

An Update 15 years later: September 2001-September 2016



# FDNY WORLD TRADE CENTER HEALTH PROGRAM

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## HEALTH IMPACTS ON FDNY RESCUE/RECOVERY WORKERS 15 Years: 2001 to 2016



**FDNY**

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**Bill de Blasio**, Mayor  
**Daniel A. Nigro**, Fire Commissioner  
**James E. Leonard**, Chief of Department





Fifteen years later, One World Trade Center, stands tall



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## Message from the Mayor of the City of New York Bill de Blasio

September 11, 2001 touched every single New Yorker. It was a time of confusion, fear, and grief. Some wondered if New York City would ever recover. Yet, in spite of the tremendous losses they had suffered, our first responders demonstrated to the world, and to their fellow New Yorkers, that the five boroughs would always be a place of hope, unity, and strength and that our spirit would never waver.

The men and women of the New York City Fire Department and the emergency medical service workers continued working in the rubble for months. When these dedicated men and women began to show the effects of exposure to dust, chemicals, and debris all New Yorkers felt the call to provide them with the medical care and support they need.

Last year, thanks to the hard work of our congressional delegation and many of our first responders who lobbied on behalf of their colleagues, Congress reauthorized the James Zadroga 9/11 Health and Compensation Act. It ensures that all rescue and recovery workers and survivors will receive care and treatment for the next 75 years. This is an important victory that would not have been possible without the efforts of the FDNY World Trade Center Health Program, which has tirelessly worked to monitor FDNY members who worked at the World Trade Center and connect them with programs and services.

This updated report outlines the program's efforts to support FDNY members affected by 9/11 and what we have learned about the health consequences of exposure to the WTC site. It is the result of years of data collection and health screenings and will provide policy makers and the public with critical information as we move forward in our work to ensure that the needs of those affected by 9/11 continue to be met.

We will never forget the sacrifices made by hundreds of FDNY members on September 11th and those who have become ill or died as a result of their duties during the rescue and recovery effort. We owe them a tremendous debt of gratitude, not only for their heroic service, but also for reminding us all what it means to be a New Yorker.

*Bill de Blasio*





## Message from the Fire Commissioner **Daniel A. Nigro**



**F**or ten long, arduous months after 9/11, thousands of us worked at the site where the Towers had stood and where 343 of our FDNY members, friends and coworkers, lost their lives. I, too, was there that day when we were attacked on 9/11 and so many of our friends were murdered; not by the heat and smoke of a fire, but by the blind hatred of terrorists. I witnessed firsthand the many days, nights, weeks, and months that our members and retirees, some who volunteered their time, worked under physically and mentally grueling conditions. It was a painful time that none of us will ever forget.

Our exposure to the dust, chemicals and other noxious elements present at the WTC have left many of us with physical and mental health illnesses and others with the potential for developing these problems. Each of us wonders whether our future will be a healthy one; and for the many of us whose health—physical and/or mental—has been affected, how best to treat these ailments.

Thankfully, the FDNY Bureau of Health Services and the FDNY WTC Health Program have been there with us from the beginning. Drs. Kelly and Prezant, like myself and many of you, were caught in the collapse. They knew that this exposure differed from a typical fire. Treatment services were provided immediately and with their foresight, FDNY was the first group to begin a medical monitoring program for all of our exposed rescue/recovery workers so that conditions could be identified and treatment provided. Monitoring and treatment were not one-time events; they continue to this day with new illnesses, such as cancers, being identified and treated.

In 2007, FDNY published a comprehensive report for our membership, describing how the WTC affected our health. That information was critical to the passage of the Zadroga Act in 2010 and, along with subsequent medical and scientific publications, was critical to its reauthorization in 2015 as a federal health program with funding available for the next 75 years. Now 15 years later, it is fitting that FDNY issue an updated version of that health report.

Nearly 16,000 of our rescue/recovery workers (Firefighters, EMS and civilians— active and retired) have been part of the FDNY WTC Health Program and contributed to this report, making it the most comprehensive post-disaster health report ever done. Read it carefully and just as I have done, please continue to go for your annual monitoring exam and, if needed, your treatment appointments. As we build a new future together, the FDNY WTC Health Program is a remarkable demonstration that our sacrifices have and never will be forgotten.

A handwritten signature of Daniel A. Nigro in black ink.

## Message from the Chief of Department James E. Leonard

**W**hen the World Trade Center collapsed on 9/11, it unleashed a cloud of dust and debris the likes of which this City had never seen before. Among the many unknowns in the aftermath of that terrible day, one that loomed large was the question of how that cloud would affect our members' health.

The FDNY's Chief Medical Officers, Drs. Kerry Kelly and David Prezant, realized almost immediately after the attack that the health effects from WTC exposure could severely impact our workforce. Together with a host of partners (e.g., FDNY labor and management, the City, academic medical centers and the National Institute for Occupational Safety & Health or NIOSH), they created our FDNY WTC Health Program, a program specifically tailored to the needs of our members. This program provides annual monitoring exams so that WTC-related illnesses, both physical and psychological, can be diagnosed early. Once diagnosed, state-of-the-art treatment is provided at no cost to our members. As a group, we were the most exposed. All WTC-exposed FDNY responders—Firefighters, EMS personnel, Officers, our civilian workers and FDNY retirees—are eligible for this program. To date, nearly 16,000 FDNY rescue/recovery workers have participated in our FDNY WTC Health Program since 9/11.

Now 15 years later, it is fitting that FDNY issue this updated health report, so you can see exactly how we are all doing. In 2007, FDNY published its first comprehensive report, describing how WTC exposures affected the health of our members. That information was critical to the passage of the Zadroga Act in 2010 and, along with subsequent medical and scientific publications, was critical to its reauthorization in 2015 as a federal health program with funding available for the next 75 years.

Continue to go for your annual monitoring exam, as I do, and please follow their treatment recommendations. We must do all that we can to remain healthy. We owe that to our families, friends, coworkers and the members of this Department who no longer are with us. Thank you all for your dedication to this Department in the aftermath of 9/11.

*James E. Leonard*





Message from **John Howard, MD**, World Trade Center Program, Administrator;  
Director, National Institute for Occupational Safety and Health;  
Centers for Disease Control and Prevention



I am pleased to see the important work of the FDNY compiled in this new 2016 health report. The National Institute for Occupational Safety and Health (NIOSH) has provided funding since 2002 to FDNY for medical screening, monitoring and treatment. As Director of NIOSH, I became aware shortly after 9/11 that responders, their families and others were deeply concerned with the question of whether exposures to airborne contaminants at Ground Zero posed ongoing risks for adverse health effects. And with persistent symptoms, it became clear that a comprehensive medical monitoring and treatment health program, based on sound scientific studies, was urgently needed.

Since that time, I have had the opportunity to meet with your representatives, as well as with many of you who provided rescue/recovery efforts at the WTC. FDNY not only has been a leader in providing monitoring and treatment early on to its workers, but also a leader in our efforts to identify and understand the health effects associated with WTC exposures. The FDNY WTC Health Program has been a model to others in its ability to serve the health needs of its membership, while simultaneously providing to others, through published, peer-reviewed scientific studies, the collective knowledge gained from its monitoring, treatment and scientific efforts.

The data analyzed by the FDNY WTC Health Program help us all to develop an accurate picture of the 9/11 health outcomes, greatly increasing our ability to identify, prevent and treat illnesses. In 2007, FDNY published a comprehensive report for its membership on WTC-related health outcomes of exposed FDNY rescue/recovery workers. In 2011, the Zadroga Act provided the framework for the continuation of these important activities—health care to treat current WTC-related issues, health surveillance to determine if new conditions are WTC-related and research to answer the many questions remaining about WTC-related health conditions. The information from the FDNY WTC Health Program, through its reports and medical publications, was critical to the authorization of the Zadroga Act and its reauthorization in 2015 as a federal health program with funding available for the next 75 years. Now 15 years later, FDNY has published this updated report. During this time, new diseases, such as cancers, have been identified as WTC-related and, once again, FDNY has been a leader in identifying these cancers, in its data-driven advocacy to include cancers under the WTC health coverage umbrella and the development of a case-based cancer management program. I continue to be impressed by the quality of the programs at FDNY, in part reflected by the contents of this updated report, and I look forward to continued partnership with FDNY to provide needed medical services and answer essential health questions that remain a concern to us all.

Sincerely,

A handwritten signature in black ink, which appears to read "J. Howard". The signature is written in a cursive, flowing style.

## Message from FDNY's Bureau of Health Services and the World Trade Center Health Program

In the aftermath of 9/11, the health consequences to our WTC-exposed, FDNY rescue/recovery workers (Firefighters, EMTs, Paramedics, Officers, civilians and retirees) were both immediate and far-reaching. Our members struggled desperately to find lost coworkers and civilians, while breathing air filled with dust, chemicals and other noxious elements. Our Department, carrying out its rescue, recovery, emergency medical care and fire suppression roles, maintained a continuous presence at the site until its closure in July 2002. As a group, FDNY rescue workers were the first in, the last out and, for many, the most exposed.

The need to evaluate and monitor the health effects of this exposure was evident from day one. That is why the Bureau of Health Services, with the help of labor, management, government and numerous partners in allied health fields, developed the FDNY WTC Health Program. Treatment began day one and monitoring evaluations began early in October 2001, just weeks after 9/11 and before any other groups were offered evaluations.

In 2007, we issued a report to every member of our workforce (active and retired), titled *World Trade Center Health Impacts on FDNY Rescue Workers*. At that time, we promised to keep you updated as new information became available. Today, we provide to you this updated report, summarizing the health impacts of WTC exposure on our workforce 15 years later. The goal of this report is to continue to address the question you ask us: "How are we doing?" To answer this question, we gathered and analyzed information from the comprehensive medical questionnaires and exams you take at your monitoring and treatment visits, from medical tests and from FDNY retirement statistics. We owe it to all of our members to share this de-identified, aggregate information with you. We know that without the participation and support of our membership, this program could never succeed.

This report demonstrates that our workforce continues to suffer from WTC-related illnesses and that new illnesses, such as cancers and autoimmune rheumatologic diseases, are occurring at rates greater than expected. This information, confirmed by other investigators, enabled the federal government to add cancers as WTC-related health conditions eligible for full benefits and, in 2015, to reauthorize the Zadroga Act, providing the WTC Health Program with federal funding for the next 75 years.

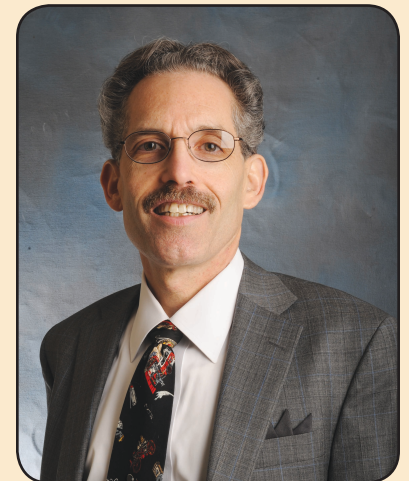
Your FDNY WTC Health Program provides you with annual monitoring exams, tests, treatment and medications, free of charge for any WTC-related illness after medical documentation is obtained by our program and then certified by the federal government WTC Program Administrator. The best way to protect your health is continued participation in the FDNY WTC Health Program. Early diagnosis and treatment lead to improved outcomes. To make participation as convenient as possible for you, our program has seven locations: FDNY BHS in Brooklyn, Manhattan (CSU only), Staten Island, Fort Totten (Queens), Brentwood (Long Island, CSU only), Commack (Long Island) and Middletown (Orange County).

Dr. Kerry J. Kelly  
Chief Medical Officer, FDNY  
Co-Director, FDNY WTC Health Program

Dr. David J. Prezant  
Chief Medical Officer, FDNY  
Co-Director, FDNY WTC Health Program



Dr. Kerry J. Kelly



Dr. David J. Prezant



## Message from the Firefighter and Fire Officer Unions



James Slevin



Jake Lemonda

**O**n 9/11 we lost 343 of our members. And, since then, we have lost far too many to WTC-related lung diseases and cancers. Many of us suffer daily with chronic sinusitis, asthma, acid-reflux, sarcoidosis, cancers and mental health ailments. Although we cannot change the WTC exposures that we experienced, we can improve our health through medical monitoring, early diagnosis and treatment.

Within a month of the 9/11 attacks, BHS initiated comprehensive annual medical monitoring for our members. We worked with BHS to design the FDNY WTC Health Program, specifically for our members. Our unions continue to serve as active and voting members on the World Trade Center Health Program Steering Committee.

Active members receive this comprehensive medical as part of their annual physical examination. Retirees have been and will continue to be contacted for follow-up annual WTC medical monitoring. When WTC-related conditions are identified, this program provides valuable health monitoring, cancer screening, testing, treatment and medications, all available free of charge for any WTC-related condition. We urge all WTC-exposed members to participate in the FDNY WTC Health Program's monitoring and treatment exams. Your participation provides you with the best opportunity for early diagnosis and treatment.

Together—the City, FDNY, BHS, IAFF, UFA and UFOA, EMS unions and our fellow unions—successfully advocated for funds from Congress for long-term medical and mental health monitoring and treatment. In 2007, FDNY published its first comprehensive report, describing how WTC exposures affected the health of our members. The FDNY WTC Health Program was the first to provide monitoring and treatment; the first to document that WTC Cough Syndrome existed; the first to show that lung function was permanently reduced; the first to show that cancers were increased; and, recently, the first to document that certain autoimmune diseases are increased. That information was critical to the passage of the Zadroga Act in 2010 and, along with subsequent medical and scientific publications, was critical to its reauthorization in 2015 as a federal health program with funding available for the next 75 years.

Now, 15 years later, the FDNY WTC Health Program has issued this updated health report. We are grateful for their continued expertise, vision, advocacy and dedication. We look forward to our continued collaborative efforts. We thank the FDNY WTC Health Program for the care and services they provide to us and we thank our members for their participation. We wish you all the very best health—today, tomorrow and in the future.

Sincerely ,

James Slevin  
President, UFA, Local 94

Jake Lemonda  
President, UFOA, Local 854

## Message from the EMT, Paramedic and EMS Officer Unions

**Y**our heroic actions on 9/11 and your dedication in the months that followed will never be forgotten. We also will never forget our members who were murdered on that day when the towers collapsed as well as those who died in the following years from WTC-related illnesses. We thank you for making us proud.

