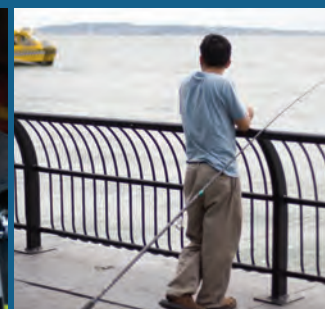


World Trade Center Medical Working Group of New York City

2009 Annual Report on 9/11 Health

September 2009



NYC[™]

Michael R. Bloomberg,
Mayor

LETTER TO MAYOR BLOOMBERG

September 2009

Dear Mayor Bloomberg:

The World Trade Center (WTC) Medical Working Group is pleased to submit its second annual report on the state of 9/11 health. We were charged two years ago with advising you about health issues that are related—or potentially related—to the September 11, 2001 terrorist attacks on the World Trade Center, and have continued to meet regularly to review and report on the evolving research in this field. In our first report, we reviewed seven years of published research about health effects resulting from the attacks and WTC collapse. This body of research described short-term health effects occurring one to three years after the event, and findings are summarized on page 2.

In the past 12 months, additional findings have been published, including some that address mid-term health effects among adults, five to seven years after 9/11. This newer research suggests that, while the vast majority of people exposed to the attacks on 9/11 and its immediate aftermath are healthy and symptom-free, thousands of exposed individuals continue to suffer from WTC-related mental and physical health conditions, and some of these conditions are likely to be chronic.

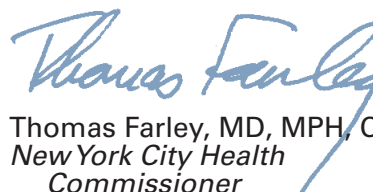
Of particular note are new epidemiological findings by the WTC Health Registry, which has been tracking the health of a large, voluntary sample of 71,000 exposed individuals since 2003 through periodic surveys. The results are published this year in the *Journal of the American Medical Association (JAMA)*, and they indicate reports of high levels of new asthma diagnoses since the attacks, especially during the first 16 months after 9/11, and sustained and late-emerging posttraumatic stress symptoms. At the time of the second survey, five to six years after 9/11, one in ten adult enrollees reported having been diagnosed with new asthma. New onset symptoms of asthma five to six years after 9/11, however, were comparable to expected levels and were not linked to the degree/intensity of WTC exposure. In the same survey, nearly one in five enrollees reported experiencing symptoms of posttraumatic stress. Many of those developing symptoms years after 9/11 also had experienced other life stressors subsequent to the attack, such as losing a job or inadequate social support.

Several newly published studies suggest that WTC-related mental and physical health conditions often can occur together, and in fact, 10-25% of people currently being treated by the WTC Centers of Excellence (see WTC Patient Population Report beginning on page 10) are being treated for both mental and physical health conditions. Fortunately, monitoring and treatment continues to be available in the New York City area for those whose health has been affected by 9/11 thanks to a combination of federal and City funding.

Our state of knowledge about the short-term health effects of 9/11 has come into sharper focus since the formation of the WTC Medical Working Group in June 2007. With this report, we better understand the longer-term health care needs of exposed individuals, in particular those who may have developed chronic conditions that can seriously affect quality of life.



Linda Gibbs, Co-Chair
New York City Deputy Mayor
for Health and Human Services



Thomas Farley, MD, MPH, Co-Chair
New York City Health
Commissioner

TABLE OF CONTENTS

Letter to Mayor Bloomberg	Inside front cover
World Trade Center Medical Working Group	1
Summary of Prior 9/11 Health Findings (2001-2007)	2
New 9/11 Health Findings	3
Strengths and Limitations of WTC Research	9
New York City WTC Patient Population Report	10
Recommendations	15
Appendix A: How WTC-Related Deaths Are Evaluated by New York City's Office of the Chief Medical Examiner	21
Appendix B: Impact of 9/11 on New York City Disability Pensions	22
Sources	24

WORLD TRADE CENTER MEDICAL WORKING GROUP MEMBERSHIP

Mayor Bloomberg appointed the WTC Medical Working Group in June 2007. Members meet quarterly to review clinical and research findings on the health effects of WTC exposure and publish an annual report. They also review the adequacy of health and mental health services available to WTC-exposed persons, and they advise city government on approaches to communicating health risk information related to WTC exposure.

Linda Gibbs, Co-Chair

New York City Deputy Mayor for Health and Human Services

Thomas Farley, MD, MPH, Co-Chair

New York City Health Commissioner

Thomas K. Aldrich, MD

*Professor of Medicine, Pulmonary Division, Montefiore Medical Center and Albert Einstein College of Medicine, Bronx, NY
Chair, New York State September 11th Worker Protection Task Force*

Lung Chi Chen, PhD

Professor, Department of Environmental Medicine, NYU School of Medicine

Kitty H. Gelberg, PhD, MPH

Chief, Epidemiology and Surveillance Section, Bureau of Occupational Health, New York State Department of Health

Eli J. Kleinman, MD, MPH

*Assistant Professor of Medicine and Hematology, Albert Einstein College of Medicine
Supervising Chief Surgeon, New York City Police Department*

Susan Klitzman, DrPH, MPH

Professor and Director, Urban Public Health Program, Hunter College, City University of New York

Philip J. Landrigan, MD, MSc, DIH

*Professor and Chairman, Department of Preventive Medicine
Professor of Pediatrics, Director, Center for Children's Health and the Environment, Mount Sinai School of Medicine*

R. Richard Leinhardt, MD, FACS

*Chief Surgeon, New York City Department of Correction
Clinical Associate Professor Emeritus of Otorhinolaryngology, New York Medical College*

David Prezant, MD

*Chief Medical Officer, Office of Medical Affairs, Co-Director, WTC Medical Monitoring & Treatment Programs, New York City Fire Department
Professor of Medicine, Albert Einstein College of Medicine*

Ramanathan Raju, MD

Executive Vice President and Corporate Chief Medical Officer Medical and Professional Affairs, NYC Health and Hospitals Corporation

Joan Reibman, MD

*Director, Bellevue Hospital WTC Environmental Health Center
Associate Professor, Medicine and Environmental Medicine, NYU Medical Center
Bellevue Hospital Center*

Michele S. Slone, MD

*Clinical Assistant Professor, Department of Forensic Medicine, New York University School of Medicine
City Medical Examiner, Office of Chief Medical Examiner, City of New York*

Lorna Thorpe, PhD, MPH

Deputy Commissioner, Division of Epidemiology, New York City Department of Health and Mental Hygiene

SUMMARY OF PRIOR 9/11 HEALTH FINDINGS (2001-2007)

For our first annual report on 9/11 health in 2008, the WTC Medical Working Group reviewed nearly 100 studies published from 2001-2007. Most of these studies examined the health of rescue and recovery workers one to three years after their exposure to the WTC disaster, although some studies also included residents and building evacuees. Physical and mental health findings were remarkably consistent across studies and can be summarized as follows:

- Results from large epidemiologic studies suggest that probable posttraumatic stress disorder (PTSD) is the most common WTC-related health condition among exposed adults. Probable PTSD means that individuals scored above a certain threshold when responding to a mental health screening questionnaire but have not undergone the psychiatric interview necessary to confirm the diagnosis.
- The risk for developing probable PTSD was higher among those who were:
 - Caught in the dust cloud released by the buildings as they collapsed
 - Injured as a result of the attacks
 - Directly exposed to the events of 9/11, including proximity to the WTC site, witnessing horrific events and knowing someone who was killed or injured in the attacks
 - Among rescue and recovery workers, working at the WTC site for a long time or doing tasks outside of their trained area of expertise.
- Several studies indicated that respiratory symptoms, sinus problems, asthma, and loss of lung function were found in people or reported by some who were exposed to WTC dust, including rescue and recovery workers, residents and evacuees. Other studies have suggested that risk of developing sarcoidosis (an inflammation that usually affects the lungs) was elevated in the first few years after the event. Many exposed adults were also diagnosed with or reported having heartburn, acid reflux or gastroesophageal reflux disease (GERD), often in conjunction with other respiratory or mental health symptoms. GERD is a common condition among the general population, however; further research is needed to understand the association between GERD, WTC exposure and other WTC-related health conditions.
- The risk for developing respiratory problems has been examined most thoroughly among rescue, recovery and clean-up workers, and was increased among those who:
 - Arrived early at the WTC site
 - Worked at the WTC site for long periods of time.
- Few studies addressed the impact of WTC exposure on child and adolescent health, especially physical health.
- Whether there is a relationship between WTC exposure and other longer-term illnesses, including cancer, is unknown but clinicians, epidemiologists and other researchers are actively studying this. They also are studying the relationship between WTC exposure and mortality.
- At the time of the report's publication last year, treatment for WTC-related conditions was available for exposed groups, including children and adolescents, in the New York City area.

Source: World Trade Center Medical Working Group, 2008 Annual Report, September 2008 (accessible on line at www.nyc.gov/html/om/pdf/2008/2008_mwg_annual_report.pdf)

NEW 9/11 HEALTH FINDINGS

Since the release of its first annual report in September 2008, the WTC Medical Working Group has identified 75 new studies published about WTC-related issues in peer-reviewed literature. Forty-eight examined health impacts or exposures and were relevant to the purpose of this report. Among relevant studies, the majority (36) examined mental health and 13 studies addressed physical health.

