesses have answered in the affirmative.

We are going to move right down the line, from your right to your left.

We will start with you, Ms. Bascetta. Thank you. If you would, just use like 5 minutes to give us a summary. And, the reason for it is that we want to be able to get into questions. And, of course, I know that these Members have something else that they need to

do. And, of course, I am involved in that, as well. So, while—and we want to be able to cover as much, so we think in the question-and-answer you may be getting into all the other things that you might not be able to say in your statement. OK? Thank you so much.

And we will go right down the line.

STATEMENTS OF CYNTHIA A. BASCETTA, DIRECTOR, HEALTH CARE, U.S. GOVERNMENT ACCOUNTABILITY OFFICE; LORNA THORPE, DEPUTY COMMISSIONER, DIVISION OF EPIDEMIOLOGY, NEW YORK CITY DEPARTMENT OF HEALTH AND MENTAL HYGIENE; DR. SPENCER ETH, VICE PRESIDENT, DEPARTMENT OF PSYCHIATRY, MEDICAL DIRECTOR, BEHAVIORAL HEALTH SERVICES, SAINT VINCENT'S CATHOLIC MEDICAL CENTERS; DR. JAMES MELIUS, ADMINISTRATOR, NEW YORK STATE LABORERS' HEALTH AND SAFETY TRUST FUND; AND THOMAS MCHALE, DETECTIVE, PORT AUTHORITY POLICE DEPARTMENT, PORT AUTHORITY POLICE DETECTIVES ENDOWMENT ASSOCIATION, NATIONAL ASSOCIATION OF POLICE ORGANIZATIONS

STATEMENT OF CYNTHIA BASCETTA

Ms. BASCETTA. Mr. Chairman and members of the subcommittee, thank you for inviting me to discuss the implementation of federally funded health programs for responders who served in the aftermath of the World Trade Center disaster.

As you know, these responders were exposed to numerous physical hazards, environmental toxins and psychological trauma, which has continued to exact a toll for many of them, even 6 years after the attack.

My testimony today is based on our body of work, including four testimonies from our July 2007 report. In this work, we found that HHS-funded programs as separate efforts serving different categories of responders; for example, firefighters, police, other workers and volunteers and the Federal responders. We also highlighted that the Federal responder screening program had accomplished little, in light of the kind of programs for other responders.

My remarks today focus on the status of NIOSH's awards for treatment to World Trade Center health program grantees, the services provided to Federal responders and efforts by NIOSH to provide services for non-Federal responders residing outside the New York City metro area.

To do our work, we reviewed numerous documents and interviewed officials of the Federal Government and private-sector organizations.

Last fall, NIOSH awarded and set aside funds totaling $51 million from its $75 million appropriation to pay for treatment programs, notably the first time that Federal funds were awarded for this purpose. And about $44 million was for outpatient treatment, and about $7 million was set aside for inpatient hospital care. The bulk of the funding went to the fire department and the New York/New Jersey Consortium. In addition to outpatient care, Federal funds paid for 34 hospitalizations of responders so far. NIOSH is now planning how to use the $50 million emergency supplemental

appropriation made in May 2007, to continue support for treatment into the year 2008.

We reported this July that HHS has had continuing difficulties ensuring the uninterrupted availability of services for Federal responders who had been eligible only for a one-time screening examination. First, the provision of these screening examinations has been intermittent. HHS suspended them from March 2004 to December 2005, resumed them for about a year, then placed the program on hold and suspended scheduling exams from January to May 2007. The interruptions occurred because interagency agreements were not put in place in time to keep the program fully operational.

Second, the provision of specialty diagnostic services associated with screening has also been intermittent, Responders often need further diagnostic tests from ear, nose and throat physicians, cardiologists and pulmonologists, and the program had referred responders and paid for these diagnostic services. However, because the contract with a new provider network did not cover these services, they were unavailable from April 2006 until the contract was modified in March 2007.

NIOSH was considering expanding the services for Federal responders to include monitoring examinations, the same followup physical and health examinations provided to other responders. Without followup, their health conditions may not be diagnosed and treated, and knowledge of the health effects caused by the disaster may be incomplete.

We also found that NIOSH has not ensured the availability of screening and monitoring services for non-Federal responders outside of the New York City area, although it recently took steps to expand their availability. Similar to the intermittent service pattern for Federal responders, NIOSH's formation of a network of occupational health clinics to provide services nationwide were on-again/off-again. NIOSH renewed its efforts to expand the provider network, however; and in May 2007, had completed about 20 exams.

Mr. Chairman, despite HHS's recent consideration of ways to add monitoring for Federal responders and to improve the availability of screening and monitoring services for Federal and non-Federal responders nationwide, these efforts remain incomplete. Moreover, the start-and-stop history of the Department's efforts to serve these groups does not provide assurance that the latest efforts to extend screening and monitoring services to these responders will be successful and will be sustained over time.

As a result, we recommended in our July 2007, report that the Secretary take expeditious action to ensure the availability of health screening and monitoring services for all people who responded to the attack on the World Trade Center, regardless of their employer or their residence. To date, HHS has not responded to our recommendation.

That concludes my remarks, and I would be happy to answer any questions.

[The prepared statement of Ms. Bascetta follows:]

United States Government Accountability Office

GAO

Testimony

Before the Subcommittee on Government Management, Organization, and Procurement, Committee on Oversight and Government Reform, House of Representatives

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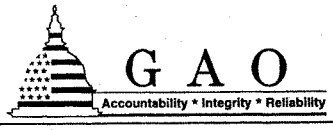
SEPTEMBER 11

Improvements Needed in Availability of Health Screening and Monitoring Services for Responders

Statement of Cynthia A. Bascetta
Director, Health Care



GAO-07-1229T

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Highlights

Highlights of GAO-07-1229T, a testimony before the Subcommittee on Government Management, Organization, and Procurement, Committee on Oversight and Government Reform, House of Representatives

Why GAO Did This Study

Six years after the attack on the World Trade Center (WTC), concerns persist about health effects experienced by WTC responders and the availability of health care services for those affected. Several federally funded programs provide screening, monitoring, or treatment services to responders. GAO has previously reported on the progress made and implementation problems faced by these WTC health programs.

This testimony is based on and updates GAO's report, *September 11: HHS Needs to Ensure the Availability of Health Screening and Monitoring for All Responders* (GAO-07-892, July 23, 2007). In this testimony, GAO discusses the status of (1) services provided by the Department of Health and Human Services' (HHS) WTC Federal Responder Screening Program, (2) efforts by the Centers for Disease Control and Prevention's National Institute for Occupational Safety and Health (NIOSH) to provide services for nonfederal responders residing outside the New York City (NYC) area, and (3) NIOSH's awards to WTC health program grantees for treatment services.

For the July 2007 report, GAO reviewed program documents and interviewed HHS officials, grantees, and others. In August and September 2007, GAO updated selected information in preparing this testimony.

www.gao.gov/cgi-bin/getrpt?GAO-07-1229T.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Cynthia A. Bascetta at (202) 512-7114 or bascettac@gao.gov.

September 10, 2007

SEPTEMBER 11

Improvements Needed in Availability of Health Screening and Monitoring Services for Responders

What GAO Found

In July 2007, following a re-examination of the status of the WTC health programs, GAO recommended that the Secretary of HHS take expeditious action to ensure that health screening and monitoring services are available to all people who responded to the WTC attack, regardless of who their employer was or where they reside. As of early September 2007 the department has not responded to this recommendation.

As GAO reported in July 2007, HHS's WTC Federal Responder Screening Program has had difficulties ensuring the uninterrupted availability of screening services for federal responders. From January 2007 to May 2007, the program stopped scheduling screening examinations because there was a change in the program's administration and certain interagency agreements were not established in time to keep the program fully operational. From April 2006 to March 2007, the program stopped scheduling and paying for specialty diagnostic services associated with screening. NIOSH, the administrator of the program, has been considering expanding the program to include monitoring, that is, follow-up physical and mental health examinations, but has not done so. If federal responders do not receive monitoring, health conditions that arise later may not be diagnosed and treated, and knowledge of the health effects of the WTC disaster may be incomplete.

NIOSH has not ensured the availability of screening and monitoring services for nonfederal responders residing outside the NYC area, although it recently took steps toward expanding the availability of these services. In late 2002, NIOSH arranged for a network of occupational health clinics to provide screening services. This effort ended in July 2004, and until June 2005 NIOSH did not fund screening or monitoring services for nonfederal responders outside the NYC area. In June 2005, NIOSH funded the Mount Sinai School of Medicine Data and Coordination Center (DCC) to provide screening and monitoring services; however, DCC had difficulty establishing a nationwide network of providers and contracted with only 10 clinics in seven states. In 2006, NIOSH began to explore other options for providing these services, and in May 2007 it took steps toward expanding the provider network.

NIOSH has awarded treatment funds to four WTC health programs in the NYC area. In fall 2006, NIOSH awarded $44 million for outpatient treatment and set aside $7 million for hospital care. The New York/New Jersey WTC Consortium and the New York City Fire Department WTC program, which received the largest awards, used NIOSH's funding to continue outpatient services, offer full coverage for prescriptions, and cover hospital care.

Mr. Chairman and Members of the Subcommittee:

I am pleased to be here today to discuss our work on the implementation of federally funded health programs for individuals affected by the September 11, 2001, attack on the World Trade Center (WTC).[1] Tens of thousands of people served as responders in the aftermath of the WTC disaster, including New York City Fire Department (FDNY) personnel, federal government personnel, and other government and private-sector workers and volunteers from New York and elsewhere. By responders we are referring to anyone involved in rescue, recovery, or cleanup activities at or near the vicinity of the WTC or the Staten Island site.[2] These responders were exposed to numerous physical hazards, environmental toxins, and psychological trauma. Six years after the destruction of the WTC buildings, concerns remain about the physical and mental health effects of the disaster, the long-term nature of some of these health effects, and the availability of health care services for those affected.

Following the WTC attack, federal funding was provided to government agencies and private organizations to establish programs for screening, monitoring, or treating responders for illnesses and conditions related to the WTC disaster; these programs are referred to in this testimony as the WTC health programs.[3,4] The Department of Health and Human Services (HHS) funded the programs as separate efforts serving different categories of responders—for example, firefighters, other workers and volunteers, or federal responders—and has responsibility for coordinating program efforts.

[1]A list of abbreviations used in this testimony is in app. I.

[2]The Staten Island site is the landfill that is the off-site location of the WTC recovery operation.

[3]In this testimony, "screening" refers to initial physical and mental health examinations of affected individuals. "Monitoring" refers to tracking the health of individuals over time, either through periodic surveys or through follow-up physical and mental health examinations.

[4]One of the WTC health programs, the WTC Health Registry, also includes people living or attending school in the area of the WTC or working or present in the vicinity on September 11, 2001.

We have previously reported on the implementation of these programs and their progress in providing services to responders,[6] who reside in all 50 states and the District of Columbia. In 2005 and 2006, we reported that one of the WTC health programs, HHS's WTC Federal Responder Screening Program, which was established to provide onetime screening examinations for responders who were federal employees when they responded to the WTC attack, had accomplished little.[6] HHS established the program in June 2003, suspended it in March 2004, and resumed it in December 2005. In September 2006, we reported that the program was registering and screening federal responders and that a total of 997 federal workers had received screening examinations.[7] We also reported that the National Institute for Occupational Safety and Health (NIOSH), the component of HHS's Centers for Disease Control and Prevention (CDC) responsible for administering most of the WTC health programs, had begun to take steps to provide access to screening, monitoring, and treatment services for nonfederal responders who resided outside the New York City (NYC) metropolitan area.[8]

In September 2006 we also testified that CDC had begun, but not completed, the process of allocating funding from a $75 million appropriation made in fiscal year 2006 for WTC health programs for responders.[9,10] This was the first appropriation specifically available for treatment for responders. We reported that in August 2006 CDC had awarded $1.5 million from this appropriation to the FDNY WTC Medical Monitoring and Treatment Program and almost $1.1 million to the New York/New Jersey (NY/NJ) WTC Consortium for treatment-related

[6]See, for example, GAO, *September 11: HHS Has Screened Additional Federal Responders for World Trade Center Health Effects, but Plans for Awarding Funds for Treatment Are Incomplete*, GAO-06-1092T (Washington, D.C.: Sept. 8, 2006). A list of related GAO products is included at the end of this testimony.

[6]See GAO, *September 11: Monitoring of World Trade Center Health Effects Has Progressed, but Not for Federal Responders*, GAO-05-1020T (Washington, D.C.: Sept. 10, 2005), and *September 11: Monitoring of World Trade Center Health Effects Has Progressed, but Program for Federal Responders Lags Behind*, GAO-06-481T (Washington, D.C.: Feb. 28, 2006).

[7]See GAO-06-1092T.

[8]In general, the WTC health programs provide services in the NYC metropolitan area.

[9]Department of Defense Appropriations Act, 2006, Pub. L. No. 109-148, § 5011(b), 119 Stat. 2680, 2814 (2005).

[10]See GAO-06-1092T.

activities. We also reported that CDC officials told us they could not predict how long the funding from the appropriation would support four WTC health programs that provide treatment services.

My testimony today is primarily based on our report issued in July 2007.[11] As you requested, I will discuss the status of (1) services provided by the WTC Federal Responder Screening Program, (2) NIOSH's efforts to provide services for nonfederal responders residing outside the NYC metropolitan area, and (3) NIOSH's awards to grantees for treatment services.

To assess the status of services provided by the WTC Federal Responder Screening Program, we obtained and reviewed program data and documents from HHS, including applicable interagency agreements. We interviewed officials from the HHS entities involved in administering and implementing the program: NIOSH and two HHS offices, the Federal Occupational Health Services (FOH)[12] and the Office of the Assistant Secretary for Preparedness and Response (ASPR).[13] To assess the status of NIOSH's efforts to provide services for nonfederal responders residing outside the NYC metropolitan area, we obtained documents and interviewed officials from NIOSH. We also interviewed officials of organizations that worked with NIOSH to provide or facilitate services for nonfederal responders residing outside the NYC metropolitan area, including the Mount Sinai School of Medicine in NYC and the Association of Occupational and Environmental Clinics (AOEC)—a network of university-affiliated and other private occupational health clinics across the United States and in Canada. To assess the status of NIOSH's awards to grantees for treatment services, we obtained documents and interviewed officials from NIOSH. We also interviewed officials from two

[11]See GAO, *September 11: HHS Needs to Ensure the Availability of Health Screening and Monitoring for All Responders*, GAO-07-892 (Washington, D.C.: July 23, 2007).

[12]FOH is a service unit within HHS's Program Support Center that provides occupational health services to federal government departments and agencies located throughout the United States.

[13]ASPR coordinates and directs HHS's emergency preparedness and response program. In December 2006 the Office of Public Health and Emergency Preparedness became ASPR. We refer to that office as ASPR throughout this testimony, regardless of the time period discussed.

WTC health program grantees[14] from which the majority of responders receive medical services: the NY/NJ WTC Consortium[15] and the FDNY WTC program. In addition, we interviewed officials from the American Red Cross, which has funded treatment services for responders. In our review of the WTC health programs, we relied primarily on information provided by agency officials and contained in government publications. We compared the information with information in other supporting documents, when available, to determine its consistency and reasonableness. We determined that the information we obtained was sufficiently reliable for our purposes. We conducted our work from November 2006 through July 2007—and updated selected information in August and September 2007—in accordance with generally accepted government auditing standards.

In brief, we reported in July 2007 that HHS's WTC Federal Responder Screening Program had had difficulties ensuring the uninterrupted availability of screening services for federal responders and that NIOSH, the administrator of the program, was considering expanding the program to include monitoring but had not done so. We also reported that NIOSH had not ensured the availability of screening and monitoring services for nonfederal responders residing outside the NYC metropolitan area, although it had recently taken steps toward expanding the availability of these services. As a result of our assessment of these programs, we recommended that the Secretary of HHS expeditiously take action to ensure that screening and monitoring services are available for all responders, including federal responders and nonfederal responders residing outside of the NYC metropolitan area. As of early September 2007 the department has not responded to this recommendation. Finally, we also reported that NIOSH had awarded and set aside treatment funds totaling $51 million from its $75 million appropriation for four NYC-area programs.

[14]NIOSH provides funds to the programs through cooperative agreements, but refers to award recipients as grantees. Therefore, in this testimony we use the term grantee when referring to NIOSH's award recipients.

[15]In previous reports we have also referred to this program as the worker and volunteer WTC program.

Background

The tens of thousands of individuals[16] who responded to the September 11, 2001, attack on the WTC experienced the emotional trauma of the disaster and were exposed to a noxious mixture of dust, debris, smoke, and potentially toxic contaminants, such as pulverized concrete, fibrous glass, particulate matter, and asbestos. A wide variety of health effects have been experienced by responders to the WTC attack, and several federally funded programs have been created to address the health needs of these individuals.

Health Effects

Numerous studies have documented the physical and mental health effects of the WTC attacks.[17] Physical health effects included injuries and respiratory conditions, such as sinusitis, asthma, and a new syndrome called WTC cough, which consists of persistent coughing accompanied by severe respiratory symptoms. Almost all firefighters who responded to the attack experienced respiratory effects, including WTC cough. One study suggested that exposed firefighters on average experienced a decline in lung function equivalent to that which would be produced by 12 years of aging.[18] A recently published study found a significantly higher risk of newly diagnosed asthma among responders that was associated with increased exposure to the WTC disaster site.[19] Commonly reported mental health effects among responders and other affected individuals included symptoms associated with post-traumatic stress disorder (PTSD),

[16]There is not a definitive count of the number of people who served as responders. Estimates have ranged from about 40,000 to about 91,000.

[17]See, for example, Centers for Disease Control and Prevention, "Mental Health Status of World Trade Center Rescue and Recovery Workers and Volunteers—New York City, July 2002-August 2004," *Morbidity and Mortality Weekly Report*, vol. 53 (2004); "Physical Health Status of World Trade Center Rescue and Recovery Workers and Volunteers—New York City, July 2002-August 2004," *Morbidity and Mortality Weekly Report*, vol. 53 (2004); and "Surveillance for World Trade Center Disaster Health Effects among Survivors of Collapsed and Damaged Buildings," *Morbidity and Mortality Weekly Report*, vol. 55 (2006). See also G. I. Banauch et al., "Pulmonary Function after Exposure to the World Trade Center in the New York City Fire Department," *American Journal of Respiratory and Critical Care Medicine*, vol. 174, no. 3 (2006); G. Izbicki et al., "World Trade Center 'Sarcoid Like' Granulomatous Pulmonary Disease in New York City Fire Department Rescue Workers," *Chest*, vol. 131 (2007); and K. Wheeler et al., "Asthma Diagnosed after September 11, 2001 among Rescue and Recovery Workers. Findings from the World Trade Center Health Registry," *Environmental Health Perspectives*, http://dx.doi.org/10.1289/ehp.10248 (downloaded Aug. 27, 2007).

[18]Banauch et al., "Pulmonary Function."

[19]Wheeler et al., "Asthma Diagnosed."

depression, and anxiety. Behavioral health effects such as alcohol and tobacco use have also been reported.

Some health effects experienced by responders have persisted or worsened over time, leading many responders to begin seeking treatment years after September 11, 2001. Clinicians involved in screening, monitoring, and treating responders have found that many responders' conditions—both physical and psychological—have not resolved and have developed into chronic disorders that require long-term monitoring. For example, findings from a study conducted by clinicians at the NY/NJ WTC Consortium show that at the time of examination, up to 2.5 years after the start of the rescue and recovery effort, 59 percent of responders enrolled in the program were still experiencing new or worsened respiratory symptoms.[20] Experts studying the mental health of responders found that about 2 years after the WTC attack, responders had higher rates of PTSD and other psychological conditions compared to others in similar jobs who were not WTC responders and others in the general population.[21] Clinicians also anticipate that other health effects, such as immunological disorders and cancers, may emerge over time.

Overview of WTC Health Programs

There are six key programs that currently receive federal funding to provide voluntary health screening, monitoring, or treatment at no cost to responders.[22] The six WTC health programs, shown in table 1, are (1) the FDNY WTC Medical Monitoring and Treatment Program; (2) the NY/NJ WTC Consortium, which comprises five clinical centers in the NY/NJ

[20]R. Herbert et al., "The World Trade Center Disaster and the Health of Workers: Five-Year Assessment of a Unique Medical Screening Program," *Environmental Health Perspectives*, vol. 114, no. 12 (2006).

[21]For example, see R. Gross et al., "Posttraumatic Stress Disorder and Other Psychological Sequelae among World Trade Center Clean Up and Recovery Workers," *Annals of the New York Academy of Sciences*, vol. 1071 (2006). M. Perrin et al., "Differences in PTSD Prevalence and Associated Risk Factors among World Trade Center Disaster Rescue and Recovery Workers," *American Journal of Psychiatry*, vol. 64 (2007).

[22]In addition to these programs, a New York State responder screening program received federal funding for screening New York State employees and National Guard personnel who responded to the WTC attack in an official capacity. This program ended its screening examinations in November 2003.

area;[23] (3) the WTC Federal Responder Screening Program; (4) the WTC Health Registry; (5) Project COPE; and (6) the Police Organization Providing Peer Assistance (POPPA) program.[24] The programs vary in aspects such as the HHS administering agency or component responsible for administering the funding; the implementing agency, component, or organization responsible for providing program services; eligibility requirements; and services.

[23]The NY/NJ WTC Consortium consists of five clinical centers operated by (1) Mount Sinai-Irving J. Selikoff Center for Occupational and Environmental Medicine; (2) Long Island Occupational and Environmental Health Center at SUNY, Stony Brook; (3) New York University School of Medicine/Bellevue Hospital Center; (4) Center for the Biology of Natural Systems, at CUNY, Queens College; and (5) University of Medicine and Dentistry of New Jersey Robert Wood Johnson Medical School, Environmental and Occupational Health Sciences Institute. Mount Sinai's clinical center, which is the largest of the five centers, also receives federal funding to operate a data and coordination center to coordinate the work of the five clinical centers and conduct outreach and education, quality assurance, and data management for the NY/NJ WTC Consortium.

[24]Project COPE and the POPPA program provide mental health services to members of the New York City Police Department (NYPD) and operate independently of the NYPD.

Table 1: Key Federally Funded WTC Health Programs, June 2007

Program	HHS administering agency or component	Implementing agency, component, or organization	Eligible population	Services provided
FDNY WTC Medical Monitoring and Treatment Program	NIOSH	FDNY Bureau of Health Services	Firefighters and emergency medical service technicians	• Initial screening • Follow-up medical monitoring • Treatment of WTC-related physical and mental health conditions
NY/NJ WTC Consortium	NIOSH	Five clinical centers, one of which, the Mount Sinai-Irving J. Selikoff Center for Occupational and Environmental Medicine, also serves as the consortium's Data and Coordination Center (DCC)	All responders, excluding FDNY firefighters and emergency medical service technicians and current federal employees[a]	• Initial screening • Follow-up medical monitoring • Treatment of WTC-related physical and mental health conditions
WTC Federal Responder Screening Program	NIOSH[b]	FOH	Current federal employees who responded to the WTC attack in an official capacity	• Onetime screening • Referrals to employee assistance programs and specialty diagnostic services[c]
WTC Health Registry	Agency for Toxic Substances and Disease Registry (ATSDR)	NYC Department of Health and Mental Hygiene	Responders and people living or attending school in the area of the WTC or working or present in the vicinity on September 11, 2001	• Long-term monitoring through periodic surveys
Project COPE	NIOSH	Collaboration between the NYC Police Foundation and Columbia University Medical Center	New York City Police Department (NYPD) uniformed and civilian employees and their family members	• Hotline, mental health counseling, and referral services; some services provided by Columbia University clinical staff and some by other clinicians
POPPA program	NIOSH	POPPA program	NYPD uniformed employees	• Hotline, mental health counseling, and referral services; some services provided by trained NYPD officers and some by mental health professionals

Source: GAO analysis of information from NIOSH, ATSDR, FOH, FDNY, the NY/NJ WTC Consortium, the NYC Department of Health and Mental Hygiene, the POPPA program, and Project COPE.

Note: Some of these federally funded programs have also received funds from the American Red Cross and other private organizations.

[a]In February 2006, ASPR and NIOSH reached an agreement to have former federal employees screened by the NY/NJ WTC Consortium.

[b]Until December 26, 2006, ASPR was the administrator.

[24]FOH can refer an individual with mental health symptoms to an employee assistance program for a telephone assessment. If appropriate, the individual can then be referred to a program counselor for up to six in-person sessions. The specialty diagnostic services are provided by ear, nose, and throat doctors; pulmonologists; and cardiologists.

The WTC health programs that are providing screening and monitoring are tracking thousands of individuals who were affected by the WTC disaster. As of June 2007, the FDNY WTC program had screened about 14,500 responders and had conducted follow-up examinations for about 13,500 of these responders, while the NY/NJ WTC Consortium had screened about 20,000 responders and had conducted follow-up examinations for about 8,000 of these responders. Some of the responders include nonfederal responders residing outside the NYC metropolitan area. As of June 2007, the WTC Federal Responder Screening Program had screened 1,305 federal responders and referred 281 responders for employee assistance program services or specialty diagnostic services. In addition, the WTC Health Registry, a monitoring program that consists of periodic surveys of self-reported health status and related studies but does not provide in-person screening or monitoring, collected baseline health data from over 71,000 people who enrolled in the Registry.[25] In the winter of 2006, the Registry began its first adult follow-up survey, and as of June 2007 over 36,000 individuals had completed the follow-up survey.

In addition to providing medical examinations, FDNY's WTC program and the NY/NJ WTC Consortium have collected information for use in scientific research to better understand the health effects of the WTC attack and other disasters. The WTC Health Registry is also collecting information to assess the long-term public health consequences of the disaster.

Federal Funding and Coordination of WTC Health Programs

Beginning in October 2001 and continuing through 2003, FDNY's WTC program, the NY/NJ WTC Consortium, the WTC Federal Responder Screening Program, and the WTC Health Registry received federal funding to provide services to responders. This funding primarily came from appropriations to the Department of Homeland Security's Federal Emergency Management Agency (FEMA),[26] as part of the approximately

[25]The WTC Health Registry also provides information on where participants can seek health care.

[26]FEMA is the agency responsible for coordinating federal disaster response efforts under the National Response Plan.

$8.8 billion that the Congress appropriated to FEMA for response and recovery activities after the WTC disaster.[27] FEMA entered into interagency agreements with HHS agencies to distribute the funding to the programs. For example, FEMA entered into an agreement with NIOSH to distribute $90 million appropriated in 2003 that was available for monitoring.[28] FEMA also entered into an agreement with ASPR for ASPR to administer the WTC Federal Responder Screening Program. A $75 million appropriation to CDC in fiscal year 2006 for purposes related to the WTC attack resulted in additional funding for the monitoring activities of the FDNY WTC program, NY/NJ WTC Consortium, and the Registry.[29] The $75 million appropriation to CDC in fiscal year 2006 also provided funds that were awarded to the FDNY WTC program, the NY/NJ WTC Consortium, Project COPE, and the POPPA program for treatment services for responders. An emergency supplemental appropriation to CDC in May 2007 included an additional $50 million to carry out the same activities provided for in the $75 million appropriation made in fiscal year 2006.[30] The President's proposed fiscal year 2008 budget for HHS includes $25 million for treatment of WTC-related illnesses for responders.

In February 2006, the Secretary of HHS designated the Director of NIOSH to take the lead in ensuring that the WTC health programs are well coordinated, and in September 2006 the Secretary established a WTC Task Force to advise him on federal policies and funding issues related to responders' health conditions. The chair of the task force is HHS's Assistant Secretary for Health, and the vice chair is the Director of NIOSH. The task force reported to the Secretary of HHS in early April 2007.

[27]See Consolidated Appropriations Resolution, 2003, Pub. L. No. 108-7, 117 Stat. 11, 517; 2002 Supplemental Appropriations Act for Further Recovery from and Response to Terrorist Attacks on the United States, Pub. L. No. 107-206, 116 Stat. 820, 894; Department of Defense and Emergency Supplemental Appropriations for Recovery from and Response to Terrorist Attacks on the United States Act, 2002, Pub. L. No. 107-117, 115 Stat. 2230, 2338; and 2001 Emergency Supplemental Appropriations Act for Recovery from and Response to Terrorist Attacks on the United States, Pub. L. No. 107-38, 115 Stat. 220-221.

[28]Pub. L. No. 108-7, 117 Stat. 517.

[29]The statute required CDC, in expending such funds, to give first priority to specified existing programs that administer baseline and follow-up screening; clinical examinations; or long-term medical health monitoring, analysis, or treatment for emergency services personnel or rescue and recovery personnel. It required CDC to give secondary priority to similar programs coordinated by other entities working with the State of New York and NYC. Pub. L. No. 109-148, § 5011(b), 119 Stat. 2814.

[30]U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007, Pub. L. No. 110-28, ch. 5, 121 Stat. 112, 166 (2007).

WTC Federal Responder Screening Program Has Had Difficulties Ensuring the Availability of Screening Services, and NIOSH Was Considering Expanding the Program to Include Monitoring

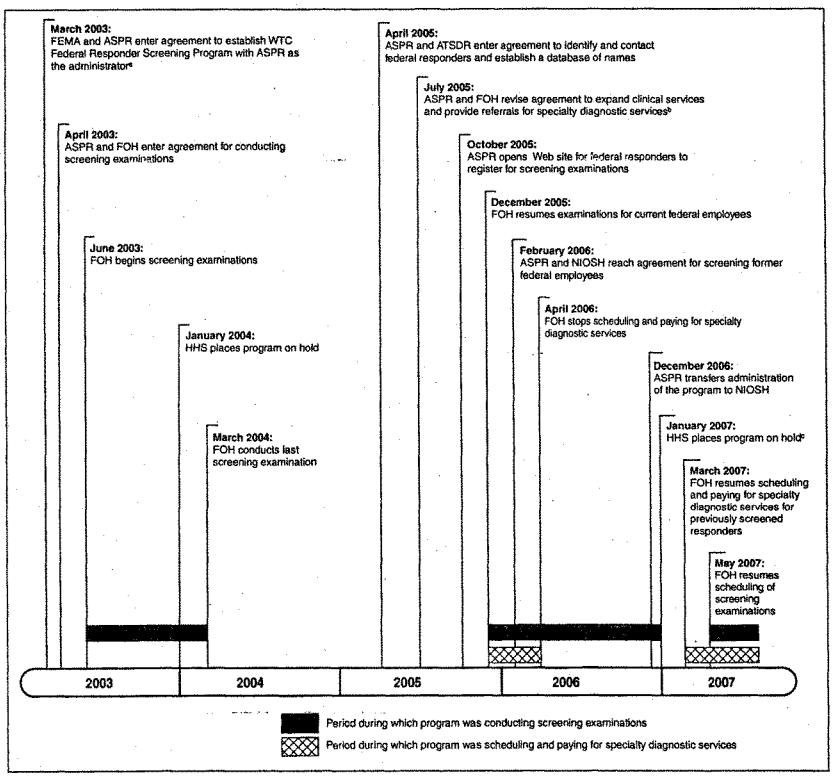
HHS's WTC Federal Responder Screening Program has had difficulties ensuring the uninterrupted availability of services for federal responders. First, the provision of screening examinations has been intermittent. (See fig. 1.) After resuming screening examinations in December 2005[31] and conducting them for about a year, HHS again placed the program on hold and suspended scheduling of screening examinations for responders from January 2007 to May 2007. This interruption in service occurred because there was a change in the administration of the WTC Federal Responder Screening Program, and certain interagency agreements were not established in time to keep the program fully operational. In late December 2006, ASPR and NIOSH signed an interagency agreement giving NIOSH $2.1 million to administer the WTC Federal Responder Screening Program.[32] Subsequently, NIOSH and FOH needed to sign a new interagency agreement to allow FOH to continue to be reimbursed for providing screening examinations. It took several months for the agreement between NIOSH and FOH to be negotiated and approved, and scheduling of screening examinations did not resume until May 2007.[33]

[31]The program previously suspended examinations from March 2004 to December 2005. See GAO-06-481T.