From the onset, we worked together with FDNY BHS to design a medical examination specifically for our members. Together with the City, FDNY, UEP, UEMSO, SOA, AFSCME, AFL-CIO and our fellow unions, we were able to secure funds from Congress to provide annual comprehensive medical monitoring and treatment through the World Trade Center Health Program at FDNY. Active members receive this comprehensive medical as part of their annual physical examination. Retirees have been and will continue to be contacted for follow-up WTC medical monitoring. This program provides valuable health monitoring, cancer screening, testing and medications, all available free of charge for any WTC-related condition.

Now 15 years later, it is fitting that the FDNY WTC Health Program issue this updated health report, so you can see exactly how we are all doing. We look forward to our continued collaborative efforts with them. We thank the FDNY WTC Health Program for the care and services they provide to us and we thank our members for their participation.

We urge all members who were exposed at the World Trade Center site to continue to participate in the FDNY WTC Health Program. Most importantly, retirement is not an excuse to conveniently forget about your WTC exposures and their health impact. You need to keep coming for your annual WTC medical monitoring exam at the WTC Health Program and for treatment as indicated. Improving or maintaining your health through the FDNY WTC Health Program is one of the most important things we can do.

Sincerely,

Israel Miranda  
UEP, Local 2507

Vincent A. Variale  
UEMSO, Local 3621

John Sullivan  
President SOA



Israel Miranda



Vincent A. Variale



John Sullivan





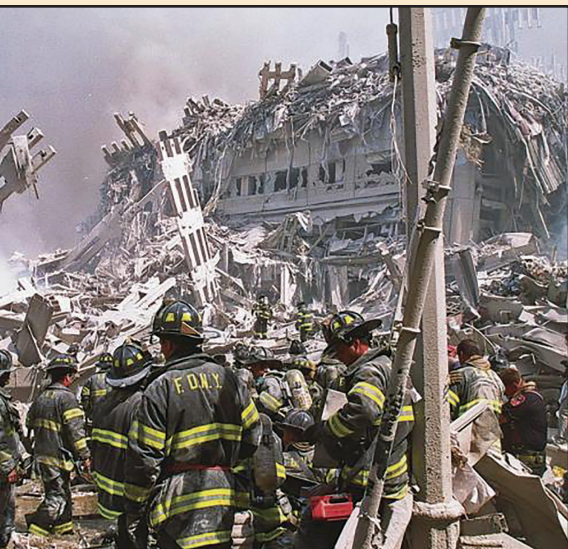


**SECTION I:**  
**INTRODUCTION AND TIMELINE**  
**The FDNY WTC Health Program ►**



## SECTION I: INTRODUCTION AND TIMELINE

### INTRODUCTION



In 2015, the U.S. Congress reauthorized the James Zadroga 9/11 Health and Compensation Act, extending federal funding for WTC-exposed rescue/recovery workers and survivors for the next 75 years. We at the Fire Department of the City of New York (FDNY) are proud to have advocated for the law's extension on behalf of the thousands of FDNY Firefighters, EMS and civilian personnel who responded to 9/11 to ensure their continued access to critical medical monitoring and treatment under the FDNY WTC Health Program. This reauthorization also serves as a reminder that 9/11 never will be a distant memory. During the great history of this Department, no single day has been more devastating than 9/11—the day our nation, City and values were attacked by terrorists: The day when WTC Towers 1, 2, 3 and 7 burned and collapsed; the day when nearly 3,000 people were killed, including 343 of our own.

Despite overwhelming losses, the members of this Department orchestrated one of the largest successful evacuations of civilians in recorded history. And, during the following 10 months, they continued to work tirelessly in rescue and recovery operations, often while overwhelmed with grief. They attended hundreds of funerals and memorial services of fallen friends and colleagues.

Now, 15 years later, FDNY has rebuilt and retrained, but has not forgotten. We continue to deal with the health effects of WTC exposure every day. Nearly 16,000 FDNY members—including Firefighters, EMS and civilian personnel, both active and retirees—were exposed to WTC dust, particulates, noxious gases, chemicals and fibers. From day one, we vowed to provide our WTC-exposed members with the very best medical monitoring and treatment programs so we could provide the best medical care, while simultaneously documenting the injuries and illnesses

that were related to work at the WTC sites. And, together, we have upheld that promise. On 9/11, that same day, we began treatment for our injured members. Four weeks later, we began Department-wide medical and mental health monitoring, completing 10,000 exams within six months of 9/11. Ours was the first WTC monitoring program in New York City and the nation. We were able to establish this program so quickly because of broad labor-management support and a pre-existing annual medical monitoring program, based on the International Association of Firefighters Wellness/Fitness Program that FDNY helped design and then implemented well before 9/11.

In the months and years after 9/11, we formed collaborations with numerous partners to help design additional treatment, monitoring and research programs to address our members' specific needs. Since then, FDNY's WTC Health Program has become a national model for providing health services for WTC-exposed members and documenting the effects of WTC exposure. And, because we performed annual medical monitoring prior to 9/11, we were the only group capable of demonstrating its impact by comparing our health information collected post-9/11 to that collected pre-9/11. These analyses allowed us to advocate for new program funding, based on credible, published data. For example, we demonstrated that post-9/11, FDNY WTC rescue/recovery workers (Fire and EMS) experienced, on average, a 372-milliliter decrease in lung function, which was 12 to 13 times greater than the average annual pre-9/11 decrease based on aging. These analyses, based on objective measures, such as comparisons of pre- and post-9/11 pulmonary function values, were an important part of the deliberations of the New York City Mayor's WTC Health Panel, whose recommendations were released in February 2007. We used these and other find-

ings to help convince Congress to authorize the Zadroga 9/11 Health Bill in 2010, which initially provided five years of funding; to add cancer coverage to the Zadroga Act in 2012; and, to reauthorize the Zadroga Act in 2015.

### MISSION

The mission of the FDNY WTC Health Program is to evaluate and treat individual FDNY members (Firefighters, EMS and civilian personnel- active and retired) who worked at the WTC sites. Central to this mission is our desire to identify injuries and illnesses that may be WTC-related. The FDNY WTC Health Program develops plans for future monitoring and treatment by analyzing patterns of illnesses and uses this information to answer important questions about the health effects of WTC exposure. Monitoring and treatment are an outgrowth and expansion of what the FDNY Bureau of Health Services (FDNY BHS) does every day—improving members' health and wellness through periodic medical evaluations, preventive therapies, injury/illness evaluations and treatment. Providing monitoring and treatment services is not without its challenges. Under the Zadroga Act, federal regulations require documentation of WTC exposure and certification of each WTC-related disease separately before a member can receive treatment. To meet these new regulations, we implemented an improved electronic medical record, obtained each member's consent and then automatically provided the federal WTC Administrator at the National Institute for Occupational Safety and Health (NIOSH) with the necessary documentation for our members to be enrolled in and certified under this program. Our ability to accomplish this successfully meant that no member's medical care was interrupted by this process and no member had to complete countless forms before receiving needed health care.

We also had other challenges. In 2011, we found an increase in cancer cases in WTC-exposed FDNY responders, compared with the U.S. general population, but could not treat our cancer patients under this program unless the federal WTC Administrator agreed to add cancers as WTC-related conditions. These findings were published as a peer-reviewed study and with this evidence, in conjunction with other studies done at other WTC Health Program clinical centers (WTC Health Registry and the non-FDNY responder consortium), the WTC Program Administrator was petitioned to add cancer as a WTC-related disease. In October of 2012, cancer was added to the WTC Health Program as a coverable condition and the FDNY WTC Health Program has been caring for affected patients since that time. In 2014, the federal government formulated additional HIPAA privacy and security requirements for our program, which resulted in major renovations of the FDNY BHS clinical site, as well as numerous policy and workflow changes. In 2015, our medical codes had to be changed from ICD9 to ICD10 codes and we had to lobby the U.S. Congress for the reauthorization of the Zadroga Act. Each challenge was successfully met and, most importantly, on no occasion was WTC monitoring or treatment interrupted.

### FUNDING

In October 2001, only four weeks after the attack, FDNY BHS began performing standardized medical screenings on WTC rescue/recovery workers with funding provided by NYC and FDNY. Ours was the first comprehensive, post-WTC exposure medical performed by any medical institution. In November 2001, the CDC granted \$4.8 million to FDNY to help fund this program for 2002 to 2004. This funding expanded upon the services originally started, using funding through the September 11th Recovery Grant

## SECTION 1: INTRODUCTION

from the American Red Cross (ARC) Liberty Disaster Relief Fund and funding for WTC-related mental health treatment that originally came from multiple sources, including the FDNY, IAFF, ARC, FEMA–Project Liberty, SAMSA and various philanthropies. The CDC funding allowed the FDNY WTC Program to include affected retirees, who previously would have been excluded from BHS monitoring and treatment, and to expand treatment services, including the provision of free medications, mental health counseling, medical specialty appointments and surgery.

In 2010, with combined labor and management support, the Zadroga Act was passed and on July, 1, 2011, was implemented to provide funding for the FDNY WTC Health Program through June 30, 2016. This funding paid for monitoring and treatment exams, staffing, scheduling and follow-up services. With this funding, every “annual” or periodic medical evaluation has been improved and expanded to include a WTC periodic medical with higher quality pulmonary function tests and comprehensive medical and mental health questionnaires. The Zadroga Act also provided funding for specialized diagnostic testing for our active and retired members, free cancer screening tests, such as colonoscopies and mammograms, and free medications. This funding also supports an FDNY data management center to provide quality assurance and data analysis and research studies so that the FDNY WTC Health Program can answer your most important questions (“How am I doing and how are my buddies doing?”), provide objective evidence that new conditions, such as cancer, are WTC-related, plan for future health needs and release findings to our members.

In 2012, we received funding from the Jimmy V Foundation for Cancer Research to participate in a collaborative study with the Albert Einstein College of Medicine, the

National Cancer Institute and Memorial Sloan Kettering, to find early blood markers for certain types of hematologic malignancies, such as multiple myeloma and leukemia. It will take some time to determine if this effort is successful, but we remain hopeful that this and other efforts will lead to early diagnosis and improved outcomes, ultimately saving lives.

In December 2015, the Zadroga Act was reauthorized by Congress with funding to provide critically important health care services to WTC-exposed members for the next 75 years. This successful advocacy effort was made possible through the combined efforts of all of the WTC Health Programs (FDNY, Mount Sinai, Stony Brook, Queens LIJ/North Shore—now known as Northwell, NYU, Robert Wood Johnson and Bellevue Medical Centers), the WTC Health Registry, the Mayor, City Council, the NY Congressional Delegation, FDNY labor and management, the IAFF, AFL-CIO and the many other supporters.

### COMMUNICATION

Communication takes many forms. First and foremost are the individual interactions our members have with their WTC health care providers. Next is our communication with you through this and other reports. The reports we send help inform you about your health and the health of your coworkers. We also publish extensively in the medical literature to help other health care professionals understand how to diagnose and treat WTC-related diseases. In 2007, we issued a report to every member of our workforce (active and retired), titled *World Trade Center Health Impacts on FDNY Rescue Workers*. At that time, we promised to keep you updated as new information became available.

Today, we provide you with an updated report, summarizing the health impacts of WTC exposure on our work-



force 15 years later. The goal of this report is to continue to address the question you ask us: “How are we doing?” To answer this question, we gathered and analyzed information from the comprehensive medical questionnaires and exams you take at your monitoring and treatment visits, medical tests and FDNY retirement statistics. We owe it to all of our members to share this de-identified, aggregate information with you. We know that without the participation and support of our membership, this program never could succeed.

These publications also provide the Federal WTC Program Administrator at NIOSH with the medical information necessary to document associations between WTC exposure and new emerging diseases. As you will read in later sections of this report, the FDNY WTC Health Program published the first ever WTC cancer study in a highly prestigious medical journal (*The Lancet*, 2011). Later, our findings were corroborated by the other WTC Health Programs and the WTC Health Registry. Under the Zadroga Act, this allowed the addition of cancer coverage to the WTC Health Program and the WTC Victims Compensation Fund. FDNY has numerous ongoing studies, most funded by the Zadroga Act, including our recently completed study showing an increase in certain rheumatologic autoimmune diseases among the most highly exposed individuals. We hope that the Federal WTC Program Administrator eventually will add these conditions to the WTC Health Program. Only by understanding the disease burden that has occurred with WTC exposure can we and others address your future WTC health care needs.

In 2006, we summarized the short-term health effects for our members in a booklet, titled *World Trade Center Health Impacts on FDNY Rescue Workers*. A copy was given to every FDNY member and still is available on

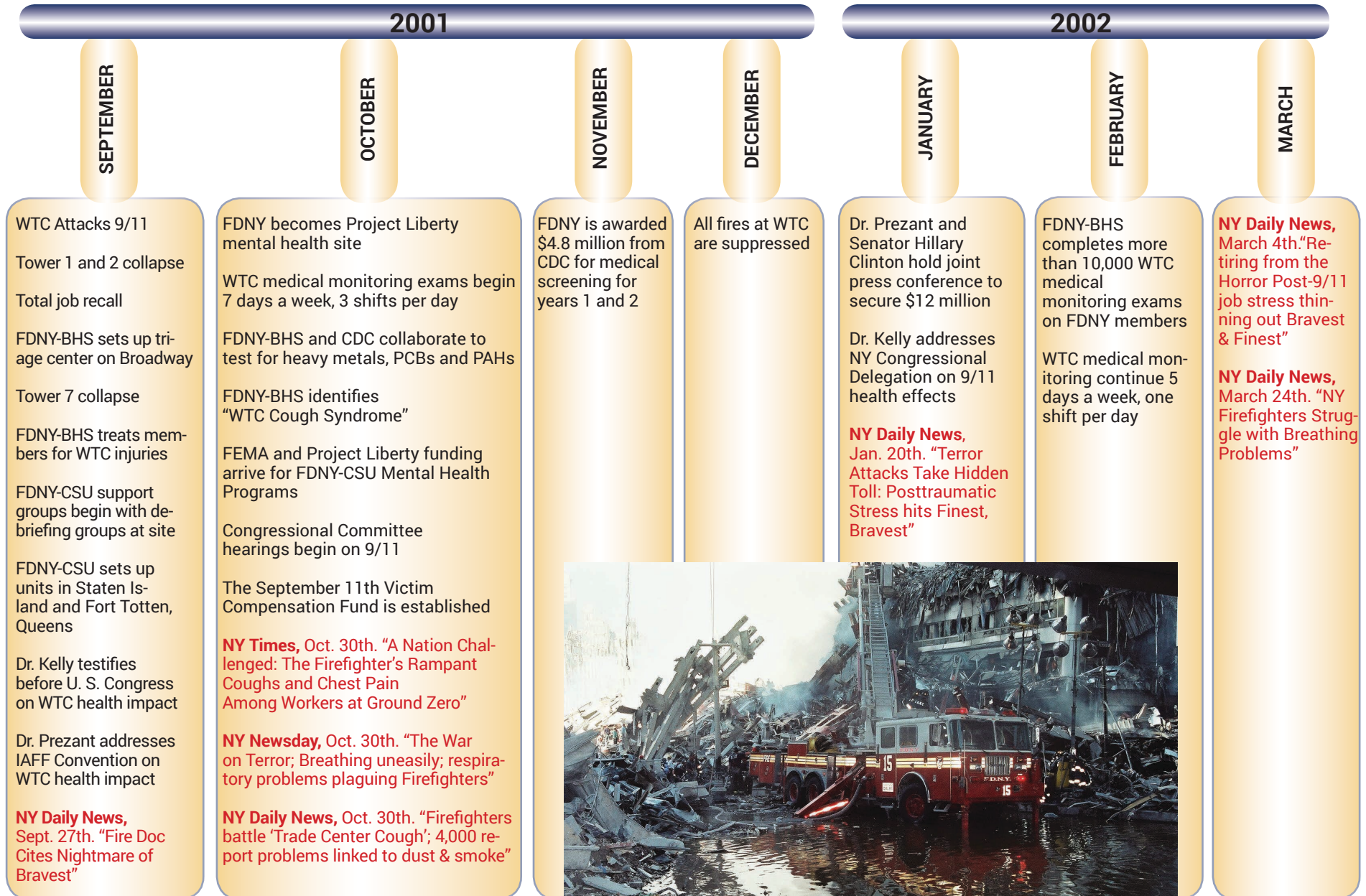
our website at <http://www1.nyc.gov/site/fdny/about/resources/reports-and-publications/911-health-impact-reports.page>

Now in 2016, we present to you an updated version, titled *World Trade Center Health Effects on FDNY Rescue/Recovery Workers—15 Years Later*. This report summarizes what we have learned so far about the health consequences of WTC exposures.