The new research findings, summarized below, largely support previously published research. Most studies continued to focus on the short-term health of adults one to three years after the disaster, although a few studies now have examined the mid-term health of adults five to seven years after 9/11.

Continued research is needed to better understand mid-term health impacts on adults, but a broad picture has begun to emerge. A large epidemiologic study conducted in 2006-2007 by the World Trade Center Health Registry provides the most recent information on mid-term health impacts of 9/11. The burden of probable posttraumatic stress disorder (PTSD) among enrollees (19%) was slightly higher than previously published estimates (16%) from 1-3 years after the event, and post-9/11 risk factors such as job loss or lack of social support were strong predictors of posttraumatic stress symptoms at the time of the survey. These findings from the WTC Health Registry highlight the effects of compounded stresses and traumas on this exposed population. In terms of physical health findings, 10% of adult enrollees reported receiving a new diagnosis of asthma after 9/11. While the bulk of asthma symptoms developed soon after 9/11, many symptomatic adults appear to have delayed seeking care for these symptoms.

These mid-term health findings from the WTC Health Registry, described in more detail below, as well as the WTC Patient Population Report on page 10, indicate that mental and physical health problems persist among thousands of adults who were exposed to the WTC collapse. They also indicate that many have not yet sought care, particularly for PTSD. The persistence of both mental and physical health problems suggests that some of the symptoms have become chronic and may require care for the foreseeable future.

Estimates of Health Impacts

Based on its 2006-2007 survey findings of physical and mental health impacts, the **WTC Health Registry** has estimated that among the 409,000 people who were most heavily exposed to the disaster on 9/11:¹

- Between 17,400-40,000 adults may have been newly diagnosed with asthma five to six years later.
- Between 43,000-88,600 adults may have experienced symptoms indicative of PTSD five to six years later.

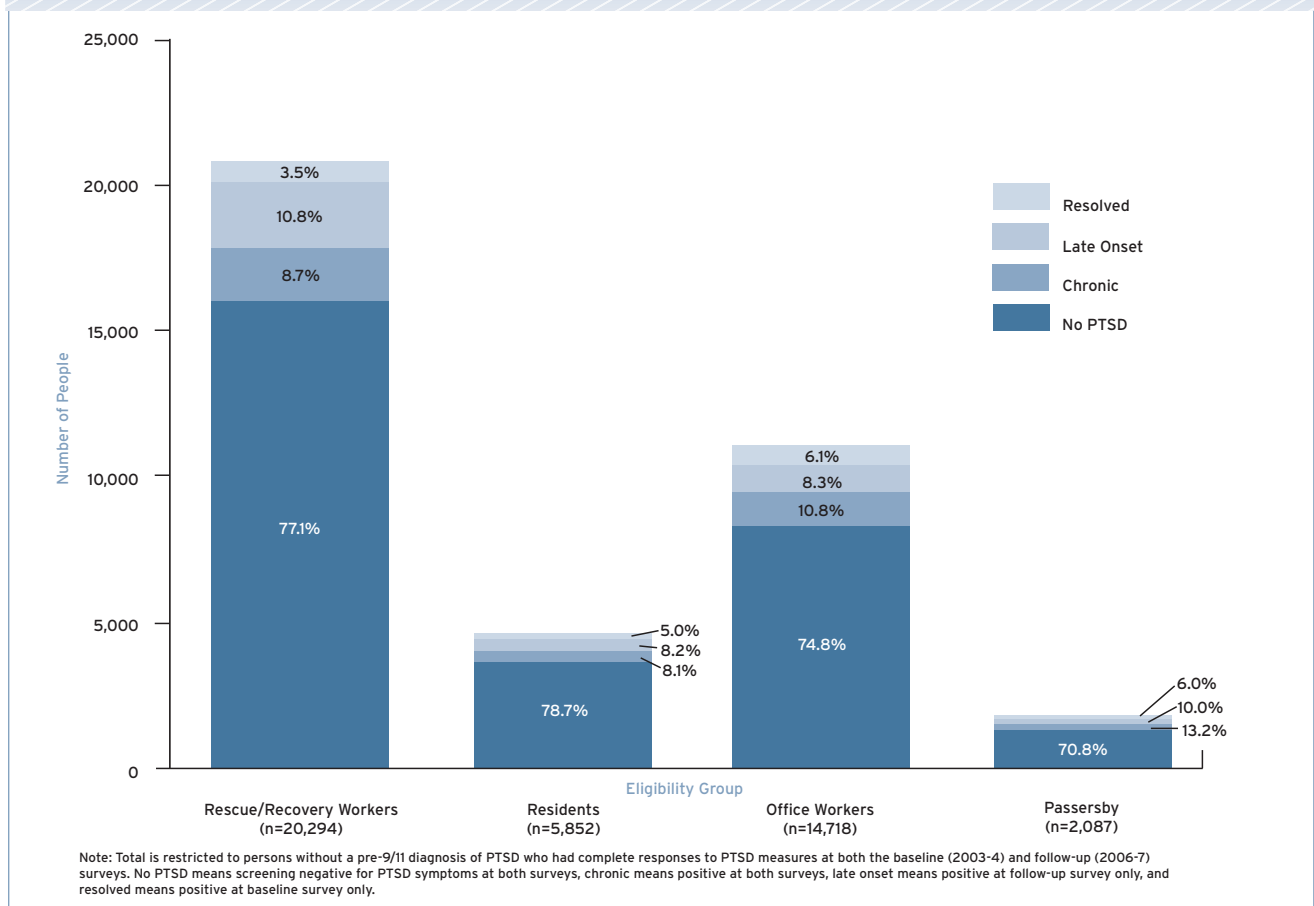
The WTC Health Registry derived these estimates by taking rates of self-reported new diagnoses of asthma and posttraumatic stress symptoms five to six years after 9/11, and applying these rates to an estimated population of people who were most heavily exposed to the WTC disaster. Ranges were used to take into account the potential for self-selection that is inherent in a voluntary registry.

Mental Health

Mid-Term Impacts Among Adults (5-6 Years After 9/11)

- 19% of adults enrolled in the **WTC Health Registry**—more than 8,200 adults—showed symptoms of probable PTSD in 2006-2007, including rescue and recovery workers and volunteers, residents, office workers and passersby. Since 2001, 10% of all enrollees showed symptoms of probable *chronic* PTSD, meaning that they reported current symptoms on both surveys (2003-2004 and 2006-2007).²
 - Passersby had the highest rates overall (23%) at the time of second survey but rescue and recovery workers and volunteers experienced the greatest increase in the rate of people experiencing symptoms between the first survey and the second (from 12% to 19%).
 - Among nearly 5,000 enrollees with probable PTSD who had not seen a mental health provider in the year before the second survey, approximately half are residents, office workers or persons other than rescue and recovery workers who were in the vicinity of the WTC site on the morning of 9/11.
- Over a five-year period from 2002 to 2007, 11% of more than 10,000 rescue, recovery and clean-up workers being monitored at the **New York/New Jersey WTC Clinical Consortium** met the criteria for probable PTSD in the month prior to their initial clinical examination. Half of the workers with probable PTSD also had either probable depression, panic disorder or both. Workers with probable PTSD also were twice as likely as those without to have an alcohol problem.³

PTSD Symptoms Among WTC Health Registry Enrollees (2003-2007)



Short-Term Impacts (1-4 Years After 9/11)

- Among 8,487 firefighters who enrolled in the **FDNY WTC Medical Monitoring and Treatment Program**, 12% screened positive for probable PTSD symptoms in the first six months after 9/11. More than one-quarter (28%) of those who screened positive self-referred for counseling over the first 2.5 years after 9/11, a fivefold increase in the number of persons referred from pre-WTC rates. Elevated PTSD risk was significantly associated with counseling use, functional job impairment and mental-health related medical leave during this period.⁴
- Several studies of people, including children, exposed to the 9/11 terrorist attacks, have found that trauma either before or after the event increased their vulnerability to PTSD or resulted in greater symptom severity:
 - Among 842 utility workers who were deployed to the WTC site and who participated in a voluntary psychological screening 17 to 27 months later, those with PTSD were more likely to have a history of trauma, depression and panic disorder prior to 9/11. In addition, the study found that the ability to function at work, or in family and social situations decreased with PTSD symptom severity.⁵
 - A clinical study of 124 ironworkers who worked at the WTC site and who sought mental health treatment 14 to 17 months after 9/11 at the **New York/New Jersey WTC Clinical Consortium** found significantly elevated rates of alcohol misuse (39%); anxiety (6.5%); and PTSD (18.5%), in comparison to the general population. Psychiatric symptoms were correlated with excessive alcohol use since 9/11, injury to and/or death of a friend, family member or co-worker on 9/11, and at least one adverse life event in the six months after 9/11.⁶
 - Findings from a study of 200 volunteer middle school children in a Lower Manhattan immigrant community near the WTC collapse suggest that children exposed to additional trauma, either before or after 9/11, were more likely to have higher PTSD symptom severity than those with exposure to 9/11 events alone, regardless of how directly they were exposed.⁷ This supports a previous finding among pre-school children.⁸
- A convenience sample of 1,040 adolescents attending the five schools closest to the WTC responded to a survey and 10% reported an increase in their post-9/11 alcohol or substance use 18 months after the attacks. Although the study didn't include a general population comparison group to adjust for time or age trends, the likelihood of increased substance use rose with the degree of reported 9/11 exposure, even after controlling for depression and PTSD. For example, substance use among adolescents with three or more exposure risk factors was nearly 20 times higher compared to adolescents with no exposure risk factors. Increased substance use was associated with impaired schoolwork, school behavior and grades.⁹
- A small study of 102 pairs of mothers and their pre-school children in Lower Manhattan who were exposed to the terrorist attacks found that three years after 9/11, children, especially boys, whose mothers had depression and PTSD were at greater risk for aggressive behavior, emotionally reactive behavior and complaints about physical health problems that had no medical basis.¹⁰
- One small study compared mental health outcomes before and after the attacks among 18 young New York City adults with generalized anxiety disorder (GAD). This group had been assessed the day before 9/11 and one-year post event findings were compared to 25 controls that also were assessed prior to 9/11. Findings suggest increased levels of functional impairment among those with GAD but not higher levels of posttraumatic stress symptoms.¹¹