[32]The agreement was a modification of ASPR's February 2006 interagency agreement with NIOSH that covers screenings for former federal employees.

[33]Before an agreement between NIOSH and FOH could be signed, the agreement between ASPR and NIOSH required several technical corrections. The revised ASPR-NIOSH agreement extended the availability of funding for the WTC Federal Responder Screening Program to April 30, 2008.

Figure 1: Timeline of Key Actions Related to the WTC Federal Responder Screening Program



Source: GAO analysis of information from ASPR, FOH, NIOSH, and FEMA.

Note: The WTC Federal Responder Screening Program serves current federal employees who responded to the WTC attack in an official capacity. In February 2006, ASPR and NIOSH reached an agreement to have former federal employees screened by the NY/NJ WTC Consortium.

[a]In December 2006 the Office of Public Health and Emergency Preparedness became ASPR. We refer to that office as ASPR throughout this figure, regardless of the time period being discussed.

[b]In providing referrals for specialty diagnostic services, FOH schedules and pays for the diagnostic services.

[c]After HHS placed the program on hold, FOH completed examinations that had already been scheduled.

Second, the program's provision of specialty diagnostic services has also been intermittent. After initial screening examinations, responders often need further diagnostic services by ear, nose, and throat doctors; cardiologists; and pulmonologists; and FOH had been referring responders to these specialists and paying for the services. However, the program stopped scheduling and paying for these specialty diagnostic services in April 2006 because the program's contract with a new provider network did not cover these services.[34] In March 2007, FOH modified its contract with the provider network and resumed scheduling and paying for specialty diagnostic services for federal responders.

In July 2007 we reported that NIOSH was considering expanding the WTC Federal Responder Screening Program to include monitoring examinations—follow-up physical and mental health examinations—and was assessing options for funding and delivering these services. If federal responders do not receive this type of monitoring, health conditions that arise later may not be diagnosed and treated, and knowledge of the health effects of the WTC disaster may be incomplete. In February 2007, NIOSH sent a letter to FEMA, which provides the funding for the program, asking whether the funding could be used to support monitoring in addition to the onetime screening currently offered. A NIOSH official told us that as of August 2007 the agency had not received a response from FEMA. NIOSH officials told us that if FEMA did not agree to pay for monitoring of federal responders, NIOSH would consider using other funding. According to a NIOSH official, if FEMA or NIOSH agrees to pay for monitoring of federal

[34]In April 2006, FOH contracted with a new provider network to provide various services for all federal employees, such as immunizations and vision tests. The contract with the new provider network did not cover specialty diagnostic services by ear, nose, and throat doctors; cardiologists; and pulmonologists. Although the previous provider network had provided these services, the new provider network and the HHS contract officer interpreted the statement of work in the new contract as not including these specialty diagnostic services.

responders, this service would be provided by FOH or one of the other WTC health programs.

NIOSH Has Not Ensured the Availability of Services for Nonfederal Responders Residing outside the NYC Metropolitan Area

NIOSH has not ensured the availability of screening and monitoring services for nonfederal responders residing outside the NYC metropolitan area, although it recently took steps toward expanding the availability of these services. Initially, NIOSH made two efforts to provide screening and monitoring services for these responders, the exact number of which is unknown.[35] The first effort began in late 2002 when NIOSH awarded a contract for about $306,000 to the Mount Sinai School of Medicine to provide screening services for nonfederal responders residing outside the NYC metropolitan area and directed it to establish a subcontract with AOEC.[36] AOEC then subcontracted with 32 of its member clinics across the country to provide screening services. From February 2003 to July 2004, the 32 AOEC member clinics screened 588 nonfederal responders nationwide. AOEC experienced challenges in providing these screening services. For example, many nonfederal responders did not enroll in the program because they did not live near an AOEC clinic, and the administration of the program required substantial coordination among AOEC, AOEC member clinics, and Mount Sinai.

Mount Sinai's subcontract with AOEC ended in July 2004, and from August 2004 until June 2005 NIOSH did not fund any organization to provide services to nonfederal responders outside the NYC metropolitan area.[37] During this period, NIOSH focused on providing screening and monitoring services for nonfederal responders in the NYC metropolitan area. In June 2005, NIOSH began its second effort by awarding $776,000 to the Mount

[35]According to the NYC Department of Health and Mental Hygiene, about 7,000 nonfederal and federal responders residing outside the NYC metropolitan area have enrolled in the WTC Health Registry.

[36]Around that time, NIOSH was providing screening services for nonfederal responders in the NYC metropolitan area through the NY/NJ WTC Consortium and the FDNY WTC program. Nonfederal responders residing outside the NYC metropolitan area were able to travel at their own expense to the NYC metropolitan area to obtain screening services through the NY/NJ WTC Consortium.

[37]In early 2004, AOEC applied to NIOSH to use its national network of member clinics to provide screening and monitoring for nonfederal responders residing outside the NYC metropolitan area, but NIOSH rejected AOEC's application for several reasons, including that the application did not adequately address how to coordinate and implement a monitoring program with complex data collection and reporting requirements.

Sinai School of Medicine Data and Coordination Center (DCC) to provide both screening and monitoring services for nonfederal responders residing outside the NYC metropolitan area. In June 2006, NIOSH awarded an additional $788,000 to DCC to provide screening and monitoring services for these responders. NIOSH officials told us that they assigned DCC the task of providing screening and monitoring services to nonfederal responders outside the NYC metropolitan area because the task was consistent with DCC's responsibilities for the NY/NJ WTC Consortium, which include data monitoring and coordination. DCC, however, had difficulty establishing a network of providers that could serve nonfederal responders residing throughout the country—ultimately contracting with only 10 clinics in seven states to provide screening and monitoring services.[38] DCC officials said that as of June 2007 the 10 clinics were monitoring 180 responders.

In early 2006, NIOSH began exploring how to establish a national program that would expand the network of providers to provide screening and monitoring services, as well as treatment services, for nonfederal responders residing outside the NYC metropolitan area.[39] According to NIOSH, there have been several challenges involved in expanding a network of providers to screen and monitor nonfederal responders nationwide. These include establishing contracts with clinics that have the occupational health expertise to provide services nationwide, establishing patient data transfer systems that comply with applicable privacy laws, navigating the institutional review board[40] process for a large provider network, and establishing payment systems with clinics participating in a national network of providers. On March 15, 2007, NIOSH issued a formal request for information from organizations that have an interest in and the capability of developing a national program for responders residing

[38]Contracts were originally established with 11 clinics in eight states, but 1 clinic discontinued its participation in the program after conducting one examination. The 10 active clinics are located in seven states: Arkansas, California, Illinois, Maryland, Massachusetts, New York, and Ohio. Of the 10 active clinics, 7 are AOEC member clinics.

[39]According to NIOSH and DCC officials, efforts to provide monitoring services to federal responders residing outside the NYC metropolitan area may be included in the national program.

[40]Institutional review boards are groups that have been formally designated to review and monitor biomedical research involving human subjects, such as research based on data collected from screening and monitoring examinations.

outside the NYC metropolitan area.[41] In this request, NIOSH described the scope of a national program as offering screening, monitoring, and treatment services to about 3,000 nonfederal responders through a national network of occupational health facilities. NIOSH also specified that the program's facilities should be located within reasonable driving distance to responders and that participating facilities must provide copies of examination records to DCC. In May 2007, NIOSH approved a request from DCC to redirect about $125,000 from the June 2006 award to establish a contract with a company to provide screening and monitoring services for nonfederal responders residing outside the NYC metropolitan area. Subsequently, DCC contracted with QTC Management, Inc.,[42] one of the four organizations that had responded to NIOSH's request for information. DCC's contract with QTC does not include treatment services, and NIOSH officials are still exploring how to provide and pay for treatment services for nonfederal responders residing outside the NYC metropolitan area.[43] QTC has a network of providers in all 50 states and the District of Columbia and can use internal medicine and occupational medicine doctors in its network to provide these services. In addition, DCC and QTC have agreed that QTC will identify and subcontract with providers outside of its network to screen and monitor nonfederal responders who do not reside within 25 miles of a QTC provider.[44] In June 2007, NIOSH awarded $800,600 to DCC for coordinating the provision of screening and monitoring examinations, and QTC will receive a portion of this award from DCC to provide about 1,000 screening and monitoring examinations through May 2008. According to a NIOSH official, QTC's providers have begun conducting screening examinations, and by the end

[41]Department of Health and Human Services, *Sources Sought Notice: National Medical Monitoring and Treatment Program for World Trade Center (WTC) Rescue, Recovery, and Restoration Responders and Volunteers*, SSA-WTC-001 (Mar. 15, 2007).

[42]QTC is a private provider of government-outsourced occupational health and disability examination services.

[43]Some nonfederal responders residing outside the NYC metropolitan area may have access to privately funded treatment services. In June 2005 the American Red Cross funded AOEC to provide treatment services for these responders. As of June 2007, AOEC had contracted with 40 of its member clinics located in 27 states and the District of Columbia to provide these services. An American Red Cross official told us in September 2007 that funding for AOEC to provide treatment services would continue through June 2008.

[44]As of June 2007, DCC identified 1,151 nonfederal responders residing outside the NYC metropolitan area who requested screening and monitoring services and were too ill or lacked financial resources to travel to NYC or any of DCC's 10 contracted clinics.

of August 2007, 18 nonfederal responders had completed screening examinations, and 33 others had been scheduled.

NIOSH Awarded Funding for Treatment Services to Four WTC Health Programs

In fall 2006, NIOSH awarded and set aside funds totaling $51 million from its $75 million appropriation for four WTC health programs in the NYC metropolitan area to provide treatment services to responders enrolled in these programs. Of the $51 million, NIOSH awarded about $44 million for outpatient services to the FDNY WTC program, the NY/NJ WTC Consortium, Project COPE, and the POPPA program. NIOSH made the largest awards to the two programs from which almost all responders receive medical services, the FDNY WTC program and NY/NJ WTC Consortium (see table 2). In July 2007 we reported that officials from the FDNY WTC program and the NY/NJ WTC Consortium expected that their awards for outpatient treatment would be spent by the end of fiscal year 2007.[45][46] In addition to the $44 million it awarded for outpatient services, NIOSH set aside about $7 million for the FDNY WTC program and NY/NJ WTC Consortium to pay for responders' WTC-related inpatient hospital care as needed.[47]

[45]In August 2007 a NIOSH official told us that NIOSH did not expect that all of these funds would be spent by September 30, 2007.

[46]In addition to funding from NIOSH, the FDNY WTC program and the NY/NJ WTC Consortium received funding in 2006 from the American Red Cross to provide treatment services. In September 2007 an official from the American Red Cross told us that it was the organization's understanding that most of the clinics in the NY/NJ WTC Consortium had expended the American Red Cross funds but that one of the Consortium's clinics was expected to request a no-cost 6-month extension up to the end of calendar year 2007. The American Red Cross had already granted a similar extension for the same period to the FDNY WTC program.

[47]Of the $24 million remaining from the $75 million appropriation to CDC, NIOSH used about $15 million to support monitoring and other WTC-related health services conducted by the FDNY WTC program and NY/NJ WTC Consortium. ATSDR awarded $9 million to the WTC Health Registry to continue its collection of health data.

Table 2: NIOSH Awards to WTC Health Programs for Providing Treatment Services, 2006

Dollars in millions		
WTC health program	**Amount of award[a]**	**Date of award**
NY/NJ WTC Consortium	$20.8	October 26, 2006
FDNY WTC Medical Monitoring and Treatment Program	18.7	October 26, 2006
Project COPE	3.0[b]	September 19, 2006
POPPA program	1.5[c]	September 19, 2006
Total amount of awards	**$44.0**	

Source: NIOSH.

[a]Amount is rounded to the nearest $0.1 million.

[b]NIOSH will provide $1 million annually to Project COPE beginning in September 2006 through September 2008, for a total award of $3 million.

[c]NIOSH will provide $500,000 annually to the POPPA program beginning in September 2006 through September 2008, for a total award of $1.5 million.

The FDNY WTC program and NY/NJ WTC Consortium used their awards from NIOSH to continue providing treatment services to responders and to expand the scope of available treatment services. Before NIOSH made its awards for treatment services, the treatment services provided by the two programs were supported by funding from private philanthropies and other organizations. According to officials of the NY/NJ WTC Consortium, this funding was sufficient to provide only outpatient care and partial coverage for prescription medications. The two programs used NIOSH's awards to continue to provide outpatient services to responders, such as treatment for gastrointestinal reflux disease, upper and lower respiratory disorders, and mental health conditions. They also expanded the scope of their programs by offering responders full coverage for their prescription medications for the first time. A NIOSH official told us that some of the commonly experienced WTC conditions, such as upper airway conditions, gastrointestinal disorders, and mental health disorders, are frequently treated with medications that can be costly and may be prescribed for an extended period of time. According to an FDNY WTC program official, prescription medications are now the largest component of the program's treatment budget.

The FDNY WTC program and NY/NJ Consortium also expanded the scope of their programs by paying for inpatient hospital care for the first time, using funds from the $7 million that NIOSH had set aside for this purpose. According to a NIOSH official, NIOSH pays for hospitalizations that have

been approved by the medical directors of the FDNY WTC program and NY/NJ WTC Consortium through awards to the programs from the funds NIOSH set aside for this purpose. By August 31, 2007, federal funds had been used to support 34 hospitalizations of responders, 28 of which were referred by the NY/NJ WTC Consortium's Mount Sinai clinic, 5 by the FDNY WTC program, and 1 by the NY/NJ WTC Consortium's CUNY Queens College program. Responders have received inpatient hospital care to treat, for example, asthma, pulmonary fibrosis,[48] and severe cases of depression or PTSD. According to a NIOSH official, one responder is now a candidate for lung transplantation and if this procedure is performed, it will be covered by federal funds. If funds set aside for hospital care are not completely used by the end of fiscal year 2007, he said they could be carried over into fiscal year 2008 for this purpose or used for outpatient services.

After receiving NIOSH's funding for treatment services in fall 2006, the NY/NJ WTC Consortium ended its efforts to obtain reimbursement from health insurance held by responders with coverage.[49] Consortium officials told us that efforts to bill insurance companies involved a heavy administrative burden and were frequently unsuccessful, in part because the insurance carriers typically denied coverage for work-related health conditions on the grounds that such conditions should be covered by state workers' compensation programs. However, according to officials from the NY/NJ WTC Consortium, responders trying to obtain workers' compensation coverage routinely experienced administrative hurdles and significant delays, some lasting several years. Moreover, according to these program officials, the majority of responders enrolled in the program either had limited or no health insurance coverage. According to a labor official, responders who carried out cleanup services after the WTC attack often did not have health insurance, and responders who were construction workers often lost their health insurance when they became too ill to work the number of days each quarter or year required to maintain eligibility for insurance coverage.

[48]Pulmonary fibrosis is a condition characterized by the formation of scar tissue in the lungs following the inflammation of lung tissue.

[49]The NY/NJ WTC Consortium now offers treatment services at no cost to responders; however, prior to fall 2006 the program attempted when possible to obtain reimbursement for its services from health insurance carriers and to obtain applicable co-payments from responders.

According to a NIOSH official, although the agency had not received authorization as of August 30, 2007, to use the $50 million emergency supplemental appropriation made to CDC in May 2007, NIOSH was formulating plans for use of these funds to support the WTC treatment programs in fiscal year 2008.

Concluding Observations

Screening and monitoring the health of the people who responded to the September 11, 2001, attack on the World Trade Center are critical for identifying health effects already experienced by responders or those that may emerge in the future. In addition, collecting and analyzing information produced by screening and monitoring responders can give health care providers information that could help them better diagnose and treat responders and others who experience similar health effects.

While some groups of responders are eligible for screening and follow-up physical and mental health examinations through the federally funded WTC health programs, other groups of responders are not eligible for comparable services or may not always find these services available. Federal responders have been eligible only for the initial screening examination provided through the WTC Federal Responder Screening Program. NIOSH, the administrator of the program, has been considering expanding the program to include monitoring but has not done so. In addition, many responders who reside outside the NYC metropolitan area have not been able to obtain screening and monitoring services because available services are too distant. Moreover, HHS has repeatedly interrupted the programs it established for federal responders and nonfederal responders outside of NYC, resulting in periods when no services were available to them.

HHS continues to fund and coordinate the WTC health programs and has key federal responsibility for ensuring the availability of services to responders. HHS and its agencies have recently taken steps to move toward providing screening and monitoring services to federal responders and to nonfederal responders living outside of the NYC area. However, these efforts are not complete, and the stop-and-start history of the department's efforts to serve these groups does not provide assurance that the latest efforts to extend screening and monitoring services to these responders will be successful and will be sustained over time. Therefore we recommended in July 2007 that the Secretary of HHS take expeditious action to ensure that health screening and monitoring services are available to all people who responded to the attack on the WTC, regardless

of who their employer was or where they reside. As of early September 2007 the department has not responded to this recommendation.

Mr. Chairman, this completes my prepared remarks. I would be happy to respond to any questions you or other members of the subcommittee may have at this time.

Contacts and Acknowledgments

For further information about this testimony, please contact Cynthia A. Bascetta at (202) 512-7114 or bascettac@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. Helene F. Toiv, Assistant Director; Hernan Bozzolo; Frederick Caison; Anne Dievler; and Roseanne Price made key contributions to this statement.

Appendix I: Abbreviations

AOEC	Association of Occupational and Environmental Clinics
ASPR	Office of the Assistant Secretary for Preparedness and Response
ATSDR	Agency for Toxic Substances and Disease Registry
CDC	Centers for Disease Control and Prevention
DCC	Data and Coordination Center
FDNY	New York City Fire Department
FEMA	Federal Emergency Management Agency
FOH	Federal Occupational Health Services
HHS	Department of Health and Human Services
NIOSH	National Institute for Occupational Safety and Health
NYC	New York City
NY/NJ	New York/New Jersey
NYPD	New York City Police Department
POPPA	Police Organization Providing Peer Assistance
PTSD	post-traumatic stress disorder
WTC	World Trade Center

Related GAO Products

September 11: HHS Needs to Ensure the Availability of Health Screening and Monitoring for All Responders. GAO-07-892. Washington, D.C.: July 23, 2007.

September 11: HHS Has Screened Additional Federal Responders for World Trade Center Health Effects, but Plans for Awarding Funds for Treatment Are Incomplete. GAO-06-1092T. Washington, D.C.: September 8, 2006.

September 11: Monitoring of World Trade Center Health Effects Has Progressed, but Program for Federal Responders Lags Behind. GAO-06-481T. Washington, D.C.: February 28, 2006.

September 11: Monitoring of World Trade Center Health Effects Has Progressed, but Not for Federal Responders. GAO-05-1020T. Washington, D.C.: September 10, 2005.

September 11: Health Effects in the Aftermath of the World Trade Center Attack. GAO-04-1068T. Washington, D.C.: September 8, 2004.

Mr. TOWNS. Thank you very much for your statement.
Dr. Thorpe.

STATEMENT OF LORNA THORPE

Dr. THORPE. Good morning, Chairman Towns, Congresswoman Maloney, Congressman Nadler and Deputy Borough President Yvonne Graham, if she is still with us.

My name is Lorna Thorpe, deputy commissioner of the Division of Epidemiology at the New York City Department of Health and Mental Hygiene. Thank you for inviting me to discuss two scientific studies done on the health impacts of the World Trade Center disaster among rescue and recovery workers.

These studies, conducted using the largest sample of exposed workers and volunteers assembled to date, add important new findings to the growing body of information on the physical and mental health effects of the disaster. They are based on interviews of more than 25,000 rescue and recovery workers who enrolled in the World Trade Center Health Registry during 2003 and 2004.

By way of background, the World Trade Center Health Registry is one of the Nation's main platforms for understanding possible short and long-term World Trade Center-related illnesses. It was developed as a collaboration between the New York City Health Department and the Agency for Toxic Substances and Disease Registry [ATSDR], with the goal of tracking exposed individuals for up to 20 years.

Initially funded through FEMA, and later through special 9/11 congressional appropriations, the Registry has sufficient funding to last through Federal fiscal year 2008. We estimate that it requires at least $4.5 million per year to maintain the Registry going forward.

In all, more that 71,000 individuals voluntarily enrolled in the Registry, including persons from every State and almost every congressional district in the United States. More than 20 percent of the enrollees lived outside of New York State on September 11, 2001.

In addition to enrolling workers, the Registry includes another 14,000 Lower Manhattan residents, 10,000 tower survivors and survivors of other damaged or destroyed buildings, 19,000 occupants of other Lower Manhattan buildings near the World Trade Center site, 3,000 children, 13,000 people who were on the street or in transit around the World Trade Center at the time of the building collapse.

The Registry will monitor the health of enrollees over a 20-year time period through periodic health surveys, special in-depth studies and routine assessments of cancer incidence and mortality. Special studies initiated by either government or academic institutions is open for external research.

The two peer-reviewed studies published this month reported the development of asthma and on post-traumatic stress disorder among rescue and recovery workers after 9/11. Both are potentially lifelong conditions that can be controlled with appropriate treatment.

The asthma study, published this month in the journal Environmental Health Perspectives, found that among more than 25,000

previously asthma-free rescue and recovery workers, 3.6 percent reported having been diagnosed with new-onset asthma by a physician within a 2 to 3-year time period after working at the site. That is a rate 12 times higher than expected in the general adult population.

The study also shows that asthma rates were highest among two groups of workers: those who arrived soon after the buildings collapsed, particularly those arriving on September 11th and September 12th; and those who worked for long durations at the site, over 90 days. For workers who arrived on September 11th and worked more than 90 days, rates of asthma were as high as 7 percent, more than 20 times higher than would have been expected in the general population.

Certain respirators or masks can reduce exposure to hazardous dust when used correctly. While the survey did not distinguish between different types of respirators or masks, or gauge correct usage, we did find that reported mask use afforded moderate protection against developing asthma.

For example, workers who wore them on September 11th and September 12th reported significantly lower rates of newly diagnosed asthma than those who did not. Generally, the longer the period of not wearing respirators or masks, the greater the risk, although asthma levels were elevated in all worker groups, including those who wore mask.

The asthma findings in this study and their dose response relationship to the World Trade Center exposures are consistent with and add important additional information to prior lung function decline studies by the New York City Fire Department and the Mount Sinai Medical Monitoring program.

The other study published this month in the American Journal of Psychiatry examined survey responses of nearly 29,000 rescue and recovery workers who worked directly at World Trade Center site.

In this study, we found that one in eight workers, or 12.4 percent, had post-traumatic stress disorder at the time of their interviews. The prevalence of post-traumatic stress disorder [PTSD], in the U.S. population is roughly 4 percent at any given time. This is three times that rate.

Post-traumatic stress disorder can be devastating, affecting the sufferer's families and their work lives.

People with PTSD are at greater risk of suffering from depression and substance abuse.

We found that levels of PTSD among workers varied significantly by occupation, with rates ranging from 6.2 percent among police officers, to 21.2 percent among volunteers not affiliated with an organization. Workers from non-emergency occupations, such as construction, engineering and sanitation workers, also suffered particularly high rates of PTSD, which may reflect that these workers do not typically have disaster preparedness training or prior experience with emergencies, both of which can help buffer psychological trauma.

As with the asthma study, people who started work or soon after 9/11, or who worked for longer periods of time, were more vulnerable to developing PTSD.

The study also found that working outside of one's area of expertise increased the risk of developing PTSD—for example, civilian volunteers engaged in firefighting, or engineering and sanitation workers performing search and rescue. Sustaining and injury and having to evacuate a building also increased their risk.

These two studies demonstrate the need for continued monitoring and care of exposed workers. They also offer important lessons to help emergency planners reduce the impact of future disasters, such as ensuring the availability of respiratory and other protective equipment, and proper training in its use; the value of disaster preparedness training for all types of emergency responders; the use of shift rotations to reduce workers' duration at emergency sites; and the importance of limiting exposure of those who have had less experience with trauma response, such as volunteers.

In addition to these two studies, we have a number of other registered studies under peer review, including ones examining the health impacts on the residents of Lower Manhattan and children.

Mr. TOWNS. If you could, sum up, please.

Dr. THORPE. The New York City Health Department is also conducting special in-depth studies, using the Registry as a foundation. First among these is a clinical investigation of respiratory health, in collaboration with Bellevue Hospital. This study focuses on residents and building occupants in Lower Manhattan who report persistent respiratory symptoms.

The collapse of the World Trade Center towers on 9/11 was an unprecedented urban environmental disaster brought on by a terrorist attack upon our Nation. We are grateful to the New York City congressional delegation and to Mayor Bloomberg for providing funding to support both the Centers of Excellence and the World Trade Center Registry.

We are confident that working together with our elected officials nationwide, we can improve the medical and healthcare services to address the needs of first responders, recovery workers, residents and all those who may have suffered health effects related to the events of September 11, 2001.

Thank you.

[The prepared statement of Dr. Thorpe follows:]

TESTIMONY

By

Lorna Thorpe, Ph.D.
Deputy Commissioner
Division of Epidemiology
New York City Department of Health and Mental Hygiene

before the

U. S. Congress
Subcommittee on Management, Organization and Procurement
Committee on Oversight and Government Reform

9/11 Health Effects: The Screening and Monitoring of First Responders

September 10, 2007
10:00 AM
Brooklyn Borough Hall
New York City

Good morning, Congressman Towns and Subcommittee Members. My name is Lorna Thorpe, Deputy Commissioner of the Division of Epidemiology at the New York City Department of Health and Mental Hygiene.

Thank you for inviting me to be here today to discuss the findings of two new scientific studies published this month on impact of the World Trade Center disaster on the health of rescue and recovery workers. These studies, conducted using the largest sample of exposed workers and volunteers assembled to date, add important new findings to the growing body of information on the physical and mental health effects of the disaster. They are based on interviews during 2003 and 2004 with more than 25,000 rescue and recovery workers enrolled in the World Trade Center Health Registry.

The World Trade Center Registry (WTCHR):

The World Trade Center Health Registry was conceived soon after September 11th, and is one the nation's main platforms to better understand possible short- and long-term WTC-related illnesses. It was developed as a collaborative effort between the NYC Health Department and the Agency for Toxic Substances and Disease Registry (ATSDR). Initially funded through FEMA, and later through special 9/11 Congressional appropriations, the Registry has sufficient funding to last through Federal FY 2008; we estimate that it requires at least $4.5 million per year to maintain the Registry for the remainder of its 20-year life.

In all, more than 71,000 individuals voluntarily enrolled in the Registry during the one-year enrollment period that ended in November 2004. Registrants include persons from every state and almost every Congressional District in the U.S. – in fact more than 20% of the enrollees lived outside New York State on September 11, 2001. Every enrollee met criteria that put him or her at a high likelihood of having been exposed to the physical and emotional environments of the WTC disaster. In addition to workers, the Registry includes more than 14,000 lower Manhattan residents, 10,000 tower survivors and survivors of other damaged or destroyed buildings, 19,000 occupants of other nearby buildings, 3,000 children, and 13,000 people who were on the streets or in transit around the World Trade Center at the time of the building collapse. (There is some overlap among these groups.) During the recruitment period, extensive efforts were made to estimate the size of the affected population and to compile lists of potentially-exposed individuals for active recruitment purposes. Nearly one-third of the Registry was recruited from such lists, allowing us to understand the differences between those who self-enroll into registries and clinical screening programs (who tend to have worse health effects) and those whom we recruited.

All participants completed an enrollment interview. The Registry will monitor the health of enrollees over a 20-year period through periodic health surveys and assessments of mortality and cancer incidence, and serve as a resource for the development of special studies by either government or academic institutions.

The size of the Registry makes it the largest effort in the history of the United States to systematically monitor the health of persons exposed to a public health threat. Because of its size and diversity, the Registry can illuminate patterns and provide valuable guidance to potentially affected groups, medical care providers, emergency planners and other policy makers.

The two peer-reviewed studies published this month are based on analyses of the initial Registry surveys of enrollees. They report on the development of asthma and post traumatic stress disorder (PTSD) among rescue and recovery workers after 9/11. Both are potentially lifelong conditions that can be controlled and alleviated with appropriate treatment. The Health Department and clinicians from New York City's three WTC Centers of Excellence have developed and distributed treatment guidelines for WTC-related respiratory and mental health conditions to more than 26,000 physicians in the city.

"Asthma Diagnosed after September 22, 2001 Among Rescue and Recovery Workers: Findings from the World Trade Center Registry"

The asthma study, published in the journal, *Environmental Health Perspectives*, (http://ajp.psychiatryonline.org/cgi/reprint/164/9/1385) found that 3.6% of previously asthma-free rescue and recovery workers reported having been diagnosed with new-onset asthma by a physician within a 2-3 year time period after working at the WTC site. The rate measured in this study is 12 times higher than expected for the general adult population in such a time period; new-onset asthma among adults is not a common occurrence, it more typically starts in childhood. Our findings also show that rates of asthma were highest among two groups of workers: those who arrived soon after the buildings collapsed, particularly those arriving on September 11th and September 12th ; and those who worked more than 90 days at the site. For workers who arrived on September 11th and worked more than 90 days, rates of asthma were as high as 7%, 24 times higher than would have been expected.

Certain respirators or masks can reduce exposure to hazardous dust when used correctly. While the survey did not distinguish among different types of respirators or masks, or gauge correct usage, something that the Registry's follow-up survey of these workers will be looking at, we found that reported mask use afforded moderate protection against developing asthma. Workers who wore them on September 11th and September 12th reported lower rates of newly-diagnosed asthma -- 4.0% and 2.9%, respectively -- than those who did not -- 6.3% and 4.5%. The study found that the longer the period of not wearing respirators or masks, the greater the risk, although all worker groups, including those who reported wearing masks, had elevated levels of newly reported asthma.

The self-reported asthma findings in this study are consistent with, and add important additional information to, prior studies by the NYC Fire Department, ("Pulmonary Function After World Trade Center Exposure in the New York City Fire Department") which documented time of arrival to be an important predictor of lung function decline, as well as a study previously published by the Mt. Sinai Medical Monitoring program

("The World Trade Center Disaster and the Health of Workers: Five-Year Assessment of a Unique Medical Screening Program") describing respiratory symptoms and lung function decline among workers being screened.