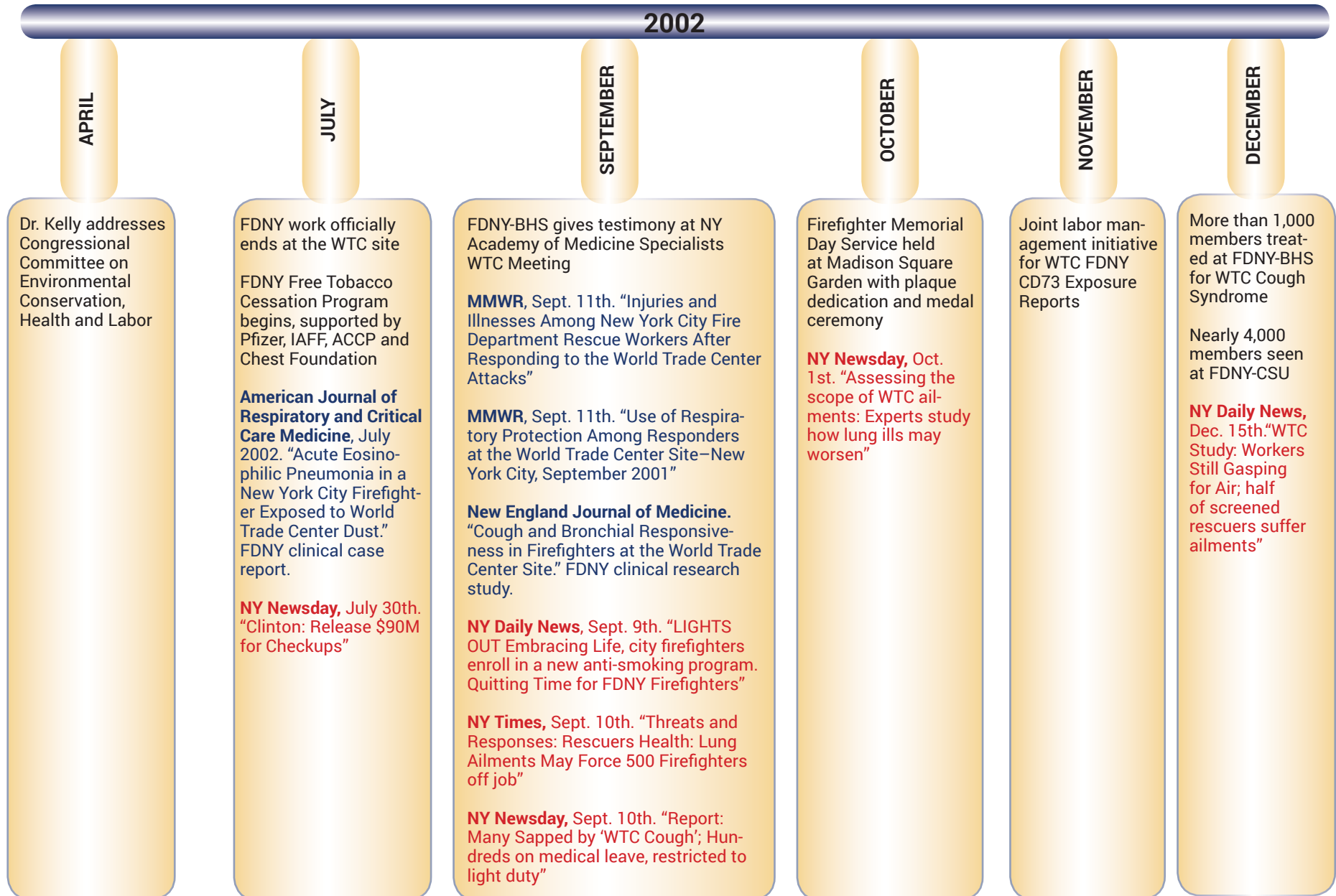
We hope the information we provide is useful to our members, non-FDNY responders, other WTC-exposed individuals and those who are interested in the health consequences of WTC exposure. This FDNY report presents only aggregate, de-identified data and contains no information about any individual member's health. In performing its medical monitoring and treatment roles, the FDNY WTC Health Program, as a top priority, preserves the confidentiality of members' personal health records and information.

Section 1 of this report provides an introduction to the FDNY WTC Health Program. Section 2 presents aggregate data on the physical health effects of WTC exposure, including important reports on the effect of WTC exposure on lung function, the risk of developing cancer and on rheumatologic autoimmune diseases. Section 3 presents aggregate data on the mental health effects of 9/11 and their comorbidity with physical health conditions. Section 4 shows the effects of 9/11 on FDNY member retirements and disability pensions. Section 5 provides information on the FDNY WTC Health Program's physical and mental health services offered to enrolled members. Section 6 presents data on members' health-related quality of life and self-rated health status. The Conclusion section provides useful additional information about treatment centers, self-evaluation quizzes about your potential need for treatment and a list of important WTC-related medical and scientific publications by FDNY and others.