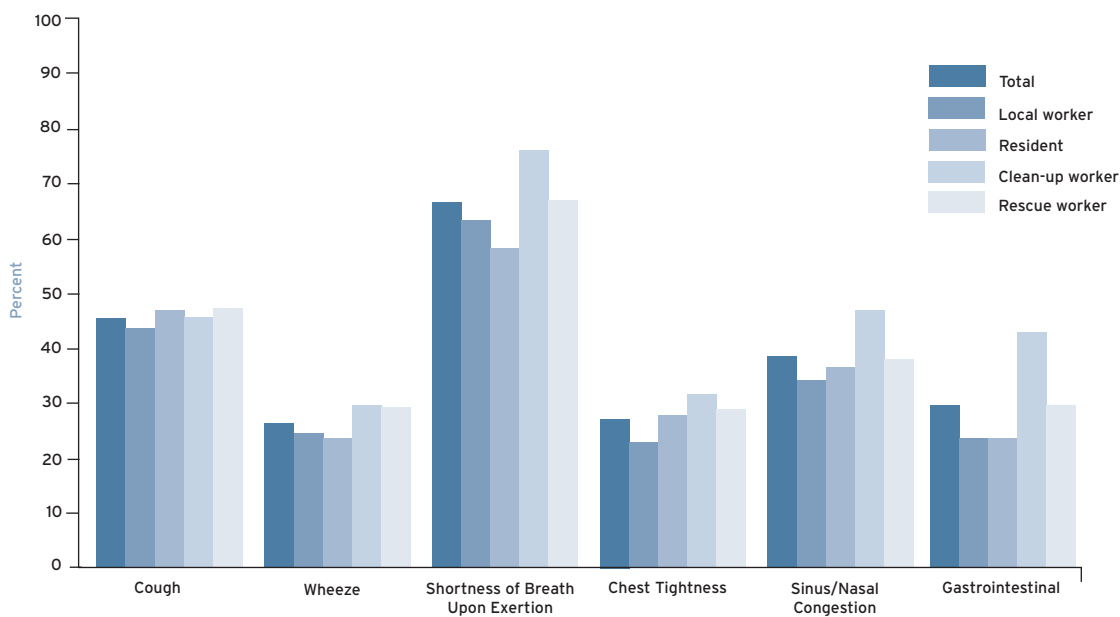
- A representative sample of more than 2,300 adult New York City residents who were interviewed about their mental health one, two and three years after 9/11 indicates:
 - People who received early, brief interventions at their worksites reported better mental health outcomes than those who received more extensive post 9/11 interventions such as formal psychotherapy sessions lasting 30 minutes or longer, adjusting for extent of 9/11 exposure, although the study did not control for severity of illness. Informal support seeking from friends, neighbors and from spiritual communities also appeared beneficial.¹²
 - Problem drinking and alcohol abuse were associated with psychological trauma up to four years after exposure, and these outcomes tend to be associated with other adverse mental health outcomes post-exposure.¹³
- A growing body of literature about people who were indirectly exposed to the WTC collapse (i.e. through media reports) supports previous findings that measurable trauma impacts were found:
 - Pre- and post-9/11 psychological screening of nearly 5,500 students who were attending college in California at the time of the attacks indicate that 44% of women and 32% of men experienced at least one symptom of posttraumatic stress disorder (PTSD) 6-17 days after 9/11.¹⁴
 - A retrospective study of 143 Canadian students two years after the attacks found a correlation between watching television coverage and two hallmark symptoms of PTSD: re-experiencing and hyper arousal.¹⁵

Physical Health

Mid-Term Impacts (5-7 Years After 9/11)

- A clinical study of nearly 2,000 Lower Manhattan area workers, clean-up workers and residents who reported being exposed to WTC dust and who sought care from the **WTC Environmental Health Center** five to seven years after the attacks documented a range of continuing respiratory symptoms, including persistent (two or more times per week) shortness of breath upon exertion, cough and sinus or nasal problems in each patient category. Although pulmonary function was normal for the total clinical sample, among those reporting persistent respiratory symptoms that arose after 9/11, nearly one third (31%) had below-normal pulmonary function similar to that found in studies of rescue, recovery and clean up workers.¹⁶
- 10% of adults enrolled in the **WTC Health Registry** have reported a new diagnosis of asthma at some point since 2001, with the highest rates reported during the first 16 months after 9/11. This is three times as many adults as would be expected in the general population over a six-year period.¹⁷
 - Although elevated rates of new asthma were reported across all eligibility groups, rescue and recovery workers who arrived at the WTC site on 9/11 had the greatest risk, and residents had the lowest.
 - Intense dust cloud exposure on 9/11 was a major contributor to new asthma diagnoses across all eligibility groups; other more lingering risks included working longer at the WTC site, not evacuating homes and experiencing a heavy layer of dust in homes or offices.
 - New onset symptoms of asthma five to six years after 9/11, however, were comparable to expected levels and were not linked to the degree/intensity of WTC exposure.
- A clinical study of more than 3,000 workers examined twice at least 18 months apart between 2002 and 2007 at the **New York/New Jersey WTC Clinical Consortium** found that weight gain between exams but not degree of WTC exposure was associated with continued loss of pulmonary function. An additional risk factor for continued loss of pulmonary function was abnormal bronchodilator response, which can be indicative of asthma, on the first exam. The majority continued to have pulmonary function within the normal range but the prevalence of reduced pulmonary function at the time of the second exam remained higher than in the general population.¹⁸

Respiratory Symptoms in a WTC-Exposed Population at the WTC Environmental Health Center (2005–2008)



Data presented for 1,852 symptomatic patients who sought care at the World Trade Center Environmental Health Center (WTC EHC) from 2005-2008. Symptoms were defined new onset (occurring after September 11, 2001 for the first time and still occurring upon entry into the WTC EHC) and persistent (experienced by patients more than twice each week in the month prior to entry into the WTC EHC).

Short-Term Impacts (1-4 Years After 9/11)

- Among 10,378 firefighters who enrolled in the **FDNY WTC Medical Monitoring and Treatment Program** after 9/11 and were evaluated at yearly intervals over the first four years, cough and sore throat declined significantly from 54% to 16% and 62% to 36%, respectively. In contrast, the prevalence of other respiratory symptoms (dyspnea, wheeze, nasal congestion or GERD) remained relatively stable, between 45% to 35% over this time period. Initial arrival time at WTC site was linked with higher risk of respiratory symptoms at every exam, and in those evaluated at both year one and year four after 9/11, symptoms were linked to both earlier arrival time and longer work duration at WTC – each additional month of work increased the likelihood of symptoms by 8% to 11%.¹⁹
- Clinical studies of WTC rescue, recovery and clean-up workers who had voluntarily enrolled in a monitoring program at the **New York/New Jersey WTC Clinical Consortium** support earlier findings that respiratory problems have persisted for some, and that respiratory problems often co-occur with other diagnoses:
 - A small study of 42 sequentially-selected patients with gastroesophageal reflux disease (GERD) suggests that it may be related to abnormal lung function.²⁰
 - Among 172 randomly selected workers, ten were diagnosed with vocal cord dysfunction (VCD), which can cause hoarseness or pain while breathing. The workers also all had GERD and chronic rhinitis. Although the study was not designed to determine whether VCD was directly associated with WTC exposure, these preliminary findings suggest that VCD may be part of a spectrum of WTC-related respiratory disorders.²¹

- One study of 750 office workers compared those in close proximity to the WTC on 9/11 to those who were not and found that more directly exposed workers—half of whom had experienced a personal loss as a result of the attacks—were more likely to report headache and cough two years after the attacks. This is one of the first studies to examine headache as a physical health outcome.²²
- A retrospective study correlated results from models of the path of the smoke plume released in the first five days after the WTC collapse with results from a random telephone health survey of nearly 3,000 New York City residents conducted six months after 9/11. For respondents residing beyond the immediate vicinity of Lower Manhattan, the study found no association between the five-day estimated cumulative intensity of the smoke and either new onset of respiratory symptoms or worsening symptoms in asthmatics. However, the smoke plume which circulated through the greater metropolitan area is different from the dust cloud which immediately resulted from the collapse of the towers.²³

Physical Exposures

- An analysis of blood samples from nearly 500 New York State employees and members of the National Guard who worked at the WTC site sometime between the attacks and December 2001 found concentrations of perfluorochemicals—manufactured chemicals used to make products that resist heat, oil, stains, grease and water—that were twice as high as those found in the general population. Levels of chemicals in the blood were similar between those who did and did not report symptoms, but were higher among those reporting higher levels of dust or smoke exposure. The blood samples were taken from May 2002 through November 2003 and the potential health effects of these chemicals are unknown.²⁴



Strengths and Limitations of Published WTC-Related Research

Much of the data presented in this report were gathered and analyzed by scientists and clinicians associated with a select number of institutions that recognized the need to monitor the health of individuals affected by the WTC collapse early after the disaster.