"Differences in PTSD Prevalence and Associated Risk Factors Among World Trade Center Disaster Rescue and Recovery Workers"

Another study published this month in the *American Journal of Psychiatry,* (http://www.ehponline.org/docs/2007/10248/abstract.html) examined survey responses of nearly 29,000 rescue and recovery workers enrolled in the Registry who worked directly at the WTC site. Using a formal screening assessment to detect probable PTSD, we found that one in eight workers – or 12.4% -- had PTSD at the time of their interviews in late 2003 and 2004. The prevalence of PTSD in the U. S. population is roughly 4% at any given time. Post traumatic stress disorder can be devastating, affecting the sufferer's families and work lives. People with PTSD are also more likely to suffer from depression and substance abuse.

Levels of PTSD among these workers varied significantly by occupation, with rates ranging from 6.2% among police officers to 21.2% among volunteers not affiliated with an organization. Workers from non-emergency occupations, such as construction, engineering and sanitation, also suffered particularly high rates of PTSD. This finding may reflect that these workers do not typically have disaster preparedness training or prior experience with emergencies, both of which can help buffer psychological trauma.

As with the asthma study, people who started work on or soon after 9/11, or who worked for longer periods, were also more vulnerable to developing PTSD. For all occupations except police, the risk of PTSD was greatest among those who were at the site for more than three months.

The study also found that working outside one's area of expertise -- for example civilian volunteers engaging in firefighting or engineering and sanitation workers performing search and rescue, or firefighters involved in construction-- raised the risk for PTSD among these workers. Sustaining an injury or having to evacuate a building also raised the risk of PTSD in nearly all the groups.

These studies demonstrate the need for continued monitoring and care of exposed workers, and they offer important lessons to help emergency planners reduce the impact of future disasters. These lessons include ensuring the availability of respiratory and other protective equipment and training in its use; the value of disaster preparedness and training for all types of emergency responders; the use of shift rotations to reduce workers' duration at emergency sites; and limiting the exposure of those who have less prior exposure to trauma, such as volunteers.

In addition to our work on these studies, the NYC Health Department is conducting a number of other studies using the World Trade Center Health Registry as a foundation. First among these is a clinical investigation of respiratory health, in collaboration with

Bellevue Hospital. This study focuses on residents and building occupants in lower Manhattan who report persistent respiratory symptoms and aims to identify any potential health impacts from exposures to dust and debris in homes and workplaces. Our partner, Bellevue, provides New York City-funded treatment services to more than 1,400 residents, office workers and students with 9/11-related health conditions. We have a number of other Registry studies under peer review at medical journals and in clearance at the Centers for Disease Prevention and Control, including studies examining the health impacts among adult residents and children.

We also are actively involved in implementing a number of recommendations from the comprehensive report "Addressing the Health Impacts of 9/11," commissioned by Mayor Bloomberg. These include:

- establishing a program to provide mental health services for people who continue to suffer the psychological effects of 9/11 that will replace a privately funded program which expires this year;
- working with our partners in a WTC Medical Working Group, a group of experts appointed by the Mayor to review the adequacy of health and mental health services available to WTC-exposed persons, and to advise city government on approaches to communicating health risk information;
- hiring a World Trade Center Health Coordinator who already has developed a one-stop shopping website for 9/11 health information and services, where the public can find links to the studies I have just described.

Presently, the Health Department is conducting its second survey of all 71,000 persons enrolled in the World Trade Center Health Registry to learn more about their current health status. So far, 60% of registrants have responded to mail and e-mail survey solicitations, a remarkably high response rate (mail surveys rarely obtain response rates higher than 20%). As of last week, we have initiated telephone calls with the remaining 40%, and we aim to continue data collection through 2007. Even more remarkable, out of more than 71,000 registrants, only 52 persons originally enrolled in the Registry have withdrawn, even though we provide them the opportunity to do so in most communications. This speaks to the level of commitment that enrollees have to the Registry's mission.

This second survey will help determine whether respiratory and mental health conditions have persisted six years after the disaster and whether any new symptoms or conditions have emerged. It includes not only questions about mental and physical health conditions, but also about bereavement, social support, and access to health care and medical treatment. An important goal for the follow-up survey is to identify and help address gaps in medical and mental health treatment. Periodic re-surveys are planned by the registry.

The collapse of the World Trade Center towers on 9/11 was an unprecedented urban environmental disaster brought on by a terrorist attack upon our nation. We share, with others in this room, a commitment to better understand the health consequences of this

event and to assure effective services are available to those in need. The WTC Health Registry is a unique resource designed to monitor and systematically document the health impacts of this disaster over a 20-year period. While the Registry's funding is secured for the next year, it is essential that our commitment to the more than 71,000 people enrolled from across the nation be sustained and its viability assured for its intended 20-year life. We are grateful to the New York City Congressional delegation and to Mayor Bloomberg for providing funding to support the critical medical monitoring and treatment programs at the Centers of Excellence and the Registry. We are confident that working together and with our elected officials nationwide, we can improve medical and health care services to address the needs of first responders, recovery workers, residents and all those who may have suffered health effects related to the events of September 11, 2001.

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Mr. TOWNS. Thank you, very much.
Dr. Eth.

STATEMENT OF SPENCER ETH

Dr. ETH. Good morning, Congressman Towns, Congresswoman Maloney, Congressman Nadler and other distinguished guests.

My name is Dr. Spencer Eth, and I am medical director of Behavioral Health Services at Saint Vincent Catholic Medical Centers, and professor of psychiatry at New York Medical College.

It is a privilege to speak today about a subject that is of the utmost importance to me as a psychiatrist, and indeed to everyone present here today.

Six years ago tomorrow, I was completing psychiatric rounds in Saint Vincent's Hospital when a plane crashed into the north tower. As the closest academic medical center to the World Trade Center and as the hospital that had received most of the victims of the February 1993, bombing, Saint Vincent's immediately implemented its disaster plan in anticipation of the expected onslaught of patients. Beds were cleared, elective surgeries and clinics were canceled, and all professional staff stood ready for action. However, within the first 2 hours, only 400 patients presented to the Saint Vincent's emergency room, most having suffered minor injuries.

Then, the sirens stopped, and few new patients arrived for emergency medical care. There was no second wave of injured survivors. Tragically, the 2,800 people trapped in and adjacent to the towers died, while the majority of others in the vicinity were not seriously hurt. Saint Vincent's did not perform a single surgery that day.

Instead, what transpired was astounding. Saint Vincent's became surrounded by hundreds of people in acute emotional distress—people who were terrified and desperately seeking information, reassurance and crisis counseling.

We mobilized our mental health staff, and within hours, began seeing all of these people at Saint Vincent's, and soon afterwards at the nearby New School University.

True to our mission, the Saint Vincent's Department of Psychiatry made a commitment to care for everyone who needed our help without charging a single fee. Operating around the clock, we provided over 7,000 sessions and answered over 10,000 telephone calls in that first week. I will never forget the impact our services had on so many suffering New Yorkers in this immediate crisis phase of the disaster response.

We knew that our professional staff would soon have to return to their regular duties treating patients with mental illness and substance abuse. Consequently, we recognized the need to hire and train new clinicians to meet the demands of the World Trade Center victims and first responders. And, in order to do so, we actively sought donations to cover the additional personnel costs. We were fortunate that many corporations, foundations and individuals supported this phase of our work.

On September 26, 2001, I testified in Washington at a special hearing of the Senate Health, Education, Labor and Pensions Committee. I vividly recall the moving testimony of the other witnesses, who included Dr. Kerry Kelly, the medical director of the FDNY. I also remember the reactions of the committee members. Chair-

man Kennedy and Senators Clinton, Wellstone, Warner and Frist—all of them pledged to supply the Federal funds that would be necessary to meet the mental health needs of the survivors of the terrorist attack.

On that basis, Saint Vincent's developed special long-term psychiatric programs to treat the World Trade Center victims, first responders and public safety workers who were at the pile. Thousands of adults and children were seen at our hospital and in site at the FDNY firehouses, at the schools in Lower Manhattan, in the Port Authority Police Department trailers surrounding Ground Zero and, in the following year, at the Saint Vincent's World Trade Center Healing Services offices at 170 Broadway.

Finally, in 2002, the promised Federal funds began to flow. In particular, FEMA's New York State Project Liberty allowed us to broaden the scope of our programs. However, FEMA mandated that only crisis counseling could be provided through Project Liberty. Many of the World Trade Center survivors we saw were already suffering from more serious mental conditions. These disorders generally required a course of psychotherapy and possibly psychotropic medication. The limitations of the FEMA regulations prevented the sickest victims from receiving effective treatment in Project Liberty funded programs.

Another Federal agency, SAMHSA, awarded Saint Vincent's one of its seven Public Safety Worker Program grants. That expanded our ability to evaluate and treat first responders. We assessed the mental health needs of this population and delivered psychiatric care in proximity to work sites. We noted that although the number of patients decreased over the 3-year life of the grant, the severity of their symptoms actually worsened. In addition, many patients presented for the first time only years after trying unsuccessfully to cope with their suffering.

Although the work of the healing was far from complete, the Federal funding for Project Liberty and the Public Safety Worker Program ended 2 years ago. Saint Vincent's has continued to meet its commitment to those still suffering the emotional wounds of 9/11.

In our current phase of disaster relief, Saint Vincent's is once again dependent on private donations, especially support from the 9/11 funds of the American Red Cross and the New York Times Foundation. We are receiving no Federal, State, or city funding, which has been exclusively directed to Bellevue and Mount Sinai Hospitals. This is despite our record of treating over 60,000 survivors for mental health needs.

Looking to the future, our clinical experience suggests—and I will be done in just——

Mr. TOWNS. Yes. Please wrap up.

Dr. ETH [continuing]. About 30 seconds——

Mr. TOWNS. OK.

Dr. ETH. Our clinical experience suggests that there will be an ongoing need for mental health care for 9/11 workers and others exposed to the terrorist attack and its aftermath. The study co-authored by Dr. Thorpe demonstrated chronic PTSD in 12 percent of rescue and recovery workers, 2 to 3 years after 9/11. This mental condition is well-known to be difficult to treat and to be associated with long-term emotional distress and occupational disability.

Further, many victims of 9/11 are developing pulmonary and other medical illnesses arising from their exposure to toxic substances. These individuals can also be expected to experience new and worsening psychiatric symptoms that will erode their level of function and their ability to cope.

These are not theoretical concerns, but actual findings from our evaluation and treatment of first responders. But, despite our best efforts, Saint Vincent's will not be able to continue going it alone. We need Federal assistance to provide mental health care to our current and future patients. We look to the Congress—we look to you—to honor the promise——

Mr. TOWNS. Doctor, please sum up.

Dr. ETH [continuing]. To honor the promise to our first responders and our Nation made 6 years ago by the Senate Health Committee. Please provide the funding to keep these vital programs alive.

[The prepared statement of Dr. Eth follows:]

Testimony of

Spencer Eth, M.D.

Vice Chairman, Department of Psychiatry
Medical Director, Behavioral Health Services
Saint Vincent Catholic Medical Centers
New York, NY 10011
Professor of Psychiatry
New York Medical College

"Persistent Mental Health Consequences of 9/11"

Committee on Oversight and Government Reform
U.S. House of Representatives

Subcommittee on Government Management, Organization, and Procurement

Hearing on "9/11 Health Effects: The Screening and Monitoring of First Responders"

Monday, September 10, 2007, 10:45 AM

Brooklyn Borough Hall Courtroom, NY

Good morning Chairman Towns, Congresswoman Maloney, Congressmen Nadler and Fossella, and other distinguished guests. My name is Dr. Spencer Eth, and I am the Vice Chairman of the Department of Psychiatry and Medical Director of Behavioral Health Services at Saint Vincent Catholic Medical Centers, and Professor of Psychiatry at New York Medical College. It is a privilege to speak today about a subject that is of the utmost importance to me as a psychiatrist and distinguished fellow of the American Psychiatric Association, and indeed to everyone present here today.

Six years ago tomorrow I was completing psychiatric rounds at St. Vincent's Hospital when a plane crashed into the North Tower. As the closest academic medical center to the World Trade Center and as the hospital that had received most of the victims of the February 1993 World Trade Center bombing, St. Vincent's immediately implemented its disaster plan in anticipation of the expected onslaught of patients. Beds were cleared, elective surgeries and clinics were cancelled, and all professional staff stood ready for action. However, within the first two hours only 400 patients presented to the St. Vincent's emergency department, most having suffered minor injuries.

Then the sirens stopped, and few new patients arrived for emergency medical care. There was no second wave of injured survivors. Tragically, the 2,800 people trapped in and adjacent to the Towers died, while the majority of the others in the vicinity were not seriously hurt. St. Vincent's did not perform a single surgery that day. Instead, what transpired was astounding. St. Vincent's became surrounded by hundreds of people in acute emotional distress – people who were terrified and desperately seeking information, reassurance, and crisis counseling.

We mobilized our mental health staff and within hours began seeing all of these people at St. Vincent's and at the nearby New School University. True to our mission, the St. Vincent's Department of Psychiatry made a commitment to care for everyone who needed our help without charging a fee. Operating around the clock, we provided over 7,000 sessions and answered over 10,000 telephone calls in the first week. I will never forget the impact our services had on so many suffering New Yorkers in this immediate crisis phase of the disaster response.

We knew that our professional staff would soon have to return to their regular duties treating patients with mental illness and substance abuse. Consequently, we recognized the need to hire and train new

clinicians to meet the demands of World Trade Center victims. In order to do so, we actively sought donations to cover the additional personnel costs. We were fortunate that many corporations, foundations, and individuals supported this phase of our work.

On September 26, 2001 I testified in Washington at a special hearing of the Senate Health, Education, Labor and Pensions Committee ["Psychological Trauma and Terrorism: Assuring that Americans Receive the Support They Need," Senate Hearing 107-382]. I vividly recall the moving testimony of the other witnesses, who included Dr. Kerry Kelly, the Medical Director of the FDNY. I also remember the reactions of the Committee Members. Chairman Kennedy and Senators Clinton, Wellstone, Warner and Frist all pledged to supply the federal funds that would be necessary to meet the mental health needs of the survivors of the terrorist attack.

On that basis St. Vincent's developed special long-term programs to treat the World Trade Center victims, first responders, and public safety workers who were at the pile. Thousands of adults and children were seen at the hospital and on site at the FDNY firehouses, at the schools in lower Manhattan, in the Port Authority Police Department trailers surrounding ground zero, and in the newly opened St. Vincent's World Trade Center Healing Services offices at 170 Broadway.

Finally, the promised federal funds began to flow. In particular, Federal Emergency Management Agency (FEMA) - New York State Project Liberty allowed us to broaden the scope of our programs in lower Manhattan. However, FEMA mandated that only crisis counseling could be provided through Project Liberty. Many of the World Trade Center survivors we saw were already suffering from more serious mental conditions. These disorders generally required a course of psychotherapy and possibly psychotropic medication. The FEMA regulations prevented the sickest victims from receiving effective treatment in Project Liberty programs.

Another federal agency, Substance Abuse and Mental Health Services Administration (SAMHSA), awarded St. Vincent's one of its seven Public Safety Worker Program grants that expanded our ability to evaluate and treat first responders. We assessed the mental health needs of this population and delivered psychiatric care in proximity to their worksites. We noted that although the number of patients decreased over the three-year life of the grant, the severity of their symptoms actually worsened. In addition, many patients presented

for the first time after years of trying unsuccessfully to cope with their suffering.

Although the work of healing was far from complete, the federal funding for the Project Liberty and the Public Safety Worker Program ended two years ago. St. Vincent's has continued to meet its commitment to those still suffering the emotional wounds of 9/11. In our current phase of disaster relief, St. Vincent is once again dependent on private donations, especially support from the 9/11 Funds of the Red Cross and the New York Times Foundation. We are receiving no federal, state or city funding, which has been exclusively directed to Bellevue and Mt. Sinai Hospitals, despite our record of treating over 60,000 survivors of 9/11.

Looking to the future, our clinical experience suggests that there will be an ongoing need for mental health care for 9/11 workers and others exposed to the terrorist attack and its aftermath. Peer review research published in the American Journal of Psychiatry has shown that the overall prevalence of PTSD, among a very large sample of rescue and recovery workers 2-3 years after 9/11, was 12%. This figure represents people diagnosed with chronic PTSD. This mental condition is well known to be difficult to treat and to be associated with long term emotional distress and occupational disability. Further, many victims of 9/11 are developing pulmonary and other medical illnesses arising from their exposure to toxic substances. These individuals can be expected to experience new and worsening psychiatric symptoms that will erode their level of function and ability to cope.

These are not theoretical concerns, but actual findings from our evaluation and treatment of first responders. But despite our best efforts, St. Vincent's will not be able to continue going it alone – we need federal assistance to provide mental health care to our current and future patients. We look to the Congress to honor the promise to our first responders and to our nation made six years ago by the Senate Health Committee. Please provide the funding to keep these vital programs alive.

Thank you, Mr. Chairman, for giving me this opportunity to testify today.

Mr. TOWNS. Thank you.
Dr. ETH. Thank you, Mr. Chairman.
Mr. TOWNS. Thank you very much.
OK, Dr. Melius.

STATEMENT OF JAMES MELIUS

Dr. MELIUS. Honorable Chairman Towns, Representatives Maloney and Nadler: I greatly appreciate the opportunity to appear before you at this hearing.

I am James Melius. I am an occupational health physician, and as you indicate, I work for the Laborers' Union. But I have also spent much of my career working to document problems experienced by emergency responders exposed to toxic chemicals as part of their work. And, for over 20 years, I have served as Chair of the Medical Advisory Committee for the International Association of Fire Fighters, advising that union and its many members in the United States and Canada on occupational health issues.

And, in that capacity, I have had the opportunity, over the last few years, to talk to many emergency responders from other parts of the country who came and helped out at the World Trade Center in the aftermath of the 9/11 attacks.

For the past 4 years, I have also served as the Chair of the Steering Committee for the World Trade Center Medical Monitoring and Treatment Program. And, therefore, I have been in a position to oversee, and I think I can provide some understanding of the situation with that particular program.

First, I would like to say that there is ample evidence that the large numbers of firefighters, police and other workers involved in the September 11th response have become ill as part of their work. Dr. Thorpe has presented two of the new findings of the New York City Health Department. And, there were ample studies in the literature already and ongoing research that will document the problems. So, very serious health problems are being experienced by literally thousands of the people who responded to that event, as well as by the residents and public people in the community.

We know that there is—through the efforts of our congressional delegation, particularly Representatives Maloney and Nadler, Senator Clinton, we have established a very good medical program and, more recently, a federally funded treatment program for those workers.

However, as we have heard from the Government Accountability Office today, there are some shortcomings of that program, and those shortcomings particularly affect two groups of workers. One is the Federal workers who responded to the event; and the second are police and firefighters, other emergency responders from around the country who came to help at that event.

I won't repeat the findings of the GAO report about Federal workers, but I would indicate that, despite efforts on the part of the Federal Government, those workers are continuing not to receive the full monitoring and treatment that they deserve. The problems seem to be within the government, within the bureaucracy, in making arrangements to get everybody transferred over and to coordinate the care, particularly those who are residing in

other parts of the country, outside of the New York City metropolitan area.

Also, firefighters, police and other emergency responders from outside the immediate New York City area have had great difficulty getting adequate care. The Federal Government has tried a number of different approaches—and, again, those are documented by the GAO report—to arrange for monitoring and treatment. They have been able to provide some of that, but frankly most of the treatment to this day continues to be funded by the Red Cross and not by the Federal Government. And, it appears that it may be many more months before the government can arrange for treatment funding to be provided for those people living outside of the New York City metropolitan area.

And this problem with the—both of these problems, for the Federal worker program, as well as for emergency responders from outside of New York City, creates a number of problems for the individuals involved. They are becoming increasingly frustrated with delays in getting care and the lack of ability to be able to arrange for care.

Just as one example, the new program for national responders, for people from outside the area, the new contract with this outside national organization have managed to arrange exams for fewer than 100 people so far, in the last several months. And, we know that there are literally hundreds, if not thousands, of responders out there waiting to receive their followup monitoring. And for them to get referred for treatment is quite difficult.

And, we know that there are resources outside of the New York area that can provide care for them. It is a question of really making the arrangements to do that.

However, I really think there are also problems with getting full monitoring and treatment for people within the New York area. What we really need is a comprehensive approach to this problem. I think the delegation from New York has called for that, and I think now is the time to move forward. We can't continue to piecemeal together a program. We need a comprehensive legislative solution that would provide care.

I believe that the legislation introduced by Congressman Maloney and Nadler really will address those problems. I would add that would directly address the problems that I have mentioned with the national program, as well as the problems that Saint Vincent's Hospital talked about today, in terms of being able to arrange for followup treatment for the many people that need it, even in the New York area.

Thank you for your time today, and I would be glad to answer questions.

[The prepared statement of Dr. Melius follows:]

TESTIMONY

Before

The United States House of Representatives

Committee on Oversight and Government Reform

Subcommittee on Government Management, Organization, and Procurement

Hearing on

9/11 Health Effects: The Screening and Monitoring of First Responders

Brooklyn, New York

September 10, 2007

Presented by

James Melius MD, DrPH

Administrator, New York State Laborers' Health and

Safety Trust Fund

Albany, NY

Honorable Chairman Towns and other members of the Subcommittee. I greatly appreciate the opportunity to appear before you at this hearing.

I am James Melius, an occupational health physician and epidemiologist, who currently works as Administrator for the New York State Laborers' Health and Safety Trust Fund, a labor-management organization focusing on health and safety issues for union construction laborers in New York State. During my career, I spent many years working for the federal and state government on occupational and environmental health issues. For the past 11 years, I have done similar work for labor organizations. I have spent much of my career working to document the health problems experienced by emergency responders exposed to toxic chemicals as part of their work and to develop better methods of ensuring their protection. For over twenty years, I have served as Chair of the Medical Advisory Committee for the International Association of Fire Fighters advising that union and its many members across the United States and Canada on occupational health issues.

I have been involved in health issues for World Trade Center responders since shortly after September 11th. Over 3,000 of our construction union members were involved in response and clean-up activities at the site. When the initial concerns were raised about potential health problems among responders at the site, I became involved in ensuring that our members participated in the various medical and mental health services that were being offered. For the past four years, I have served as the chair of the Steering Committee for the World Trade Center Medical Monitoring and Treatment Program. This committee includes representatives of responder groups and the involved medical centers (including the NYC Fire Department) who meet monthly to oversee the program and to ensure that the program is providing the necessary services to the many people in need of medical follow-up and treatment. I also serve as co-chair of the Labor Advisory Committee for the WTC Registry operated by the New York City Department of Health. Through my work with the International Association of Fire Fighters, I have also had the opportunity to meet with fire fighters from other areas in New York State and from

around the country who worked at the WTC site in the immediate aftermath of September 11 and are now concerned about their health. These activities provide me with a good overview of the benefits of the current programs and the difficulties encountered by responders seeking to address their medical problems and other needs.

First, there is ample evidence that large numbers of fire fighters, police, and other workers involved in the September 11 response have become ill from their work at the site. We have heard about some of those problems today, and the ongoing medical studies continue to confirm a number of medical problems including pulmonary disease, upper respiratory illnesses, and mental health problems. There is no doubt that we have major medical problems among thousands of these workers and that these medical conditions have become disabling for many. We do not yet know the full scope of these problems and are just beginning to understand some of the possible long term consequences such as cancer and sarcoidosis.

With great effort on the part of Mount Sinai Hospital, the New York City Fire Department, and other institutions and with federal assistance, we have implemented a medical monitoring program and, more recently, a treatment program for those workers. This program is providing medical examinations and treatment for thousands of these workers. Each month hundreds of people who worked at Ground Zero enroll in the program for the first time, and over half of these people are found to have WTC-related conditions that require medical treatment. Unfortunately, the funding for this program has been short term, and this lack of stable long term funding causes numerous difficulties for this program.

The Government Accountability Office has done a very good job of documenting some of the problems for this program. In particular, federal workers and emergency responders who came to New York from other parts of the country in response to 9/11 have had great difficulty accessing adequate medical monitoring and treatment. Federal workers were initially provided monitoring through the federal employee medical programs. This monitoring was not comprehensive, and there were great difficulties in

referring these workers for additional treatment. Despite some attempt to transfer these federal workers to the program providing monitoring and treatment for the other responders, the medical needs of these federal workers still are not being met.

Fire fighters, police, and other emergency responders from outside of the New York City Metropolitan area have also had great difficulty finding adequate care. As GAO has documented, there have been several different approaches to providing care for these workers who reside throughout the United States. Many of these people have received initial monitoring, and some have been able to get medical treatment for WTC-related conditions through this program. However, the vast majority have not had adequate medical services. Currently, medical monitoring is provided through a contract with a national network of examining physicians. Medical treatment if needed must be arranged through another organization and is paid for by the American Red Cross (who supported treatment for the NYC area responders before the federal support for treatment was available). As best, this arrangement is unwieldy and can lead to long delays in obtaining monitoring and treatment.

In my discussions with fire fighters outside of New York City, there is growing frustration with this program. Many are confused about the arrangements and unaware of the availability of services. Others have given up and are seeking care from other sources. It is important to note that most municipalities (i.e., the employers of these fire fighters and police) do not have the medical resources to provide the type of comprehensive medical monitoring needed for this program. The physicians involved are not familiar with the health problems of 9/11 responders, increasing the possibility that people will not be properly diagnosed or treated. Moreover, if these people were monitored and treated independent of the current program, information on their medical problems would not be reported to comprehensive data system for this program. As a result, important health findings among the overall population of responders could be missed. These responders deserve the same level of health monitoring and treatment that is currently available for the NYC area responders.

This lack of an adequate program for responders outside of New York City needs to be addressed. Although NIOSH is trying to develop short term solutions to these problems, a more comprehensive approach is needed. NIOSH needs to be able to establish arrangements for comprehensive monitoring and treatment for these responders. I believe that it may take several months for these arrangements to be established. The lack of adequate long term funding for this program is also hampering the development of the contracts needed to provide this care. At the moment, the funding for treatment program will run out later this year or early next year.

A comprehensive solution is needed to address the health needs of the 9/11 rescue and recovery workers. We cannot rely on a fragmented system utilizing private philanthropy, health insurance, line of duty disability retirement, and workers' compensation to support the necessary medical monitoring and treatment for the thousands of people whose health may have been impacted by their WTC exposures. This fragmented approach will inevitably leave many of the ill and disabled rescue and recovery workers without necessary medical treatment and will only worsen their health conditions. The delays and uncertainty about payments would discourage many of the ill rescue and recovery workers from seeking necessary care and discourage medical institutions from providing that care. We need legislation that will provide comprehensive monitoring and treatment for fire fighters, police, and all of the other workers who responded to 9/11 and that includes all of these workers, regardless of where they live.

Thanks you for your time. I would be glad to answer any questions.

Mr. TOWNS. Thank you very much, Doctor. Thank you.
Mr. McHale.

STATEMENT OF THOMAS MCHALE

Mr. MCHALE. Good morning, Chairman Towns and members of the subcommittee.

My name is Thomas McHale, and I am a police detective with the Port Authority of New York and New Jersey Police Department. I am also a member of the Port Authority Police Detectives Endowment Association, an associate member of the Port Authority Police Benevolent Association, which are member organizations of the National Association of Police Organizations. NAPO is one of the largest police organizations in the Nation, representing over 238,00 sworn rank-and-file law enforcement officers throughout the United States.

When lives are at stake, America's first responders do not hesitate to rush directly into harm's way. We do our jobs, searching for, rescuing and aiding victims, regardless of what unseen dangers and health risks and health hazards await. The substantial risks that we face when responding to disasters are no more clearly illustrated than by the suffering brought on as a result of the response to the September 11th attacks on the World Trade Center. As you are aware, the World Trade Center was the headquarters of the Port Authority and was a worldwide symbol of New York and America.

Seven years after the attack on our Nation, we continue to mourn the 84 Port Authority personnel, including 37 members of the Port Authority Police Department, 23 New York City Police Department officers, 11 New York State and Federal law enforcement officers, 343 firefighters and over 2,200 civilians who lost their lives.

While the Nation remembers those we lost, those who responded to the World Trade Center continue to suffer from the physical and mental traumas suffered that day and in the days following. According to the Mount Sinai Medical Center study on 9/11 health effects, 70 percent of the first responders at Ground Zero suffer from chronic lung ailments.

Today, I would like to take the opportunity to address my personal 9/11-related health issues and the need for extended funding for the World Trade Center Medical Monitoring and Treatment Fund. For purposes of character and integrity, I would like to provide you with a brief biography.

I am 46 years of age, married, with four daughters, and I am a non-smoker. I am a Port Authority of New York and New Jersey police detective, with 22 years of service. Since 1995, I have been assigned to the FBI Joint Terrorism Task Force of Newark, NJ. In addition to the Task Force, since 2001, I have been co-assigned to the NYPD Major Case Squad, specializing in cold case homicides of police officers.

Unfortunately, I am no stranger to traumatic incidents. On February 26, 1993, I was critically injured in the bombing of the World Trade Center. On September 11, 2001, minutes after the first plane struck, I responded to the World Trade Center and I joined in the rescue effort from my Major Case office at 1 Police Plaza here in

New York. I survived the collapse of the first tower from inside the World Trade Center.

After escaping the first collapse, I returned to the Trade Center and continued with search and rescue. Before the second tower collapsed, I escaped through 5 World Trade Center into the street, where again I was caught in the debris cloud.

I remained at the site throughout the evening and into the early morning hours of September 12th, taking part in the rescue of two Port Authority Police Officers that were trapped in the rubble.

In addition to being a police detective, I am also a Union Ironworker. For the first 10 days following 9/11, I was on full-time assignment at the Trade Center site as part of the Port Authority Police Rescue and Recovery Team. I utilized my ironworking skills in the recovery of victims' bodies.

During the second week of the rescue and recovery, the Port Authority Police Department ordered me to resume my position with the Joint Terrorism Task Force, which was investigating the attack. I complied with the order, but returned to the site at the end of my shift.

I worked the site as a volunteer ironworker with Ironworkers Local 40, New York, and as a PA Police Detective. I worked this schedule until the end of January 2002.

From the end of January 2002, to the beginning of April 2002, I was on JTTF assignment in Pakistan and Afghanistan. On March 17, 2002, after a suicide bomber attacked a church in Islamabad, Pakistan, I took part in rescue and recovery of those injured and killed. Upon my return to the States, I resumed working both jobs, but not as rigorously as before. On May 28, 2002, Ironworkers Local 40 invited me to participate in the removal of the last column from the World Trade Center.

To the present day, I have been diagnosed with reactive airway disease, lung scar tissue, asthma, atrial fibrillation, sinus tachycardia, chronic rhinitis, turbinate hypertrophy, and Barrett's esophagus. I am currently under the primary care of Dr. David Fischler, my pulmonologist, and Dr. Rakesh Passi, my cardiologist. In addition to my primary care physicians, my current health issues are being managed and monitored by the World Trade Center Medical Monitoring and Treatment Program under Dr. Iris Udasin, Environmental and Occupational Health Science Institute Clinical Care in Piscataway, NJ.

On November 1, 2006, I underwent a pulmonary vein ablation in my heart at Robert Wood Johnson University Hospital, New Brunswick. While in recovery, I suffered aspiration pneumonitis and was transferred to the critical care unit. On November 7, 2006, I was discharged from the hospital. In March 2007, I was able to return to work.