## FDNY WTC Health Program Timeline—September 2001-September 2016

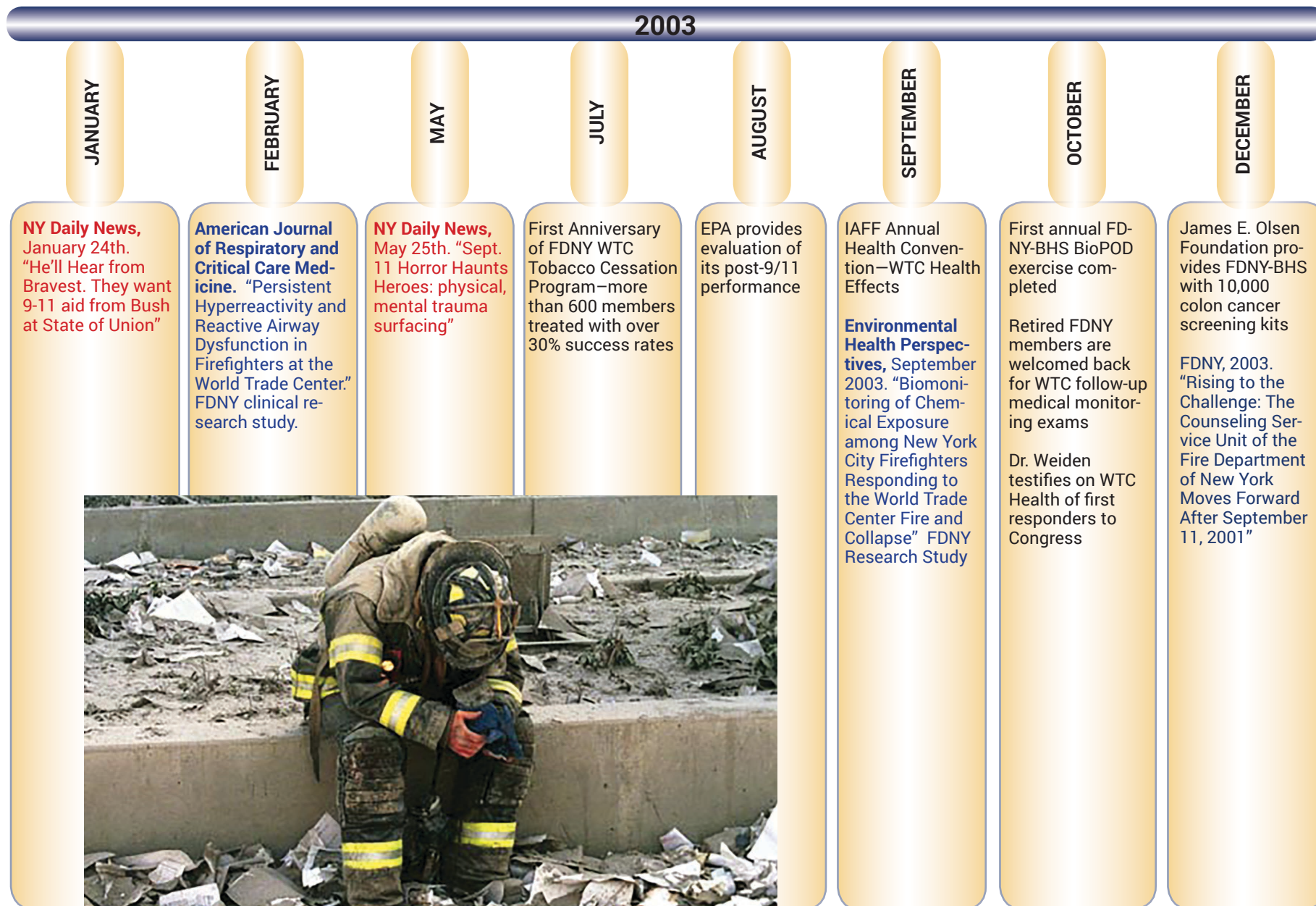


## FDNY WTC Health Program Timeline—September 2001-September 2016

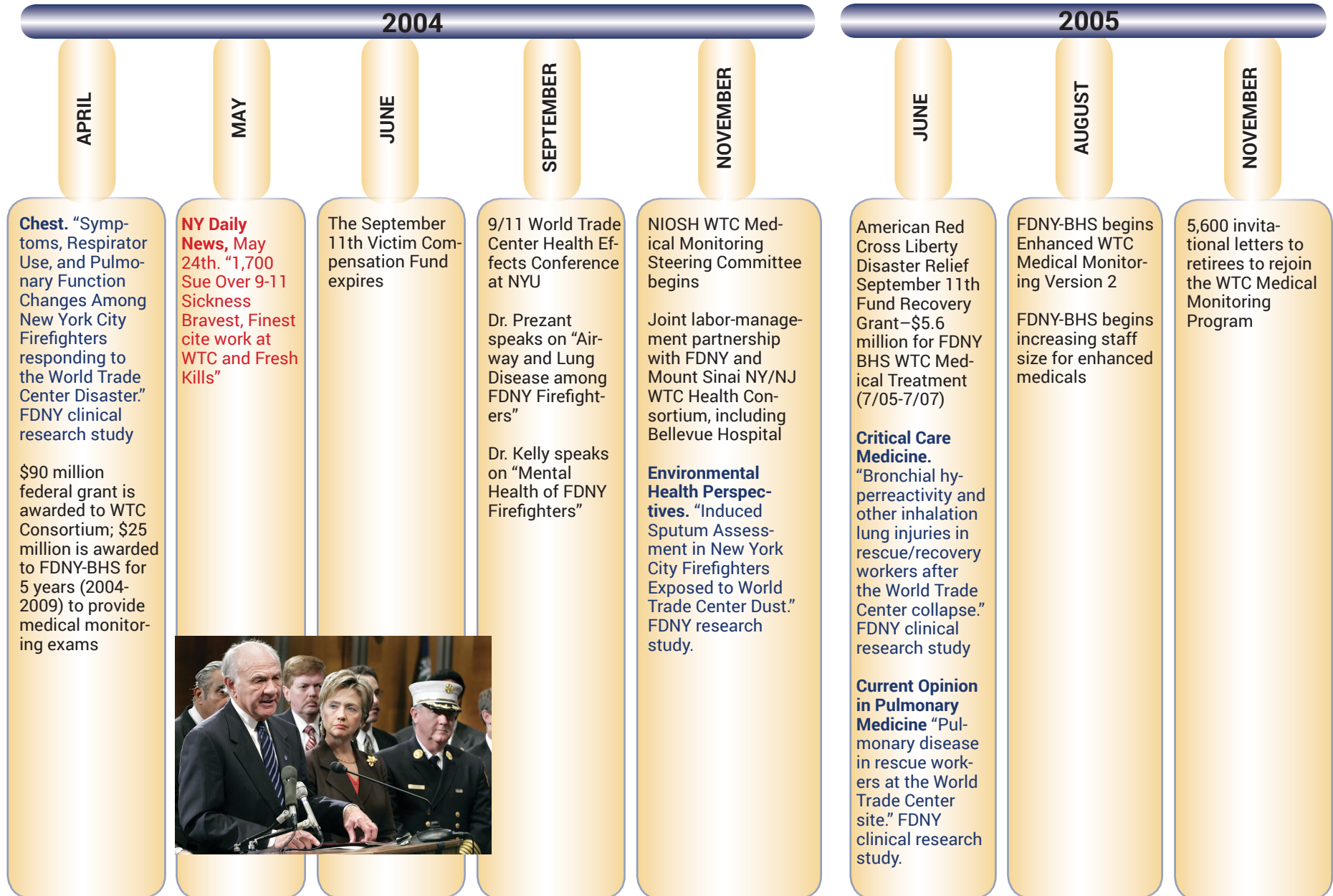




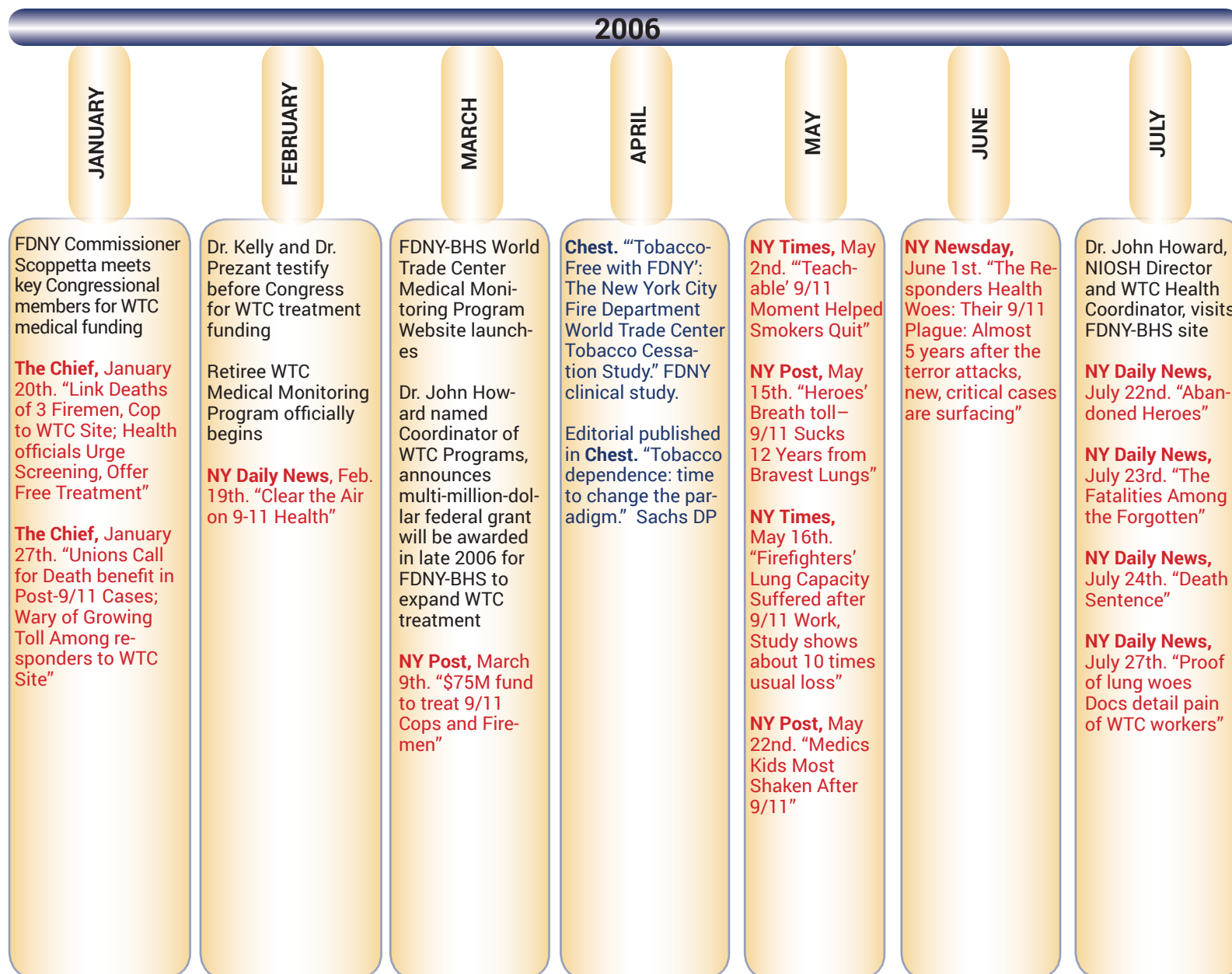
## FDNY WTC Health Program Timeline—September 2001-September 2016



## FDNY WTC Health Program Timeline—September 2001-September 2016

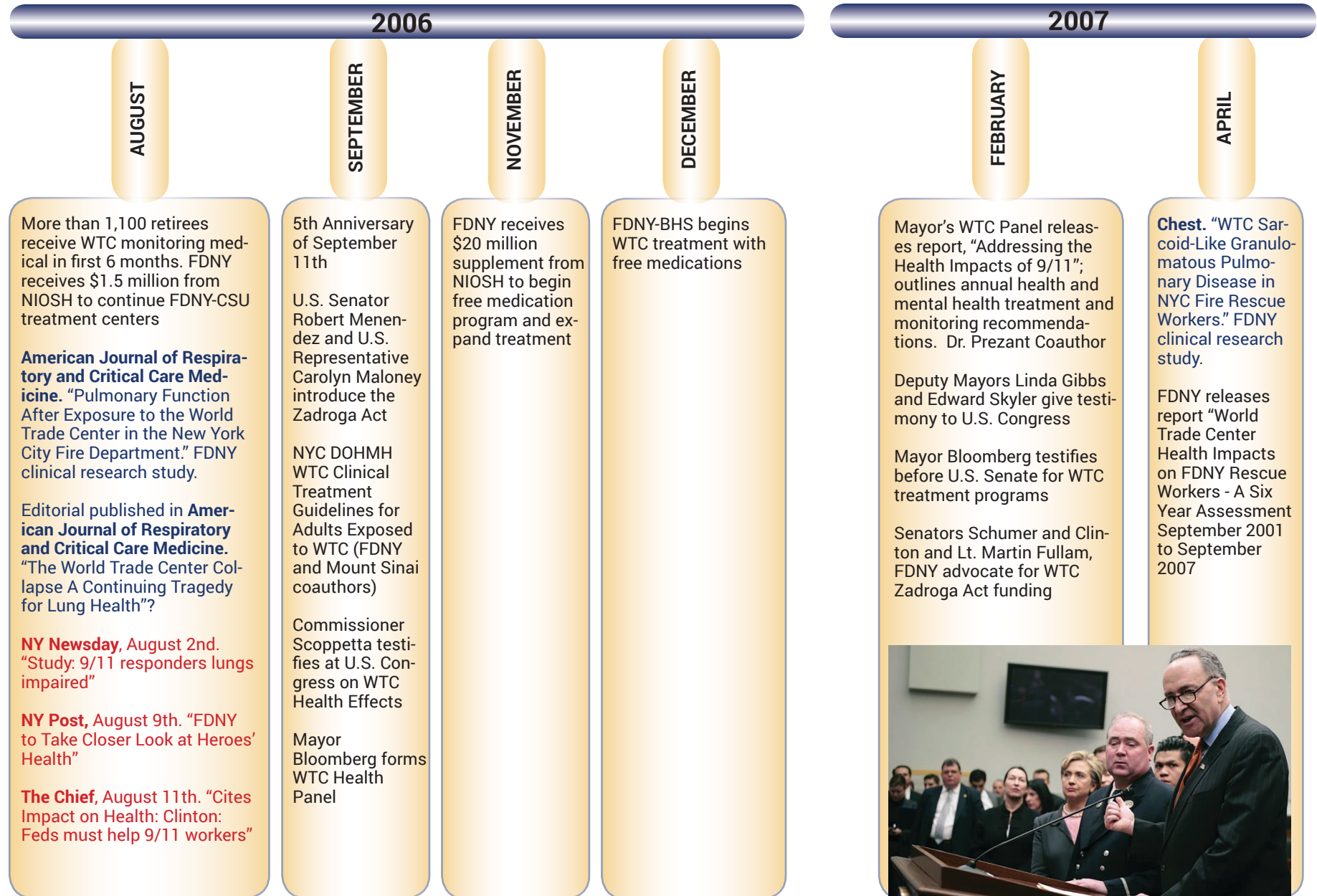


## FDNY WTC Health Program Timeline—September 2001-September 2016

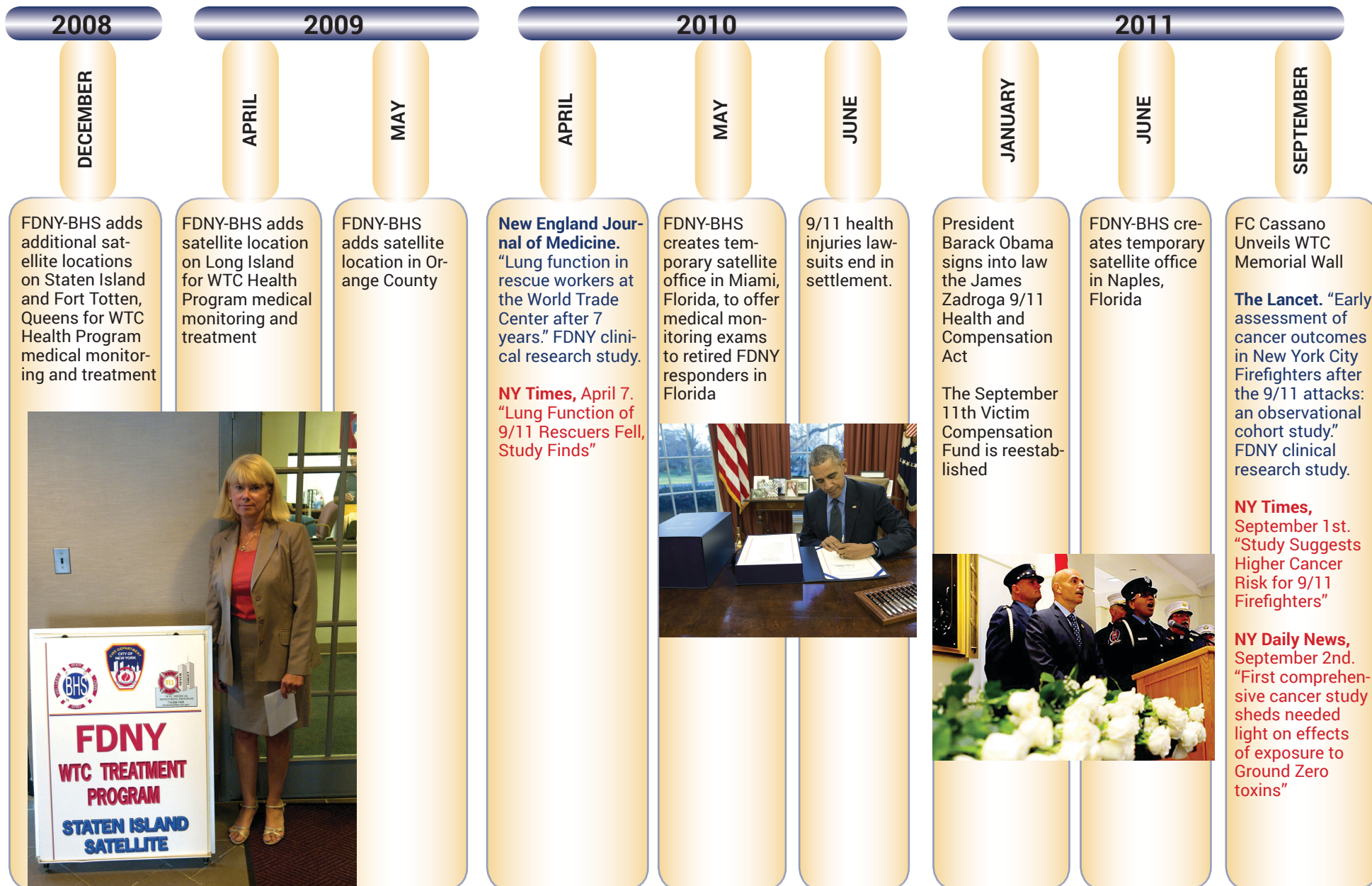




## FDNY WTC Health Program Timeline—September 2001-September 2016



## FDNY WTC Health Program Timeline—September 2001-September 2016

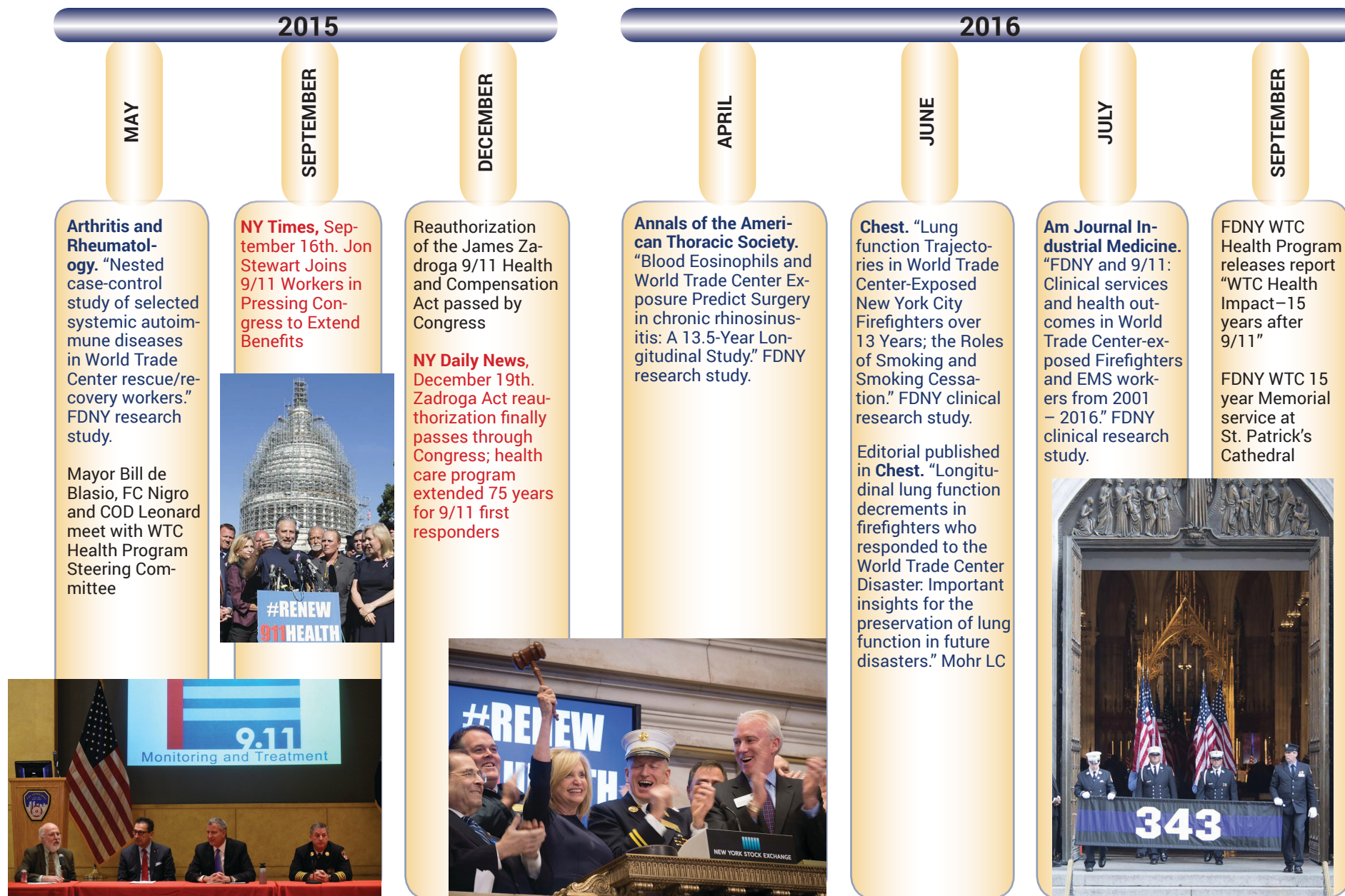


## FDNY WTC Health Program Timeline—September 2001-September 2016





## FDNY WTC Health Program Timeline—September 2001-September 2016



# **SECTION II:**

# **PHYSICAL HEALTH ASSESSMENT**

## **INTRODUCTION**

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- Early Mask/Respirator Use ►**
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- Underlying Cause of Pulmonary Function Loss ►**
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## SECTION II: PHYSICAL HEALTH ASSESSMENT