Particular strengths of this body of research include the fact that many different studies have found similar physical and mental health effects across exposed groups, and that research findings are gleaned from several large longitudinal cohorts, in addition to numerous one-time surveys.

Some of the largest study groups include:

- Nearly all **FDNY** responders who responded to the disaster. All have pre- and post-9/11 medical records and the group receives ongoing clinical monitoring.
- A large cohort of responders enrolled in the **New York/New Jersey WTC Clinical Consortium** for clinical screening, monitoring and treatment. This Consortium collects similar data to FDNY to facilitate comparisons across worker groups.
- A growing cohort of symptomatic patients who include residents, area workers and clean-up workers at the **WTC Environmental Health Center** at Bellevue Hospital Center, Gouverneur Health Care Services and Elmhurst Hospital Center.
- The **WTC Health Registry**, the largest post-disaster exposure registry in U.S. history, enrolling more than 71,000 exposed individuals to be tracked for an expected period of 20 years.

Several significant challenges also affect the ability to conduct accurate research on 9/11 health effects. It is important to highlight these limitations that characterize most of the published studies described in this report, and to review these limitations when planning data collection efforts after future disasters:

- The exact size and composition of the population affected by the disaster remains unknown, although estimates have been developed and published.
- It is difficult to measure how much and what type of exposure different people had to traumatic or environmental impacts of 9/11. All exposure measurements remain imprecise.
- Many studies are conducted on volunteer or clinic-based samples, which may not be representative of the true population of exposed people. Depending on the enrollment criteria of specific studies, they may over-represent those who are ill. People with PTSD may be under-represented in studies because avoidance of anything that reminds them of 9/11 can be symptomatic of the condition.
- It is difficult to determine the incidence and prevalence rates for many potentially WTC-related conditions, including persistent cough, dyspnea, sinusitis, gastrointestinal symptoms, PTSD and depression because confirmatory laboratory or diagnostic testing is either not available or because an acknowledged “gold standard” does not exist. In addition, the high frequency of conditions such as asthma and GERD in the general population, as well as the absence of pre-9/11 data in most WTC- exposed populations, make it difficult to draw firm conclusions about whether or not post 9/11 diagnoses can be attributed definitively to WTC exposure.
- Many studies rely on self-reports of symptoms and conditions to measure the burden of these conditions in exposed populations without verification of diagnoses.

New York City WTC Patient Population Report

In the New York City area, three WTC Centers of Excellence offer physical and mental health monitoring and treatment, including medications and social support services, with no out-of-pocket costs to eligible individuals. In addition, any resident of New York City who continues to experience psychological distress related to 2001 terrorist attacks can seek cost reimbursement for out-of-pocket expenses through the New York City 9/11 Benefit Program for Mental Health and Substance Use Services. These programs are described briefly below.

The utilization of these four programs, which are made possible through a combination of funding from the federal government and New York City, offers the most concrete measure of the continuing demand for health services among people who were exposed to the WTC collapse. A fifth program, the federally funded WTC National Responder Health Program, monitors and treats rescue, recovery and clean-up workers who live outside of the New York area. **It is important to remember, however, that there may be many other persons under care of their own physicians for WTC-related conditions.**

Total Patients¹ in the New York City Area Receiving Publicly Funded WTC Monitoring and Treatment Services (FY 2009)

	July 2008 – June 2009	Since WTC Programs Began
Number of Patients Screened/Monitored²	19,760	42,410
Patients Treated For Physical Health ³	12,230	N/A
Patients Treated For Mental Health ⁴	5,680	N/A
Total Number of Patients Treated⁵	15,688	N/A

1 Includes patients enrolled in the New York/New Jersey WTC Clinical Consortium, FDNY and the WTC Environmental Health Center, and individuals reimbursed by the NYC 9/11 Benefit Program for Mental Health and Substance Use Services. Specific details about each program follow on pages 11-14.

2 Shortly after the 2001 terrorist attacks, the federal government recognized that there might be health risks associated with rescue, recovery and clean-up work at the WTC site. It began funding services to screen workers for 9/11-related health problems and monitor their health on a regular basis through 2009.

3 WTC patients may have multiple physical health diagnoses. Upper respiratory symptoms include sinus or nasal congestion; lower respiratory symptoms include cough, shortness of breath, wheeze and chest tightness; gastrointestinal conditions include gastroesophageal reflux disease (GERD) and acid reflux-like symptoms; musculoskeletal symptoms include pain in the back, neck, shoulders and upper limbs.

4 WTC patients may have multiple mental health diagnoses. Diagnoses include posttraumatic stress disorder (PTSD), depression, generalized anxiety disorder and substance use disorders.

5 This reflects the actual number of individual patients treated. Some of these patients may appear in both of the rows above.

Patients Receiving Services at the WTC Medical Monitoring and Treatment Program: New York/New Jersey Clinical Consortium (FY 2009)

	July 2008 – June 2009	Since Program Began
Total Number of Patients Screened/Monitored	10,121	27,250¹
Number of Patients Treated For Physical Health	6,436	N/A
Number of Patients Treated For Mental Health	2,207	N/A
Total Number of Patients Treated	6,990	9,949²

The WTC Medical Monitoring and Treatment Program, coordinated by the Mount Sinai School of Medicine and formally known as the New York/New Jersey WTC Clinical Consortium, is currently funded by the National Institute for Occupational Safety and Health (NIOSH). Begun in 2002, it screens, monitors and treats workers and volunteers who participated in the rescue, recovery and clean-up operations at the WTC site and three other locations. Services are provided in 10 clinical centers throughout the greater New York area.

- Since its inception in 2002, the New York/New Jersey WTC Consortium has provided screening examinations to 27,250 WTC rescue and recovery workers from all 50 states.¹
- In this same time period, the program has provided over 48,000 medical monitoring exams to WTC rescue and recovery workers. Monitoring exams now are conducted annually.
- Since NIOSH began funding treatment services in September 2006, the New York/New Jersey WTC Consortium has provided over 58,000 treatment services to approximately 10,000 responders.

Between July 1, 2008 and June 30, 2009, 39% of 10,121 responders who had a monitoring examination were referred into the NIOSH-funded WTC treatment program. The rate of referral was highest for those responders entering the program for their initial visit and declined for those seen for Visits 2 and 3.

NY/NJ WTC Consortium Treatment Facts in FY 2009:

- 25% of patients received treatment for both mental and physical health conditions.
- 71% of patients received treatment for an upper respiratory condition, 46% received treatment for a lower respiratory condition, 52% received treatment for a gastrointestinal condition, and 15% received treatment for a musculoskeletal condition.³
- 32% of patients received treatment for a mental health condition.³
- 19% of patients were uninsured for at least one point during the year.
- 5% of patients were covered by Medicaid at least one point during the year.
- 10% of patients were served in a language other than English.



¹ Includes National Program (NP) numbers that were coordinated through the WTC Medical Monitoring and Treatment Data and Coordination Center at Mount Sinai through June 30, 2008. Effective July 1, Logistics Health Incorporated is the NP clinical center with coordination provided by NIOSH.

² Reflects the period from January 1, 2007 through June 30, 2009

³ Patients included in each respective category may have multiple diagnoses.

Patients Receiving Services at the WTC Medical Monitoring and Treatment Program: FDNY (FY 2009)

	July 2008 – June 2009	Since Program Began
Total Number of Patients Screened/Monitored	9,639	15,160
Number of Patients Treated For Physical Health	3,517	8,280
Number of Patients Treated For Mental Health ¹	1,457	9,350
Total Number of Patients Treated¹	4,794	N/A

The WTC Medical Monitoring and Treatment Program at the Fire Department of New York (FDNY) is currently funded by NIOSH. Begun in 2001, it screens, monitors and treats active and retired members of FDNY [firefighters, emergency service workers (EMS) and officers] who responded to the WTC disaster. Services are provided at six clinics throughout the greater New York area. WTC-related mental health treatment services are also available to family members of FDNY-WTC patients but they are not included in the “Number of Patients Treated for Mental Health” above.

After initial screenings, workers were asked to return at 18-month intervals for monitoring exams. Annual monitoring exams began in 2009. 13,965 workers (92%) have been examined at least twice since 2001; 12,238 workers (81%) have been examined at least three times since 2001; 9,940 workers (66%) have been examined at least four times.

FDNY Treatment Facts in FY 2009:

- Approximately 10% of patients received treatment for both mental and physical health conditions.
- Lower respiratory symptoms were the leading diagnoses among patients treated (77%) followed by gastrointestinal symptoms (46%) and upper respiratory symptoms (32%). Many patients have at least two of these diagnoses.