My doctors, two cardiologists and two pulmonologists and the doctors from the World Trade Center Medical Monitoring Program all attributed my medical conditions to my exposure at the World Trade Center. The Port Authority Medical Division, without a thorough examination or consulting my doctors, ruled that my medical conditions are not related to the events of 9/11. Fortunately, for me, the Port Authority Police Director, Samuel J. Plumeri, agreed with my physicians and overruled PA Medical's decision. Director

Plumeri ruled that my injuries were, in fact, 9/11-related, thus entitling me to line of duty status.

On July 20, 2007, I underwent nasal surgery to clear an obstruction of my nasal airway at Robert Wood Johnson. I returned to work 11 days later, on July 31st. The PA Medical Department, again without examination or consulting any of my physicians, determined that my nasal obstruction was not related to my exposure at Ground Zero. Once more, PA Police Director Plumeri overruled PA Medical's decision. Director Plumeri agreed with my physicians' findings that my nasal injuries or disease may, in fact, have been caused by my exposure at Ground Zero.

On September 5, 2007, due to chronic acid reflux, I underwent an upper endoscopy at Robert Wood Johnson Hospital. The procedure revealed that I have Barrett's esophagus, which is caused by chronic acid reflux and is considered to be a pre-malignant condition. Barrett's is associated with an increased risk of esophageal cancer. I am currently awaiting the results of my biopsy.

Most of the costs associated with my lung and heart procedures have been processed through my medical insurance. The World Trade Center Medical Screening and Treatment Program have incurred some of the costs for surgery and treatment associated with my nasal and gastro ailments.

In fact, it was Dr. Udasin, at EOSHI, who referred me to the ear, nose and throat doctor and gastroenterologist who diagnosed my most recent ailments.

I would like to state that I did not file a claim for the Federal moneys that were available in 2001 and 2002. Although entitled, I could not bring myself to complete and file the same form as that of the survivors of those who were killed. I do, however, have a pending State Workers Compensation claim.

As the health risks associated with exposure to the World Trade Center site become more manifest, it is important to ensure that workers in the rescue and recovery effort are properly monitored and treated for exposure-related diseases. I appreciate all you are doing to support those of us who have fallen ill due to our response and subsequent exposure at the World Trade Center. I urge Congress to continue to support the funding for the World Trade Center Medical Monitoring and Treatment Program in order that first responders like myself can maintain, or regain, their good health.

Thank you for this opportunity to speak to you on behalf of the dedicated first responders who responded to the 9/11 attacks in New York City. I ask that my printed testimony, in addition to my spoken testimony, be made a part of the record. And, I would be happy to answer any questions you may have.

[The prepared statement of Mr. McHale follows:]

Testimony of Thomas McHale
Detective, Port Authority Police Department
Port Authority Police Detectives Endowment Association
National Association of Police Organizations (NAPO)
"9 11 Health Effects: Monitoring and Treatment of First Responders"
U.S. House of Representatives Subcommittee on Government
Management, Organization, and Procurement

Good Afternoon Chairman Towns, Ranking Member Bilbray, and members of the Subcommittee. My name is Thomas McHale and I am a Police Detective with the Port Authority of New York and New Jersey Police Department. I am also a member of the Port Authority Police Detectives Endowment Association, which is a member organization of the National Association of Police Organizations (NAPO). NAPO is one of the largest police organizations in the nation, representing over 238,000 sworn rank-and-file law enforcement officers throughout the United States.

When lives are at stake, America's first responders do not hesitate to rush directly into harm's way. We do our jobs, searching for, rescuing, and aiding victims, regardless of what unseen dangers and health hazards await. The substantial risks that we face when responding to disasters are no more clearly illustrated than by the suffering resulting from the response to the September 11, 2001, terrorist attacks on the World Trade Center (WTC), the headquarters of the Port Authority of New York and New Jersey and worldwide symbol of New York and America.

Seven years after the attack on our nation, we continue to mourn the 84 Port Authority personnel, 23 New York Police Department officers, the 343 fire fighters, and over 2,200 civilians who lost their lives. While the nation remembers those we lost, those who responded to the WTC continue to suffer from the physical and mental traumas suffered that day and in the days following. According to the Mount Sinai Medical Center study on 9/11 health effects, released on September 8, 2006, seven out of every ten – **70 percent** – of the first responders at Ground Zero suffer from chronic lung ailments.[i]

Today, I would like to take the opportunity to address my personal 9/11 related health issues and the need to extend funding for the World Trade Center Medical Monitoring and Treatment Fund. For purposes of character and integrity, I would like to provide you with a brief biography.

I am forty-six years of age, married, with four daughters, and I am a non-smoker. As I said before, I am a Port Authority (PA) of New York (NY) and New Jersey (NJ) Police Detective with twenty-two years of service. Since 1995, I have been assigned to the Federal Bureau of Investigation (FBI) Newark (NJ) Joint Terrorism Task Force (JTTF). In addition to the JTTF, since 2001, I have been co-assigned to the New York Police Department (NYPD) Major Case Squad, specializing in cold case homicides of police officers.

Unfortunately, I am no stranger to traumatic incidents. On February 26, 1993, I was critically injured (pulmonary injuries, hearing, etc.) in the bombing of the World Trade Center. On September 11, 2001, minutes after the first plane struck, I responded to the WTC from my Major Case office at 1 Police Plaza, New York, and joined in the rescue effort. I survived the collapse of the first tower from inside the WTC. After escaping the first collapse, I returned to the WTC and continued with search and rescue. Before the second tower collapsed, I escaped to the street through 5 WTC. Again, I was caught in the debris cloud. I remained at the site throughout the evening and into the early morning of September 12, taking part in the rescue of two Port Authority officers trapped in the collapse.

In addition to being a police detective, I am also a Union Ironworker (Ironworkers Local Union #45, Jersey City, NJ). For the first ten days following 9/11, I was on full time assignment at the WTC site as part of the Port Authority Rescue and Recovery Team. I utilized my ironworking skills (burning and rigging) in the recovery of the victims' bodies. During and after the second week of the rescue and recovery, the Port Authority Police Department (PAPD) ordered me to resume my position with the FBI Newark JTTF, which was investigating the attack. I complied with the order but returned to the WTC site at the end of my shift each evening. I worked the WTC site as a volunteer Ironworker with Ironworkers Local Union #40 (New York City) and as a PA Police Detective. I worked a twelve hour shift with the FBI JTTF (7am – 7pm), then a twelve hour shift at the WTC (7pm – 7am), then returned for the next day shift at FBI Newark (7am – 7pm). I worked this thirty-six hours on and twelve hours off schedule through the end of January 2002.

From the end of January 2002 to the beginning of April 2002, I was on JTTF assignment in Pakistan and Afghanistan. Upon my return to the States, I resumed working both jobs but not on as rigorous a schedule as before. On May 28, 2002, Ironworkers Local #40 invited me to participate in the removal of the last column from the WTC.

To the present day, I have been diagnosed with Reactive Airway Disease, Lung Scar Tissue, Asthma, Atrial Fibrillation, Sinus Tachycardia, Chronic Rhinitis, Turbinate Hypertrophy and Barrett's Esophagus. I am currently under the primary care of Dr. David Fischler, Pulmonologist, and Dr. Rakesh Passi, Cardiologist. In addition to my primary care physicians, my current health issues are being managed and monitored by The World Trade Center Medical Monitoring and Treatment Program under Dr. Iris G. Udasin, MD, Environmental and Occupational Health Science Institute (EOHSI) Clinical Care, Piscataway, NJ.

On November 1, 2006, I underwent a pulmonary vein ablation (heart) at Robert Wood Johnson University Hospital (RWJ), New Brunswick, NJ. While in recovery, I suffered Aspiration Pneumonitis and was transferred to Critical Care Unit. On November 7, 2006, I was discharged from the hospital. I was unable to go back to work until March 2007. My doctors, two cardiologists and two pulmonologists, and the doctors from the WTC Medical Monitoring Program attributed my medical conditions to my exposure at the WTC. The Port Authority Medical Division - without a thorough examination or consulting my doctors - ruled that my medical conditions are not related to the events of 9/11. Fortunately, for me, the Port Authority Police Director, Samuel J. Plumeri, overruled PA Medical's decision. Director Plumeri ruled that my injuries were in fact 9/11 related, thus entitling me to line of duty status.

On July 20, 2007, I underwent nasal surgery to clear an obstruction of my nasal airway at RWJ. I returned to work eleven days later on July 31. The PA Medical Department, again without examination or consulting any of my physicians, determined that my nasal obstruction was not related to my exposure at Ground Zero. Once more, PA Police Director Plumeri overruled PA Medical's decision. Director Plumeri agreed with my physicians' findings that my nasal injuries or disease may in fact have been caused by my exposure at Ground Zero.

On September 5, 2007, due to chronic acid reflux, I underwent an Upper Endoscopy at RWJ Hospital. The procedure revealed that I have Barrett's Esophagus, which is caused by chronic acid exposure (reflux) and is considered to be a premalignant condition. Barrett's is associated with an increased risk of esophageal cancer. I am currently awaiting the results of the biopsy.

Most of the costs associated with my lung and heart procedures have been processed through my medical insurance. The WTC Medical Screening and Treatment Program have

incurred some of the costs for surgery and treatment associated with my nasal and gastro ailments.

I would like to state that I did not file a claim for the federal monies that were available in 2001 and 2002. Although entitled, I could not bring myself to complete, and file, the same form as that of the survivors of those who were killed. I do, however, have a pending state workers compensation claim.

As the health risks associated with exposure to the World Trade Center site following 9/11 become more manifest, it is imperative to ensure that workers in the rescue and recovery effort are properly monitored and treated for exposure related diseases that do occur. I appreciate all you are doing to support those of us who have fallen ill due to our response and subsequent exposure at the WTC. I urge Congress to continue to support the funding for the World Trade Center Medical Monitoring and Treatment Program in order that first responders like myself can maintain, or regain, their good health.

Thank you for this opportunity to speak to you on behalf of the dedicated first responders who responded to the 9/11 attacks in New York City. I ask that my printed testimony, in addition to my spoken testimony, be made part of the record, and I would be happy to answer any questions you may have.

[i] Based on its findings from the World Trade Center Worker and Volunteer Medical Screening Program and on medical examinations performed on almost 9,500 World Trade Center Responders.

Mr. TOWNS. Thank you very much, and your entire statement will be included in the record.

Let me begin by first thanking you for your service and, of course, all of you, for your testimony.

Let me just sort of raise a question. I guess I will begin with you, Dr. Melius. I am concerned that we had people who came from across the country to volunteer their services and to respond to the crisis that we had. And, of course, if we do not treat them properly, we might discourage people from volunteering, and I think that is the last thing that we want to do.

I think that we always want to make certain that people feel, to respond and come to the aid of others. But, if we are not treating people properly that came and gave of their service, what does this do to volunteerism? And, of course, what is the labor movement saying about these kind of issues.

Dr. MELIUS. Now, you raise an excellent point, and it is certainly one, I think, that we should all be concerned about.

I will say, if you talk to people that did volunteer, even many of those that become ill, they would tell you they would do it again in that circumstance. There has been a long tradition, I think, of being willing to come forward.

However, if one sees that one is ill and disabled, and we know that the firefighters, the other emergency responders have become ill and disabled and are now struggling economically because they can no longer work, certainly it creates a second thought. And certainly on the part of all of us, I think, including organized labor, we want to make sure that if someone does volunteer in that situation, or is assigned—some of them, I think, were assigned to come in and work on the site—that they, one, are properly protected. We don't want this to be happening again.

However, should they develop illness, that the followup be provided for that. There should be a mechanism in place. They should not have to wait 6 years. They shouldn't have to wait so long to get the medical monitoring and treatment that they rightfully deserve.

And, it certainly could affect, in the long term, the willingness to do it again, or to come back, knowing that you are not going to be taken care of. You are risking your family's future by doing that, as well as your own health, by coming forward to help.

Mr. TOWNS. Thank you very much.

Why can't we move to get a comprehensive monitoring system? This is sort of for, I guess, GAO and, of course, in particular, Dr. Thorpe.

I mean, why can't we get that going? A comprehensive monitoring system. What do you think the problems are?

Ms. BASCETTA. It is not a matter of not knowing what to do. I can only conclude that it is a matter of, well, the administration, you know, has within its sphere the expertise to develop the programs, and the Congress has pushed hard for funding. And it just hasn't happened.

But there is no substantive reason why we shouldn't be much farther along at this point. And, for that matter, the really sad thing is that we need to learn a lesson from 9/11, so that in future

disasters, whether they are manmade or natural, we are better prepared.

Mr. TOWNS. All right. Any other comments on that? Yes, Dr. Melius?

Dr. MELIUS. I would just echo that one of the problems is with the lack of commitment on the part of the administration. This program has been funded through Congress on, basically, emergency appropriations each time. And then, the government, the Federal administration, then makes the wrong assumption that, therefore, the program isn't going to continue beyond that.

And, when Dr. Agwunobi came here right after the treatment program was initially funded, I believe it was last November or December, he immediately wanted to send out letters telling the responders that the treatment program would be discontinued. He wasn't even going to wait until the program got started.

We need a commitment on the part of the administration to move this forward and to plan. I believe Dr. Howard has done an excellent job in these circumstances, of trying to develop a good, solid program to provide the continuity of care that is needed.

But, we need certainly a longer-term commitment. I think that is going to take the kind of legislation that Representatives Maloney and Nadler are going to take—and Congressman Towns, you are a co-sponsor also—to move this forward and establish a long-term program that will deal with this comprehensively.

It shouldn't have taken that, and it shouldn't have taken 6 years of non-response to get there, but I think that is really what we are faced with, certainly at the present time.

Mr. TOWNS. Right. Thank you, very much.

And, Dr. Eth, I know you have personally treated many first responders for mental health conditions. Do you think we have adequately met the need.

Dr. ETH. Clearly, we haven't adequately met the needs. We are barely scratching the surface of the needs of those people who have chronic conditions.

As we have heard, PTSD can often be successfully treated if the patient is seen early. However, many patients with PTSD develop chronic illnesses, and then we are into symptom management. And, there is no system in place to deliver that kind of care.

Congressman Nadler quoted President Abraham Lincoln. That quotation is the motto of the Department of Veterans Affairs. What we need is a system of care for first responders who, like our Veterans, were there to protect us and to take care of us and deserve the kind of treatment that will persist over the years, to make sure that their distress and disability is medically treated as best we can.

Mr. TOWNS. You know, there has been some media coverage. You know, you always get this when we are trying to move forward, where they said that some people are faking a mental health condition.

I know that you have treated, of course, many of these responders. Do you think that this is a widespread practice? Because you get one situation, and they just blow it up, you know.

Dr. ETH. Right. Unfortunately, this issue of faking or malingering has been around for a very long time. There was the dramatic

scene in the movie "Patton," where General Patton slapped the soldier who was suffering from combat fatigue, because he thought he was a malingerer.

These are real psychiatric conditions that impose suffering on patients, on their family, and deserve the care that we can provide. Fortunately, we have the treatments, but we are limited because of the stigma associated with these conditions, the stigma that is amplified when people are thought to be malingering. And, there are delays of care, there is access issues. And, the thing is, we do have effective ways to manage symptoms.

Mr. TOWNS. What do you think needs to be done in Congress? What do you think that we should do? And, let me just run down the line, very quickly. We don't have a lot of time. So——

Mr. MCHALE. Obviously, the team of the World Trade Center medical management, in addition to making sure that a comparative amount is put into research, as well, for that. And I know I, don't mind my health screening put into kind of a data base that may help another first responder who may have the symptoms that I had, prior to being diagnosed with the disease that I have.

So, a multiple, comprehensive data base that can be used to compare each responder's conditions, so that it may help another one needing treatment.

Mr. TOWNS. Thank you. Right down the line, if there are any other comments.

Dr. MELIUS. Certainly, as I have said, I think the No. 1 priority is to make this into a comprehensive program, provide the framework through legislation that will ensure that everybody who responded at the World Trade Center, worked there, who were exposed, including people in the community, can receive medical monitoring and get treatment, if needed. And, that is a life-long commitment. I think we need to do that comprehensively and do that over the long term.

Second, I think we also need to look at how do we prevent some of the outcomes that have occurred. We need to make sure that there is adequate protection. My personal belief is that OSHA needs to be mandated to provide enforcement action at those sites, to ensure that people are properly protected.

I will add that, in order to do that, we also need research in the development of protective equipment.

Mr. McHale and I were talking before the hearing, and there are circumstances that he was working in where there was no respirator that is currently available that would have allowed him to do his work in a safe manner. He needed to communicate with his friends while he was doing that, in a very enclosed, tight space, and it was very difficult, and no respirator that was currently available, I believe, would have allowed him to do that.

We also know of the communication problems that occurred, with the firefighters at the site. So, there is technology that needs to be worked on, and we need to invest in that in order to protect people.

So, one, it is a comprehensive solution of medical followup. Second, it is prevention and enforcement at the site. And then, on the part of EPA and the city Health Department to make sure that people in the community are also protected.

Mr. TOWNS. Thank you, very much. Thank you. And, run right down the line.

Dr. ETH. Well, Congress and the administration has to honor its promise to first responders to deliver the care that they need in the long-term way, and we need to expand the number of treatment programs available to first responders, so that they can get the care.

Mr. TOWNS. Thank you.

Dr. THORPE. I would like to repeat that very fact, that the World Trade Center Medical Monitoring Program and the other Centers of Excellence at FDNY and at Bellevue Hospital, these are programs that were established with Federal funds. The patients who are enrolled in these programs have an expectation to a certain commitment to their long-term monitoring and care. And so, it is really that these are federally funded programs that can't be dismantled mid-mission.

This would also be true for the World Trade Center Health Registry, which is also federally funded. These were established for long-term care, and we need to ensure that the long-term care is provided and not being withdrawn mid-mission.

Mr. TOWNS. Right, thank you.

Ms. BASCETTA. On a smaller scale, holding HHS accountable for implementing GAO's recommendations. That is very important. And, for ensuring that, over the long term, the money is there to do the screening and monitoring that is required for responders.

And, on a broader scale, exercising your oversight authority to take a look at the NRP, to make sure that those relationships for the National Response Plan that are in place go to prevent these kinds of situations and to ensure that where they can't be prevented, that the health effects are taken care of after a disaster is very important.

Mr. TOWNS. All right. Thank you, very much.

And, I yield now to my colleague, Congresswoman Carolyn Maloney.

Mrs. MALONEY. And, I thank you again, Ed, for having this hearing, and I thank Mr. McHale for his service, and all of you for your services in your own professional ways. It is deeply appreciated.

First off, I want to thank Cynthia Bascetta, the Director for Health Care at the U.S. Government Accountability Office, and talk about the really extraordinary work of the GAO that has led us to the point today.

They have issued five different reports that Ed Towns and I have requested, and others. They were presented to the Oversight and Government Reform Committee, on which we both serve.

And, over the last 3 years, they have been absolutely invaluable to this committee in informing our work on this topic. So, I have a series, first of all, for Director Bascetta.

Regretfully, there have been a series of articles recently that I would like to put into the record, with official responses from our Senators and Jerry and myself and many others. So, in the New York Times.

There is one today in the New York Post that questions whether or not that there really is a problem. Jerry and I see sick people

every day, who come to see us in our homes and in our offices, and we know first-hand the crisis.

But, there have been some press reports that have attempted to cast doubt by questioning the exact extent of the health problems arising from the deadly toxins at Ground Zero.

In your opinion, Ms. Bascetta, as part of the independent, nonpartisan Government Accountability Office, do you have any doubt that tens of thousands of people served as responders and rescue/recovery and clean-up workers and construction workers, in the aftermath of the World Trade Center disaster, and that these responders were exposed to numerous physical hazards, environmental toxins and psychological trauma.

Ms. BASCETTA. No, I certainly don't have doubt.

Mrs. MALONEY. Now, do you have any doubt that those physical hazards, environmental toxins and psychological trauma could potentially cause serious, long-term health effects in these responders?

Ms. BASCETTA. No doubt at all. And, our first report, in September, had four and a half pages of articles that were written and published in peer-reviewed journals from the time of the attack through September 2004, and the body of literature has grown since then.

Mrs. MALONEY. Without objection, may we place that report in the record, Chairman.

Mr. TOWNS. Without objection.

[The information referred to follows:]

record

- New York Times, September 7, 2007, Accuracy of 9/11 Health Reports Is Questioned by Anthony DePalma and Serge F. Kovaleski
- STATEMENT OF SENATORS SCHUMER AND CLINTON AND REPRESENTATIVES MALONEY, NADLER AND FOSSELLA REGARDING 9/11 HEALTH EFFECTS
- The Mount Sinai Medical Center Statement
- Submitted letter to NYT from Steven Markowitz MD
- Submitted letter to NYT from Philip J. Landrigan, MD, MSc
- A transcript of the Mayor's comments on the radio show

New York Times
September 7, 2007

Accuracy of 9/11 Health Reports Is Questioned

By ANTHONY DePALMA and SERGE F. KOVALESKI

Much of what is known about the health problems of ground zero workers comes from a small clinic in Manhattan that at the time of the trade center collapse had only six full-time doctors and a tiny budget.

Yet in the weeks after 9/11, its doctors stepped into the fray in the absence of any meaningful effort by the city, state or federal government to survey, interview or offer treatment to potentially sickened recovery and cleanup workers.

Since then, the clinic, the Irving J. Selikoff Center for Occupational and Environmental Medicine, based at Mount Sinai Medical Center has examined more than 15,000 workers and volunteers and has overseen the examination of 5,000 more at clinics elsewhere.

Those programs have received more than $100 million from the federal government for tracking and treating those workers. The clinic's doctors published the largest and most often quoted study of recovery workers' ills. And they have testified about the health problems before city and federal committees.

But six years after the disaster, it is clear that while the center's efforts have been well meaning, even heroic to some, its performance in a number of important areas has been flawed, some doctors say. For years after 9/11, the clinic did not have adequate resources or time to properly collect detailed medical data on workers exposed to ground zero dust.

The clinic's doctors presented their findings in what other experts say were scientifically questionable ways, exaggerating the health effects with imprecise descriptions of workers' symptoms and how long they might be sick.

Researchers in this field say that the clinic's data collection was so badly planned that its usefulness may be limited. Others say that doctors at the clinic, which has strong historical ties to labor unions, have allowed their advocacy for workers to trump their science by making statements that go beyond what their studies have confirmed.

Dr. Albert Miller, a pulmonologist who spent more than three decades at Mount Sinai before moving to Mary Immaculate Hospital in Queens in 1994, worries that the actions of the center's leaders have harmed the legitimate cause of workers who might be in need of help. "They are doing the workers a disservice," he said, "because any time you veer from objective and confirmable statements, you're destroying your own case."

"They are people with a cause," Dr. Miller said.

Even now, there is debate about how harmful the dust was, and whether it could cause cancer or debilitating chronic diseases, although there is emerging medical consensus that workers who arrived at ground zero early and stayed longest were at greatest risk of getting sick. Medical studies by the Fire Department, and most recently by the city health department, show that the dust has caused diseases like asthma and sarcoidosis (a lung-scarring disease) in a small percentage of rescue workers.

Although the Selikoff clinic's research has found signs of ill health in more workers than other studies, it generally tracks the same trends. But that has not lessened the skepticism of critics.

The clinic's leaders acknowledge that their efforts were troubled. But they challenge anyone facing the same hardships to have done better. The doctors point out that they took on ever-increasing responsibilities with federal financing that came in fits and starts. They had to continue their clinical care while collecting data, and clinical care had to come first. They tackled an unprecedented epidemiological challenge with too little money, too few records and too little time to plan properly.

"I'll accept that we could have done some things better and there's always room for improvement," said Dr. Philip J. Landrigan, who has overseen the clinic's efforts to help ground zero workers. "You have to have a thick skin in this business."

While organized labor has steadfastly supported and praised the Selikoff Center's efforts, other doctors say its missteps have heightened the anxiety of New Yorkers who expected the center to answer medical questions that have unsettled the city since 9/11.

There remains confusion about whether government officials should have done more to protect workers from toxic materials at ground zero. The city is still contesting thousands of lawsuits from workers who claim they were sickened while working at ground zero, even as it is providing millions of dollars to Bellevue Hospital Center to treat people sickened by the dust.

And experts agree that the clinic's imperfect work - done alone and under difficult circumstances - might have long-lasting consequences if the poorly collected data eventually skew the results of future studies. Should the clinic come to conclusions different from other medical researchers, say experts, those contrary findings would confuse the overall health picture, delaying scientific consensus. The city would then have lost valuable time in developing a precise picture of diseases from this kind of disaster and the public health response needed.

Dr. Steven Markowitz, who runs a ground zero screening and monitoring program at Queens College and who worked at the Selikoff Center in the 1980s, says there is no doubt that the clinic, for all it has accomplished, has also let people down.

"Frankly," he said, "it was reasonable for the public to expect more."

A Logical Choice

Forty-eight hours after the attack, Dr. Robin Herbert, Dr. Stephen Levin and other Mount Sinai doctors met at a Westchester County home to figure out how to respond to the disaster at ground zero. They agreed to volunteer extra hours to see sickened workers, and to gather medical information on them. And in the weeks and months that followed, the Selikoff Center was virtually the only place for workers to turn to.

While federal officials warned those on the pile to protect themselves from the dust, they also said that the chance of developing serious long-term illnesses was low. And city officials stressed that the risk of illness from exposure was minimal. They also faced enormous legal liability if workers on the smoldering pile got sick.

Thomas R. Frieden, commissioner of the New York City Department of Health and Mental Hygiene since 2002, said in a recent interview that the threat of lawsuits in no way shaped the city's response. Rather, he said, the city did not step in more forcefully because clinical treatment is not one of the department's responsibilities. But, he said, it was something the Selikoff Center did well.

Few people in New York's medical community were surprised that the center had taken the lead. After all, the Selikoff Center, named after a pioneering asbestos researcher who died in 1992, was founded in the mid-1980s with political backing from New York labor leaders. It was well known for serving injured union workers, including those with lung diseases, a major concern of Dr. Selikoff's.

But on 9/11, the center was focused mostly on repetitive strain injuries, the workplace hazard of the moment. Still, ground zero workers complaining of a persistent cough started showing up on Oct. 2. It was not until April 2002, six months later, that the Federal Emergency Management Agency provided the center with $12 million to support a program to give physical and mental health examinations to 9,000 workers.

But the clinic got no money to begin a comprehensive research program, or to make any long-range plans for tracking or caring for injured workers.

"We were told very unequivocally that we were not being funded to do research," recalled Dr. Herbert, who has been a part of the of the screening program since its inception. "We were being funded to do screening."

Without money or time to plan, they started collecting data anyway, knowing that it would be necessary to track the rise of symptoms related to dust exposure. But the medical history questionnaire they pulled together was an unwieldy 74 pages long, full of questions that were too vague to be useful. When combined with X-rays and breathing tests, the examination process took more than three hours and scared off many workers. Some of the data was collected on paper and stored in boxes.

"It took me three months just to figure out where the information was and how it had been kept," said Dr. Jeanne Mager Stellman, a medical researcher who was hired as deputy director of the data center in April 2006. "I don't think they knew what they were getting into."

Dr. Stellman resigned last November for personal reasons but continued to work on several mental health studies of ground zero workers. "This is a program that's done

enormous good for 20,000 people," she said, "but it's a program that has not yet met expectations."

The clinic's doctors also faced significant problems because critical information was simply not available. There were no records of how many people worked at ground zero or for how long. No one knew exactly what was in the dust or how much contamination each person at the site breathed in. And since many workers had not seen a doctor regularly before Sept. 11, there was no reliable way to confirm when respiratory symptoms and ailments started.

By contrast, the New York Fire Department, which monitors its 15,000 firefighters, knew exactly how many firefighters had been exposed. And mandatory annual checkups provided precise medical histories.

It was not until 2004 that the Mount Sinai clinic started to receive federal financing for analysis - about $3 million a year for a data and coordination center. The money was part of $81 million in federal aid for medical tracking - half to cover firefighters, and the rest for ground zero workers.

By then, it was too late to undo some of the missteps made early on.

A Misleading Impression

The Selikoff Center has been criticized for blurring the line between scientific observation and alarmism in acting like an advocate for worker causes. But its doctors say that an aggressive approach is necessary in occupational health because employers tend to challenge complaints about workplace safety.

"I've spent my whole professional life walking that line," said Dr. Landrigan, who founded the center in 1986 with Dr. Selikoff. "You can collect facts and be rock-solid certain about those facts, but you know quite well that those facts are only a piece of the puzzle. The intellectual question then is: 'Do I have enough information to issue a call for action?' "

Last year, as the fifth anniversary of the attack approached, the center produced a major report that was published in Environmental Health Perspectives, a scientific journal of the National Institute of Environmental Health Sciences, a federal agency. The report said, and Dr. Landrigan declared at a major press conference, that 69 percent of 9,442 responders examined had reported "new or worsened respiratory symptoms."

In fact, a chart accompanying the report showed that 46.5 percent reported the more serious lower respiratory symptoms, which lung specialists consider to be indications of significant health problems (17 percent reporting shortness of breath, 15 percent reporting wheezing, and 14 percent listing cough with phlegm), while 62.5 percent of the workers reported minor upper respiratory symptoms like runny noses and itchy eyes.

The decision to combine the two categories of symptoms was criticized by medical experts, but it made a powerful - and misleading - impression on the public and the press about the nature and scale of the health problems.

"There is not a scientific reason to lump those two together," Dr. John R. Balmes, a professor of environmental health and medicine at the University of California San

Francisco, who reviewed a version of the report before it was published, said in a recent interview. "Science is better served separating them."

Dr. Miller, who called the press conference a "public relations extravaganza," said: "I'm not as worried about a runny nose as I am about shortness of breath."

In fact, the 69 percent figure - though it deals with symptoms, rather than actual diseases - suggests a more alarming picture than other studies. For example, a report by the city health department released last week showed that about 4 percent of 26,000 ground zero workers reported developing asthma after working on the pile. And the Fire Department's sarcoidosis study focused on 26 new cases of the disease since 9/11.

Dr. Landrigan, in an interview, defended the way he presented the findings, maintaining that symptoms like a persistent runny nose could have indicated more serious lower respiratory problems.

The clinic was also criticized for suggesting that the symptoms were longer lasting than their own evidence indicated at the time. No symptom, major or minor, had persisted for more than two and a half years when the study was done, and a condition is not generally considered chronic until it lasts at least five years, doctors say. Yet Dr. Herbert said at the press conference that many workers would "need ongoing care for the rest of their lives."

Newspapers, including The New York Times, gave prominent play to Dr. Herbert's statements about the lasting nature of the problems. For some experts, her words went too far.

"It's very hard to predict the future," said Dr. Markowitz. "I know people want answers, and I know people want to give answers, but we really have to stick to the scientific method if we want to understand the truth."

One thing is certain. The press conference galvanized many more workers to seek medical exams. More than 1,000 additional workers signed up for monitoring and 500 new workers continue to enroll each month even now.

Dr. Landrigan said he and his colleagues did not exaggerate their findings to scare workers. But other experts said the doctors may have caused a panic.