### INTRODUCTION

**O**n 9/11, many of our Medical Officers immediately responded to the WTC disaster. Drs. Kelly and Prezant were caught in the collapse and experienced firsthand the kinds of problems that FDNY rescue/recovery workers (Fire and EMS) experienced, which included eye and skin irritation, nasal drip/congestion, coughing, breathing difficulties and other respiratory symptoms. Understanding the potential for these symptoms to progress to career-threatening and possibly life-threatening illnesses, they recognized the need to provide immediate treatment and started a comprehensive medical and mental health screening program. FDNY BHS was the first program in the nation to institute medical (physical and mental health) screening, starting only four weeks after 9/11, which included physical exams, pulmonary function tests, chest x-rays, cardiograms, hearing tests and collection of blood and urine samples for testing. Early on, blood samples from the first 321 FDNY rescue/recovery workers were sent to the CDC's National Laboratory where they were tested for more than 110 chemicals, including heavy metals, polyaromatic hydrocarbons, PCBs and dioxins. Test results showed no clinically significant elevations and, therefore, bio-monitoring tests for the rest of our group (more than 10,000 additional members) concentrated on specific, highly toxic heavy metals (lead, mercury and beryllium) and total PCBs. Subsequently, testing for these heavy metals and total PCBs also were found to be within normal clinical limits for nearly all of our members. We since have come to understand that

exposure to the dust itself was the major problem: Its irregular shape, composition and high alkalinity appear to have initiated an inflammatory cascade that for many of us has resulted in chronic diseases involving the upper and lower respiratory systems.

#### QUESTIONNAIRE DATA

FDNY BHS staff designed health questionnaires detailing exposures and symptoms within weeks of 9/11, which became an integral part of the screening/monitoring visit. Within six months, more than 10,000 members had completed these health questionnaires. Obtaining this information early post-9/11 proved critically important because it allowed us to quickly understand the scope of the health impact of 9/11, prompting us to design the necessary immediate treatments and long-term monitoring and treatment programs needed by our members. It also proved useful in allowing our members to document their exposures and health findings early on, before WTC health and pension benefits became available.

After successful administration of our first post-9/11 questionnaires, the FDNY BHS WTC Health Program continued to develop a series of self-administered, computerized questionnaires for use in conjunction with the annual or periodic medical monitoring exam of active members and retirees. This was important to assess the longer-term physical and psychological impact of 9/11 on rescue/recovery workers and their families. For the first time





since any disaster, FDNY BHS, through the WTC Health Program, provided the same extensive monitoring exam to Firefighters and EMS personnel, regardless of whether they were active or retired. As of July 1, 2016, more than 15,300 members have participated in monitoring at least once and more than 12,000 have participated in seven or more exams (see Section 5). This unprecedented response from more than 97 percent of our workforce demonstrates the success of this labor-management partnership in delivering high quality medical monitoring and WTC-related healthcare to nearly every WTC-exposed member.

The information contained in this section comes from the physical health questionnaires, pulmonary function tests taken by FDNY members during monitoring evaluations, treatment visits to the FDNY WTC Health Program (including its satellite locations), imaging and other medical tests, as indicated. As shown on the following pages, many WTC-related symptoms and conditions (respiratory and mental health) are strongly tied to one's time of first arrival at the WTC site. The results documented on the following pages are summaries of the nearly 80 scientific studies that we have published in medical journals, based on our work in the FDNY WTC Health Program. Some of the figures and tables within are updated versions of those originally distributed in 2007 in a monograph, titled *World*

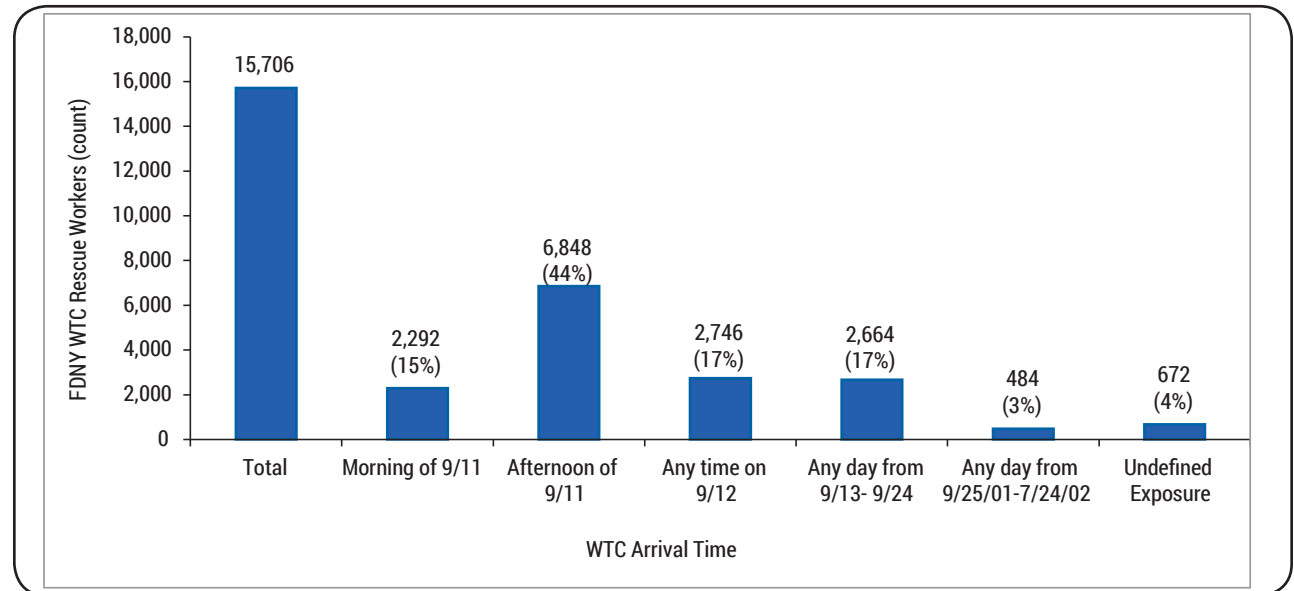
*Trade Center Health Impacts on FDNY Rescue Workers—a six-year assessment, September 2001 to 2007*. Other figures and tables are new and represent some of the latest findings on WTC-related health outcomes at FDNY. Our studies have allowed us to answer your questions: “How am I doing?” and “How are my buddies doing?” and to show Congress and NIOSH, our federal funding agency, that your problems are real and deserve continued federal support. Without our work and these published studies, the federal government likely would not have officially recognized numerous physical and mental WTC-related health conditions, including most cancers, the treatments of which now are entirely covered by the WTC Health Program.

Our work is not done. Using similarly obtained data, we are trying to convince the federal government to add rheumatologic (autoimmune) diseases as WTC-covered health conditions. We understand, however, that many of our members have not seen these studies. Therefore, just as we did six years after 9/11, we now provide this health update across the 15 years since 9/11. The information that we present is based on the full group of WTC-exposed FDNY rescue/recovery workers (more than 13,100 firefighters and 2,100 EMS personnel) who have enrolled in the FDNY WTC Health Program.

## SECTION 2: QUESTIONNAIRE DATA

► Shortly after the WTC disaster, we classified FDNY rescue/recovery workers (Fire and EMS) into groups, based on their estimated time of first arrival to work at the WTC site. Arrival groups have been helpful in explaining health conditions that developed after 9/11 and persist, even today.

### WTC Arrival Time at the Disaster Site

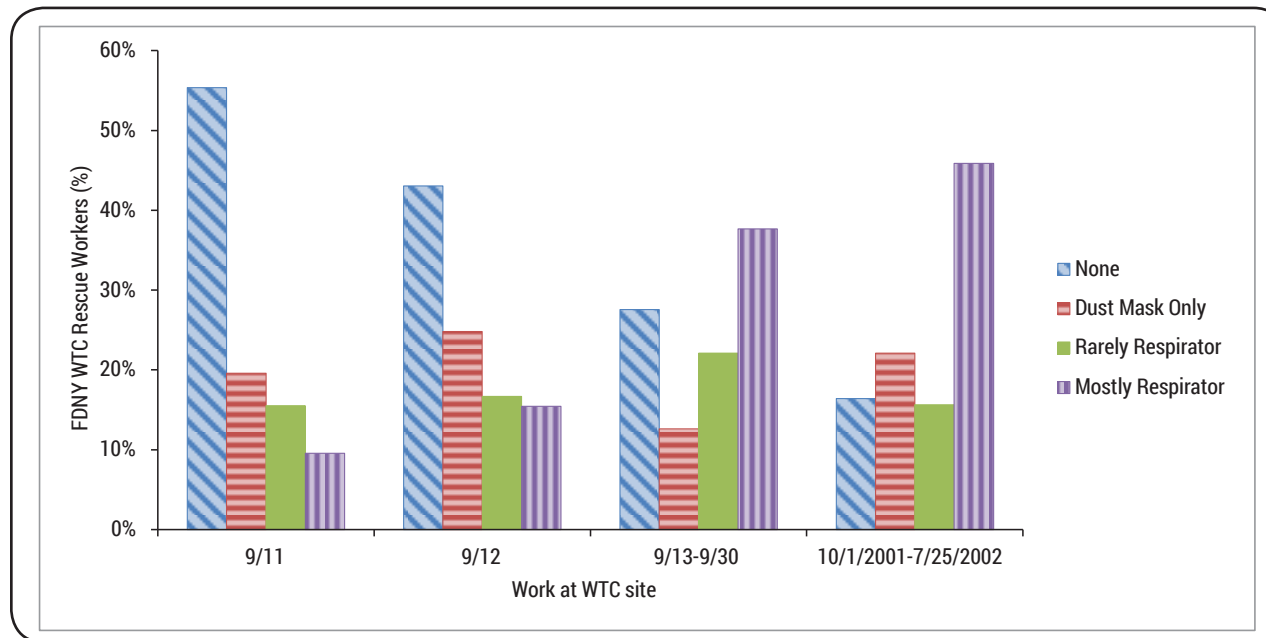


Ninety-nine percent of the FDNY workforce responded to the WTC disaster because of a job-wide mobilization that brought in nearly every active member. Members who retired prior to 9/11 also responded to the disaster site and volunteered to help in whatever ways possible. In the trauma of that day, our injured members were taken to local hospitals (including locations in New Jersey), most with orthopedic injuries and a few with respiratory injuries severe enough to require breathing assistance via intubation and mechanical ventilation. Members critically injured by falling debris required hospitalization and some required surgery. In the first 24 hours, 240 FDNY members were treated in emergency departments and 28 of them were admitted to hospitals. Thankfully, all survived.

Following 9/11, members spent, on average, three to four months assisting in rescue/recovery operations at the WTC site. Some members were present for portions of the full 10 months that the site was open, concluding their efforts in July 2002. The following pages document the extent of symptoms and physical health diagnoses experienced by our WTC-exposed FDNY workforce. As demonstrated in this section, mask/respirator use was infrequent, particularly in the first weeks after 9/11. Many members had respiratory difficulties (upper and lower airway problems) beginning their first day at the site, but for others, symptoms surfaced in the days, weeks, months and even years after 9/11. We found that earlier WTC arrival times were associated with a higher incidence of lower and upper respiratory symptoms, including acid reflux (GERD or heartburn), respiratory disease diagnoses (chronic rhinosinusitis, asthma, chronic bronchitis, obstructive sleep apnea and compromised pulmonary function), and led to an increase in disability retirements. Based on these data, we convinced the federal government to extend WTC coverage to rarer pulmonary conditions, including sarcoidosis and several years later to cancer. It is our hope that we will be equally successful in getting WTC coverage for some rheumatologic (autoimmune) diseases.

## SECTION 2: QUESTIONNAIRE DATA

### Early Masks/Respirator Use



When the Towers collapsed, an enormous dust cloud with a high concentration of particulate matter enveloped lower Manhattan. FDNY first responders inhaled this thick, polluted air, a situation made worse by strenuous work that required increased respiratory effort and open-mouth breathing. On day 1, those with self-contained breathing apparatus (SCBA) had clean air for about 15 minutes. After SCBAs ran out of air and for those who responded without SCBAs, there were few respirators available. Some who used protection wore only dust masks, which provided little, if any, real protection. Similarly, some wore N95 "TB" respirators, which also do not provide adequate respiratory protection for the particulate and chemical exposures found at this collapse/fire disaster site. The correct mask for this type of exposure, a P-100 respirator, was not widely available until after the first week and then it was difficult to wear for any length of time due to its bulk and interference with voice communication in this difficult work environment. This intense environmental exposure is directly related to many of the symptoms and illnesses described in this publication and especially to respiratory illnesses.

- While dust masks were common, respirators were seldom used on 9/11 and in the early days thereafter.