¹ FY 2009 numbers for mental health are only through March 31, 2009 due to a change in reporting mechanisms in final quarter of FY 2009. Final numbers will be available by the end of the 2009 calendar year.

Patients Receiving Services at the WTC Environmental Health Center (FY 2009)

	July 2008 – June 2009	Since Program Began
Number of Patients Treated For Physical Health	2,277	3,915
Number of Patients Treated For Mental Health	389	389
Total Number of Patients Treated	2,277	3,915

The WTC Environmental Health Center (EHC) at Bellevue Hospital Center, Gouverneur Health Care Services and Elmhurst Hospital Center, began in the Bellevue Hospital Clinic asthma clinic in 2005. It became a separate program in 2006 when the American Red Cross provided funds to treat both residents and responders. New York City subsequently expanded the program to three locations in 2007 when the WTC EHC began focusing primarily on local residents, area workers (including commuters living outside of New York City), students and others who report exposure to WTC dust and fumes and are currently experiencing physical or mental health symptoms.

Unlike the other WTC Centers of Excellence, the WTC EHC did not receive funding from the federal government to provide screening exams for asymptomatic people who lived and worked in Lower Manhattan on 9/11 and in the months afterward. In September 2008, the WTC EHC received its first NIOSH funding to expand its program. The WTC EHC is now beginning a monitoring program that offers follow-up exams and evaluations for patients once they have begun treatment.

Initially, the WTC EHC accepted only patients with physical health symptoms. Patients were then screened for mental health symptoms and treated for both conditions if present. In late 2007, the WTC EHC established a formal mental health program, which includes individual and group counseling in several languages, and began treating patients with mental health symptoms only.

The WTC EHC developed a pediatric program in 2007 that offers medical and mental health treatment. With NIOSH funding, program staff has been expanded to include specialists in pulmonary medicine and child development.

WTC EHC Treatment Facts in FY 2009:

- More than 40% of all patients treated at Bellevue scored positive for PTSD.
- 17% of patients received treatment for both mental and physical health conditions.
- 19% of patients were treated in a language other than English.
- 50% of patients were uninsured for at least one point during the year.
- 35% had some form of commercial insurance; 7% of patients were covered by Medicaid at least one point during the year.
- Lower respiratory symptoms were the leading diagnoses among new patients treated at Bellevue (55%) followed by upper respiratory (40%) and gastrointestinal symptoms (32%). Many patients have at least two of these diagnoses.



Patients Reimbursed by the NYC 9/11 Benefit Program for Mental Health and Substance Use Services (FY 2009)

	July 2008 – June 2009	Since Program Began
Patients Reimbursed	1,627	1,637 ¹
Patients Enrolled	2,575	3,130 ²

The New York City Department of Health and Mental Hygiene (DOHMH) launched the NYC 9/11 Benefit Program for Mental Health and Substance Use Services in April 2008. This insurance-like program serves as a payer of last resort for two groups of New York City residents who are experiencing psychological distress as a result of the 2001 terrorist attacks:

- Residents who were directly affected by the WTC disaster (Group A). These individuals also met the eligibility criteria established by a privately funded program that offered a similar benefit from 2002-2007. They include rescue, recovery and clean-up workers and their family members, and Lower Manhattan residents and area workers.
- Residents who do not meet the criteria of the privately funded program but who screen positive for a WTC-related mental health condition and whose providers will attest that this condition is related to 9/11 (Group B).

The extent of reimbursement for the two groups differs over the life of the program which covers outpatient services received through January 7, 2011. Medication reimbursement for both groups is capped at \$1,500.

The NYC 9/11 Benefit Program provides coverage retroactive to January 2007, when coverage under the privately funded program expired. Retroactive coverage was offered to help ensure continuity of care for 9/11-affected New York City residents who had been enrolled in the privately funded program.

¹ Most individuals who were reimbursed when the program began in FY 08 also were reimbursed in FY 2009.

² Individuals often delay seeking reimbursement (or services) after enrolling.



Recommendations

The WTC Medical Working Group made a series of recommendations about 9/11 health treatment and services in its 2008 annual report. These were grouped into three broad categories and can be accessed in their entirety at www.nyc.gov/9-11HealthInfo.

The WTC Medical Working Group remains committed to seeing its 2008 recommendations implemented in their entirety. The City of New York, the WTC Centers of Excellence and other stakeholders have made significant progress on many of these recommendations during the past year. The WTC Medical Working Group also identified a small number of new recommendations. These are both described below.

New Recommendations

- **Advocate for federal funding to increase scientific knowledge about WTC-related health impacts including:**
 - Research at the WTC Centers of Excellence, including the development of population-specific mental health screening tools.
 - Investigations to identify how environmental conditions such as the WTC collapse can cause illness, specifically through laboratory experiments using stored or generated environmental dust samples.
 - Research to identify biologic indicators of specific 9/11 exposures.
 - Other research as needed to identify people at higher risk for illness due to WTC exposure.
- **Gather and publish lessons learned after 2001 terrorist attacks on the World Trade Center about preventing and treating disaster-related health conditions.**

Progress Report on Implementation of 2008 Recommendations

I. Funding

These recommendations emphasized advocacy for long-term funding of 9/11 health programs so that all WTC- exposed populations could be tracked, monitored and treated.

Since the publication of the 2008 report, the **WTC Environmental Health Center** (WTC EHC) successfully applied for grant funding from the Centers for Disease Control and Prevention to provide monitoring and treatment services to Lower Manhattan residents, area workers and students. In September 2008, the National Institute for Occupational Safety and Health (NIOSH) awarded \$30 million to the WTC EHC over the next three years. This is the first time that the federal government has funded WTC-related services for community residents, area workers and students.

As part of the NIOSH grant, the WTC EHC and the WTC Health Registry have begun reaching out to Registry enrollees who are eligible for services at the WTC EHC by phone and by mail to refer them to care. Preliminary results from the 2006-2007 adult follow-up survey conducted by the WTC Health Registry indicate that 15% of 46,000 survey respondents had unmet health care needs.

The WTC EHC is now seeking a modification of the grant so that it can offer this population other options for mental health care through the NYC 9/11 Benefit Program for Mental Health and Substance Use Services. If NIOSH approves the modification, people eligible for services at the WTC EHC also will be able to seek outpatient care through licensed providers of their own choice in New York State.

In June, NIOSH awarded a \$12 million grant over the next three years to the **WTC Health Registry**, which had been supported by the Agency for Toxic Substances and Disease Registry since 2002. The new funding will permit the Registry to survey the health of more than 71,000 people who were directly exposed to the WTC disaster a third time, nearly a decade after 9/11.

In July 2009, NIOSH awarded a \$1.8 million research grant over four years to the **Department of Environmental Medicine, NYU School of Medicine** to investigate the toxicities of WTC dusts. Specifically, researchers will study how select physico-chemical properties of the dusts may have contributed to the respiratory illness and sarcoid-like granulomatous pulmonary disease development that has been documented in WTC-exposed responders.

The continued success of these programs and the **WTC Medical Monitoring and Treatment Programs** at **FDNY** and the **New York/New Jersey Consortium** requires dependable, long-term funding. In April, Mayor Bloomberg identified long-term federal funding for WTC medical monitoring and treatment programs as one of five legislative priorities. Representatives of the Mayor's Office and the Centers of Excellence have been consistent and persistent in their testimony concerning the critical need for this funding before the Senate Committee on Health, Education, Labor and Pensions; the House Committee on Energy and Commerce, Subcommittee on Health; and the City Council.

In response to the documented persistence of WTC-related illnesses, similar bills were introduced in both the House (H.R. 847) and Senate (S. 1334) during the 111th Congress that would permanently fund monitoring and treatment services at all three Centers of Excellence, as well as epidemiologic research through the WTC Health Registry. If this legislation becomes law, an estimated 55,000 responders and 17,500 community members will have long-term access to the specialized care and medications with no out-of-pocket costs at the **WTC Centers of Excellence**.

In the meantime, the 2009 fiscal year omnibus appropriations bill, signed into law by President Obama in March, included \$70 million in new funding "to provide screening and treatment for first response emergency services personnel, residents, students, and others related to the September 11, 2001 terrorist attacks on the World Trade Center." President Obama also proposed an additional \$70 million in funding in his 2010 fiscal year budget. In July, the House approved adding nearly \$930,000 to the President's request, bringing the total for FY 10 to nearly \$71 million. This funding, along with unspent appropriations from previous years, continues to sustain screening, monitoring and treatment services at the **New York/New Jersey WTC Clinical Consortium** and the **FDNY** on a temporary basis.

II. Research and Evaluation

These recommendations focused on continuing research about 9/11 health issues, particularly in the areas of mental health and any potential late emerging conditions such as cancer, and evaluating treatment effectiveness.

Many institutions who are represented on the WTC Medical Working Group actively continue to investigate health impacts related to 9/11 exposures. In addition to recent published research that is included in the **New Findings** section, several of these institutions have important research initiatives underway to advance research and evaluation. Examples of this progress are summarized below.

Fire Department of New York (FDNY)

Over the last year, FDNY has expanded its medical monitoring and treatment of WTC-related physical health diseases beyond its main center in Brooklyn to satellite locations in Queens, Staten Island, Long Island and Orange County, NY that previously were used only for mental health treatment.