"We have patients constantly saying after one of these pronouncements, 'Am I going to die?' " said Dr. David Prezant, deputy chief medical officer of the New York Fire Department, who has overseen several epidemiological studies for the department.

Dr. Prezant said that the Selikoff clinic's statistics sometimes so worried workers that they neglected proven treatments to seek unorthodox cures that have questionable results.

In what many critics regard as the clinic's most disturbing recent miscue, Dr. Herbert said in a 10-minute audio interview posted in May on the Web site of The New England Journal of Medicine that she was seeing the beginning of a "third wave" of disease, referring to cancer. In her interview, which accompanied a separate article on ground zero health effects by doctors not affiliated with the Selikoff Center, she named specific types of cancer - leukemia, lymphoma, multiple myeloma - and expressed concern about "synergistic effects" caused by chemicals in the dust, a controversial contention among medical experts.

She was instantly criticized by doctors outside Mount Sinai, who felt her comments were irresponsibly speculative because there is no evidence yet to conclusively link exposure to the dust to cancer. But the city's tabloid newspapers seized on Dr. Herbert's comments, prompting another panic among some recovery workers.

In an interview last month, Dr. Herbert defended her comments, explaining that she was speaking as a clinician and sharing her observations about diseases she was seeing with other clinicians.

"I feel that it is our job to communicate as clearly as we can what we do know, what we worry about, what are possible red flags," Dr. Herbert said. "We have to strike a balance between not exaggerating and not waiting to act until we have absolute proof."

Praise From Unions

Today, union officials stand by the work the Selikoff Center has done.

"Sinai should be canonized for the services it is providing," said Micki Siegel de Hernandez, the health and safety director for District 1 of the Communications Workers of America "The doctors have really established relationships with responders who walk in. This is the place where workers know that the people care and have the expertise."

Only late last year did the center and the other clinics begin getting federal money to treat ill workers - $17 million then and more on the way. About 10,000 are now receiving treatment, which generally consists of prescription medication or counseling.

Most days, dozens of ground zero workers make their way to the clinic on East 101st Street. Dr. Jacqueline Moline, who now directs the programs, said some workers show up to be examined for the first time. Others come back to be re-examined. All of them expect answers, but for most, uncertainty has become a constant part of their lives. The center continues to collect data from each of them, and Dr. Landrigan said he expected to publish as many as 10 new reports within the next 18 months.

Eventually, doctors and scientists analyzing the long-term effects of the dust will take into account not only Mount Sinai's studies but those of the Fire Department, the city's health department and other sources. Clinical studies will continue for decades.

The Selikoff doctors acknowledge their mistakes, but they do not apologize for speaking out aggressively about the potential health dangers.

"If our advocacy has brought in people and we've saved their lives because we've identified health problems, whether they're World Trade Center-related or not, I'll take that any day of the week," said Dr. Moline. "And if that's our epitaph - that we talked loudly and we brought people in for health care - so be it."

For Immediate Release
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STATEMENT OF SENATORS SCHUMER AND CLINTON AND REPRESENTATIVES MALONEY, NADLER AND FOSSELLA REGARDING 9/11 HEALTH EFFECTS

After the tragic attacks of 9/11, thousands of first responders, building and construction trade workers, volunteers, residents, office workers, students and others were affected by the toxins that were released into the air and many are now suffering serious physical problems as a result. Many also experience mental health effects linked to the trauma they faced during the attacks and during the subsequent rescue and recovery.

The scientific peer-reviewed published work of Mt. Sinai, the Fire Department of the City of New York, the World Trade Center Health Registry and others have documented the long-term health effects resulting from 9/11.

It is our obligation to continue to care for the heroes who so selflessly risked their health and their lives in the days, weeks and months after September 11th, and we believe this Administration is long overdue in providing the support and resources necessary to address these health concerns.

Mt. Sinai's doctors were quick to respond to the needs after the attacks and offered specialized care to the responders, workers and volunteers with limited resources. As funding has become available, it has helped to set up essential monitoring and treatment efforts that have served tens of thousands of responders, and has played an invaluable role in helping to understand the health impacts emerging from this tragedy, while providing care to those who are ill.

The facts are clear: In the aftermath of the attacks on the World Trade Center, thousands became ill. There is no doubt that people are suffering as a result of their exposure to toxins released on and after September 11th. As a result, we will continue to work together to develop a long-term solution and meet our obligation to those who need and deserve it.

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The Mount Sinai Medical Center Statement:

> "We stand by our findings regarding the rate of respiratory illness in first responders on 9/11. We published these findings one year ago in the highly-respected, peer-reviewed medical journal, *Environmental Health Perspectives,* an official journal of the National Institutes of Health.
>
> It would have been irresponsible for us not to collect and publish this information to help us better understand the symptoms and illness we were seeing and to improve our ability to treat these patients.
>
> Without any funding we began to treat these heroic men and women who became ill in the days following the attack. Since that time, we have examined 21,000 people who have experienced varying degrees of illness related to their work at ground zero and have been able to apply the knowledge and understanding we have gleaned from our data collection and clinical experience.
>
> Mount Sinai's mission, then and now, is to provide the best possible care to the brave men and women who put themselves in harm's way, to share with them the knowledge we are discovering about their illnesses, and always to be here to help."

To the Editor:

In: "Accuracy of 9/11 Health Reports is questioned" (NYT, September 7, 2007), A. DePalma and S. Kovaleski question the veracity of the physicians at Mount Sinai Medical Center who provide care for 15,000 World Trade Center workers. These physicians are accused of questionably accurate and exaggerated health reports about 9/11 health effects that may "skew" results and "confuse the overall health picture" of 9/11 workers. A chorus of medical experts, including myself, are cited as supporting this point of view.

These assertions are incorrect, and I was very disturbed to be quoted as suggesting that I support these contentions. It is true that the medical community, not just Mount Sinai physicians, has been a little slow in issuing full scientific reports about the health of 9/11 workers. The public has a reasonable expectation for timely medical publications from the involved medical community, including myself. The main reason for this slowness has been the extraordinary demands created by 9/11 on an occupational medicine system that had limited capacity to provide that care.

In place of an attack on their integrity, the Mount Sinai physicians deserve enormous credit for stepping forward in a very difficult situation and providing expert and compassionate care for thousands of workers in need. Who else stepped forward?

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September 7, 2007

Letter to the Editor
New York Times

Regarding your story "Accuracy of 9/11 Health Reports is Questioned", Friday, September 7, 2007, we stand by our findings on respiratory illnesses in 9/11 responders.

We published these findings one year ago in *Environmental Health Perspectives*, a peer-reviewed journal of the National Institutes of Health; 46.5% of responders had lower respiratory symptoms, 62.5% had upper respiratory symptoms, and 68.8% were affected overall.

We published these results because as physicians it is our responsibility to disseminate information to the medical community and the public. This hard-won information guides diagnosis and treatment.

Mount Sinai launched our response to 9/11 just 48 hours after the attack. We were the only institution to offer care to responders in those early days. We have now examined more than 21,000.

Our mission is to provide the best care to the men and women who served, to share our knowledge, and always to be here to help.

Philip J. Landrigan, MD, MSc
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A transcript of the Mayor's comments on the radio show follows:

Gambling: We continue, John Gambling, Mayor Michael Bloomberg and you right here at 77 WABC. We were talking about hospitals. Did you see the article in The New York Times today about the J. Selikoff Center for Occupational and Environmental Medicine and the 911 Center?

Mayor: Yeah, I think a lot of this is, you know, different people can interpret data in different ways but I think one thing is clear, that there are real health consequences to those who were down at the site during the recovery- rescue and then recovery. And there's just no question that 9/11 health effects are serious and that our Fire Department and our- from the program at Bellevue Hospital and the World Trade Center Health Registry confirmed the problem, and Mt. Sinai's data is in there as well. You know, last September I asked Deputy Mayors Gibbs and Skyler to take a look at it and we concluded that the Fire Department and Mt. Sinai and Bellevue programs, which we've termed 'Centers of Excellence,' really have to be the core part of our ability to address this problem. And they've developed a lot of expertise; they've got an enormous amount of data. Interestingly, the Fire Department data is the best data because Fire Department-

Gambling: Well even this article acknowledged that.

Mayor: Yeah, they have data going all the way back so you know what people were before then. If you're just starting at that time, the science is more difficult. But we've formed a medical working group from experts in the City government and out, including Mt. Sinai people. And we've asked them to look at the latest research and the latest techniques in treatment. And the bottom line is when you get all done, we need these Centers of Excellence to go on and we need other 9/11 programs and we've got to get some federal monies to pay for it because the cost of providing medical care to people who really are sick will be significant going forward.

Gambling: Also, there are legal ramifications here as well.

Mayor: You know, there's nothing you do which isn't- and it's like with the data we talked about from the HHC hospitals, the lawyers always say, 'oh don't release anything because that gives somebody that's suing you ammunition.' But, you know, the truth is the truth and you've got to get the data out there and then my attitude is, the lawyer's job is to deal with that not to manage the data. You know, you can't totally do that; companies obviously try to put the best foot forward and protect themselves and that's understandable. But I think what you're really seeing that- at Mt. Sinai with this article is simply: different doctors can interpret data different ways and if you work with it all the time you probably think that everybody has it; 70% of the people that show up have something. Yeah, but you don't know how many people didn't show up. Maybe an awful lot more people didn't so the number is a lot smaller percentage. But what is clear is some people really do have serious respiratory and other problems that come out of breathing the air back then.

Gambling: And of course the fear that lingers because again, there are no hard and fast answers here.

Mayor: There are no hard- and you know, I said that at the beginning and I got vilified, if course, in the press. 'What do you mean? We demand an answer right now.' It's not the way medicine works. You don't- most time you can never, with 100% assuredness, know what the

cause and effect is. And you just can't- you know, you get different results with different people with the same symptoms, with different medicines or the same medicine. This is- medicine is still in its developmental stages, there's a long way to go. We don't know everything about all this.

Mrs. MALONEY. And, do you have any doubt that currently thousands of responders are sick, some of them very seriously sick, because of the exposure they endured during their work in the aftermath of 9/11.

Ms. BASCETTA. No doubt. I believe HHS's own draft plan notes that there are thousands of sick responders.

Mrs. MALONEY. And last, should the government be doing more to help the sick heroes and heroines of 9/11.

Ms. BASCETTA. Absolutely.

Mrs. MALONEY. Thank you, Director Bascetta.

And so, the Director for Health at the U.S. Government Accountability Office, well-known as the independent congressional watchdog, has no doubt that the health effects of 9/11 are real and serious, and that they are affecting thousands of people, and that our government should be doing much more to help. And, I hope that everyone hears this message loud and clear. And, I think that this is a very important part of your hearing today, Congressman Towns.

And, I would like to thank Dr. Thorpe for her work with the New York City Health Department and to ensure that mental health services are available.

And, I want to know why did you close the Registry.

I will tell you, I know there are 71,000. I know that every congressional district is in it, and every State in the Union. But I, to this day, have people who come up to me either on the street, my congressional office, my home, and say, "You know, after 9/11, I wasn't sick. Now, I am sick. It just happened."

And so, health problems are arising. And, as we know from Dr. Melius's testimony and from Dr. Eth's, a lot of these things are going to keep coming up further down the road. And, I personally don't think the Health Registry should be closed. I think that people who may die today, or develop the asthma today, and were there—you know, some will say to me, "You know, I was just there on 9/11 and 9/12," and I will say, "Well, that is the worst 2 days. No wonder you have a problem."

But why did we close it? Why aren't we making adjustments for the people that are still sick——

Dr. THORPE. Thank you, Congresswoman——

Mrs. MALONEY [continuing]. Or becoming sick.

Dr. THORPE [continuing]. Maloney.

The purpose for closing the World Trade Center Health Registry is not one to shut out the individuals who later developed illness in any fashion. The purpose of closing the Registry after a certain period of enrollment was purely for validation of a similar time period, where people who did enroll were telling the information that they had on their exposures within a short, finite time period.

One standard challenge for epidemiologic studies is that you combine the individuals who described their experiences early on, at a date after an event, and you combine that with persons who describe their experience years later, that the descriptions change over time, or may change over time, and could call into question the very purpose of the tracking of the Registry.

All individuals who are developing any late-onset symptoms should be in a World Trade Center of Excellence program, where

they can be evaluated. And that data and that information is very important.

This was not a disease registry. This was an exposure registry. So, the focus was getting a clean snapshot at a finite period of time, that may track the effects in those potentially highly exposed people. This is part of the picture and is an important component.

And similar, the different component of the health profile of people who were available in the clinical centers at Mount Sinai, at Bellevue and the Fire Department, are another profile.

Mrs. MALONEY. But, following up on your statement that it is an exposure registry, I think it should certainly be limited to those who were exposed, but if there is no doubt that a firefighter or someone else was exposed on September 11th or 12th or the 13th were fine, and then all of a sudden they are sick 5 years later, they should be part of it.

And, as you know, the monitoring program at Mount Sinai and at Bellevue and Queens and some of the other areas that are there, they are very limited. As you know, they are limited only to the responders. They do not include the area residents who were exposed. They do not include the volunteers. They do not include the school children which, according to your report, are now coming up with increased asthma. So, I think we should look at re-opening it.

But I would like to talk to Dr. Eth and Dr. Melius. I know my time is coming to an end.

And, you were deeply involved, actually representing labor in the consortium that really worked for 6 years now, through various routes, to create the 9/11 Health and Compensation Act, which Mr. Nadler and Mr. Towns and I will be introducing, along with Charlie Rangel and others, this week.

If passed by Congress and signed into law by the President, would this legislation allow for the monitoring and treatment of all those affected, especially those now not covered at all.

And, I regret, Mr. McHale, that you had trouble getting covered, but your story is like so many other responders, some of them I see in the room, who were turned down for treatment.

Would this comprehensive bill treat these people?

Dr. MELIUS. Absolutely. It includes all Federal workers, by statute, into the bill. And, it also includes provisions for what we refer to as a national program for covering people outside of the New York City metropolitan area. So, they would be covered.

It also provides for the development and naming of new centers, what we are referring to as "Centers of Excellence," that provide clinical care. So, for example, Saint Vincent's would become a Center of Excellence, and it would become part of that program. Certainly, as they have described their efforts so far, they would, you know, I believe that it would qualify under the way the legislation is written, at least my knowledge of it.

So, I think it absolutely would provide the framework for covering everybody who is now having difficulty getting covered. It expands the coverage to include residents, workers who also had, you know, very significant exposures cleaning out offices and buildings, people in their homes and apartments, who were exposed, school children. So, I think it really comprehensively deals with everyone who was potentially affected, and it will provide them with the

monitoring, the screening, and the health treatment that they deserve.

Mrs. MALONEY. So, it doesn't rely on what hat you were wearing that day, but the extent of your exposure.

Now, since there are some of these articles that are saying people aren't sick, or maybe they weren't sick from 9/11, how is that treated in the bill? I understand that there is very high medical standards written into the bill, because I was there when we wrote it and that the medical profession would have certain criteria that they develop that is related to 9/11 and you have to be certified that you had that.

Could you go through how people would be able to be treated, so that there would be no abuse, but that it would be there for the people who truly warrant it.

Dr. MELIUS. Certainly, to be initially eligible for the screening or for monitoring, the examinations, one has to have some evidence that they were exposed. And, there are criteria that have already been developed, as far as the programs that relate to the type of work that people do, did at the time and the time period of that work.

And then, similar criteria would be developed for the other groups. The program at Bellevue Hospital is already working on that, meeting with community groups, labor groups, others that are involved there, that aren't covered by the current responders' programs, and develop those criteria.

So, those would need to be developed. They would be, you know, promulgated, as far as the program, by the Federal Government, with significant input from the outside groups, affected groups.

And second, there are criteria for how people would be—what conditions would be treated? Currently, there is a list of conditions that include respiratory, upper respiratory, mental health conditions, gastrointestinal conditions, that have been found in significantly higher rates in the responders. That list can be expanded, additional conditions added.

And, a similar list, based on the initial list, would be developed for people who living in the community, people that worked in other areas in ways that are not currently eligible for the program. Again, that would be done through a public process, in a timely fashion, so that people would be able to receive treatment, but will be treated for World Trade Center-related conditions.

Mr. TOWNS. All right.

Mrs. MALONEY. I thank the Doctor, and my time has expired.

Mr. TOWNS. Yes.

Mrs. MALONEY. Thank you, all the panelists.

Mr. TOWNS. Right. Let me yield now to Congressman Nadler.

Mr. NADLER. Thank you, thank you, Mr. Chairman.

Let me begin by following up on the first question that Congresswoman Maloney asked. This morning's New York Post says the following: "a searing New York Times piece suggests that an activist clinic"—meaning Mount Sinai—"egged on by opportunistic pols and naive (at best) journalists, has blown health fears way out of proportion. Bottom line: There is scant reliable scientific evidence to link 9/11's toxic plume to any serious, chronic health problems. . . .

It casts doubt on the severity of even the short-term fallout. . . . There is scant evidence that any lives were endangered."

Ms. Bascetta and then Dr. Thorpe, could you comment on those assertions?

Ms. BASCETTA. It is a shame that was published. You know, as I said, I——

Mr. NADLER. Well, it is in the Post, so—[laughter.]

Ms. BASCETTA. Well, even the New York Times article, if you read it closely, didn't say there were no health effects. There was more argument around the aims of——

Mr. NADLER. Well, that is my next question, on the New York Times article.

Ms. BASCETTA. OK.

Mr. NADLER. I will come to that.

Dr. Thorpe, do you have any comment on this? I mean, on the observation that there were no long-term health effects, no evidence of long-term health effects, scant evidence of short-term health effects.

Dr. THORPE. I think the consistent—one of the things that epidemiologists look for by trying to understand the exposure, causes of disease, is the consistency of the literature. And, there is growing consistency of literature across the studies, from the medical monitoring programs, from the World Trade Center Health Registry, and elsewhere, on physical health effects and mental health effects among the rescue and recovery workers.

Mr. NADLER. So, would you both agree or disagree than any competent, honest epidemiologist would say this is nonsense?

Ms. BASCETTA. Yes, I would agree.

Dr. THORPE. I think that would be different scientists who analyze data differently, but I think most scientists would look at the growing literature and say that there are clear health ramifications from 9/11.

Mr. NADLER. Thank you. Now, as we said that, I read—and obviously you have read the New York Times article, since you just referred to it—I was going to ask you if you had. I read that article very carefully on Friday.

Would it be fair to say, because this is what I found there, that one of the key points, really, is that to the extent that there is some doubt in the literature, or doubt as to control groups, it is because nobody—neither the Federal, State, or city governments—did adequate studies in the first 9 months, so you don't have a base control, and that is the real problem, to the extent there is a real problem.

Ms. BASCETTA. Well, it is a contributing factor to the difficulties in doing the research. But, you know, I have a different response.

One of the—the Fire Department is really the gold standard. They have baseline data on their workers, and it is absolutely clear from their studies that the health effects are simply not questioned.

Second, as Dr. Thorpe has said, there are well-accepted epidemiological dictates that involve looking for excess rates of disease in populations where, you know, we don't have very good medical records, you don't know what their baseline health was before, so it is more complicated. But, you can certainly document, and it has

been documented, that respiratory effects, asthma, PTSD, you know, do appear to be diagnosed at rates that are higher than we would expect.

Mr. NADLER. And, are you familiar with the Mount Sinai study?

Ms. BASCETTA. I am.

Mr. NADLER. Would you say that is a good, competent study?

Ms. BASCETTA. It was published in a well-thought-of peer-reviewed journal. I would have no reason to doubt that their techniques were in question.

Mr. NADLER. So that the aspersions, the comments, and the loathage of the Mount Sinai researchers here would have no foundation, in your opinion.

Ms. BASCETTA. I wouldn't weigh them in my assessment of the literature. I would certainly include some in any view of it.

Mr. NADLER. Thank you.

Dr. Thorpe, in your testimony—first of all, you say, "We estimate that it requires at least $4.5 million per year to maintain the Registry for the remainder of its 20-year life."

Why only 20 years? Shouldn't we maintain this Registry for the balance of the lives of all of the people involved in it.

Dr. THORPE. Twenty years is the commitment that we gave to participants who enrolled. That does not in any way negate the potential need for this Registry to move forward beyond 20 years, if we are looking at long-term health ramifications, development of cancers with long latency periods, or mortality. There are many reasons why it may——

Mr. NADLER. And it——

Dr. THORPE [continuing]. Serve for a longer period.

Mr. NADLER. And, since the basic purpose of the Registry is for research and for knowledge, as you said a few minutes ago, that would seem to indicate that we should keep the Registry open much longer.

Dr. THORPE. Yes, depending on the findings of the first run of the Registry, yes.

Mr. NADLER. OK, thank you.

I have a second question. You referred in your testimony quite often to the asthma study found that 3.6 percent of previous asthma-free rescue and recovery workers reporting asthma as 12 times the normal rate in the general population. Further on, you refer to findings in the Fire Department, showing a higher than normal—the problem of health problems. These studies demonstrate the need for continued monitoring and care of exposed workers, etc.

So clearly you and Ms. Bascetta, both, and Dr. Eth, with respect to mental health conditions, you say clearly that there is more than ample evidence of heightened rates of all kinds of pathologies, as a result of the exposure to these toxins.

Dr. THORPE. There is a lot of evidence on the widespread experience of respiratory symptoms among the people who responded to the World Trade Center site as a volunteer or a worker. There is widespread evidence of long-term mental health implications. And, I think there are still a lot of unknowns.

Mr. NADLER. OK.

Dr. THORPE. It is still unknown——

Mr. NADLER. There is a lot of evidence for what you said.

Now, the State and the city and the Port Authority, as we have heard from Mr. McHale and others, have been contesting causation on all kinds of Workers Comp and other claims. Now, I observed before that we know that, as a result of Hiroshima and Nagasaki, there were wildly increased incidents of cancer in the exposed population. But, you couldn't prove that an individual case of leukemia would not have otherwise occurred, even if it is 90 percent would not otherwise have occurred—even if 90 percent of the people who came down with leukemia in Hiroshima would not have done so but for the atomic bomb, and 10 percent would have, the statistic is, you couldn't prove which was which.

So, is it fair, is it proper for these government agencies to be denying claims on the basis that you can't prove that your case of asthma, your case of sarcoidosis, was caused by this, even though we know that 98 percent would not have occurred but for this.

Dr. THORPE. I can't speak to these individual cases. What I can speak to is the difficulty and the importance of understanding the relationships between the level of exposure and the development of a disease. Heart disease and cancer are common conditions that are going to exist and that are going to occur, independent of whether or not the World Trade Center attack——

Mr. NADLER. Occurred.

Dr. THORPE [continuing]. Has resulted.

Now, the difficulty in identifying whether or not cancers or heart disease deaths are occurring at a greater rate as a result of these events——

Mr. NADLER. Or asthma or sarcoidosis or——

Dr. THORPE [continuing]. Is a very important endeavor, but it is—and because there are so many background cases——

Mr. NADLER. But my question——

Dr. THORPE [continuing]. It is a challenge.

Mr. NADLER. It is a challenge, but is there any way—well, my real question is, is government asking something impossible and unfair, when it says to a firefighter who was in the peak of condition and suddenly can't breathe any more, prove this was World Trade Center-related.

Dr. THORPE. I can't speak to these single conditions, Again, what I can speak to is——

Mr. NADLER. I mean, a health condition. Can you assume that most of these cases are because that—is it unfair ethically, never mind legally, is it not fair, the requirement to ask that kind of proof? Is it not realistic to require it, knowing that most—let me re-phrase the question.

Is it the case that most with sarcoidosis, these lung diseases, most people who are coming down with it who were exposed probably would not have, and therefore, it is unfair to ask the specific proof in each case.

Dr. THORPE. I am having a difficult time answering your question——

Mr. NADLER. OK.

Dr. THORPE [continuing]. Because you are talking about many different conditions together in one, and I think each condition merits its own individual evaluation.

Mr. NADLER. Thank you.

Ms. Bascetta, have you seen any evidence that the Federal Government is doing anything to expand the services that it provides beyond responders to residents, office workers, school children, other people who were exposed and who, as a result of that exposure, are sick or may get sick in the future.

Ms. BASCETTA. I have not looked into that. There is another team at GAO that has done work on ambient air. They have responsibility for EPA, and I could take a look at that report and have it submitted to the record.

Mr. NADLER. I would——

Ms. BASCETTA. I don't believe that it specifically addresses the problems of those groups.

Mr. NADLER. Well, I would appreciate if you would, because I have seen no evidence that the Federal Government has done anything with response to anybody other than the specific first responders.

I think my time has almost expired. Let me just thank all of you for your services in various lines, in particular Dr. Melius, for your help in developing the legislation which we are introducing.

I just want to say that I wasn't aware that quote that I always use from President Lincoln was the motto for the Veterans Administration. But, it is fitting that it is. And, I think that this Federal Government, State government, city government have been incredibly deficient, incredibly guilty in not meeting the moral debt that we all owe to the first responders and to the other victims of this terrorist attack on the United States.

Mr. TOWNS. Thank you, very much, Congressman. And, let me just say that I will thank all of you for your testimony.

But, I cannot let this moment pass without saying that, when you look at the clinics, look at the Borough of Brooklyn, which has 2.5 million people in it. And, as I remember that day, as I saw the second plane hit, standing over by the Navy Yard, that I saw that dark cloud coming over. And of course, I am sure that it affected people in Brooklyn. And, there are no ifs, ands, and buts about it.

So, I am hoping that somewhere along the line, that Brooklyn would get one of these clinics. And the reason I say that is I really, really mean it, that there are people in Brooklyn that have never been to Manhattan, have never been to Manhattan. So, it points out how serious it is to get a clinic in Brooklyn. You know, I have had the opportunity to talk to people over the years, who have said to me—I am talking about adults—that I have never gone to Manhattan. So which means that we need to establish something in Brooklyn where those 2.5 million people reside.

So, thank you, again, all of you, for your testimony, because as you know, as we look at the first responders, we also have to look at the residents, as well. So, thank you for your testimony. We look forward to working very closely with you in the days and months ahead.

You can see we are rushing to get to another meeting, and that is the reason why we are sort of being brief here. So, thank you, again, for your testimony.

The hearing is now adjourned.

[Whereupon, at 12:30 p.m., the subcommittee was adjourned.]

[Additional information submitted for the hearing record follows:]

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SURVEY FINDS ELEVATED RATES OF NEW ASTHMA AMONG WTC RESCUE AND RECOVERY WORKERS

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SURVEY FINDS ELEVATED RATES OF NEW ASTHMA AMONG WTC RESCUE AND RECOVERY WORKERS

New Findings from the World Trade Center Health Registry Indicate That Respirators Helped Reduce the Risk of Developing Asthma

NEW YORK CITY – August 27, 2007 – Findings released today by the Health Department shed new light on the health effects of exposure to dust and debris among workers who responded to the World Trade Center disaster on September 11, 2001. The data, drawn from the World Trade Center Health Registry, show that 3.6% of the 25,000 rescue and recovery workers enrolled in the Registry report developing asthma after working at the site. That rate is 12 times what would be normally expected for the adult population during such a time period. The paper was published today in the journal Environmental Health Perspectives and is available online at www.ehponline.org.

The rescue and recovery workers are a subset of the 71,000 people enrolled in the registry. The survey, conducted in 2003 and 2004, found that arriving soon after the buildings collapsed, or working on the WTC pile over a long period, increased the workers' risk of developing asthma. Workers who arrived on September 11, 2001, and worked more than 90 days reported the highest rate of new asthma (7%).

Though respirator use increased as the clean-up progressed, many workers did not wear respiratory protection at the outset. Certain respirators can reduce exposure to hazardous dust when used correctly, but the survey could not distinguish among different types of masks or respirators, nor could it gauge correct usage. Workers who wore them on September 11th and September 12th reported newly-diagnosed asthma at lower rates (4.0% and 2.9%, respectively) than those who did not (6.3% and 4.5%). The longer the period of not wearing masks or respirators, the greater the risk, the survey found. Workers who went months without respiratory protection reported two to three times more asthma incidence than those who wore respirators from the outset. Though respirators were shown to be protective, all worker groups, including those who reported wearing masks, had elevated levels of newly reported asthma.

"The dust from the World Trade Center collapse appears to have had significant respiratory health effects at least for people who worked at the site," said Dr. Thomas R. Frieden, New York City Health Commissioner. "These findings reflect the critical importance of getting appropriate respiratory protection to all workers as quickly as possible during a disaster, and making every effort to make sure workers wear them at all times. The events of 9/11 were unprecedented, and with the urgency of rescue operations and the difficulty of prolonged physical exertion with most types of respirators, there are no easy answers, even in retrospect."

Rescue and recovery workers were a diverse group that included firefighters, police officers, construction workers and volunteers, among others. The study found no significant differences among people of different occupations, but workers' locations did affect their risk. Those who were caught in the dust cloud or worked on the debris pile reported asthma at higher rates (4.9% and 4.5% respectively), presumably because they inhaled more dust.

Asthma can be controlled with the right care and medications. Inhaled corticosteroids are a very effective treatment for people with frequent symptoms. By learning what triggers asthma and developing a plan to manage it, people can stay healthy for work, school, and other activities. The Health Department has collaborated with clinicians from WTC Centers of Excellence to develop and distribute treatment guidelines for WTC-related respiratory condition. The guidelines are available at http://www.nyc.gov/html/doh/downloads/pdf/chi/chi25-7.pdf.

Update on Efforts to Learn More about WTC-Related Illness

The World Trade Center Health Registry, the largest public health registry in U.S. history, was launched in 2003 to track the health of people exposed to the collapse of the World Trade Center and those who worked at the WTC site. The registry is a collaborative effort involving the Health Department, the CDC's Agency for Toxic Substances and Disease Registry (ATSDR), with funding from the Federal Emergency Management Agency (FEMA).

The Health Department is now re-surveying all 71,000 registrants to learn more about their current health status. So far, nearly 60% of registrants have responded. The re-survey will help determine whether respiratory and mental health conditions have persisted five to six years after the disaster. Because of its size, the registry can illuminate patterns that would elude individual physicians and provide valuable guidance to affected groups. Previous findings from the WTC Health Registry can be found at http://www.nyc.gov/html/doh/html/wtc/materials.html.

The Health Department is conducting a separate study of respiratory health among registrants, and is analyzing records to see whether the disaster has affected cancer incidence. The Health Department – along with the Fire Department, Mount Sinai Medical Center and Bellevue Hospital – is also updating last year's guidelines for treating adults with WTC-related illness. A similar group of experts is developing guidelines for treating affected children.

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Asthma Diagnosed after September 11, 2001 among Rescue and Recovery Workers: Findings from the World Trade Center Health Registry

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Asthma Diagnosed after September 11, 2001 among Rescue and Recovery Workers: Findings from the World Trade Center Health Registry

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The authors declare they have no competing financial interests.