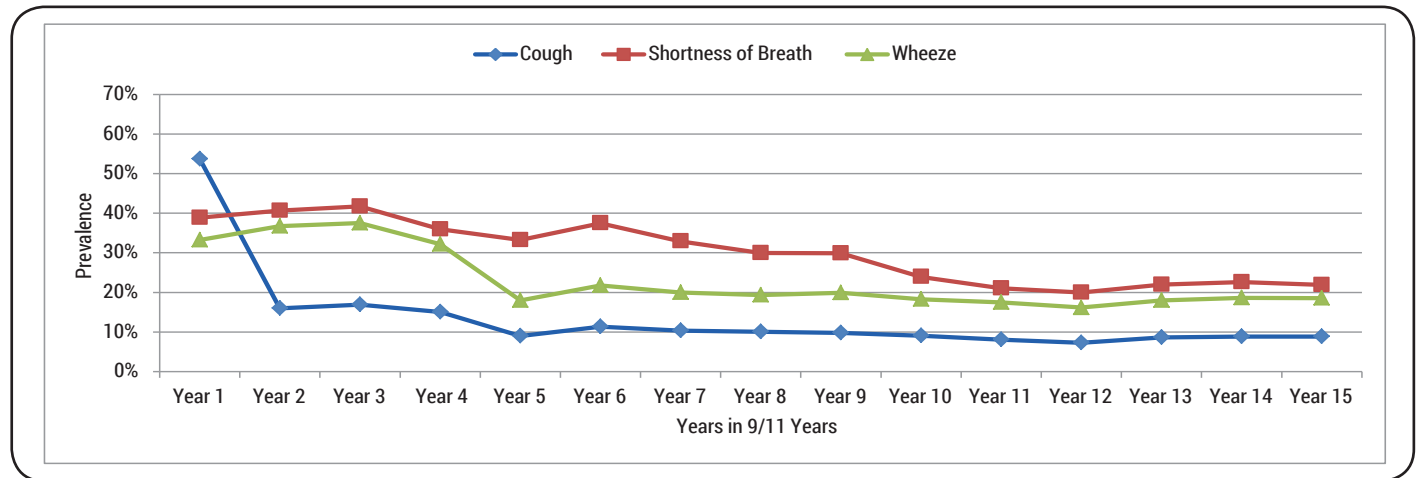




## SECTION 2: QUESTIONNAIRE DATA

- With early diagnosis and treatment, reports of lower respiratory symptoms have declined over time, although some symptoms persist for nearly 20 percent of those exposed.

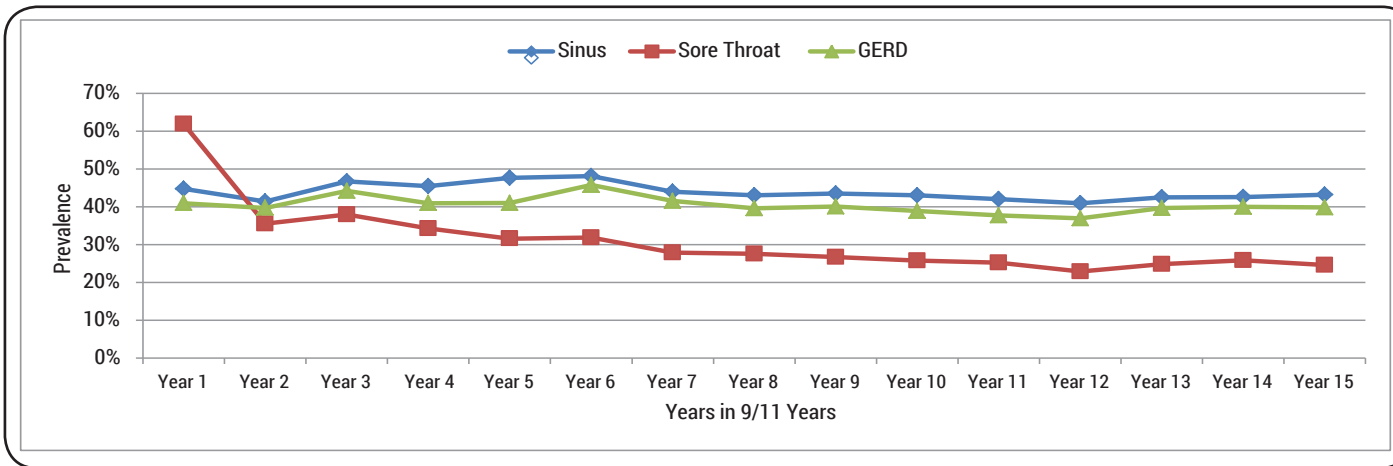
### Lower Respiratory Symptoms Over Time



Day 1 exposure to clouds of dust and debris resulted in frequent daily cough symptoms for almost all of those present at the WTC site (not shown). While cough was the first major respiratory symptom, with time and early diagnosis and treatment, cough symptoms improved, so that beginning in Year 5, frequent cough stabilized, currently affecting nine percent of our workforce. Despite this decline, however, frequent coughing was reported far more often post-9/11 than pre-9/11, when only three percent of FDNY rescue/recovery workers reported a daily frequent cough (not shown). Wheezing and shortness of breath also decreased beginning in 2006, but not to the same degree as cough. For example, 15 years after 9/11, wheezing has stabilized, affecting 19 percent of our rescue/recovery workers. Shortness of breath has shown a gradual decline since Year 2, dropping from 41 to 22 percent during this time period, but has begun to stabilize since Year 11. And more than a decade after 9/11, we continue to find that earlier WTC arrival time is associated with a higher risk of current symptoms. The ongoing high rates of respiratory symptoms, supported by objective evidence of a decline in pulmonary function, explain why FDNY WTC rescue/recovery workers must continue their participation in the long-term monitoring and treatment programs offered by the FDNY WTC Health Program.

## SECTION 2: QUESTIONNAIRE DATA

### Upper Respiratory and GERD Symptoms Over Time

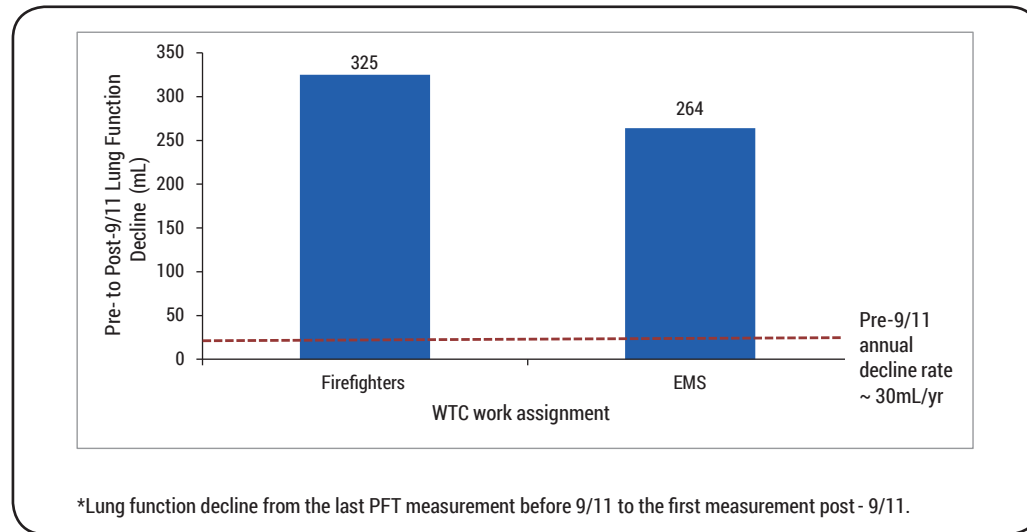


- Upper respiratory and GERD symptoms continue to be problematic for many of our members.

Upper respiratory symptoms (nasal/sinus congestion/drip, sinus headaches and sore throat) and gastroesophageal acid-reflux disease (GERD) symptoms of acid-reflux, sore throat, chest burning/tightness, cough, belching and difficulty swallowing are still frequently reported by FDNY first responders. “WTC Cough Syndrome” is the term, first coined by FDNY BHS, to describe the presence of lower respiratory symptoms, upper respiratory symptoms and GERD in WTC-exposed rescue/recovery workers. We first reported this new syndrome in September 2002 in the *New England Journal of Medicine*. Although sore throat has declined over time, from a high of 62 percent in the first post-9/11 year to 25 percent in 2016, rates of chronic rhinosinusitis symptoms and GERD have persisted and are consistently reported by about 40 percent of the WTC-exposed workforce. This is a higher rate of persistence than we found for lower respiratory symptoms. Whether this is due to differences between how WTC dust inhalation affects the upper and lower airways or differences in the effectiveness of medication for the upper and lower airways, remains to be determined. If you still experience these symptoms and have not yet done so, please schedule a treatment appointment at our WTC Health Program by calling 718-999-1858, where free treatment and medications are available for WTC-covered conditions.

## SECTION 2: PULMONARY FUNCTION TESTS

### Early Pulmonary Function Loss Within the First Post-9/11 Year by Work Assignment\*



► On average, FDNY rescue/recovery workers lose ~30 milliliters (mL) of FEV1 each year (similar to U.S. population averages)

Within the First Year Post-WTC:

► Members in Arrival Group II (9/11 P.M. and 9/12) lost on average 388 mL of FEV1 (more than 12.5 times the average pre-WTC annual loss)

► Members in Arrival Group II (9/11 P.M. and 9/12) lost on average 372 mL of FEV1 (12 times the average pre-WTC annual loss)

► Members in Arrival Group III (9/13 to 9/24) lost on average 357 mL of FEV1 (more than 11.5 times the average pre-WTC annual loss)

- The unprecedented loss of lung function can be linked directly to WTC exposure, regardless of the time of first arrival to the site, with Firefighters experiencing the greater decline compared with EMS workers, when measured within the first year following the WTC attacks.

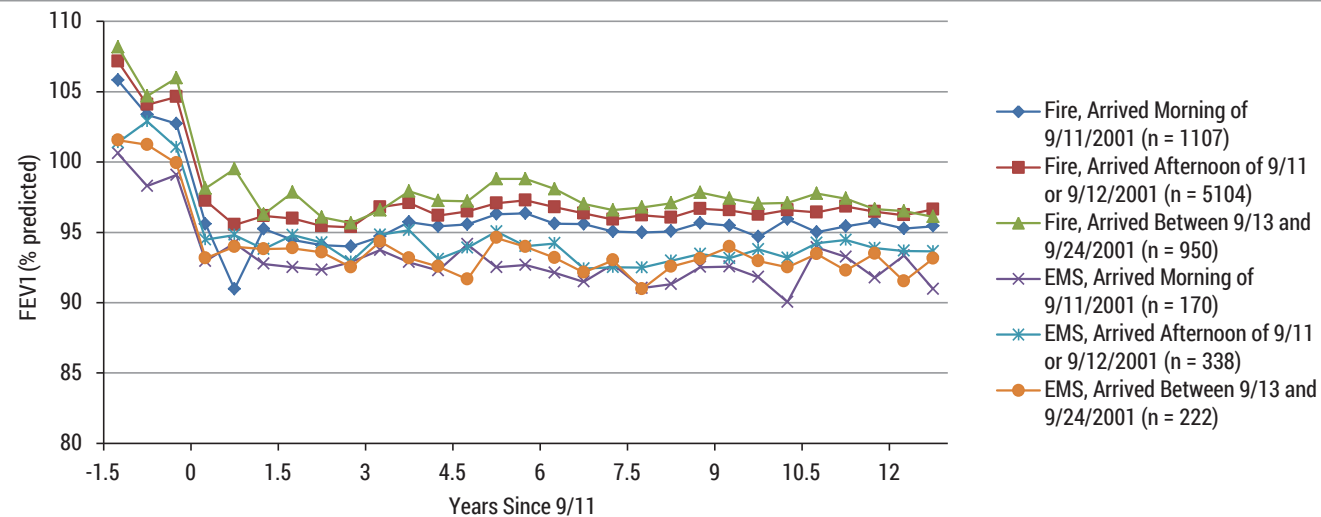
One important part of the FDNY routine medical evaluations is a pulmonary function test (PFT). The PFT measures forced vital capacity (FVC), which is the total breath out, and the forced expiratory volume in the first second (FEV1) of expiration in milliliter (mL) units. When we separate our rescue/recovery workers into Firefighters and EMS personnel, Firefighters had a greater average decline compared with EMS members, but both groups had, on average, declines that were 10 to 12 times greater than expected declines, based on normal aging. The greater decline of FEV1 in Firefighters compared to EMS personnel likely was due to the different tasks and responsibilities of each job in the rescue/recovery effort. Thus, job-related tasks and proximity to the Ground Zero site each had an impact on the loss of lung function. For those with symptoms or substantial declines in lung function, treatment is recommended to prevent further reductions and to maximize lung health.

In the general U.S. population, both FVC and FEV1 decline at an average rate of about 30 mL per year as part of normal aging. Our studies have shown a similar decline for the FDNY workforce pre-9/11 and in those FDNY members never exposed to WTC dust, demonstrating that SCBA respiratory protection works well for most of our members during usual firefighting and other hazardous exposures. Further, we found a connection between early WTC exposure (initial arrival time) and pulmonary function loss (FEV1 mL decline), with members who first arrived at the WTC during the morning of 9/11 demonstrating a greater loss in FEV1 than members who arrived later. Although the reduction in pulmonary function was greatest for those present during the collapse, FEV1 was decreased substantially, even in FDNY rescue/recovery workers first arriving during later time periods. The findings for FVC were similar.



## SECTION 2: PULMONARY FUNCTION TESTS

### Pulmonary Function Over Time in Firefighters and EMS Personnel



► Declines in post-9/11 pulmonary function persist over time.

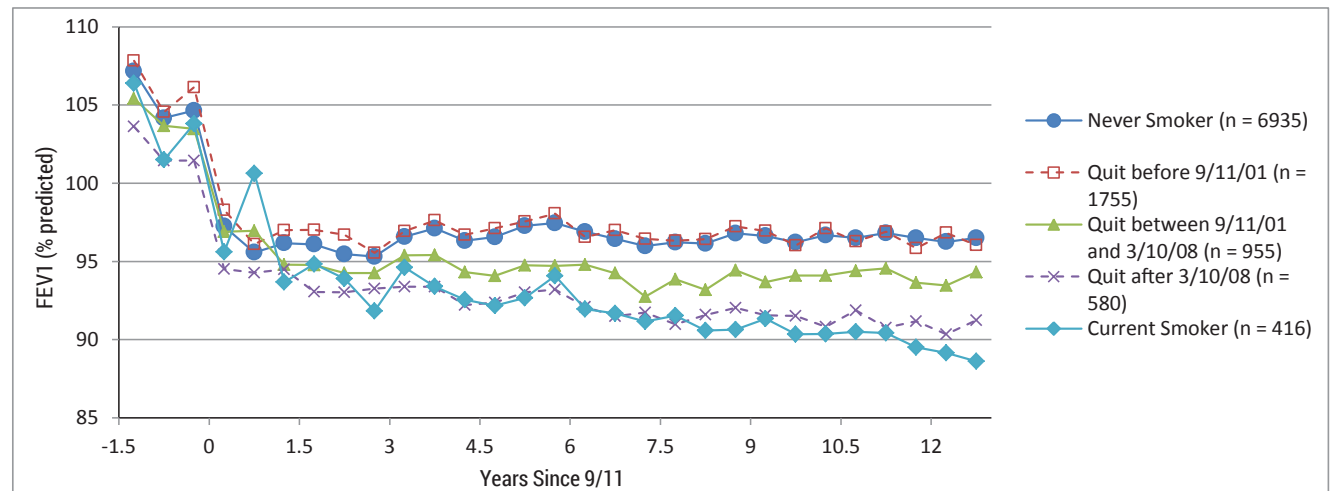
After our first study in the *New England Journal of Medicine* (2002), documenting the substantial decline in lung function during the first six to 12 months after 9/11, there remained considerable uncertainty about the longevity of this effect. The hope was that it would be an acute, short-term drop that would resolve over time. Accordingly, we extended the first study through seven years post-9/11 and again published our findings in the *New England Journal of Medicine* (2010). In this second study, we analyzed 61,746 pulmonary function test results from 12,781 FDNY WTC-exposed members (Fire and EMS). We have since further extended this work through 9/10/2014 (published in *CHEST* in 2016) and again demonstrated that after the dramatic decline in lung function (FEV1) during the first six to 12 months post-9/11 (as noted on the prior page), this reduction of lung function persisted with little or no recovery during the 13 years since 9/11. This was not an acute, temporary decline.