FDNY also is verifying self-reported cancer diagnoses among enrollees with medical records and NYS cancer registry data. Analysis is ongoing with results expected in the next year. Similar work is ongoing for autoimmune diseases such as sarcoidosis, polymyositis, rheumatoid arthritis and other systemic inflammatory illnesses.

In previously published research, FDNY demonstrated that the average decline in lung function in the first year after 9/11 was nearly 12 times the normal annual decline observed in this population before the WTC terrorist attacks. The study also indicated that further monitoring would be required to ascertain whether the elevated rate reflected long-term effects. In December 2008, FDNY finished collecting data for over 96,000 pulmonary function tests done between 1997 and 2008 in FDNY firefighters and EMS rescue workers. Analysis that would extend first-year findings to an eight-year longitudinal study of pulmonary function among these workers after 9/11/01 is nearly complete.

Preliminary results have been published in abstract form by the American Thoracic Society on a study of 1,720 FDNY rescue workers (13% of the total FDNY cohort) with respiratory symptoms or reduced lung function who received extensive pulmonary testing at the FDNY WTC Medical Monitoring and Treatment Program. Evidence for airways obstruction was found in the majority of patients. Interstitial lung disease was rare.

FDNY has just completed and had accepted for publication mental health studies of nearly 2,000 retired firefighters. One study validates the use of self-administered mental health screening tools in comparison to structured diagnostic interviews; another demonstrates nearly equal rates of PTSD (22%) and depression (23%) in this group during 2005-2007. Co-morbidity studies are now underway.

New York City Department of Health and Mental Hygiene (NYC DOHMH)

In December 2008, the WTC Health Registry's follow-up pediatric survey ended, and analyses on this important, understudied population six to seven years after 9/11 have begun. Surveys were completed for 50% of the 2,000 children currently under the age of 18 enrolled in the Registry. This is the only cohort of WTC-exposed children whose health is being tracked prospectively, and external researchers are encouraged to propose collaborative studies.

The WTC Health Registry is verifying self-reported cancer diagnoses among enrollees with cancer registries in twelve states. Cancer data linkage is nearly complete with all state cancer registries (except Missouri and Massachusetts); the NYC DOHMH Institutional Review Board has approved a protocol for contacting enrollees whose diagnoses cannot be verified through the state registries.

The WTC Health Registry is also comparing mortality rates among enrollees, as well as rates for specific causes of death, to local and national rates over time. This comparison will be critical in determining whether or not people exposed to the WTC disaster are at an increased risk for premature death. Three rounds of matching to the New York City Bureau of Vital Statistics and two rounds of matching to the National Death Index (NDI) have been completed using social security numbers provided by enrollees. A preliminary analysis of death rates through 2006 is underway.

In addition, the WTC Health Registry encourages external researchers to analyze existing survey data for enrollees and to recruit enrollees for new studies. The physical and mental health effects of the 2001 WTC disaster on police responders; the impact of parental exposure to mass violence on child mental health; the combination of exposure therapy and medication in treating PTSD; and how maternal PTSD may affect pregnancy outcomes are among the nine studies that have been initiated with a number of institutions, including Columbia University, the New York State Department of Health and the Yale School of Medicine.

New York City Police Department

The New York Police Department (NYPD) —whose members comprise the City’s largest WTC responder group—has evaluated, tracked and referred for treatment all its exposed members since 2001. The NYPD Medical Division continues to offer annual monitoring, a full array of treatment options and prescription drugs for all its exposed uniformed members. It also recently completed an analysis of a five-year follow-up study of pre- and post-9/11 data of the NYPD Emergency Services Unit personnel. Results are forthcoming.

New York/New Jersey WTC Clinical Consortium

This consortium, coordinated by the Mount Sinai School of Medicine and also including the State University of New York at Stony Brook, New York University/Bellevue Hospital, Queens College and the University of Medicine and Dentistry of New Jersey, continues its long-term medical monitoring and treatment programs for WTC rescue, recovery and clean-up workers not covered by the FDNY program. Many of these workers are first-generation immigrant male laborers, a population that has limited access to appropriate health care.²⁵ In December 2008, Mount Sinai, in partnership with Richmond University, expanded to include a fourth Mount Sinai-operated clinical center located on Staten Island.

During the past year, the New York/New Jersey WTC Clinical Consortium has conducted investigations of sarcoidosis and anosmia (loss of sense of smell) among patients who have sought treatment in the WTC Medical Monitoring and Treatment Program.

The New York/New Jersey WTC Clinical Consortium also has documented eight confirmed cases of multiple myeloma, the second most commonly diagnosed blood cancer in the United States, among 28,252 responders who sought treatment in the WTC Medical Monitoring and Treatment Program in the first six years after 9/11. While four of these responders were younger than 45 years of age, this was not a statistically significant elevation above the background estimate of one. It is still too early to tell whether WTC exposures caused these cases of multiple myeloma among rescue and recovery workers, and continuing medical follow-up is therefore necessary. The New York/New Jersey WTC Clinical Consortium published this case series in the August 2009 issue of the *Journal of Occupational and Environmental Health*.²⁶

The Mount Sinai School of Medicine conducted a semi-structured clinical evaluation of 416 responders in the New York/New Jersey WTC Clinical Consortium. Results of the evaluation, published in the summer 2009 issue of the *Psychiatric Quarterly*,²⁷ personalized the 9/11 symptom reports and mental health diagnoses among rescue, recovery and clean-up workers. It also provides useful information for addressing the psychological dimensions of disasters, particularly in the areas of occupational roles and exposures.

The Mount Sinai School of Medicine also published a special issue of the *Mount Sinai Journal of Medicine*²⁸ devoted to the WTC Medical Monitoring and Treatment Program. It summarizes key physical and mental health findings among WTC rescue, recovery and clean-up workers.

New York State Department of Health

Using a variety of source materials, including employment information, death certificates, and medical and autopsy records, the New York State Department of Health identifies and tracks all deaths among WTC responders so that science-based investigations of root causes can be explored. As of July 2009, the WTC Responder Fatality Investigation Program had confirmed the causes of death for 614 people who worked at the WTC site. 74% of these responders died as a result of illness; the remainder died as a result of traumatic injury. Researchers are beginning to compare mortality rates for the responders to local and national rates. These comparisons will assist in determining whether WTC responders may be at increased risk for specific causes of death. Until these or similar analyses are completed, there is insufficient information available to assess whether or not mortality rates may be elevated.

WTC Environmental Health Center

The WTC Environmental Health Center (EHC) serves local workers, residents, students and children, as well as a population of clean-up workers. The number of area workers seeking care continues to increase the most, particularly at Bellevue Hospital, with the Gouverneur program serving more residents. Elmhurst Hospital, the smallest of the three programs, provides services predominantly for clean-up workers. At Bellevue Hospital, an increasing number of patients are seeking second opinions after having previously sought care elsewhere, a trend in keeping with the potentially chronic nature of the symptoms.

Several ongoing projects at the WTC EHC include those to better understand disease mechanisms in the WTC-exposed community, as well as the high prevalence of PTSD, depression and anxiety among patients who have been referred primarily for physical symptoms.

These projects include: correlating clinical, radiographic and pathologic findings among patients who have undergone open lung biopsies because of abnormal CT scans or because they have restrictive lung disease; using methacholine challenge tests to evaluate patients with lower respiratory symptoms and normal lung function to evaluate airway hyperreactivity; evaluating CT scans of patients with persistent sinus complaints; and using endoscopy to examine the esophagus and stomach in patients who have persistent GERD-like symptoms.

III. Education

These recommendations sought to increase awareness of 9/11-related health conditions among the general public and within the medical community, and to increase awareness of the services available to affected individuals.

The New York City Health and Hospitals Corporation (HHC) launched a \$5 million advertising and grass roots marketing campaign in September 2008 to promote the services available at the WTC Environmental Health Center. Multilingual subway advertisements using the tag line “**Lived There? Worked There? You Deserve Care**” were particularly effective in increasing awareness among Lower Manhattan residents, area workers and students who were exposed to the WTC disaster but who may not have been aware that treatment is available at no out-of-pocket cost for various common physical and emotional symptoms that may be related to 9/11. Ads also ran in newspapers and on radio and television, urging people to call 311 for more information.

Recognizing that a broad-based advertising campaign was likely to reach people eligible for services at the New York/New Jersey WTC Clinical Consortium, information about this program was incorporated into the City’s **311 referral system**. This made it possible for hundreds of callers to be directly transferred to the WTC EHC or to the toll-free number operated by the Consortium for the first time.

As part of the HHC campaign, ten community-based and other organizations also received grants to conduct grass roots outreach to hard-to-reach groups, host educational forums, conduct health fairs, and provide patient navigation services to improve access to care. The following groups received up to two year grants that together total \$2.1 million: **Beyond Ground Zero (BGZ) Network; Henry Street Settlement; Lin Sing Association; United Jewish Council; Ecuadorian International Center, Inc.; Communications Workers of America; DC 37 Safety & Health; NY Committee for Occupational Safety & Health (NYCOSH); and the Organization of Staff Analysts**. These groups also were provided with informational brochures in English, Spanish, Chinese and Polish as well as premiums to promote the WTC Environmental Health Center.