Running title: Newly-diagnosed Asthma among WTC Workers

Article descriptor: Respiratory Disease

Key words: asthma, disaster, masks, respirators, World Trade Center, workers

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Abbreviations:
ATSDR – The Agency for Toxic Substances and Disease Registry
CDC – The United States Centers for Disease Control and Prevention
CI –Confidence Interval
EMS – Emergency Medical Services
EPA – Environmental Protection Agency
FDNY – The New York City Fire Department
FEMA – The Federal Emergency Management Agency
IRB – Institutional Review Board
NYC – New York City
NYC DOHMH – The New York City Department of Health and Mental Hygiene
NYPD – The New York City Police Department
OR – Odds Ratio
OSHA – Occupational Safety and Health Administration
SCBA – Self Contained Breathing Apparatus
US – United States
WTC – The World Trade Center
WTCHR – The World Trade Center Health Registry

Outline

Abstract

Background: Studies have consistently documented declines in respiratory health after September 11, 2001 among surviving first responders and other World Trade Center (WTC) rescue, recovery and clean-up workers.

Objectives: To describe newly-diagnosed asthma among WTC site workers and volunteers, and characterize its association with WTC site exposures.

Methods: We analyzed 2003-2004 interview data from the World Trade Center Health Registry for workers who did not have asthma prior to 9/11 (n= 25,748), estimating the risk of newly-diagnosed asthma and its associations with WTC work history, including mask or respirator use.

Results: Newly-diagnosed asthma was reported by 926 workers (3.6%). Earlier arrival and longer duration of work were significant risk factors, with independent dose responses ($p<0.001$), as were exposure to the dust cloud and pile work. Among workers who arrived on September 11, 2001, longer delays in the initial use of masks or respirators were associated with increased risk of asthma; adjusted odds ratios ranged from 1.63 (95% confidence interval [CI]: 1.03-2.56) for one day of delay to 3.44 (95% CI: 1.43-8.25) for 16-40 weeks delay.

Conclusions: The rate of self-reported newly-diagnosed asthma was high in the study population and significantly associated with increased exposure to the WTC disaster site. Although we could not distinguish appropriate respiratory protection from inappropriate, we observed a moderate protective effect of mask or respirator use. The findings underscore the need for adequate and timely distribution of appropriate protective equipment, and the enforcement of its use when other methods of controlling respiratory

exposures are not feasible.

Introduction

Following the attacks of September 11, 2001 in New York City (NYC), an estimated 90,000 workers and volunteers were involved in rescue, recovery, clean-up, and support services (Dolan et al. 2006). The initial cloud of dust and smoke released during the collapse consisted of pulverized building materials and products of combustion, which settled heavily over the World Trade Center (WTC) site over the first twelve hours (Landrigan et al. 2004). In the subsequent two weeks, re-suspended particulate matter and fires were the predominant sources of airborne contaminants; smoldering fires continued to be a source of gaseous and particulate combustion products into December 2001 (Landrigan et al. 2004).

Studies have documented increased respiratory symptoms, severe persistent cough ("WTC cough"), reactive airways disease, and declines in pulmonary function among surviving first responders and other WTC workers after September 11, 2001 (Banauch et al. 2006; Centers for Disease Control and Prevention 2004; Feldman et al. 2004; Levin et al. 2002; Herbert et al. 2006; Herbstman et al. 2005; Prezant et al. 2002; Salzman et al. 2004; Skloot et al. 2004). In each of these studies, declines in respiratory health were significantly associated with earlier time of arrival relative to the collapse of the towers. Likewise, being caught in the initial dust cloud on September 11, 2001 was significantly associated with increased respiratory symptoms among surviving occupants of damaged and destroyed buildings (Brackbill et al. 2006). Consistent with the results of these observational studies, mice that were experimentally exposed to high levels of fine particulate matter from the WTC site developed mild to moderate pulmonary inflammation and significant increases in airway hyperresponsiveness after acute

exposure (Gavett et al. 2003).

Traditionally, the control of workers' exposure to airborne contaminants involves a hierarchical approach that first aims to reduce or eliminate the source of pollution through engineering processes, such as by ventilation. Whenever effective engineering controls are not feasible, federal occupational safety standards require the establishment of a respirator program. The requirements include: informing employees of respiratory hazards, selecting appropriate devices for routine use and foreseeable emergencies, providing respirator training, fit-testing and medical evaluations, and conducting program evaluations (OSHA 2006). Underlying these regulations is the understanding that respirators should be used as a secondary means of controlling workers' exposure to airborne contaminants, knowing that that no device is fully protective, and that the margin of safety afforded by their use is strongly dependent on selection, fit, and appropriate use (Martyny et al. 2002).

In the aftermath of the WTC disaster, engineering controls clearly were not feasible. While steps were taken by a number of entities to provide respiratory protection to workers, adequate respiratory protection devices were not immediately or universally available or employed over the course of the rescue and recovery response. Self-contained breathing apparatuses (SCBA) typically used in firefighting are not designed for long term use and generally were not employed at the site beyond the first day of the collapse (Feldman et al. 2004). The types of alternative devices reportedly worn by emergency responders and other workers ranged from surgical masks and ordinary nuisance dust masks, which lack certification for particulate exposure, to disposable N95 respirators and half- and full-face respirators with cartridges (Feldman et al. 2004;

Prezant et al. 2002; Spadafora 2002). An inherent challenge was that many volunteers lacked prior experience and training in the use of personal protective equipment, including air filtering respirator (Jackson et al. 2002). Fit checking and qualitative fit testing began shortly after September 11, 2001, though was inconsistently performed. Quantitative fit testing for respirators with cartridges began in late October (Lippy 2002). While the percentage of workers using any respiratory protection increased over time (Feldman et al. 2004; Prezant et al. 2002), overall consistency of use was generally low to moderate. Estimates of the number of frequent users in late September and October range from approximately 20%-50% in observational data (Lippy 2002) to 50% (Banauch et al. 2006; Feldman et al. 2004) and 65% (Prezant et al. 2002) in self-reported data.

Using data from the World Trade Center Health Registry (WTCHR), we described the risk of self-reported asthma diagnosed by a healthcare provider after September 11, 2001 and its association with timing and duration of work at the WTC site as well as work-related risk factors for increased exposure to potential respiratory hazards. We then evaluated the use of masks or respirators of any type during work at the WTC site. We examined if their use had a protective effect on the risk of newly-diagnosed asthma, recognizing that not all devices provide equivalent protection against exposure to particulate matter and other air pollutants, and that improper fit and maintenance limit the amount of protection provided by any individual device.

Methods

Study Population and Exclusions

Workers and volunteers who conducted any rescue, recovery, clean-up and/or volunteer tasks at the WTC Site, Staten Island, or in transport between these sites from September 11, 2001 to June 30, 2002 were recruited to enroll in the World Trade Center Health Registry, a collaborative effort of the New York City Department of Health and Mental Hygiene (NYC DOHMH) and the federal Agency for Toxic Substances and Disease Registry (ATSDR), using lists of employees and volunteers involved in the response, where available, and via media and community outreach. The WTCHR protocol was approved by the Institutional Review Boards (IRBs) of the Centers for Disease Control and Prevention (CDC) and the NYC DOHMH. Informed consent was obtained from all participants.

Out of an estimated 91,469 workers involved in the rescue, recovery, clean-up and support services (Dolan et al. 2006), more than 51,000 people were identified and screened for worker/volunteer eligibility. Of these, 32,705 eligible participants completed an interview between September 5, 2003 and November 20, 2004, for an estimated coverage rate of 35.8%. A total of 29,626 registrants worked directly at the WTC site, defined as the area of Lower Manhattan west of Broadway, between Chambers Street to the north and Rector Place to the south. The pile, as it was commonly known, was further defined as the immediate area in the footprints of the collapsed buildings. The analyses presented in this paper pertain to workers located in any area of the WTC

site as defined above, distinguishing work on the pile where noted in the methods and results

We excluded workers who reported a diagnosis of asthma before September 11, 2001 (n= 2773). An additional 129 registrants who were under 18 years of age at the time of the interview were removed from the sample to limit our case definition to adult-onset asthma. Registrants who were missing one or more of the primary analytic variables (gender, age, NYC residence status on September 11, 2001, education, affiliated organization at the WTC site, smoking status, exposure to the initial dust cloud, first date of work, work history on the pile, use of masks and respirators, and asthma history) were also excluded (n = 976). Prior to these exclusions, when income was missing, we assigned registrants the median 2000 household income for their zip code (n = 2601) (US Census Bureau 2001). Registrants missing work history information for a specific time period were excluded in analyses involving the relevant time period as noted in the results. The final full analytic sample consisted of 25,748 workers, of whom 9171 (36.0%) were recruited using employee lists, while the remainder contacted the Registry following media and community outreach in order to enroll (self-identified).

Questionnaire and Data Preparation

History of asthma was assessed using the question: "Have you ever been told by a doctor or other health professional that you had asthma?" If registrants responded positively, they were asked to further specify, "Did a doctor or other health professional first tell you that you had asthma before 9/11 or after 9/11?" We defined newly-diagnosed asthma as cases diagnosed after September 11, 2001.

Workers' affiliations at the WTC site were captured using 34 pre-coded categories and one open-ended "other" category. Open-ended responses were subjected to review by three raters and categorized. Disagreements between raters were re-evaluated and all final assignments were made by the primary author. For the analyses presented in this study, the resulting 52 organization types were grouped into seven overall categories based on assumed similarity of work tasks, though some overlap between categories was anticipated: 1) fire and rescue, including the NYC Fire Department (FDNY) and other fire departments, task forces of the Federal Emergency Management Agency (FEMA), and urban search and rescue teams; 2) medical, including FDNY Emergency Medical Services (EMS) and other EMS teams, disaster medical and mortuary teams, medical examiner staff, and healthcare providers; 3) law enforcement and military, including the NYC Police Department (NYPD), Port Authority police, state and federal law enforcement, Coast Guard, National Guard, and all other armed forces; 4) construction, including demolition, trucking, heavy engineering, utility work, environmental remediation and abatement, dust control; 5) sanitation, specifically the NYC Department of Sanitation; 6) public agencies not already specified, including the Port Authority (non-police), the CDC, the US Environmental Protection Agency (EPA), the US Occupational Safety and Health Administration (OSHA), the NYC DOHMH, and other city, state and federal agencies; and 7) volunteers and miscellaneous, including the Red Cross, Salvation Army, other volunteer agencies, unaffiliated volunteers, and all other non-disaster related businesses and organizations.

Work history at the WTC site was documented across five analytic time periods aimed at representing a gradient of exposure to respiratory irritants from most intensive

to least intensive: day 1 (September 11), day 2 (September 12), days 3-7 (September 13 – 17), weeks 2-15 (September 18 - December 31, 2001) and weeks 16- 40 (January 1 - June 30, 2002). Date of arrival and duration of work were coded using two open-ended questions in the baseline questionnaire specifying registrants' first and last date of work, and three additional multiple-choice questions specifying the number of days registrants worked from September 13–17, September 18- December 31, and January 1 – June 30. The latter two time periods were recorded categorically. In summing duration of work, we used the midpoint of the indicated day range for these two time periods. For example, if the registrant selected "31-60 days," we assigned 45.5 days of work for that time period. We also evaluated an alternate variable, which was the difference in days between the last and first date of work. We compared odds ratios from logistic regression models for newly-diagnosed asthma as predicted by quartiles of either variable, and the results were equivalent. The summation method was chosen as it allowed for a larger sample size, due to workers missing exact start or end date of work.

To document mask or respirator use, registrants were asked, "On [9/11, etc.] did you wear a mask all of the time, most of the time, some of the time, or not at all?" for each of the five time periods. The term "mask" was inclusive of disposable dust masks, surgical masks, disposable N95 particulate respirators, as well as half-face and full-face respirators with particulate and/or chemical filtration cartridges, and self-contained breathing apparatuses. We estimated the number of days worked without a mask or respirator of any type by multiplying the number of work days by the fractions 0%, 25%, 50%, and 100%, corresponding to the four categories "all of the time," "most of the time," "some of the time," and "not at all," respectively. For example, a registrant who

reported working four days from September 13-17, 2001, while using a mask or respirator "most of the time," received a value of one unprotected work day (4 x 0.25 = 1) during that time period. This variable was used in the arrival-stratified models described below. We also created a variable for initial mask or respirator use at the WTC site corresponding to one of the five analytic time periods, used in the delayed-use model also described below.

Additional information collected on WTC work history included location on or off the pile in each of the five time periods. Pile workers were also asked to specify tasks they performed on the pile, including firefighting, attempted search and rescue, hand-digging, steel-cutting/torch operation, heavy equipment operation, and light construction. All registrants were asked if they were exposed to the dust cloud on September 11, 2001. Smoking status at the time of the interview and demographic characteristics were also recorded, including gender, sex, age, race, Hispanic ethnicity, education, and income, and residence on September 11, 2001.

Statistical Analyses

Descriptive statistics and multivariable analyses were conducted using SAS Version 9.1. We computed frequencies of demographic and work-related characteristics and described the three-year risk of newly-diagnosed asthma as well as its frequency across demographic and potential work-related risk factors. We tested for trends in arrival and duration of work using multiple logistic regression, where arrival period was modeled as an ordinal variable with values 1-5, referring to the 5 ascribed time periods, and days of work were modeled continuously. We used multiple logistic regression to

model newly-diagnosed asthma as predicted by arrival date, duration of work, exposure to the dust cloud, work site organization, and work on the pile, controlling for age, gender, NYC residence, smoking status, and method of enrollment. Age was modeled continuously in all models using age + age^2 terms to allow for a non-linear relationship, since we observed that the youngest and oldest age groups had a lower rate of newly-diagnosed asthma compared to the middle two age groups.

We then described the frequency of mask or respirator use by time period and affiliated organization at the site. We used multiple logistic regression to model newly-diagnosed asthma as predicted by the number of days worked without any mask or respirator in each time period, stratified by arrival period. The arrival-stratified models likewise controlled for gender, age, NYC residence, and smoking status, as well as work days in the time period and total duration of work, exposure to the dust cloud, organization, work on the pile, and enrollment method.

Finally, we modeled the association between newly-diagnosed asthma and delay between arrival and initial mask or respirator use, using a restricted subset of highly exposed workers who arrived on September 11 and worked in all subsequent time periods. For both the arrival-stratified models and the delayed-use model, we tested for potential interaction between working directly on the pile and working without a mask or respirator, and found that there was none. For comparability to other published data, we repeated the models in a restricted subset of firefighters. To evaluate potential self-selection bias, we again repeated the models and excluded all registrants who were self-identified rather than recruited from employee lists.

Results

Characteristics of the Study Population

WTC workers enrolled in the WTCHR were predominantly white, Non-Hispanic males between 25-65 years of age (Table 1). Nearly half of the workers (47.8%) were residents of NYC on September 11, 2001. In comparison with NYC residents, a larger proportion of WTC workers held at least a college degree (39.2% vs. 27.4%) or earned an annual household income over $35,000 (85.7% vs. 53.6%) (US Census Bureau 2001b). The average prevalence of current smoking across four age groups was lower than the NYC population average in 2004 for the same four age groups (15.1% vs. 17.1%) (NYC DOHMH 2004).

The vast majority of workers arrived prior to December 31, 2001 (92.1%) (Table 1). Approximately one-third (34.2%) worked at the site for a week or less, another 31.1% worked as long as one month, and the remaining 34.7% worked at the site for 31 days or more. Overall, 11,253 workers (43.7%) in the study population worked directly on the pile at some point during the disaster response.

The most common worksite affiliation among registrants was volunteer/miscellaneous (8,133, 31.6%). Police, law enforcement and military agencies (4,906, 15.9%), and construction, utility, demolition, debris removal, and remediation unions and contractors (4,099, 15.9%) were the next largest groups, followed by firefighting and other rescue services (3,587, 13.9%), employees of other public agencies (3,216,12.5%), the Department of Sanitation (1,603, 6.2%), and medical workers (1,014,

3.9%) (Table 1). Among registrants who worked on the pile, attempted search and rescue (71.5%) and hand-digging (71.5%) were the most frequently identified tasks. These were followed by firefighting (23.9%), light construction (21.7%), steel-cutting/torch operation (14.6%), and heavy equipment operation (11.5%).

Newly-Diagnosed Asthma and WTC Work History

We estimated an expected 0.3% three-year risk of asthma, based on the reported incidence of asthma in the general adult population of 100/100,000 person-years (Reed 2006). A total of 926 registrants reported being told they had asthma for the first time after September 11, 2001, which was equivalent to a three-year risk of 3.6%; this was twelve times higher than expected. The frequency of workers reporting newly-diagnosed asthma increased with arrival dates closer to the time of the collapse and with longer duration of work. The highest three-year risk of newly-diagnosed asthma was reported by workers who arrived on September 11 and worked over 90 days (7.0%) (Figure 1). When modeled simultaneously, the trends in earlier arrival ($p<0.001$) and duration of work ($p<0.001$) were independently significant. Furthermore, we observed a significant 2-3% increase in risk for every ten days of work at the WTC site, controlling for arrival and exposure to the initial dust cloud ($p<0.001$, data not shown).

After adjusting for demographic and work-related characteristics, the experience of being caught in the initial dust cloud on September 11, 2001 remained a significant risk factor for newly-diagnosed asthma, as did arrival during the first week (ranging from an OR of 1.81 for those who arrived on September 11, to 1.59 for those arriving later in the week), work duration over 90 days, and any history of working directly on the pile

(Table 2). The three-year risk of reported newly diagnosed asthma was elevated for all organization affiliations, ranging from 2.4% to 5.2%, compared to the expected background risk of 0.3%. In unadjusted models, the risk was significantly elevated for fire and rescue workers, medical workers, and police and military personnel compared to volunteers; however, organization type did not remain a significant predictor of newly-diagnosed asthma in the adjusted model. Among workers who reported ever working on the pile, firefighting (OR: 1.61, 95% CI: 1.33-1.95), searching (OR: 1.71, 95% CI: 1.37-2.14), and hand digging (OR: 1.69, 95% CI: 1.35-2.12) were individually associated with an increased risk of asthma, however in the fully adjusted model limited to pile-workers, the associations were not significant.

Use of Masks or Respirators

In analyzing the frequency of reported mask or respirator use (Figures 2 and 3), we limited the study population in each time period to those who reported working on the pile, for comparability of exposure. The proportion of pile workers who reportedly wore a mask or respirator for at least some of the time increased from 50% on September 11, 2001, to over 80% after the first week (i.e., after September 17) (Figure 2). However, the percentage of pile workers who reported wearing a mask or respirator most or all of the time was smaller, peaking only near 50% after December 31, 2001. The variation between organization groups in this latter trend diminished by the final time period, with the exception of volunteers and miscellaneous workers (Figure 3).

Assessment of Days Worked without a Mask or Respirator, by Arrival Time

We stratified the study population by time of arrival at the WTC site and evaluated the effect of days worked without a mask or respirator among workers arriving at the site for the first time during that period. Because of the small number of registrants who arrived in the final time period, January 1 – June 30, 2002, and who reported newly-diagnosed asthma (n=32), regression models were limited to the first four arrival groups only. We did not restrict these analyses to pile workers, but adjusted for pile work as indicated below.

Workers who arrived on September 11 and September 12 were significantly more likely to report newly-diagnosed asthma if they worked without any mask or respirator on either day (OR for 9/11: 1.51 (1.21-1.89); OR for 9/12: 1.42 (1.04-1.94)), controlling for work-related risk factors (exposure to dust cloud, affiliated organization, any pile work, and pile tasks), method of enrollment (self identified vs. recruited), demographic characteristics associated with newly-diagnosed asthma, and smoking status (Table 3). A non-significant dose response relationship was observed between newly-diagnosed asthma and number of days worked from September 18 - December 31, 2001 without a mask or respirator.

Assessment of Increasing Delay in Initial Mask or Respirator Use

We also modeled the effect of incremental delays in the initial use of masks or respirators at the WTC site, restricting the analysis to workers with the greatest cumulative opportunity for exposure. These were workers who arrived on September 11, 2001 and worked in all subsequent time periods (n=2161).

Longer delays in the initial use of a mask or respirator were associated with

significant increases in the risk of newly-diagnosed asthma (Table 4). Compared to initiating use of a mask or respirator on September 11, delays of one day (adjusted OR: 1.63, 95% CI: 1.03-2.56) and up to one week (adjusted OR: 1.62, 95% CI: 1.00-2.63) were associated with an approximately 60% increase in risk of newly-diagnosed asthma. Further delays of up to 16 weeks, and 16 weeks or more, resulted in more than two and three-fold increases in risk, respectively.

Subset Analysis of Firefighters

Because previously published studies of NYC firefighters did not detect a protective effect of masks and respirators (Banauch et al. 2006; Feldman et al. 2004; Prezant et al. 2002), we replicated our analyses with a subset of the study population restricted to the organization group comprised of firefighters and search and rescue teams. Again, we found a significant association between working without a mask or respirator on September 11 and newly-diagnosed asthma (adjusted OR: 1.48, 95% CI: 1.02-2.15). When the delayed-use model was also restricted to fire and rescue workers only, the effects of delayed use were slightly larger than for the study population as a whole, and remained significant; delays of one day (adjusted OR: 2.24, 95% CI: 1.06-4.77) and up to one week (adjusted OR: 2.46, 95% CI: 1.22-4.96) were associated with more than a two-fold increase in risk of newly-diagnosed asthma, while delays of up to 16 weeks resulted in more than a 3.5 fold increase in risk (adjusted OR: 3.70, 95% CI: 1.68-8.12), and delays after January 1, 2002 were associated with a nearly 5-fold increase in risk (adjusted OR: 4.78, 95% CI: 1.38-16.5).

Assessment of Potential Self-Selection Bias

Self-identified workers had a significantly higher rate of newly-diagnosed asthma (4.5%) compared to workers who were recruited via employee lists (2.0%) (OR 2.29, 95% CI: 1.94-2.69). We assessed the impact of potential selection bias by excluding all self-identified registrants from the arrival stratified models. The detrimental effect of working without a mask or respirator on September 11 (adjusted OR: 1.87, 95% CI: 0.69-5.08) and September 12 (adjusted OR: 1.85, 95% CI: 1.02-3.34) was likewise evident and slightly increased in magnitude among list-recruited participants only; however the confidence intervals were wider, reflective of the loss of precision due to the reduced sample size. We did not repeat this analysis in the delayed-use model because the model required a restricted subset of the study population; a model further restricted to firefighters would have poor statistical power to assess associations.

Discussion

Using data collected on the largest cohort of WTC rescue, recovery, clean-up, and volunteer workers, encompassing a diverse range of organizations involved at the site, we found that the risk of newly-diagnosed asthma was twelve-fold higher than the expected background three-year risk in the general population (3.6% versus 0.3%) (Reed 2006), and that there were significant increases in risk for earlier arrival, total duration of work, exposure to the dust cloud, and working on the pile at the WTC site. We also observed that the timing of mask and respirator use was an important determinant of its protective effect, where earlier first-time use of masks and respirators at the site was significantly associated with decreased risk of newly-diagnosed asthma.

The observed effect of arrival time in the study population was consistent with previous studies, which found that workers who arrived closer to the time of the collapse were more likely to experience respiratory symptoms and reduced pulmonary function after September 11, 2001 (Banauch et al. 2006; Centers for Disease Control and Prevention 2004; Feldman et al. 2004; Levin et al. 2002; Herbert et al. 2006; Herbstman et al. 2005; Prezant et al. 2002; Salzman et al. 2004; Skloot et al. 2004). Similar to Herbstman et al. (2005), we observed that total duration of work at the WTC site was also a significant risk factor for newly-diagnosed asthma. We further demonstrated that the effect of working for an extended duration, especially over 90 days, was independent of workers' arrival date and exposure to the initial dust cloud on September 11, 2001. Our results therefore suggest that the onset of asthma was not only associated with acute exposure to high levels of respiratory hazards, but also with chronic exposure to presumably lower levels of airborne contaminants. Notably, Gavett et al. (2003) observed pulmonary inflammation and airway hyperresponsiveness in mice given a single, high-level exposure to WTC fine particulate matter; however, the study did not measure the effects of chronic low-level exposure.

The patterns of reported mask or respirator use were similar to previous studies based on self-reported use data (Banauch et al. 2006; Feldman et al. 2004; Prezant et al. 2002; Skloot et al. 2004). However, prior studies of surviving firefighters who worked at the WTC site did not detect a significant association between the use of masks and respirators and either reduced respiratory symptoms or changes in pulmonary function after September 11, 2001 (Banauch et al. 2006; Feldman et al. 2004; Prezant et al. 2002). In the first two of these studies, use of any mask or respirator was summarized over the

duration of the work period, both a) dichotomously, comparing frequent (protected) versus infrequent and non-users (unprotected) (Prezant et al. 2002) and b) as a score indicator ranging from 0 (present at the site, unprotected) to 3 (not present at the site), which was averaged across four time periods (Feldman et al. 2004; Prezant et al. 2002). Given our finding that newly-diagnosed asthma was significantly elevated among workers who had greater delays in initial use, we suggest that overall summary measures, such as those in the two aforementioned studies, might not capture the protective role of masks or respirators since they did not account for the timing of their use relative to workers' arrival. A third study of firefighters compared frequent (protected) versus non-frequent and non-use of masks and respirators (unprotected) on the worker's day of arrival (Banauch et al. 2006). Although this approach was similar to our models presented in Table 3, we quantified unprotected exposure as the estimated number of days worked without a mask or respirator during each arrival period, and stratified the regression model by arrival period.

A study conducted among ironworkers compared workers who ever used a respirator (protected) to those who never used a respirator (unprotected), again as a summary measure over the duration of work at the site. The authors did observe a significant protective association between the use of respirators with cartridges and changes in pulmonary function after September 11, 2001, but the association did not reach statistical significance for respiratory symptoms, and was not significant in either case for dust masks alone (Skloot et al. 2004). Neither the firefighters' studies nor the ironworkers' study, however, measured the effect of increasing delay in mask or respirator use, which was unique to our study.

As noted, the rate of self-reported, newly-diagnosed asthma in the study population was high; we estimated an expected count of 77 cases and observed 926. Although we hypothesized that firefighters, construction workers and others would have higher background rates of adult-onset asthma than the general population, we found few data on the incidence of asthma across occupational groups, and no published studies on the incidence of asthma in firefighters. One cohort study from Finland documented a 2% five-year risk in construction workers (Sauni et al. 2003). This was also elevated compared to the general adult population (0.4% versus 0.1% one-year risk), but still lower than the estimated one-year risk in our study (1.2%).

Workers who developed asthma may have been more likely to enroll in the Registry than workers who did not develop asthma. It is also possible that enrollees were more likely to misclassify their asthma status or time of diagnosis (before or after September 11) than non-enrollees. For example, registrants experiencing a relapse of asthma may have selectively chosen "after 9/11" if they were unsure of an earlier diagnosis. We did not verify diagnoses using medical records and therefore cannot rule out over-reporting by study participants. Healthcare provider behavior must also be considered, as WTC site workers may be more likely to be screened for respiratory illness than other workers and adults generally. Providers also may be more likely to offer a diagnosis of asthma in rescue, recovery and clean-up workers. Notwithstanding, self-reported diagnosed asthma is a commonly used measure in peer-reviewed literature and has been validated with very strong (99%) specificity in adults (Toren et al. 1993). Furthermore, we would not expect misclassification of disease to differ across categories of exposure intensity or duration, and therefore we do not think it would have produced

the exposure-response relationships we observed.

As an additional validation, we computed the prevalence of self-reported asthma diagnosed before 9/11 in the WTC worker population, prior to exclusion of these cases (n= 2773) from the study population. The prevalence was 9.8%, which was comparable with results for the U.S. adult population from the 2000 National Health Interview Survey (9.3%) and lower than the prevalence from the 2002 NYC Community Health Survey (12.0%) (Garg et al. 2003). It would not appear, therefore, that registrants as a whole were more likely to over-report asthma status. Finally, if we assumed at an extreme that none of the approximate 50,000-60,000 non-enrollees were diagnosed with asthma after September 11, the 3-year risk of newly diagnosed asthma would be 1%, which is still over three fold higher than the background risk in the general adult population (0.3%).

As with any retrospective questionnaire, the results may also be subject to recall bias. It is possible that workers who developed asthma might have under-reported mask use, in an attempt to explain their disease. It is equally possible that workers over-reported mask use to avoid blame for noncompliance. The net direction of the resulting bias is unknowable, though unlikely to act in such a way as to produce an apparent trend between newly-diagnosed asthma and increasing delay in mask or respirator use.

There was potential misclassification in the estimation of time worked at the WTC site due to differing work shift lengths. Our analyses assumed one day's work was equivalent across the study population, whereas shift length may have varied between occupational groups. As a result, the number of days worked without masks or respirators would be misclassified, with the highest exposure group tending to be combined with less

exposed groups. Such error would most likely bias the results toward the null. Of note, we observed an increase in the magnitude of the association between newly-diagnosed asthma and working without masks and respirators in the models restricted to firefighters, who, anecdotally, have been reported to have routinely worked long shift lengths.

Although we found that mask or respirator users were more likely to have worked on the pile (data not shown), a significant risk factor for newly-diagnosed asthma that we controlled for in our models, it is possible that mask use was also associated with protective behaviors, such as working shorter shift lengths (not measured) and not smoking. We controlled for smoking status in our models even though we did not detect evidence of confounding in this study. Again, we do not suspect that confounding by an unmeasured protective factor would otherwise explain the observed trend between delay in mask use and risk of newly-diagnosed asthma. It is possible, however, that the onset of respiratory symptoms may have prompted workers to begin using a mask or respirator, in which case the results would be biased toward the null.

A central limitation of this study was the inability to distinguish the type of mask or respirator used, which was not assessed in the questionnaire. In addition, the baseline questionnaire did not assess previous training in the use of respiratory protection equipment, degree of fit-checking, fit-testing, or maintenance of respirators used at the site. Were we able to measure and control for these variables in the analyses, we would expect the magnitude of the effect of appropriate respiratory protection to be in fact greater than that which we observed. The first follow-up survey of registrants, conducted in 2007, includes questions on type(s) of masks or respirators worn, training, access to fit-testing, qualitative fit-checking, and respirator maintenance.

A number of recommendations were voiced by participants at a national meeting conducted in December 2001 that was attended by emergency responders, law enforcement, construction and trade workers, health and safety workers, and local and federal agency workers involved in the responses to events of September 11, the Oklahoma City bombing, and the 2001 anthrax incidents. Participants suggested a need for planning to ensure the rapid supply of appropriate respiratory and other personal protective equipment for workers who may be called to respond to disasters. Our findings in fact demonstrate the benefit of the rapid initiation of respiratory protection use. Other recommendations concerned the need for anticipatory pre-event and early on-site training in the use of different types of masks and respirators, increased on-site risk communication regarding respiratory hazards, and planned, independent regulatory oversight of respiratory protection programs and other areas of occupational safety and health via incident command structures for disaster response (Jackson et al. 2002).

We conclude that the use of masks and respirators at the WTC site did not eliminate the risk of newly-diagnosed asthma in the study population; however we did observe evidence of a protective effect, even given the limitations already documented. It is reasonable to conclude that the early initiation and consistent use of appropriate respiratory protection may have further prevented additional cases of new-onset asthma. As such, the findings underscore the importance of preparedness for the health and safety of workers who may be called to respond to a disaster through anticipatory training, the adequate and timely distribution of appropriate personal protective equipment, and the enforcement of respiratory protection programs when other methods of controlling exposure to hazardous airborne contaminants are not feasible.