## SECTION 2: PULMONARY FUNCTION TESTS

### Pulmonary Function Over Time in Firefighters—Impact of Cigarette Smoking and Cessation

► WTC exposure was the cause of the acute and persistent decrease in lung function, but cigarette smoking had a significant impact, as demonstrated by the improvement following tobacco cessation:

- o By 2014, never-smoking Fire fighters and early quitters (smokers who quit before 9/11) had the best lung function compared with current smokers, who had the worst.
- o Firefighters who quit after 9/11, but before 3/2008, had better lung function than those who quit after 3/2008.
- o Findings were similar for EMS workers (not shown).

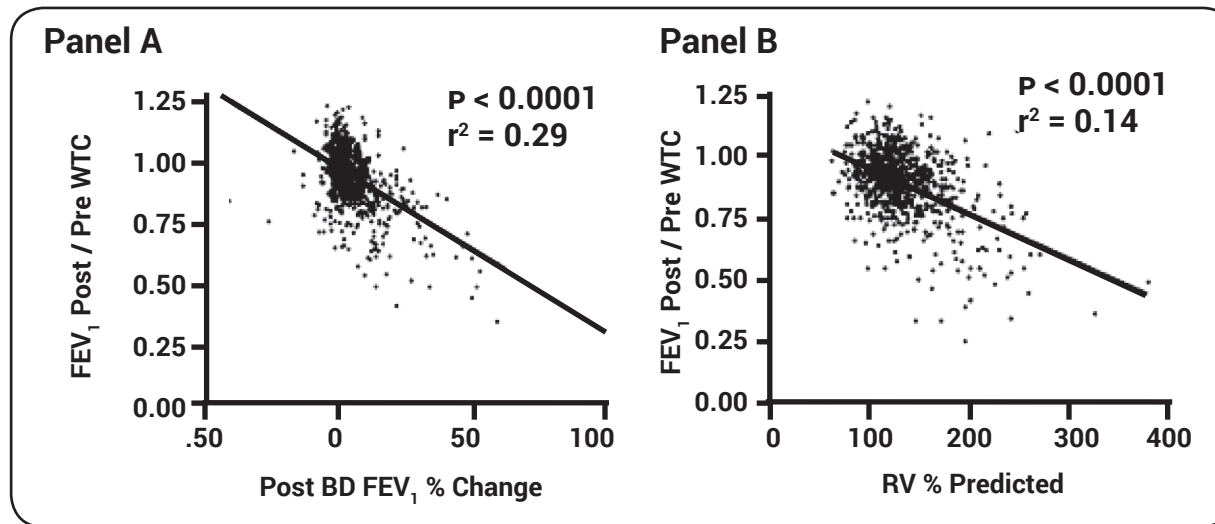


Following the severe initial decline in lung function after 9/11, the proportion of never-smoking FDNY rescue/recovery workers who had an abnormally low FEV1 increased for Firefighters from two percent before 9/11 to 10 percent in 2014 and for EMS workers from six percent before 9/11 to 15 percent in 2014. Cigarette smoking had an additional negative effect in the years after 9/11. During most of the post-9/11 time intervals, particularly after 2005, those who never smoked had significantly better lung function than current and former smokers, who quit after 9/11. The good news is that stopping smoking has a positive impact on lung function. Firefighters who quit smoking before 9/11 had roughly the same lung function as those who never smoked; the difference no longer was statistically significant. Firefighters who quit smoking before 3/2008 also had significantly higher lung function than current smokers during most of the post-9/11 follow-up. Beginning around 2006, EMS personnel who never smoked or who quit by 3/10/2008 also had significantly higher lung function than current smokers. For those who quit after 2008, we are hopeful that additional years of abstinence will demonstrate improvement in lung function similar to that seen in those who never smoked. This finding underscores the importance of tobacco smoke as a risk for poor lung function, even in those who worked at the WTC.

We have shown that it is never too late to stop smoking and see a positive health effect. FDNY BHS and the FDNY WTC Health Program run a highly successful, confidential, free tobacco cessation program. Call 718-999-1942 for more information.

## SECTION 2: PULMONARY FUNCTION TESTS

### Underlying Cause of Pulmonary Function Loss in Obstructive Airways Disease



Our findings demonstrate that lung function declined post-9/11, although the underlying cause for this decline has been open to question. In a study of our members referred for a pulmonary sub-specialty evaluation, 1,051/1,720 (61 percent) were found to have obstructive airways diseases, such as asthma, chronic bronchitis or COPD/emphysema. After statistically adjusting for age, gender, race, height and weight, and tobacco use, lung function decline (defined as an FEV<sub>1</sub> Post/Pre WTC ratio less than 1.00) was associated with increased responsiveness to bronchodilators (Panel A above), increased hyper-reactivity on challenge testing (not shown) and/or increased air-trapping (Panel B above). Chest CT scans that demonstrated bronchial wall thickening also were significantly associated with lung function decline, increased hyper-reactivity on challenge testing and increased air-trapping. Additional studies and clinical follow-up have shown that these findings are due mostly to asthma and/or chronic bronchitis and only rarely the result of emphysema.

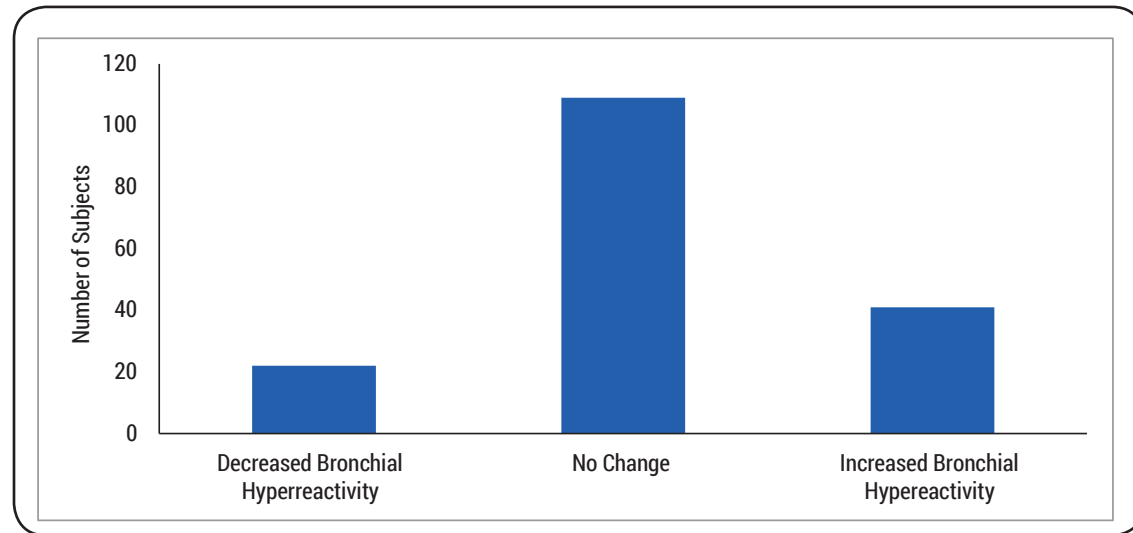
The data show that in the majority of FDNY WTC rescue/recovery workers presenting for pulmonary evaluation, airways obstruction is the predominant mechanism underlying the reduction in lung function. Airways obstruction, while not always completely reversible, is nearly always treatable, and treatment is available to members through the WTC Health Program. Equally important, interstitial lung disease with untreatable, life-threatening pulmonary fibrosis was found in only a handful of FDNY WTC rescue/recovery workers.



## SECTION 2: PULMONARY FUNCTION TESTS

► Most patients with early post-9/11 bronchial hyperreactivity remained hyperreactive 10 years later.

### Persistent Bronchial Hyperreactivity (or Asthma) by Methacholine Challenge Testing (2002 vs. 2013)



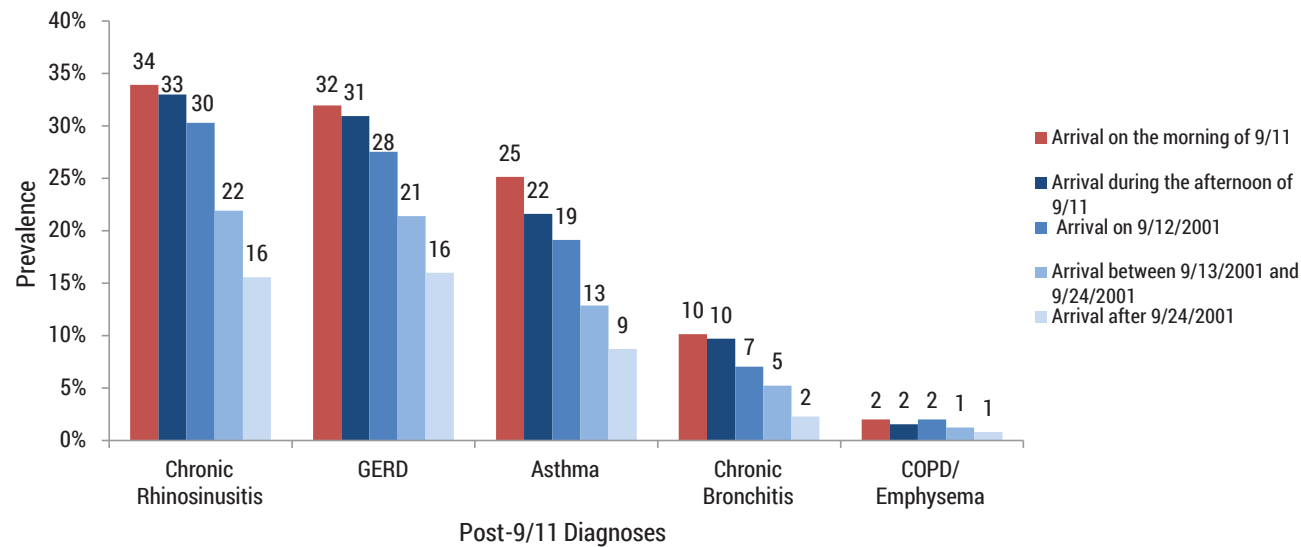
Methacholine is a chemical that, when inhaled at increasing doses in a controlled setting, identifies persons with bronchial hyperreactivity who are likely to have asthmatic reactions. In susceptible subjects, this test can provoke an asthma attack (airway spasm). The American Thoracic Society defines significant airway hyperreactivity as a 20 percent drop in FEV1 at low-dose methacholine levels (such as <8mg methacholine). For years, even pre-9/11, FDNY BHS has used challenge testing (methacholine and/or cold air exercise) as an important test for diagnosing asthma in those with “provocable” respiratory symptoms, which are intermittent symptoms that occur under specific circumstances, such as during/after exercise or in the presence of specific triggers (such as smoke, dust, temperature extremes, fumes, irritants, allergens). Challenge testing has resulted in the diagnosis and treatment of hundreds of affected members. Airway hyperreactivity can be especially burdensome to Firefighters who, during routine performance of their jobs, breathe cold, dry air from self-contained breathing apparatus (SCBA) during heavy exertion/exercise, often while being exposed to smoke, fumes, irritants and extremes of temperature. Similar to our symptom and pulmonary function test data, methacholine challenge tests indicate a correlation between hyperreactivity (“asthma”) and the earliest WTC arrival time.

Before the WTC attacks, there was essentially no asthma history in our Firefighter workforce because asthma diagnoses excluded candidates from hire and, for incumbents, ensured a disability retirement under the Lung Bill (usually about 30 each year). As shown in the above figure (published in *Chest* 2016), new cases of hyperreactivity in FDNY rescue/recovery workers were not short-lived effects of WTC exposure. Hyperreactivity persisted when re-measured 10 or more years later for the majority of those who were found to be hyperreactive within the first two years after 9/11. This remained true even with treatment; symptoms improved, but hyperreactivity persisted.

## SECTION 2: DISEASE SURVEILLANCE

### Respiratory Diagnoses by WTC Arrival Time (2001-2016)

► Associations between early arrival at the WTC site and FDNY physician-diagnosed respiratory conditions remain.