In June 2009, DOHMH published **Clinical Guidelines for Children and Adolescents Exposed to the WTC Disaster** for distribution to pediatricians in the New York City area. The guidelines were developed to raise awareness among pediatricians about the potential health effects of WTC exposure among children; to provide evidence-based recommendations about the treatment of WTC-exposed children; and to encourage referral to the specialized services available through the pediatric program at the WTC Environmental Health Center. Pediatricians and other clinical experts from the WTC Environmental Health Center, Children's Hospital at Montefiore, Columbia University, Mount Sinai Medical Center, New Jersey Medical School, New York-Presbyterian Medical Center, New York University and the University of Oklahoma participated in the process, in addition to parent and community representatives from Lower Manhattan.

Many adolescents who were exposed to the WTC disaster have entered college since the terrorist attacks. DOHMH expanded the distribution of the *Clinical Guidelines for Adults Exposed to the WTC Disaster* in 2008 to more than 200 college health clinics in the northeastern United States, with a letter encouraging physicians to consider the potential impact of WTC exposure on student health. The clinical guidelines for adults, children and adolescents are also accessible from New York City's **9/11 health website**, which receives an average of 5,000 unique visitors per month.

As part of its overall effort in June to increase awareness of WTC-related problems and services, DOHMH used its flagship publication, **Health Bulletin**, to educate the general public about WTC-related health effects and to urge individuals who may have been affected to seek specialized treatment for posttraumatic stress disorder and asthma. More than 65,000 subscribers received the *Health Bulletin* called "Is 9/11 Affecting Your Health?" electronically. Printed copies may be obtained in English, Spanish or Chinese by calling 311.

Although the number of programs specifically serving the various needs of people who were affected by the terrorist attacks decreased with the end of American Red Cross funding in 2008, DOHMH also published a **9/11 Resource Guide** that categorized all remaining programs and included all publicly funded WTC services. Publication of the guide coincided with the 7th anniversary of the 2001 terrorist attacks, the time of the year when demand for services typically is greatest. Copies of the *9/11 Resource Guide* are available in English, Spanish, Chinese and Polish, and were widely distributed by WTC Health Liaisons at New York City agencies whose employees participated in WTC rescue and recovery operations.

Appendix A: How WTC-Related Deaths Are Evaluated by New York City's Office of the Chief Medical Examiner

New York City's Office of Chief Medical Examiner (OCME) evaluates possible WTC-related causes of death on an individual, case-by-case basis.

After a request has been made by a physician or family member, OCME applies the same objective rules and definitions in determining causes of death related to the World Trade Center as it does for other cases. This includes, but is not limited to, the evaluation of autopsy reports, microscopic tissue examination, case history, medical records, medical and legal investigation and a review of current scientific literature. In some cases, additional testing or external consultation may be necessary. The information is then evaluated by a committee composed of the Chief Medical Examiner along with Senior Medical Examiners who make a determination about both the cause and manner of death.

According to a March 23, 2009 letter from Charles S. Hirsch, MD, the Chief Medical Examiner, "The underlying **cause of death** is the disease or injury responsible for initiating the lethal sequence of events. The **manner of death** explains how the cause arose: natural or violent. *Natural* deaths are caused exclusively by disease. The way in which an injury was sustained determines the sub-classification of violent deaths: *accident, homicide or suicide.*"

Dr. Hirsch further explains that "the criterion used to determine whether or not a WTC-related death is *homicide* is objective and non-arbitrary; the injury responsible for death must have been caused by burns, trauma from collision of an airplane or collapse of the one of the buildings on 9/11/01, inhalation of the dust cloud created by the collapse of a building on 9/11/01, or acute stress directly related to the disaster."

Because OCME takes into consideration the circumstances of a particular injury when determining the **manner of death**, not all WTC-related deaths are classified as *homicide*. In order for OCME to classify a WTC-related death as a homicide, the precipitating injury **must** have occurred on September 11, 2001. Dr. Hirsch offers the following example to illustrate why the **manner of death** may differ in WTC-related cases: "if a person at the WTC was crushed by a falling steel beam on 9/11/01, this is *homicide*. Two weeks later, if a recovery worker at the WTC was crushed by a steel beam falling from a crane, the death would have been an *accident* not *homicide*." Similarly, if a person who participated in WTC rescue and recovery operations eventually died as a result of inhaling dust at the site, but didn't begin working until sometime after September 11, 2001 the manner of death would be classified as *natural*. Nevertheless, Dr. Hirsch adds, "In instances when exposure to WTC dust after 9/11/01 contributed to the development of the fatal disease, the cause of death will be noted as 'WTC-related' on the death certificate."

Using these standards, OCME has determined that "other than the terrorists on the airplanes, all persons killed at the World Trade Center on 9/11/01 are victims of homicide. Three persons who sustained physical injuries at the WTC on 9/11/01 were treated in hospitals until they died, 11-112 days later. Those three persons are victims of *homicide*. Two persons who died from heart disease, either fleeing from a falling building or shortly following exposure to the dust cloud created by a falling building, were both victims of homicide. One woman died in February, 2002, and one man died in October, 2008, from sarcoidosis or related complications; since their disease either was caused or aggravated by exposure to the dust cloud created by the collapse of a building, their deaths ultimately were classified as homicide. No other death has been classified as a WTC-related homicide by the OCME."

Dr. Hirsch also notes that its classification of the **manner of death** "does not preclude formal recognition by New York City of the rescue and recovery personnel believed to have suffered harmful effects of their exceptional and dedicated service."

Appendix B: Impact of 9/11 on New York City Disability Pensions

New York City employees who are disabled as a result of an accidental injury that occurred while they were doing their jobs are eligible to file for an accidental disability pension through their retirement system. If the accidental disability pension is granted, they receive a tax-free pension that is equal to three quarters of their final annual salary if they are uniformed personnel or 60% of their final annual salary if they are civilian personnel.

A disability determination requires that an injury or illness result in a permanent level of functional impairment that reasonably prevents the worker from safely performing his or her essential job tasks. This means that the same level of functional impairment may be disabling for one type of job but not for another.

Under New York State law, each City retirement system has one or more independent medical boards whose sole responsibility is reviewing disability applications. They determine whether or not the applicant is disabled and advise the retirement systems' Board of Trustees if the disability occurred as a result of job-related duties, or if the injury was caused by circumstances unrelated to work duties.

A variety of state laws direct the pension system to presume certain injuries and illness are work-related. For example, if members of NYPD and FDNY develop certain kinds of heart diseases or suffer from a stroke, the "Heart Bill" presumes that these conditions were caused by job-related stress or other occupational strains on the heart. There also are presumption laws for lung diseases (FDNY only), many cancers (FDNY only) and certain communicable diseases (FDNY, EMS and NYPD).

World Trade Center (WTC) Disability Law

In 2005, New York State enacted the World Trade Center (WTC) Disability Law which establishes a presumption that certain disabilities for certain New York City employees were caused by their participation in WTC rescue, recovery or clean-up operations. This presumption law entitles employees with a range of medical conditions who meet certain requirements (including the kind of work that they did, and where, when and how long they worked) to collect accidental disability retirement benefits, unless evidence proves otherwise.

Three important factors make the WTC Disability Law different from other presumption laws (e.g., the "Heart Bill"): 1) it is based on participation in an event; 2) it includes employees in the New York City Employees Retirement System (NYCERS) who work for agencies that typically are not covered by other presumption laws; and 3) it includes a large number of qualifying conditions that may be physical or psychological.

In October 2008, New York State amended the WTC Disability Law following unanimous recommendations by the New York State September 11th Workers Protection Task Force, which includes representatives of City and State governments, unions and physicians with expertise in occupational medicine and/or WTC-related illness. The amendment broadened the definition of eligible workers, and extended to September 11, 2010 the filing deadline for a Notice of Participation. These Notices protect employees who haven't shown any signs of illness to date or when they retire(d). If they get sick with illnesses covered under the WTC Disability Law after retiring, these employees can apply to have their pensions reclassified and benefits increased to reflect this disability.

Of the 1584 New York City employees who have retired with WTC-related accidental disability through December 2008, (see WTC Disability Approvals By NYC Retirement System below), 62% of these employees retired prior to the enactment of the WTC Disability Law on June 14, 2005. The vast majority of these retirees worked at FDNY.

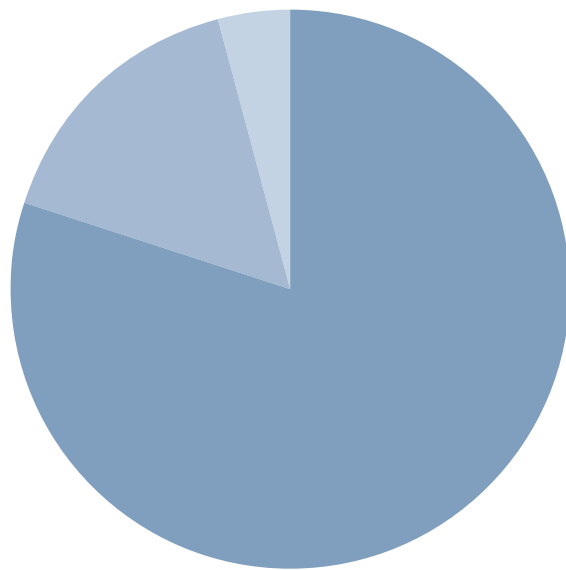
WTC Disability Law, Cancer and Treatment

Cancer is among the diseases covered by the WTC Disability Law. However, the federally funded WTC Centers of Excellence, which provide treatment for most of the conditions covered by the WTC Disability Law, do not provide free care for any kind of cancer. This means that a disabled WTC rescue worker employed by New York City or New York State may be able to collect a WTC disability pension but will not be eligible for cancer treatment through a WTC Center of Excellence. Instead, the worker will have to rely on private insurance for cancer treatment which, depending on the extent of coverage offered by a particular plan, may not cover all the costs.