References

Banauch G, Hall C, Weiden M, Cohen H, Aldrich T, Christodoulou V, et al. 2006. Pulmonary function after exposure to the World Trade Center collapse in the New York City Fire Department. Am J Resp Crit Care Med 174:312-319.

Brackbill R, Thorpe L, DiGrande L, Perrin M, Sapp J, Wu D, et al. 2006. Surveillance for World Trade Center disaster health effects among survivors of collapse and damaged buildings. MMWR 55(SS02):1-18.

Centers for Disease Control and Prevention (CDC). 2004. Physical health status of World Trade Center rescue and recovery workers and volunteers – New York City, July 2002-August 2004. MMWR 53:807-812.

Dolan M, Murphy J, Thalji L, Pulliam P. 2006. World Trade Center Health Registry: Sample building and denominator estimation. Chicago, IL: RTI International. Available: http://www.nyc.gov/html/doh/html/wtc/materials.html [accessed 11 July 2007].

Feldman D, Baron S, Bernard B, Lushniak B, Banauch G, Arcentales N, et al. 2004. Symptoms, respirator use, and pulmonary function changes among New York City firefighters responding to the World Trade Center disaster. Chest 125:1256-1264.

Garg R, Karpati A, Leighton J, Perrin M, Shah M. 2003. Asthma facts, second edition. New York City Department of Health and Mental Hygiene. Available: http://www.nyc.gov/html/doh/html/asthma/asthma.shtml. [accessed 19 June 2007].

Gavett S, Haykal-Coates N, Highfill J, Ledbetter A, Chi Chen L, Cohen M, et al. 2003. World Trade Center fine particulate matter causes respiratory tract hyperresponsiveness in mice. EHP 111(7):981-991.

Herbert R, Moline J, Skloot G, Metzger K, Baron S, Luft B, et al. 2006. The World Trade Center disaster and health of workers: five-year assessment of a unique medical screening program. Environmental Health Perspectives 114:1853–1858.

Herbstman J, Frank R, Schwab M, Williams D, Samet J, Breysse P, et al. 2005. Respiratory effects of inhalation exposure among workers during the clean-up effort at the World Trade Center disaster site. Environmental Research 99:85-92.

Jackson B, Peterson D, Bartis J, LaTourrette T, Brahmakulam I, Houser A, et al. 2002. Protecting emergency responders: lessons learned from terrorist attacks. Santa Monica, CA: RAND.

Landrigan P, Lioy P, Thurston G, Berkowtiz G, Chen L, Chillrud S, et al. 2004. Health and environmental consequences of the World Trade Center disaster. Environmental Health Perspectives 112:731-739.

Levin S, Herbert R, Skloot G, Szeinuk J, Teirstein A, Fischler D, et al. 2002. Health effects of World Trade Center site workers. Am J Industrial Med 42:545-547.

Lippy B. 2002. Safety and health of heavy equipment operators at Ground Zero. Am J Ind Med 42:539-542.

Martyny J, Glazer C, Newman L. 2002. Respiratory protection. N Engl J Med 347: 824-830.

NYC Department of Health and Mental Hygiene (DOHMH). 2004. Community Health Survey. Available: http://www.nyc.gov/html/doh/html/survey/survey.shtml [accessed 11 July 2007].

OSHA (Occupational Safety and Health Administration). 2006. Occupational Safety and Health Standards: Respiratory Protection. 29 CFR 1910.134.

Prezant D, Weiden M, Banauch G, McGuinness G, Rom W, Aldrich T, et al. 2002. Cough and bronchial responsiveness in firefighters at the World Trade Center site. N Engl J Med 347:806-815.

Reed CE. 2006. The natural history of asthma. J Allergy Clin Immunol 118:543-8.

Salzman S, Moosavy F, Miskoff J, Friedmann P, Fried G, Rosen M. 2004. Early respiratory abnormalities in emergency services police officers at the World Trade Center site. J Occup Environ Med 46:113-122.

Sauni R, Oksa P, Huikko S, Roto P, Uitti J. 2003. Increased risk of asthma among Finnish construction workers. Occ Med 53:527-521.

Skloot G, Goldman M, Fischler D, Goldman C, Schechter C, Levin S, et al. 2004. Respiratory symptoms and physiologic assessment of ironworkers at the World Trade Center site. Chest 125:1248-1255.

Spadafora R. 2002. Firefighter safety and health issues at the World Trade Center site. Am J Ind Med 42:532-538.

Toren K, Brisman J, Jarvholm B. 1993. Asthma and asthma-like symptoms in adults assessed by questionnaires. A literature review. Chest 104:600-608.

U.S. Census Bureau. 2001. 2000 Summary File 1 Technical Documentation. Available: http://www.census.gov/prod/cen2000/doc/sf1.pdf [accessed 11 July 2007].

U.S. Census Bureau. 2001b. 2000 Summary File 1 [New York Counties: Bronx, Kings, Manhattan, Queens, Richmond]. Available: http://factfinder.census.gov/ [accessed 11 July 2007].

Tables

Table 1. Number and percent of workers in the study population (n=25,748) by selected demographic characteristics, smoking status, and WTC work history.

Variable	Category	No.	%
Gender	Male	20,394	79.2%
	Female	5,354	20.8%
Age on September 11, 2001	18 - <25 Years	1,346	5.2%
	25 - <45 Years	15,599	60.6%
	45 - <65 Years	8,319	32.3%
	65+ Years	484	1.9%
Race	White, Non-Hispanic	18,670	72.5%
	Black, Non-Hispanic	2,246	8.7%
	Hispanic or Latino	3,464	13.5%
	Asian	607	2.4%
	Multiple	457	1.8%
	Other or Unknown	304	1.2%
Income	Less than $35,000	3,673	14.3%
	$35,000 to less than $100,000	16,286	63.3%
	$100,000 or more	5,789	22.5%
Education	Did not complete high school	1,292	5.1%
	High school graduate or GED	6,331	24.6%
	Some college	8,045	31.3%
	College or post-graduate degree	10,080	39.2%
Residence on 9/11	NYC	12,282	47.8%
	Outside NYC	13,466	52.3%
Smoking status on interview date	Current Smoker	4,434	17.2%
	Former Smoker	6,930	26.9%
	Never Smoked	14,384	55.9%

Date of arrival at the WTC site	September 11, 2001	7,339	28.5%
	September 12, 2001	5,204	20.2%
	September 13 – 17, 2001	5,398	21.0%
	September 18 – December 31, 2001	5,807	22.6%
	January 1 – June 30, 2002	2,000	7.8%
Duration of work at the WTC site	1-7 days	8,754	34.0%
	8-30 days	8,002	31.1%
	31-90 days	4,279	16.6%
	Over 90 days	4,713	18.3%

Table 2. Unadjusted and adjusted odds ratios for newly-diagnosed asthma, predicted by work history characteristics (n=25,748)[a]

WTC work-related factors		Number of cases	Percent	Newly-diagnosed asthma Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Arrival date	9/11	376	5.1	3.32 (2.31-4.78)	1.81 (1.19-2.74)
	9/12	179	3.4	2.19 (1.50-3.20)	1.55 (1.03-2.33)
	9/13-17	195	3.6	2.30 (1.58-3.36)	1.69 (1.13-2.51)
	9/18-12/31	144	2.5	1.56 (1.06-2.31)	1.25 (0.84-1.86)
	1/1-6/30	32	1.6	REF	REF
Duration of work at WTC site	Over 90 Days	229	4.9	1.78 (1.48-2.14)	1.74 (1.43-2.12)
	31-90 Days	168	3.9	1.43 (1.17-1.74)	1.18 (0.95-1.45)
	8-30 Days	285	3.6	1.29 (1.09-1.53)	1.20 (1.00-1.44)
	1-7 Days	244	2.8	REF	REF
Organization	Fire & Rescue	188	5.2	1.88 (1.55-2.31)	1.20 (0.93-1.54)
	EMS and Medical, Medical Examiner	49	4.8	1.73 (1.26-2.37)	1.11 (0.79-1.54)
	Law Enforcement and Military	190	4.6	1.66 (1.36-2.01)	0.99 (0.79-1.25)
	Construction, Utilities, Remediation	118	2.9	1.01 (0.81-1.26)	0.98 (0.77-1.26)
	Sanitation	38	2.4	0.83 (0.58-1.17)	1.05 (0.72-1.53)
	Public Agency, not already specified	111	3.5	1.22 (0.97-1.53)	0.92 (0.72-1.17)
	Volunteers and Miscellaneous	232	2.9	REF	REF

[a] Adjusted model controls for female gender, age, age^2, NYC residence on 9/11/2001, affiliated organization, duration of work, exposure to the dust cloud, and work on pile.

Exposed to 9/11 dust cloud	Yes	476	4.9	1.77 (1.55-2.01)	1.28 (1.09-1.50)
	No	450	2.8	REF	REF
Any work on pile	Ever	505	4.5	1.57 (1.38-1.79)	1.30 (1.11-1.53)
	Never	421	2.9	REF	REF

Table 3. Unadjusted and adjusted odds ratios for newly-diagnosed asthma, predicted by number of days worked at WTC site without masks and respirators in each time period, among workers who arrived during that time.[a]

Arrival date	Number of days worked without mask or respirator during time period	Number of workers	Percent reporting newly-diagnosed asthma	Newly-diagnosed asthma	
				Unadjusted OR (95%CI)	Adjusted OR (95% CI)
September 11	0	3,620	4.0	(REF)	(REF)
	1	3,683	6.3	1.64 (1.32-2.02)	1.51 (1.21-1.89)
September 12	0	3,377	2.9	(REF)	(REF)
	1	1,774	4.5	1.54 (1.14-2.09)	1.42 (1.04-1.94)
September 13-17	0	1,683	3.3	(REF)	(REF)
	1 - 4	3,066	3.8	1.16 (0.84-1.61)	1.13 (0.80-1.59)
	5	227	3.5	1.06 (0.50-2.26)	1.20 (0.54-2.67)
September 18-	0	783	2.0	(REF)	(REF)
December 31	1-7	2,175	2.0	0.97 (0.54-1.73)	1.21 (0.66-2.23)
	8-30	2,102	2.7	1.34 (0.76-2.34)	1.08 (0.55-2.13)
	31+	619	4.0	2.02 (1.07-3.81)	1.61 (0.69-3.78)

[a] Total number of workers in each time period (column 3) excludes workers missing responses specific to time period of analysis: 9/11 (36, <1.0%); 9/12 (53, <1.0%); 9/13-17 (424, 7.8%); 9/18-12/31 (128, 2.2%). Adjusted models control for female gender, age, age^2, NYC residence on 9/11/2001, smoking status, affiliated organization, duration of work, exposure to the dust cloud, pile work, and pile tasks.

Table 4. Unadjusted and adjusted odds ratios for newly-diagnosed asthma, predicted by increasing delays in the use of masks and respirators among workers who arrived on September 11, 2001 and worked in all time periods (N=2037).[a]

Initial use of masks and respirators	Amount of delay	Number of workers	Percent reporting newly-diagnosed asthma	Newly-diagnosed asthma	
				OR (95% CI)	Adjusted OR (95% CI)
September 11	0 days	1022	4.9	REF	REF
September 12	1 day	483	8.1	1.77 (1.13 – 2.76)	1.63 (1.03-2.56)
September 13-17	1 day to <1 wk	399	8.8	1.98 (1.25 – 3.13)	1.62 (1.00-2.63)
September 18 – December 31	1 wk to <16 wks	171	10.5	2.27 (1.27 – 4.07)	2.28 (1.22-4.25)
January 1 – June 30	16 wks to 40 wks	35	14.3	3.39 (1.25 – 9.15)	3.46 (1.22-9.81)
Never	----	51	15.7	3.93 (1.74 – 8.87)	3.44 (1.43-8.25)

[a] Adjusted model controls for female gender, age, age^2, NYC residence on 9/11/2001, smoking status, affiliated organization, duration of work, exposure to the dust cloud, pile work, and pile tasks.

Figure Legends

Figure 1. Three-year risk of newly-diagnosed asthma in the study population by arrival period (horizontal axis) and duration of work (shaded bars) at the World Trade Center site. Number of cases in each category indicated above vertical bars.

Figure 2. Frequency of reported mask or respirator use by date among workers in the study population located on the pile.

Figure 3. Percent of pile workers who reported wearing a mask or respirator most or all of the time, by organization.

Figures

Figure 1.

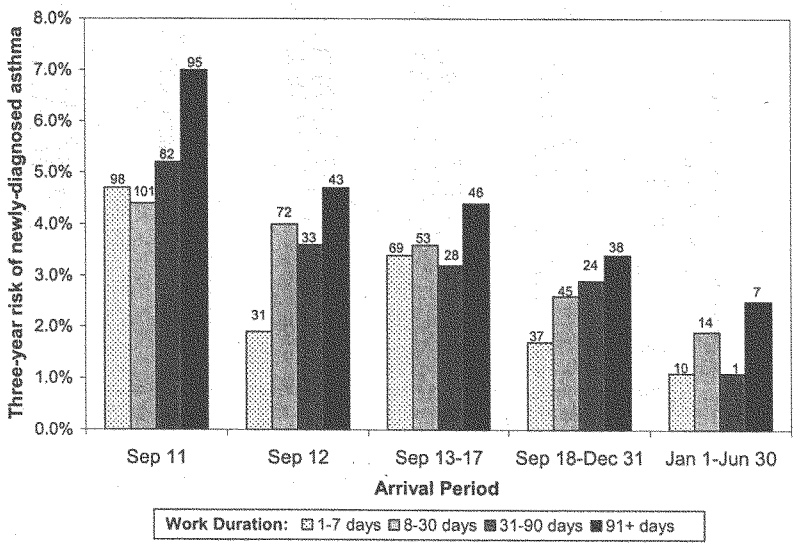


Figure 2

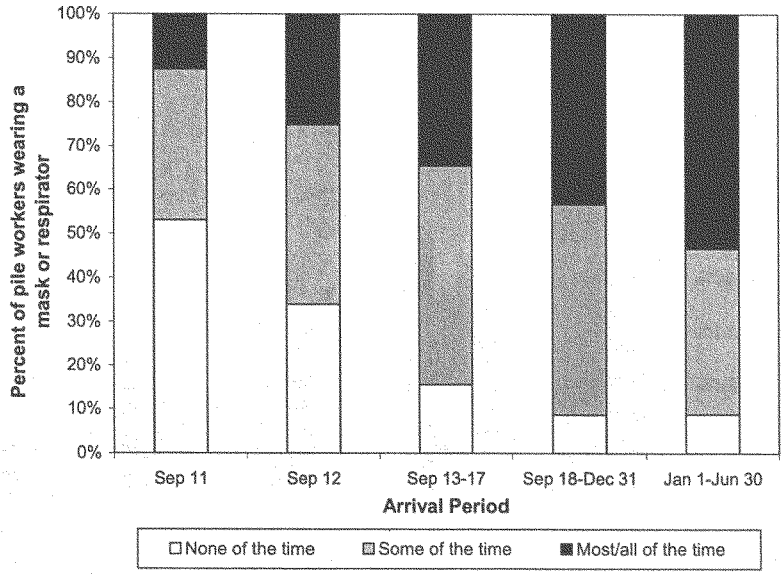
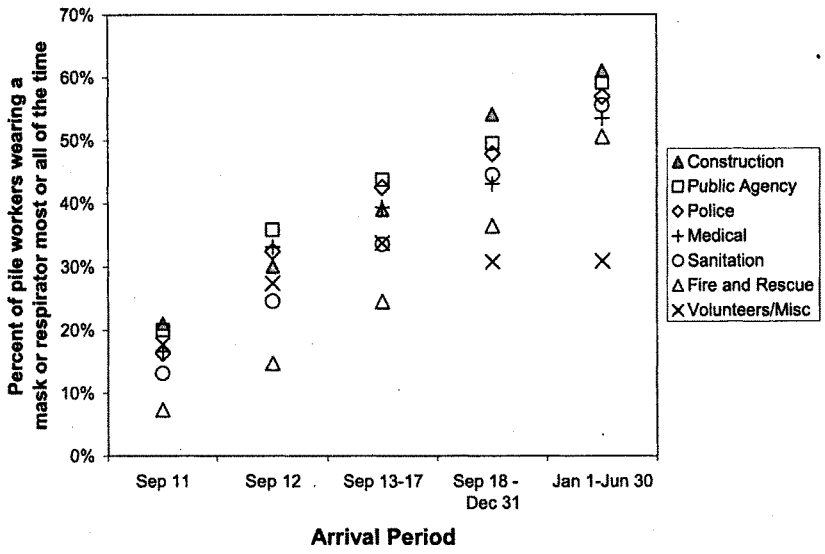

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent of pile workers wearing a mask or respirator
Sep 11
Sep 12
Sep 13-17
Sep 18-Dec 31
Jan 1-Jun 30
Arrival Period
None of the time
Some of the time
Most/all of the time

Figure 3.


70%
60%
50%
40%
30%
20%
10%
0%
Percent of pile workers wearing a mask or respirator most or all of the time
Sep 11
Sep 12
Sep 13-17
Sep 18 - Dec 31
Jan 1-Jun 30
Arrival Period
Construction
Public Agency
Police
Medical
Sanitation
Fire and Rescue
Volunteers/Misc

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ONE IN EIGHT WTC RESCUE AND RECOVERY WORKERS DEVELOPED POST-TRAUMATIC STRESS DISORDER

FOR IMMEDIATE RELEASE
Press Release # 076-07
Wednesday, August 29, 2007

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ONE IN EIGHT WTC RESCUE AND RECOVERY WORKERS DEVELOPED POST-TRAUMATIC STRESS DISORDER

New Findings from the World Trade Center Health Registry Show Rates Were Highest Among Volunteer Workers, Lowest Among Police Officers

NEW YORK CITY – August 29, 2007 – Thousands of World Trade Center rescue and recovery workers were still suffering serious mental health effects three years after the disaster, the Health Department reported today. New findings released from the World Trade Center Health Registry show that one in eight rescue and recovery workers (12.4%) likely had post-traumatic stress disorder when they were interviewed in 2003 and 2004. The findings were published today in the American Journal of Psychiatry, available online at www.ajp.psychiatryonline.org (direct link: http://ajp.psychiatryonline.org/cgi/reprint/164/9/1385).

The new data come from the World Trade Center Health Registry's initial survey of nearly 30,000 rescue and recovery workers. The respondents ranged from police officers and firefighters to clergy and construction workers. The prevalence of post-traumatic stress disorder (PTSD) varied significantly by occupation, with rates ranging from 6.2% among police officers to 21.2% among unaffiliated volunteers (those who were not working with an organization such as the Red Cross). The prevalence of PTSD in the U.S. population is roughly 4% at any given time.

Type of Worker	% with PTSD in 2003-2004
All	12.4%
Unaffiliated volunteer	21.2%
Construction, Engineering	17.8%
Firefighter	12.2%
Other government worker	11.8%
EMS	11.6%
Sanitation	10.6%
Volunteer with organization	7.2%
Police	6.2%

Like the unaffiliated volunteers, workers from non-emergency occupations such as construction, engineering and sanitation also suffered particularly high rates of PTSD. It is unlikely that these workers had gone through disaster preparedness training or had experience with previous emergencies, both of which can help buffer psychological trauma.

People who started work on or soon after 9/11, or who worked for longer periods, were also more vulnerable to PTSD. For all occupations except police, the risk of PTSD was greatest among those who worked at the site for more than three months. The finding suggests that shortening work periods, and limiting exposure of those who have less prior exposure to trauma, might help

reduce PTSD rates in future emergencies.

"Post-traumatic stress disorder can be devastating, affecting people's families and work lives," said Dr. Thomas R. Frieden, New York City Health Commissioner. "People with PTSD are also more likely to suffer from depression and substance abuse. The Registry helps us gauge the persistence of these problems over time. It also helps us inform the public and the medical community about the health effects of 9/11, so that people can get the best possible care."

The survey found that firefighters developed PTSD at nearly twice the rate of police officers (12.2% versus 6.2%), a finding consistent with past research. The discrepancy is not well understood, but the authors offer several possible explanations. It may reflect the rigorous screening that police recruits undergo, but it could also reflect under-reporting by police officers who fear being judged unfit for duty. In addition, firefighters lost six times as many comrades as police officers, suggesting that grief may have compounded the trauma and the risk of PTSD.

Sustaining an injury, or having to evacuate a building, raised the risk of PTSD in nearly all of the groups surveyed. But other risk factors affected only certain types of workers. Performing search and rescue work raised the risk of PTSD for engineering and sanitation workers, but civilian volunteers were more likely to suffer if they engaged in firefighting or light construction work. This suggests again that working outside of one's area of expertise can place people at risk for developing PTSD.

The new findings highlight the value of disaster preparedness and training for all types of emergency responders, and point to concrete steps that could help minimize PTSD in future disasters:

- Use shift rotations to reduce workers' and volunteers' duration of service at emergency sites.
- Establish mental-health services to address the needs of rescue and recovery workers who have received less disaster training than police and fire staff.

The Health Department has linked all survey participants with mental-health issues to LifeNet, a 24-hour hotline operated by the Mental Health Association of New York City. LifeNet provides an assessment, information and referrals and assists the caller in determining an appropriate place for care. When a person is in crisis, LifeNet will refer to a Mobile Crisis Team and will follow up to ensure contact is made. If you or someone you know is suffering with PTSD, or any other emotional or substance abuse problem, call 311 and ask for LifeNet. Services are available in multiple languages.

Update on Efforts to Learn More about WTC-Related Illness

The World Trade Center Health Registry, the largest public health registry in U.S. history, was launched in 2003 to track the health of people exposed to the collapse of the World Trade Center and those who worked at the WTC site. The registry is a collaborative effort involving the Health Department, the CDC's Agency for Toxic Substances and Disease Registry (ATSDR), with funding from the Federal Emergency Management Agency (FEMA).

The Health Department is now re-surveying all 71,000 registrants to learn more about their current health status. So far, nearly 60% of registrants have responded. The re-survey will help determine whether respiratory and mental health conditions have persisted five to six years after the disaster. Because of its size, the registry can illuminate patterns that would elude individual physicians and provide valuable guidance to affected groups. Previous findings from the WTC Health Registry can be found at

http://www.nyc.gov/html/doh/html/wtc/materials.html.

The Health Department is also conducting a separate study of respiratory health among registrants and analyzing records to see whether the disaster has affected cancer incidence. The Health Department – along with the Fire Department, Mount Sinai Medical Center and Bellevue Hospital – is also updating guidelines for treating adults with WTC-related illness. The same group is developing guidelines for treating affected children.

About PTSD

PTSD is an anxiety disorder that can result from experiences marked by intense fear, hopelessness or horror. The common causes include war, terrorism and personal assault. Symptoms include avoiding situations reminiscent of the event, reliving the event when reminded of it, feeling emotionally numb, or feeling hyper-alert. Many people recover with counseling or medication, but PTSD can be very disruptive to those who suffer from it, leading to family and work problems, as well as drug and alcohol abuse.

If you or someone you know is suffering with PTSD, or any other emotional or substance abuse problem, call 311 and ask for LifeNet. Services are available in multiple languages.

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Article

Differences in PTSD Prevalence and Associated Risk Factors Among World Trade Center Disaster Rescue and Recovery Workers

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Objective: This study compared the prevalence and risk factors of current probable posttraumatic stress disorder (PTSD) across different occupations involved in rescue/recovery work at the World Trade Center site.

Method: Rescue and recovery workers enrolled in the World Trade Center Health Registry who reported working at the World Trade Center site (N=28,962) were included in the analysis. Interviews conducted 2–3 years after the disaster included assessments of demographic characteristics, within-disaster and work experiences related to the World Trade Center, and current probable PTSD.

Results: The overall prevalence of PTSD among rescue/recovery workers was 12.4%, ranging from 6.2% for police to 21.2% for unaffiliated volunteers. After adjustments, the greatest risk of developing PTSD was seen among construction/engineering workers, sanitation workers, and unaffiliated volunteers. Earlier start date and longer duration of time worked at the World Trade Center site were significant risk factors for current probable PTSD for all occupations except police, and the association between duration of time worked and current probable PTSD was strongest for those who started earlier. The prevalence of PTSD was significantly higher among those who performed tasks not common for their occupation.

Conclusions: Workers and volunteers in occupations least likely to have had prior disaster training or experience were at greatest risk of PTSD. Disaster preparedness training and shift rotations to enable shorter duration of service at the site may reduce PTSD among workers and volunteers in future disasters.

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First responders and others involved in rescue/recovery work following natural and manmade disasters are exposed to physical and emotional trauma. Such experiences are known to increase the risk of posttraumatic stress disorder (PTSD) (1). Studies show that rescue/recovery responders are at increased risk for PTSD. Compared to the national prevalence of 4% for the general population (2), the prevalence varies across rescue/recovery occupations, ranging from 5% to 32% (3–7), with the highest prevalence documented in search and rescue personnel (25%) (5), firefighters (21%) (8), and workers with no prior disaster training (6, 9, 10). It is not known whether certain occupations are intrinsically associated with higher risk for psychological distress or whether risk is associated with working outside one's area of training. Response to the Sept. 11, 2001, attack on the World Trade Center, which involved numerous rescue/recovery organizations working for prolonged periods of time, provides a unique opportunity to better understand the burden of adverse psychological sequelae among rescue/recovery personnel.

Findings on the mental health status of rescue/recovery workers exposed to the World Trade Center disaster are slowly emerging. An assessment 2 weeks after the attack found that 22% of World Trade Center workers had acute posttraumatic stress symptoms (11), and a study initiated 1 year after the disaster identified PTSD symptoms among 13% of workers (12). Nearly 3 years after the attack, 10% of sanitation and construction workers continued to experience nonspecific mental health complaints (13). Although useful, these studies have limited use for comparing the risk of PTSD across rescue/recovery occupations because they were either limited to one group or did not specify the occupation of responders included in the assessments. This study documents the prevalence and risk factors of PTSD among a variety of rescue/recovery workers responding to the World Trade Center disaster. The participants were enrollees of the World Trade Center Health Registry, a longitudinal cohort of individuals highly exposed to the World Trade Center attack. The registry includes the largest sample of rescue/recovery workers from various professional and volunteer organizations, allow-

This article is featured in this month's AJP Audio.

TABLE 1. Prevalence of Current Probable PTSD Among 28,692 Rescue and Recovery Workers Who Reported Working at the World Trade Center Site Between Sept. 11, 2001, and June 30, 2002

	Types of DSM-IV Symptoms			Probable PTSD With Diagnostic Criteria[a,b]	Probable PTSD With PTSD Checklist—Civilian Version Cutoff Score[a,c]
	Group B: Re-Experiencing	Group C: Avoidance	Group D: Hyperarousal		
Workers	%	%	%	%	%
All rescue/recovery workers (N=28,692)	37.5	20.2	33.4	15.4	14.7
Occupation/volunteer affiliation:					
Police (N=3,925)	27.0	12.2	23.8	8.3	7.2
Firefighters (N=3,232)	39.4	25.3	36.8	17.4	14.3
Emergency medical services, medical, or disaster personnel (N=1,741)	33.3	20.0	32.3	14.1	14.1
Construction or engineering workers (N=4,498)	47.0	26.4	40.4	21.1	20.8
Sanitation workers (N=1,798)	38.2	18.3	33.5	13.9	13.0
Volunteer organizations (N=5,438)	26.2	12.0	23.1	9.1	8.4
Unaffiliated volunteers (N=3,797)	50.8	29.3	45.2	24.5	24.7
Other government agencies (N=4,263)	37.6	19.2	33.7	14.7	14.0

[a] Last 30 days.
[b] Calculated according to DSM-IV criteria of at least one of five re-experiencing symptoms, three of seven avoidance symptoms, and two of five increased arousal symptoms.
[c] Score of 44 or greater.
[d] Calculated with a combination of DSM-IV criteria and a score of 44 or greater.
[e] Adjusted for mode of enrollment, demographic characteristics, within-disaster experiences, and work experiences related to the World Trade Center.
[f] $p<0.001$.

ing for the comparison of the prevalence of PTSD across occupations. We examined the prevalence of PTSD 2–3 years after September 11th by occupation and assessed whether occupations with less experience and training had a greater risk of developing PTSD. We also assessed whether tasks performed by workers that were inconsistent with their typical occupational roles (e.g., construction workers engaging in firefighting) were associated with an increased risk of PTSD.

Method

Cohort

The World Trade Center Health Registry is a voluntary registry of persons who were exposed to the Sept. 11, 2001, terrorist attack. Individuals eligible for enrollment included residents who lived near the World Trade Center site, persons who were physically in lower Manhattan during the attacks, schoolchildren and staff in lower Manhattan, and persons involved in rescue/recovery work (14, 15).

The eligibility criterion for this analysis was working at least one shift from Sept. 11, 2001, to June 30, 2002, at the World Trade Center site. Both active and passive recruitment methods were used to enroll rescue/recovery workers. Active recruitment involved contacting potentially eligible individuals from lists obtained through government agencies and private sectors/entities, including organizations throughout the United States known to have participated in the rescue/recovery effort. Six hundred and seventy organizations were contacted, and 144 provided lists (14). Passive recruitment involved self-identification through a toll-free number and project website (15). Recruitment was supported by a large-scale public outreach and media campaign. The total World Trade Center Health Registry cohort is composed of 71,437 registrants; 29,572 were rescue/recovery workers at the World Trade Center site.

Workers who did not report their employment affiliation (N=447) and those who did not respond to a sufficient number of questions to accurately screen for probable PTSD (N=433) were excluded from this analysis. The final analytic group comprised responses from 28,692 workers and covered approximately one-third of the 91,469 workers and volunteers eligible for enrollment in the World Trade Center Health Registry (14).

Data Collection

Enrollment was from Sept. 5, 2003, to Nov. 20, 2004. Baseline interviews were conducted during enrollment. Informed consent was obtained after a complete description of the study was provided and before eligibility was determined. The mode of administration was a 30-minute computer-assisted telephone interview. Interviews with rescue/recovery workers were conducted in English (96.2%), Spanish (2.6%), and Chinese (0.3%) with real-time translation for other languages (1.2%).