Given these differences between federal policy and state disability law, an important function of the WTC Medical Working Group, which includes representation from the WTC Centers of Excellence, is to offer policymakers advice based on current scientific knowledge. In its 2008 annual report, the WTC Medical Working Group concluded “to date, there is no evidence for or against a causal connection between WTC exposure and any form of cancer.” A year later, this is still the case.

Multiple studies have begun to evaluate whether there are such associations, but conclusive results are not yet available. The WTC Medical Working Group will continue to monitor results of those and other studies regarding possible latent or late-emerging illnesses with the goal of determining if these illnesses are occurring in higher proportions among persons with WTC exposure than among persons of similar age and gender without this exposure.

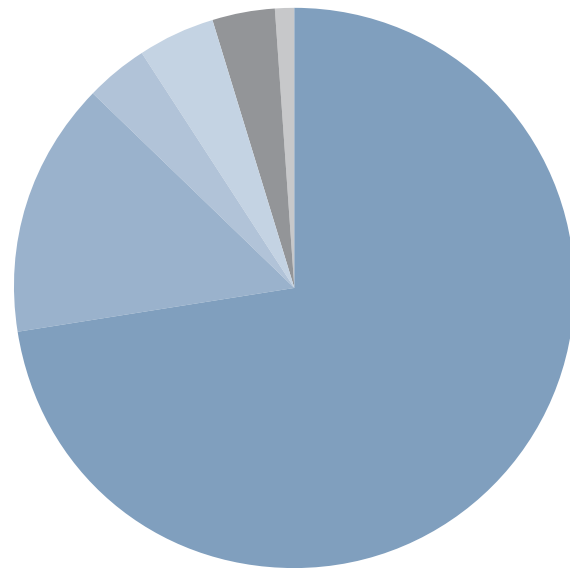
WTC Disability Approvals by NYC Retirement System 2001-2008



TOTAL APPROVALS: 1584

FDNY: 1264 (80%)
 NYPD: 263 (16%)
 NYCERS: 57 (4%)

WTC Disability Approvals by Health Conditions 2001-2008



TOTAL APPROVALS: 1584

Lung/Respiratory: 1073 (80%)
 Psychiatric: 239 (16%)
 Orthopedic: 106 (4%)
 Cancer*: 88 (5%)
 Other/Unknown: 63 (4%)
 Death: 15 (1%)

* Cancers to date have included bone marrow ; breast; colon; leukemia; liver, lung, liposarcoma; lymphoma; prostate; renal; throat.

Sources

1. Brackbill RM, Hadler JL, DiGrande L, et al. Asthma and Posttraumatic Stress Symptoms 5 to 6 Years Following Exposure to the WTC Terrorist Attack. *Journal of the American Medical Association* 2009; 302(5): 502-516.
2. Ibid.
3. Stellman JM, Smith RP, Katz CL, et al. Enduring Mental Health Morbidity and Social Function Impairment in WTC Rescue, Recovery, and Cleanup Workers: The Psychological Dimension of an Environmental Health Disaster. *Environmental Health Perspectives* 2009; 116(9): 1248-1253.
4. Corrigan M, McWilliams R, Kelly K, et al. A Computerized Self-administered Questionnaire to Evaluate Posttraumatic Stress in Firefighters after the WTC Collapse. *American Journal of Public Health* 2009; In Press.
5. Evans S, Patt I, Giosan C, et al. Disability and Posttraumatic Stress Disorder in Disaster Relief Workers Responding to September 11, 2001 WTC Disaster. *Journal of Clinical Psychology* 2009; 65(7): 684-694.
6. Katz CL, Levin S, Herbert R, et al. Psychiatric Symptoms in Ground Zero Ironworkers in the Aftermath of 9/11: Prevalence and Predictors. *Psychiatric Bulletin* 2009; 33: 49-52.
7. Mullett-Hume E, Anshel D, Guevara V, et al. Cumulative Trauma and Posttraumatic Stress Disorder Among Children Exposed to the 9/11 WTC Attack. *American Journal of Orthopsychiatry* 2008; 78(1): 103-108.
8. Chemtob CM, Nomura Y & Abramovitz RA. Impact of Conjoined Exposure to the WTC Attacks and to Other Traumatic Events on the Behavioral Problems of Preschool Children. *Archives of Pediatric & Adolescent Medicine* 2008; 162(2): 126-133.
9. Chemtob CM, Nomura Y, Josephson L, et al. Substance Use and Functional Impairment among Adolescents Directly Exposed to the 2001 WTC Attacks. *Disasters* 2009; 33(3): 337-352.
10. Nomura Y & Chemtob CM. Effect of Maternal Psychopathology on Behavioral Problems in Preschool Children Exposed to Terrorism. *Archives of Pediatric & Adolescent Medicine* 2009; 163(6): 531-539.
11. Farach FJ, Mennin DS, Smith RL, & Mandelbaum M. The Impact of Pretrauma Analogue GAD and Posttraumatic Emotional Reactivity Following Exposure to the September 11 Terrorist Attacks: A Longitudinal Study. *Behavior Therapy* 2008; 39: 262-276.
12. Boscarino JA & Adams RE. Overview of Findings from the WTC Disaster Outcome Study: Recommendations for Future Research after Exposure to Psychological Trauma. *International Journal of Emergency Mental Health* 2008; 10(4): 275-290.
13. Cerda M, Vlahov D, Tracy M & Galea S. Alcohol Use Trajectories among Adults in an Urban Area after a Disaster: Evidence from a Population-based Cohort Study. *Addiction* 2008; 103: 1296-1307.
14. Matt GE & Vazquez C. Anxiety, Depressed Mood, Self-Esteem, and Traumatic Stress Symptoms among Distant Witnesses of the 9/11 Terrorist Attacks: Transitory Responses and Psychological Resilience. *The Spanish Journal of Psychology* 2008; 11(2): 503-515.
15. Collimore KC, McCabe RE, Carleton RN & Asmundson GJ. Media Exposure and Dimensions of Anxiety Sensitivity: Differential Associations with PTSD Symptom Clusters. *Journal of Anxiety Disorders* 2008; 22: 1021-1028.
16. Reibman J, Liu M, Cheng Q, et al. Characteristics of a Residential and Working Community with Diverse Exposure to WTC Dust, Gas and Fumes.
17. Brackbill, op. cit.
18. Skloot GS, Schechter CB, Herbert R, et al. Longitudinal Assessment of Spirometry in the WTC Medical Monitoring Program. *Chest* 2009; 135(2): 492-498.
19. Webber MP, Gustave J, Lee R, et al. Trends in Respiratory Symptoms of Firefighters Exposed to the WTC Disaster: 2001-2005. *Environmental Health Perspectives* 2009; 117(6): 975-980.
20. de la Hoz RE, Christie J, Teamer J, et al. Reflux Symptoms and Disorders and Pulmonary Disease in Former WTC Rescue and Recovery Workers and Volunteers. *Journal of Occupational and Environmental Medicine* 2009; 50(12): 1351-1354.
21. de la Hoz RE, Shohet MR, Bienenfeld LA, et al. Vocal Cord Dysfunction in Former WTC Rescue and Recovery Workers and Volunteers. *American Journal of Industrial Medicine* 2008; 51(3): 161-165.
22. Osinubi OY, Gandhi SK, Ohman-Strickland P, et al. Organizational Factors and Office Workers' Health after the WTC Terrorist Attacks: Long-term Physical Symptoms, Psychological Distress, and Work Productivity. *Journal of Occupational and Environmental Medicine* 2008; 50(2): 112-125.
23. Laumbach RJ, Harris G, Kipen HM, et al. Lack of Association Between Estimated WTC Plume Intensity and Respiratory Symptoms among New York City Residents Outside of Lower Manhattan. *American Journal of Epidemiology* 2009; [Epub ahead of print].
24. Tao L, Kannan K, Aldous KM, et al. Biomonitoring of Perfluorochemicals in Plasma of New York State Personnel Responding to the WTC Disaster. *Environmental Science & Technology* 2008; 42(9): 3472-3478.
25. de la Hoz RE, Hill S, Chasan R et al. Health Care and Social Issues of Immigrant Rescue and Recovery Workers at the WTC Site. *Journal of Occupational and Environmental Medicine* 2008; 50(12): 1329-1334.
26. Moline JM, Herbert R, Crowley L, et al. Multiple Myeloma in WTC Responders: A Case Series. *Journal of Occupational and Environmental Medicine* 2008; [Epub ahead of print].
27. Bills CB, Dodson N, Stellman JN, et al. Stories Behind the Symptoms: A Qualitative Analysis of the Narratives of 9/11 Rescue and Recovery Workers. *Psychiatric Quarterly* 2009; [Epub ahead of print].
28. Mount Sinai Journal of Medicine 2008; 75(2): 63-141.



For more information about the research and services described in this report, including an extensive bibliography with links to abstracts of the cited sources, please visit www.nyc.gov/9-11HealthInfo.