During the baseline interview, rescue/recovery workers were asked with which employer or volunteer organization they were affiliated while working at the World Trade Center site. The responses were assessed by human review and assigned to one of 52 groups, which were validated by multiple raters. These groups were used to assign workers into the following occupations:

1. Police (N=3,925), including New York City police, Port Authority police, New York City and non-New York City sheriff's offices, and all other non-New York City police departments
2. Firefighters (N=3,232), including both New York City and non-New York City fire departments
3. Emergency medical services/medical disaster personnel (N=1,741), including all New York City and non-New York City emergency medical services and medical organizations, disaster medical assistance teams, the Federal Emergency Management Agency, and other search and rescue teams
4. Construction/engineering (N=4,498), including U.S. Corps of Engineers, New York City Department of Design and Construction, environmental abatement and pest and dust control companies, and utility companies
5. Sanitation (N=1,798), including employees from the New York City Department of Sanitation

Probable PTSD Based on Both Diagnostic Criteria and PTSD Checklist—Civilian Version Cutoff Score[a,d]

%	95% CI	Odds Ratio$_{crude}$	95% CI	Odds Ratio$_{adj}$[e]	95% CI
12.4	12.1–12.8	—		—	
6.2	5.4–6.9	1.0		1.0	
12.2	12.1–12.8	2.1[f]	1.8–2.5	2.0[f]	1.7–2.4
11.6	10.0–13.0	2.0[f]	1.6–2.4	2.2[f]	1.7–2.7
17.8	16.7–18.9	3.3[f]	2.8–3.8	3.8[f]	3.2–4.6
10.6	9.2–12.0	1.8[f]	1.5–2.2	2.7[f]	2.1–3.4
7.2	6.5–7.8	1.2	1.0–1.4	2.0[f]	1.6–2.5
21.2	20.0–22.6	4.1[f]	3.5–4.8	3.7[f]	3.1–4.4
11.8	10.8–12.8	2.0[f]	1.7–2.4	2.2[f]	1.8–2.6

6. Volunteer organizations (N=5,438), including the Red Cross, the Salvation Army, and other volunteer organizations
7. Unaffiliated volunteers (N=3,797), including clergy and individuals who reported occupations unrelated to rescue and recovery work (e.g., finance and insurance, real estate)
8. Other government agencies (N=4,263), including employees of other local, state, and federal government agencies

Demographic Characteristics

Demographic characteristics assessed for potential confounding included age, gender, race/ethnicity, educational attainment, income status, and marital status.

Within-Disaster Experiences

Experiences during the disaster (within-disaster experiences) known to increase the risk for PTSD include life threat (11, 16) and witnessing horror (9, 17). Assessment of life threat among rescue/recovery workers included being caught in the dust/debris cloud that resulted from the collapse of the towers, being an occupant of World Trade Center tower 1 or 2, or sustaining an injury on September 11th. Witnessing horror was measured by creation of a dichotomous variable and was defined as witnessing any of the following: an airplane hitting the World Trade Center, a building collapsing, people running from a cloud of dust/debris, individuals being injured or killed, or people falling or jumping from the World Trade Center towers. A continuous variable of number of horrific events witnessed was not used because most who witnessed at least one witnessed multiple events.

Work Experiences Related to the World Trade Center

Workers were asked to specify the first and last dates they worked at the site and how many days they worked during each of the following time periods: on Sept. 11, 2001 (day 1); on Sept. 12, 2001 (day 2); between Sept. 13, 2001, and Sept. 17, 2001 (days 3–7); between Sept. 18, 2001, and Dec. 31, 2001 (days 8–112); and between Jan. 1, 2002, and June 30, 2002 (days 113–262). The start date was categorized into the same time periods. For workers who did not report the date they started working (3.4%), the first interval they reported working at least 1 day was assumed to be their start date. Workers were also asked to estimate how many days they worked during each time period. For the last two time periods, they were asked to estimate how many days they worked using the following time intervals: 1–2 days, 3–6 days, 7–30 days, 31–60 days, and more than 60 days. The midpoint for each time interval was used to approximate the amount of time worked during these time periods. Total duration of time worked was calculated by summing the approximated number of days worked during each time period and was verified by a sensitivity analysis based on the first and last reported dates of work. Information was also collected about specific tasks performed on "the pile" ("the pile" refers to the construction/restricted zone composed of the rubble and remains for the collapsed World Trade Center towers), including firefighting, search and rescue activities, hand digging, welding/steel cutting/torch operation, operation of heavy equipment, and light construction.

Probable PTSD

The PTSD Checklist—Civilian Version was used to assess probable PTSD (18, 19; unpublished work by Weathers et al., 1993). The PTSD Checklist—Civilian Version is a self-reported 17-item symptom scale that corresponds to APA's DSM-IV criteria and is often used when a clinical interview is not feasible (20). The PTSD Checklist—Civilian Version assesses the full domain of PTSD symptoms in three clusters: intrusive and reexperiencing, numbing and avoidance, and hyperarousal. Each symptom was assessed as event-specific ("as a result of the World Trade Center disaster") and current ("within the last 30 days"). As suggested by North and Pfefferbaum (21), we refer to this outcome as current *probable* PTSD to acknowledge that symptoms determined through the use of a screening instrument do not necessarily indicate psychopathology.

Missing responses on the PTSD Checklist—Civilian Version were imputed for 1.6% of the workers who answered at least 80% of the questions within each symptom cluster. Imputation, which consisted of substituting the respondent's average cluster response for missing data, resulted in no statistically significant difference in prevalence. In order to permit comparisons across studies, probable PTSD was calculated three ways: 1) using DSM-IV diagnostic criteria (the presence of at least one reexperiencing symptom, three avoidance symptoms, and two hyperarousal symptoms) (22), 2) with a standard cutoff score of 44 (18), and 3) with a combination of both.

TABLE 2. Multivariable Analysis of Risk Factors Associated With PTSD Among Workers Involved in Rescue and Recovery Work at the World Trade Center Site

	Police (N=3,925)			Firefighters (N=3,232)		
Variable	N[a]	Odds Ratio[b]	95% CI	N[a]	Odds Ratio[b]	95% CI
Mode of enrollment						
Self-identified	3,824	—[c]		3,185	—[c]	
Within-disaster experiences						
Tower survivor	84	2.5[d]	1.3–4.7	97	—[c]	
Witnessed trauma	2,412	—[c]		2,192	—[c]	
Dust cloud exposure	2,214	—[c]		1,838	1.5[d]	1.1–2.1
Sustained an injury	2,053	2.4[f]	1.8–3.3	2,260	2.7[f]	1.9–3.9
World Trade Center work experiences: tasks performed						
Heavy equipment operator	46	—[c]		134	—[c]	
Light construction	252	—[c]		515	1.4[e]	1.1–1.9
Welding	151	—[c]		589	—[c]	
Firefighting	76	2.1[e]	1.0–4.2	2,161	—[c]	
Hand digging	1,950	—[c]		2,740	—[c]	
Search and rescue	2,005	—[c]		2,790	—[c]	

[a] Refers to the number who reported exposure to each within-disaster experience within each occupation.
[b] Adjusted odds ratios adjusted for significant confounders, including mode of enrollment, demographic characteristics, within-disaster experiences, and work experiences related to the World Trade Center.
[c] Removed from the final model so no parameter estimates were calculated.
[d] $p<0.01$.
[e] $p<0.05$.
[f] $p<0.0001$.
[g] $p<0.001$.

Statistical Analyses

Simple and multivariable logistic regression analyses using PROC LOGISTIC in SAS, Version 9.2 (SAS Institute, Cary, N.C.), were performed to compare PTSD prevalence across occupations. Police were used as the referent category because previous studies have suggested that PTSD prevalence tends to be lowest among police (9, 23, 24). Significant risk factors identified in the simple logistic regression analyses were considered for the multivariable logistic regression. To assess which variables to include in the final models, we performed forward and backward selection and calculated the chi-square from the difference in −2 log likelihood estimates for each subsequent model. We retained all variables that significantly improved model fit ($p<0.05$) and adjusted for mode of World Trade Center Health Registry enrollment (list recruitment versus self-identification).

Another goal of the study was to assess occupation-specific risk factors for PTSD. To accomplish this, simple logistic regression and multivariable regression analyses were performed for each occupational group. Multivariable regression analyses controlled for mode of enrollment, demographic characteristics, and within-disaster and work experiences that significantly improved model fit.

Results

The mode of World Trade Center Health Registry enrollment was significantly associated with PTSD among sanitation workers and volunteer organizations and thus was left in the model. For all other occupational groups, mode of enrollment was not significantly associated with PTSD.

Demographic Characteristics

Demographic characteristics differentially influenced PTSD risk by occupational group. Because interpretation was beyond the scope of the present study, the results are not included. The multivariable analyses controlled for demographic characteristics within each occupational group that significantly improved the model fit.

PTSD Prevalence

Table 1 presents the prevalence and odds ratios associated with current probable PTSD and symptom clusters stratified by occupation. The prevalence of current probable PTSD among all rescue/recovery workers was 12.4%. With the exception of firefighters, the prevalence of current probable PTSD using either diagnostic criteria or the PTSD Checklist—Civilian Version cutoff score was similar. The combined criteria yielded a lower prevalence in all occupations. Because this calculation was the most conservative estimate, it was used as the outcome for subsequent risk factor analyses. The prevalence of PTSD ranged from 6.2% for police to 21.2% for unaffiliated volunteers. Reexperiencing and hyperarousal were reported more frequently than avoidance symptoms.

Compared to police, the highest PTSD prevalences were found among unaffiliated volunteers (adjusted odds ratio [odds ratio_{adj}]=3.7) and construction/engineering (odds ratio_{adj}=3.8). After we controlled for significant demographic, disaster, and work experiences related to the World Trade Center, the prevalence of PTSD was substantially elevated in sanitation workers (odds ratio_{adj}=2.7) and individuals reporting affiliation with volunteer organizations (odds ratio_{adj}=2.0).

Within-Disaster Experiences

Tables 2 and 3 present the adjusted associations between within-disaster experiences and current probable PTSD stratified by occupation. Sustaining an injury was the only within-disaster experience that increased risk

Emergency Medical Services, Medical, or Disaster Personnel (N=1,741)			Construction or Engineering Workers (N=4,498)			Sanitation Workers (N=1,798)		
N[a]	Odds Ratio[b]	95% CI	N[a]	Odds Ratio[b]	95% CI	N[a]	Odds Ratio[b]	95% CI
1,379	—[c]		1,970	—[c]		278	1.7[d]	1.2–2.5
45	2.2[e]	1.1–4.7	52	2.0[e]	1.0–3.8	3	—[c]	
824	—[c]		2,239	1.5[f]	1.2–1.8	787	—[c]	
691	—[c]		1,172	1.2	0.9–1.4	533	1.5[e]	1.2–2.2
752	4.0[f]	2.8–5.7	1,451	1.9[f]	1.6–2.3	616	2.0[f]	1.4–2.8
17	—[c]		639	—[c]		284	1.6[e]	1.1–2.3
100	—[c]		943	1.3[e]	1.1–1.6	119	—[c]	
119	—[c]		460	—[c]		13	—[c]	
150	2.4[g]	1.5–4.1	113	—[c]		6	—[c]	
601	—[c]		796	—[c]		255	—[c]	
735	—[c]		724	1.7[f]	1.4–2.2	198	2.1[g]	1.4–3.2

among all occupations and was the strongest risk factor for all occupations (odds ratios$_{adj}$ ranging from 1.9 to 4.0) except police and construction/engineering. Evacuating from one of the World Trade Center towers was associated with an increased risk among all occupations except firefighters; too few sanitation workers reported evacuating to analyze (N=3). All within-disaster experiences except dust cloud exposure were significant risk factors for PTSD in construction/engineering workers.

Nearly all within-disaster experiences were significant risk factors for volunteer organizations, unaffiliated volunteers, and other governmental agencies (Table 3). Sustaining an injury was the strongest risk factor for both volunteer organizations and unaffiliated volunteers (odds ratios$_{adj}$=3.3 and 2.3, respectively), whereas the strongest risk factor for other government agencies was evacuating from one of the towers (odds ratio$_{adj}$=2.3). Dust cloud exposure was a significant risk factor in volunteer organizations only.

Work Experiences Related to the World Trade Center

The adjusted associations between work experiences related to the World Trade Center and current probable PTSD stratified by occupation are presented in Tables 2 and 3. The relationships between tasks performed at the World Trade Center site and PTSD varied by occupation, with the strongest associations observed for tasks performed that were atypical of reported occupation. For example, firefighting was associated with a twofold increase in PTSD risk among police and emergency medical services/medical/disaster personnel, whereas performing light construction was the only task associated with PTSD among firefighters. Search and rescue was the strongest task-related risk factor among construction/engineering and sanitation workers. None of the work experiences related to the World Trade Center increased the risk for PTSD among volunteer organizations. Performing light construction work was associated with a nearly twofold increase in PTSD among unaffiliated volunteers and other government agencies. The strongest risk factor for unaffiliated volunteers was firefighting (odds ratio$_{adj}$=2.4).

The relationship between the duration of time worked and current probable PTSD differed by occupation. Figures 1 and 2 present the association between the duration of time worked and probable PTSD stratified by the start date for each occupation. The probability of PTSD increased with longer duration of time worked at the site for all occupations except police. The probability of PTSD was also greater for those who started on September 11th compared to those who started after September 18th (odds ratios: firefighters=2.4, emergency medical services/medical/disaster personnel=2.6, construction/engineering workers=1.8, sanitation workers=2.7). The association between the duration of time worked and probable PTSD was strongest among those who started on September 11th for all occupations except police.

Starting work on September 11th also increased the association between the duration of time worked and the probability of PTSD for the other workers (odds ratios: volunteer organizations=5.1, unaffiliated volunteers=1.6, other government agencies=1.9). The association for starting on September 12th was nearly the same as starting on September 11th in the affiliated and unaffiliated volunteers (odds ratios=5.2 and 1.4, respectively).

TABLE 3. Multivariable Analysis of Risk Factors Associated With PTSD Among Other Workers Involved in Rescue and Recovery Work at the World Trade Center Site

	Volunteer Organizations (N=5,438)			Unaffiliated Volunteers (N=3,797)			Other Government Agencies (N=4,263)		
Variable	N[a]	Odds Ratio[b]	95% CI	N[a]	Odds Ratio[b]	95% CI	N[a]	Odds Ratio[b]	95% CI
Mode of enrollment									
Self-identified	1,813	2.2[c]	1.7–2.8	2,645	—[d]		3,356	—[d]	
Within-disaster experiences									
Tower survivor	21	3.2[e]	1.1–9.6	106	—[d]		40	2.3[e]	1.0–5.1
Witnessed trauma	1,231	1.6[f]	1.2–2.2	2,499	1.6[c]	1.3–2.0	2,119	1.7[c]	1.3–2.1
Dust cloud exposure	825	1.5[e]	1.0–2.1	1,820	—[d]		1,648	—[d]	
Sustained an injury	788	3.3[c]	2.5–4.3	1,769	2.3[c]	1.9–2.8	1,607	2.1[c]	1.7–2.7
World Trade Center work experiences: tasks performed									
Heavy equipment operator	7	—[d]		27	—[d]		155	—[d]	
Light construction	42	—[d]		117	1.8[f]	1.2–2.8	305	1.8[g]	1.3–2.5
Welding	11	—[d]		80	—[d]		172	—[d]	
Firefighting	19	—[d]		56	2.4[f]	1.3–4.4	91	—[d]	
Hand digging	162	—[d]		428	—[d]		934	—[d]	
Search and rescue	150	—[d]		406	—[d]		971	—[d]	

[a] Refers to the number who reported exposure to each within-disaster experience within each occupation.
[b] Adjusted odds ratios adjusted for significant confounders, including mode of enrollment, demographic characteristics, within-disaster experiences, and work experiences related to the World Trade Center.
[c] $p<0.0001$.
[d] Removed from the final model so no parameter estimates were calculated.
[e] $p<0.05$.
[f] $p<0.01$.
[g] $p<0.001$.

Discussion

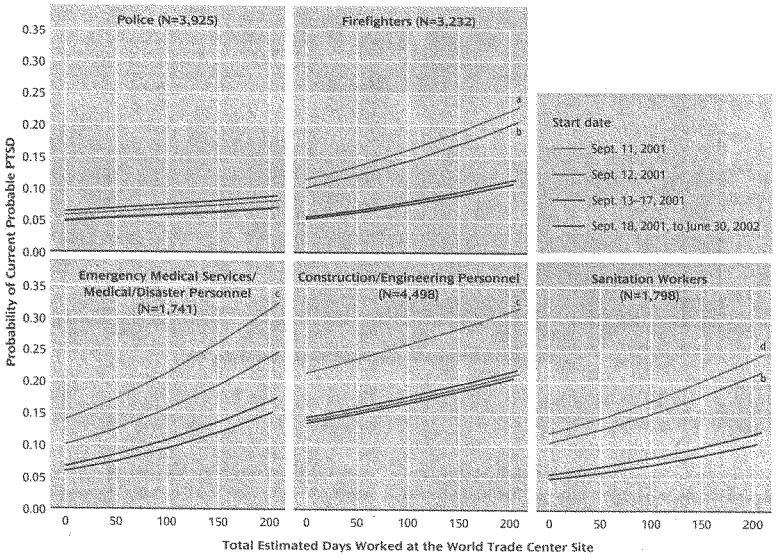
This is one of the first studies to compare workers from different occupations responding to the same disaster and the first, to our knowledge, to analyze this for the World Trade Center attacks, the largest manmade disaster in U.S. history. The prevalence of PTSD and associated risk factors differed substantially, nearly fourfold across occupations. Workers in occupations less prepared for the type of disaster work required at the World Trade Center site, such as firefighting and search and rescue, were more likely to develop PTSD; the highest rates were documented among volunteers, construction/engineering workers, and sanitation workers. Furthermore, workers who engaged in tasks outside of their training were also at increased risk. When examined by task, the rates of PTSD were highest among emergency medical services/medical/disaster personnel who engaged in firefighting and sanitation workers who engaged in search and rescue. In contrast, few work experiences at the World Trade Center were associated with risk among groups for which prior training and preparedness is most likely to be heterogeneous, and the strongest risk factors for these groups were within-disaster experiences.

Our finding that the prevalence of PTSD varied by occupation is consistent with the previous literature on disaster responders (3–7) and suggests that prior training or experience may protect against the psychological distress associated with disaster work, as suggested by others. Potential explanations for why prior training protects against PTSD include an increased sense of self-efficacy or internal locus of control and the satisfaction of applying previous training to successfully fulfill duties (23, 25, 26).

Among occupations most likely to have had prior training, emergency medical services/medical/disaster personnel and firefighters were twice as likely to have current probable PTSD as police. Other studies of police involved in rescue/recovery work have also reported a lower prevalence of psychological distress (23, 27) and probable PTSD (24). Police screening procedures may result in selection of a more psychologically resilient workforce. It is also possible that police officers are more likely to underreport symptoms of psychological distress for fear that they will judged as unable to perform their job responsibilities. Firefighters and emergency medical services personnel may also underreport symptoms; however, it is more likely among police officers because compromised psychological health is associated with graver consequences in an environment where carrying a firearm is a daily requirement.

For the World Trade Center disaster, bereavement (28) and self-identification with the victims (29) may have also contributed to the difference in PTSD prevalence. Firefighters lost six times as many comrades as the police (30), and Fire Department of New York funerals continued through September 2003. An assessment 7–13 weeks after Hurricane Katrina, however, documented no disparity in the prevalence of PTSD among police and firefighters (19% and 22%, respectively) (31). These findings may be explained by other experiences known to increase risk for psychological distress, such as civil disobedience, hostility, and aggression toward police (32), all widely depicted in post-Katrina media coverage.

FIGURE 1. Probability of PTSD Among Rescue and Recovery Workers by Amount of Time Spent at the Site, Stratifying by Start Date



[a] p<0.001.
[b] p<0.05.
[c] p<0.0001.
[d] p<0.01.

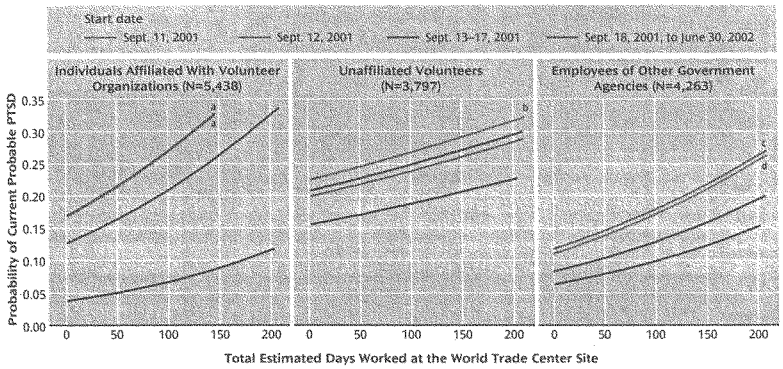
Lack of access to mental health services may also account for increased risk of PTSD among sanitation workers, construction/engineering workers, and unaffiliated volunteers. Although our survey did not directly assess this, sanitation workers, medical personnel, and other volunteers were excluded from the World Trade Center injury and illness surveillance programs established in local hospitals after the attack to assist rescue/recovery workers injured while working at the site because it was believed that they were not directly involved in rescue/recovery operations (33). Furthermore, World Trade Center firefighters and police had additional access to mental health support and critical incident stress management services through other organizations. To our knowledge, no comparable services were established for construction/engineering and sanitation workers.

It is also possible that lack of recognition is partially responsible for an increase in psychological distress. Construction and sanitation World Trade Center workers from another study reported feeling that their psychological distress was prolonged because unlike other World Trade Center workers, they did not receive recognition for their efforts, preventing them from obtaining closure (13).

Among the range of traumatizing experiences during the disaster, being injured on September 11th significantly increased the risk of PTSD for all workers, whereas witnessing trauma was a significant risk factor only for construction/engineering workers, volunteer organizations, unaffiliated volunteers, and other government agencies. One potential explanation for this finding is that previous exposure to trauma during the daily job responsibilities required of police, firefighters, and emergency medical services personnel may have desensitized them to the deleterious effects of witnessing trauma. In contrast, sustaining an injury is a measure of personal life threat, which is less likely to be modified by prior experiences.

As was found among responders to the Oklahoma City bombing (25), the duration of work at the disaster site was associated with PTSD. For all occupations except police, the probability of PTSD was elevated for those who

FIGURE 2. Probability of PTSD Among Other Rescue and Recovery Workers by Amount of Time Spent at the Site, Stratifying by Start Date



[a] p<0.0001.
[b] p<0.05.
[c] p<0.001.
[d] p<0.01.

worked for more than 3 months. Stratified analyses also revealed that the relationship between time worked at the site and the probability of PTSD was strongest for those who started on September 11th, when exposure to trauma and risk of injury was greatest in all groups except for police. It is possible that the lack of association between the start date, duration of work, and PTSD among police may be related to tasks performed because they were responsible for patrolling the perimeter and less likely to have been involved with tasks on the pile for which they had no prior training. Supporting this argument is evidence from our cohort that few police reported operating heavy equipment (1.2%), performing light construction work (6.9%), or firefighting (1.9%) at the World Trade Center site.

A few limitations of this study must be noted. First, among sanitation workers and volunteer organizations, mode of enrollment was significantly associated with PTSD. Individuals within these groups who self-identified into the registry were more likely to be diagnosed with probable PTSD. This raises the possibility of reporting bias and overestimation of the mental health impact of the event; however, we appropriately controlled for this in each of the multivariable analyses across all occupations, and our findings remained the same. Second, individuals from hundreds of different organizations responded to the disaster and initiated work at varying time periods, and ascertaining the representativeness of this cohort is challenging. An assessment of coverage and enrollment rates found that approximately one-third of those eligible enrolled in the World Trade Center Health Registry with coverage varying among organizations: the enrollment rate was 68.9% for the New York City Police Department, 50.4% for the New York City Department of Sanitation, and 23.5% for the Fire Department of New York (34). Although coverage for some groups was modest, for the five major occupational groups included in this study, we successfully recruited ample numbers from both self-enrollment and employee lists to examine differences in prevalence and risk factors. Third, degree of previous training and professional experience were not directly assessed but rather inferred based on occupation. However, the observation that tasks inconsistent with typical occupational roles were significant risk factors for PTSD provides greater confidence in our assumptions about prior training. Examination of characteristics such as mental health history and social support and mental health care use are also necessary to further elucidate the relationship between disaster work and PTSD. Such assessments are planned for the first follow-up survey of World Trade Center Health Registry registrants. Finally, it is important to note that among some of the groups assessed, such as volunteer workers and responders from other government agencies, individuals most likely self-selected for participation in rescue/recovery work. It is possible that some persons who self-selected to respond were not well screened compared to police and firemen and may have been at increased risk for PTSD.

The World Trade Center Health Registry is the largest disaster registry in U.S. history, and the rescue/recovery worker sample includes the largest number of workers

from multiple occupations exposed to the same disaster. Current probable PTSD was identified with a standardized, well-validated assessment, providing confidence in our prevalence estimates and enabling comparisons across studies.

The results from the present analysis suggest that rescue/recovery workers who responded to the September 11th disaster continue to experience substantial psychological distress years later. Our findings demonstrate a need for targeted interventions specific to the diversity of workers who respond to large disasters to reduce the psychological burden associated with participation. Disaster preparedness training and shift rotations to enable a shorter duration of service at the site may reduce PTSD among workers and volunteers in future disasters.

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References

1. Norris FH, Friedman MJ, Watson PJ, Byrne CM, Diaz E, Kaniasty K: 60,000 disaster victims speak, part I: an empirical review of the empirical literature, 1981–2001. Psychiatry 2002; 65:207–260
2. Kessler RC, Chin WT, Demler O, Merikangas KR, Walters EE: Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. Arch Gen Psychiatry 2005; 62:617–627
3. Fullerton CS, Ursano RJ, Wang L: Acute stress disorder, posttraumatic stress disorder, and depression in disaster or rescue workers. Am J Psychiatry 2004; 161:1370–1376
4. Epstein RS, Fullerton CS, Ursano RJ: Posttraumatic stress disorder following an air disaster: a prospective study. Am J Psychiatry 1998; 155:934–938
5. Ozen S, Aytekin S: Frequency of PTSD in a group of search and rescue workers two months after 2003 Bingol (Turkey) earthquake. J Nerv Ment Dis 2004; 192:573–575
6. Guo U, Chen C, Lu M, Tan HK, Lee H, Wang T: Posttraumatic stress disorder among professional and non-professional rescuers involved in an earthquake in Taiwan. Psychiatry Res 2004; 127:35–41
7. North CS, Tivis L, McMillen JC, Pfefferbaum B, Spitznagel EL, Cox J, Nixon S, Bunch KP, Smith EM: Psychiatric disorders in rescue workers after the Oklahoma City bombing. Am J Psychiatry 2002; 159:857–859
8. Chang C, Lee L, Connor KM, Davidson JRT, Jeffries K, Lai T: Posttraumatic distress and coping strategies among rescue workers after an earthquake. J Nerv Ment Dis 2003; 191:391–398
9. Marmar CR, Weiss DS, Metzler TJ, Ronfeldt HM, Foreman C: Stress responses of emergency services personnel to the Loma Prieta earthquake interstate 880 freeway collapse and control traumatic incidents. J Trauma Stress 1996; 9:63–85
10. Dyregrov A, Kristoffersen JI, Gjestad R: Voluntary and professional disaster-workers: similarities and differences in reactions. J Trauma Stress 1996; 9:541–555
11. Fullerton CS, Ursano RJ, Reeves J, Shigemura J, Grieger T: Perceived safety in disaster workers following 9/11. J Nerv Ment Dis 2006; 194:61–63
12. Smith RP, Katz CL, Holmes A, Herbert R, Levin S, Moline J, Landsbergis P, Stevenson L, North CS, Larkin GL, Baron S, Hurrell JJ: Mental health status of World Trade Center rescue and recovery workers and volunteers—New York City, July 2002–Aug 2004. MMWR 2004; 53:812–815
13. Johnson SB, Langlieb AM, Teret SP, Gross R, Schwab M, Massa J, Ashwell L, Geyh AS: Rethinking first response: effects of the clean up and recovery effort on workers at the World Trade Center disaster site. J Occup Environ Med 2005; 47:386–391
14. Dolan M, Murphy J, Thalji L, Pulliam P: World Trade Center Health Registry: Sample Building and Denominator Estimation. Research Triangle Park, NC, Research Triangle Institute, RTI project number 08692, contract number 200–2002-M-00836, 2006
15. Pulliam P, Thalji L, DiGrande L, Perrin M, Walker D, Wu D, Dolan M, Triplett S, Dean E, Peele P, Brackbill RM: World Trade Center Health Registry: Data File User's Manual. New York, RTI International, New York Department of Health and Mental Hygiene and the Agency for Toxic Substances and Disease Registry, 2006
16. Marmar CR, Weiss DS, Metzler TJ, Delucchi K: Characteristics of emergency services personnel related to peritraumatic dissociation during critical incident exposure. Am J Psychiatry 1996; 153(7 suppl):94–102
17. Brandt GT, Fullerton CS, Saltzgaber L: Disasters: psychological responses in health care providers and rescue workers. Nordic J Psychiatry 1995; 49:89–94
18. Blanchard EB, Jones-Alexander J, Buckley RC, Forneris CA: Psychometric properties of the PTSD Checklist (PCL). Behav Res Ther 1996; 34:669–673
19. Ruggiero KJ, Del Ben K, Scotti JR, Rabalais AE: Psychometric properties of the PTSD Checklist—Civilian Version. J Trauma Stress 2003; 16:495–502
20. Dobie DJ, Kivlahan DR, Maynard CR, McFall M, Epler AJ, Bradley KA: Screening for post-traumatic stress disorder in female veteran's affairs patients: validation of the PTSD Checklist. Gen Hosp Psychiatry 2002; 24:367–374
21. North CS, Pfefferbaum B: Research on the mental health effects of terrorism. JAMA 2002; 288:633–636
22. Smith MY, Redd W, DuHamel K, Vickberg SJ, Ricketts P: Validation of the PTSD Checklist—Civilian Version in survivors of bone marrow transplantation. J Trauma Stress 1999; 12:485–499
23. Alexander DA, Wells A: Reactions of police officers to body-handling after a major disaster. Br J Psychiatry 1991; 159:547–555
24. Renck B, Weisæth L, Skarbö S: Stress reactions in police officers after a disaster rescue operation. Nordic J Psychiatry 2002; 56: 7–14
25. North CS, Tivis L, McMillen JC, Pfefferbaum B, Cox J, Spitznagel EL, Bunch KP, Schorr J, Smith EM: Coping, functioning, and adjustment of rescue workers after the Oklahoma City bombing. J Trauma Stress 2002; 15:171–175

26. Alvarez J, Hunt M: Risk and resilience in canine search and rescue handlers after 9/11. J Trauma Stress 2005; 18:497–505
27. Alexander DA: Stress among police body handlers: a long-term follow-up. Br J Psychiatry 1993; 163:806–808
28. Pivar IL, Field NP: Unresolved grief in combat veterans with PTSD. J Anxiety Disord 2004; 18:745–755
29. Ursano RJ, Fullerton CS, Vance K, Kao TC: Posttraumatic stress disorder and identification in disaster workers. Am J Psych 1999; 156:353–359
30. Death, destruction, charity, salvation, war, money, real estate, spouses, babies, and other September 11 statistics. New York Magazine. http://www.newyorkmetro.com/news/articles/wtc/1year/numbers.htm
31. Bernard BP, Driscoll RJ: Health hazard evaluation of police officers and firefighters after Hurricane Katrina—New Orleans, La, Oct 17–18 and Nov 30–Dec 5, 2005. MMWR 2006; 55:456–458
32. Sims A, Sims D: The phenomenology of post-traumatic stress disorder. Psychopathology 1998; 31:96–112
33. Berrios-Torres SI, Greenko JA, Phillips M, Miller JR, Treadwell T, Ikeda RM: World Trade Center rescue recovery worker injury and illness surveillance, NY, 2001. Am J Prev Med 2003; 25:79–87
34. Murphy J: World Trade Center Health Registry Enrollment and Coverage Report. Research Triangle Park, NC, RTI International, RTI project number 0B692, contract number 200–2002-M-00836, 2006