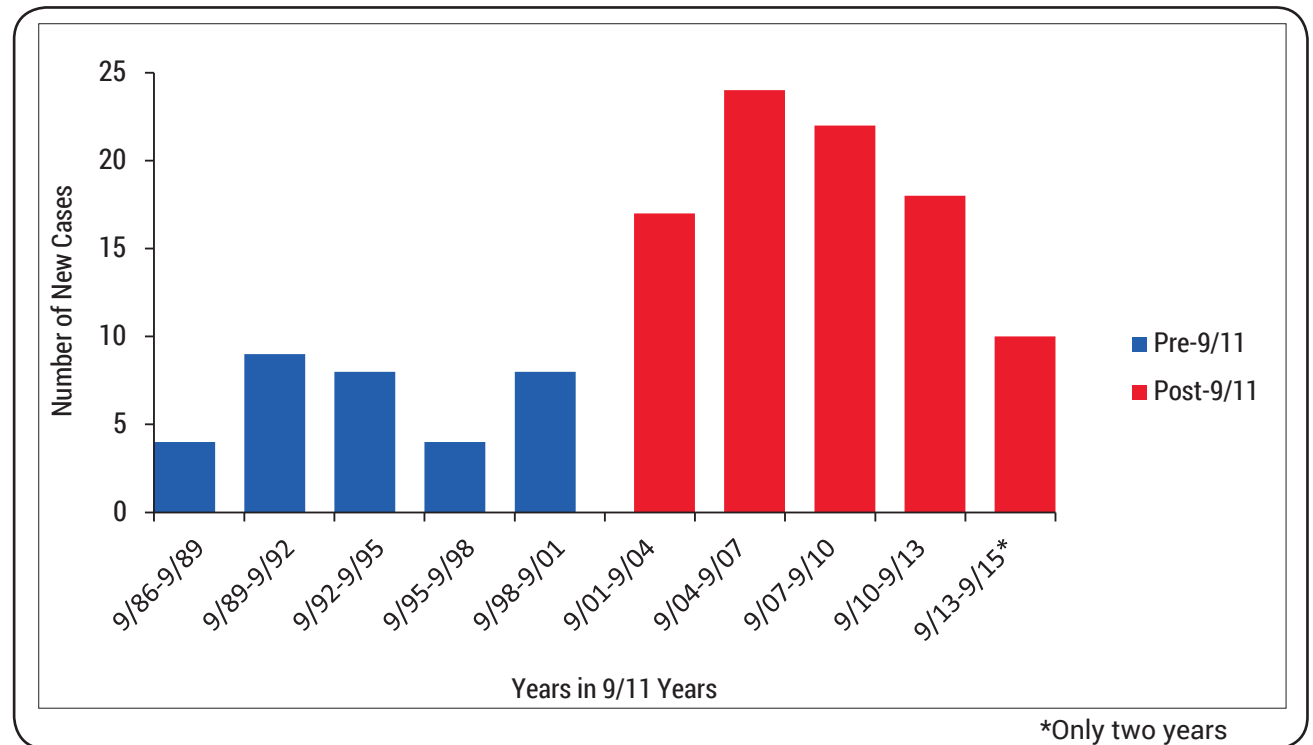


Over time, many respiratory symptoms persisted, becoming important features of physician-diagnosed respiratory conditions. This figure shows that those arriving early on or soon after the attacks have the highest rates of respiratory illnesses. Currently, for our entire WTC-exposed workforce (Fire, EMS, regardless of arrival time; active or retired), 30 percent have a diagnosed chronic rhinosinusitis condition; 28 percent GERD; 19 percent asthma; eight percent chronic bronchitis; and two percent COPD/emphysema. Obstructive Airways Disease (OAD), a category that includes asthma, chronic bronchitis and COPD/emphysema, affects 24 percent of our entire exposed population. Furthermore, many of our exposed members often have more than one of the conditions described above: 25 percent have two or more of the above conditions (chronic rhinosinusitis, GERD or obstructive airways diseases).

## SECTION 2: DISEASE SURVEILLANCE

- Number of sarcoidosis diagnoses increased markedly in the years after 9/11.

### Sarcoidosis or “Sarcoid-Like” Granulomatous Pulmonary Disease (SLGPD) Among FDNY Fire and EMS Pre- & Post-WTC



Sarcoidosis is an autoimmune, inflammatory disease that can produce lumps of inflammatory cells (granulomas) in any organ, but mainly does so in the lungs, lymph nodes and skin. These organs are thought to be entry points for occupational and environmental agents. While the cause of sarcoidosis is unclear, previous work has shown it to be associated with exposure to organic and chemical dusts, metals, silica and wood dust or smoke. Pre-9/11, FDNY BHS showed somewhat higher than expected rates of sarcoidosis in Firefighters, presumably due to smoke exposure. After 9/11, the number of new FDNY sarcoidosis or “sarcoid-like” cases increased dramatically, especially in the first decade post-WTC. In contrast to pre-9/11 cases, most new cases were symptomatic, producing symptoms including shortness of breath, cough and other asthma-like symptoms.

### Sarcoidosis—Clinical Course Years After Post-9/11 Diagnosis

Sarcoidosis organ involvement	Study Cohort (n=59)
Intrathoracic nodes	25 / 54* (46%)
Lungs	22 / 54* (41%)
Joints/nerves/muscles	16 (27%)
Eyes	7 (12%)
Skin	6 (10%)
Brain	2 (3%)
Heart	6 / 52* (12%)
Hypercalcemia	0
Hypercalciuria	2 (3%)

\* 54 cases with completed chest CT and 52 with completed cardiac MRI

**Sarcoidosis Clinical Course**—In 2015, in a NIOSH-supported study, we re-evaluated 59 post-9/11 sarcoidosis cases in WTC-exposed Firefighters. Preliminary analyses showed resolution of pulmonary involvement on current chest CT in 26 of 54 (48 percent) cases in which the follow-up CT has been completed. Fortunately, we found relatively stable lung function, even among the 28 without resolution (i.e., persistent lung involvement). However, independent of lung involvement, 16 (27 percent) reported new musculoskeletal problems (joints, nerves and/or muscles), which often required sophisticated anti-inflammatory medications. Further, seven cases had cardiac involvement: six of 52 (12 percent) had recent cardiac MRIs, which showed new cardiac involvement and another person had existing cardiac sarcoidosis. Expensive treatments for these problems are fully covered by our WTC Health Program, but more importantly, these potentially life-threatening complications and their lifesaving treatments were identified only because of this program.

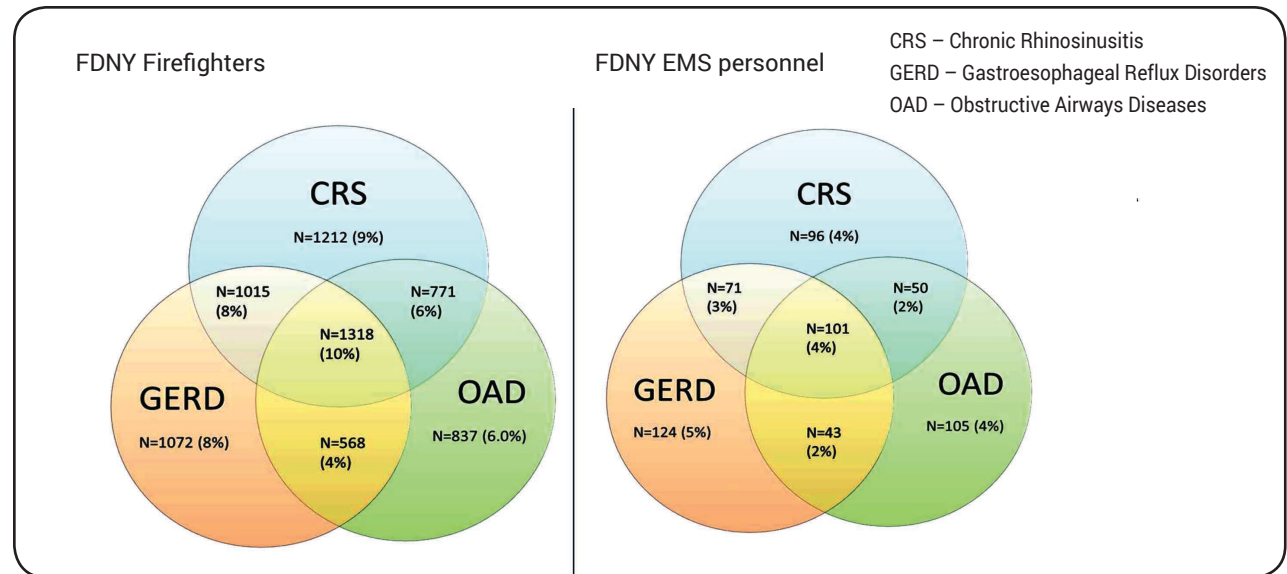
**Rare Pulmonary Diseases Other than Sarcoidosis**—Interstitial Lung Diseases, other than sarcoidosis, have been extremely rare in FDNY rescue/recovery workers. In 2002, we found two cases of eosinophilic pneumonitis, which were cured with early diagnosis and treatment. Similar cases have occurred in the U.S. military while serving in Iraq. We also have seen several cases of diffuse pulmonary fibrosis, a life-threatening disease which, when diffuse and progressive, has no treatment other than lung transplant. We had one early fatality (in 2004) and two cases that required lung transplants, which provided a few good years although, unfortunately, both since have passed away. Two additional fatalities occurred in 2013 and 2015—both in retired members who were not viable candidates for lung transplantation. Several others remain relatively stable with controlled disease. We continue to monitor for these rare lung diseases in our population and, if found, remain fully prepared to arrange for state-of-the-art treatment, including lung transplantation, as indicated. FDNY, through its WTC Health Program, was the first to have stabilized patients long enough to achieve lung transplantation. This is certainly due to the strength of our members and the support they receive from their families, our case management team and our family support unit, which provides round-the-clock assistance and transportation.



## SECTION 2: DISEASE SURVEILLANCE

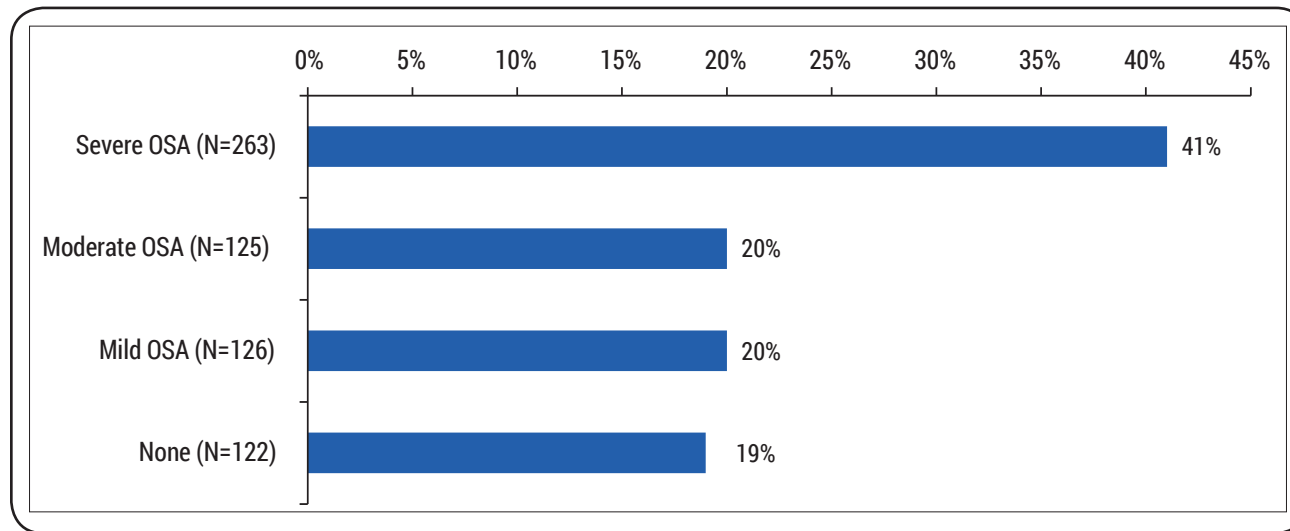
- Comorbidities of physical health conditions require multi-faceted treatment plans.

### Overlap in Physical Health Conditions in FDNY WTC-Exposed Rescue/Recovery Workers 2001-2016



We used FDNY physician diagnoses since 9/11 to estimate the cumulative prevalence of physical health conditions, including chronic rhinosinusitis (CRS), gastroesophageal reflux disease (GERD) and obstructive airways lung diseases (OAD), which are referred to as aerodigestive conditions, and the overlap of these conditions in WTC-exposed Firefighters and EMS personnel. About 27 percent of Firefighters and 11 percent of EMS personnel have two or more of the three WTC-related aerodigestive conditions. As depicted in the above diagram, approximately 10 percent of Firefighters and four percent of EMS personnel have diagnoses of all three conditions.

### Obstructive Sleep Apnea Diagnoses



► 81 percent of 636 high-risk FDNY WTC-exposed male rescue/recovery workers have obstructive sleep apnea (OSA), confirmed by sleep test (polysomnography); 41 percent were classified as having severe OSA.

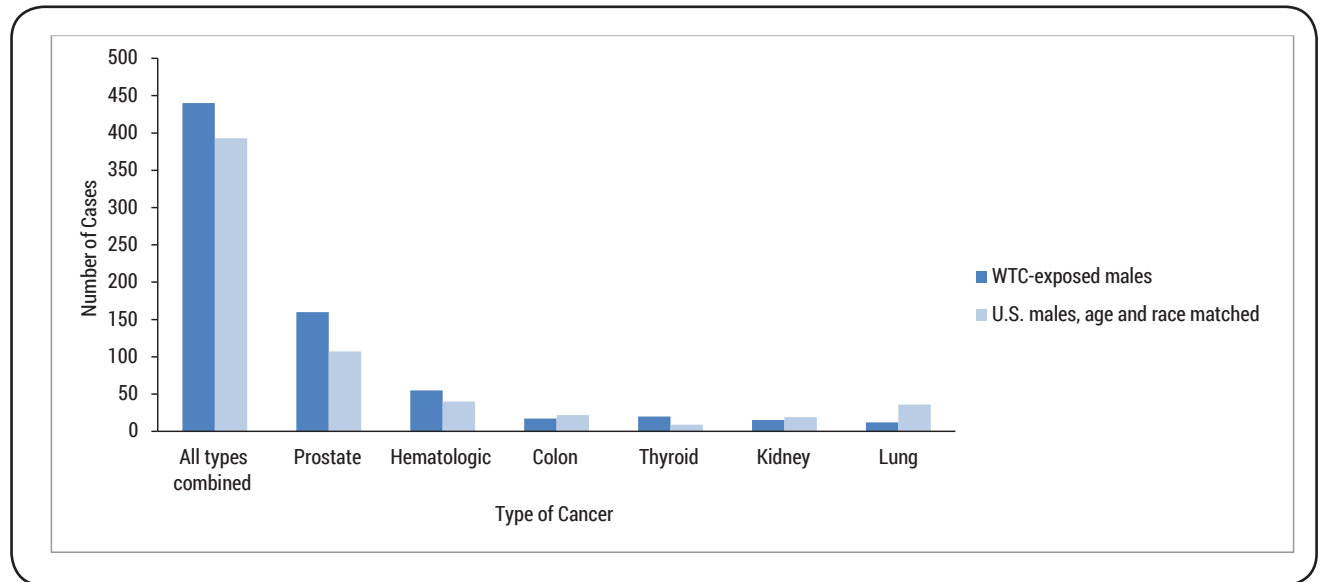
Between 9/11/05 and 9/10/08, 36 percent of male rescue/recovery workers were found to be at high risk for obstructive sleep apnea (OSA), based on their responses to our health questionnaire, although only seven percent reported having received a physician diagnosis of OSA. “High risk” is based on being male, overweight (or obese), hypertensive and reporting snoring or severe daytime fatigue/sleepiness.

Based on this preliminary work, we offered free sleep tests to 636 high-risk men to see whether sleep tests confirmed a diagnosis of OSA. Results were published, showing that sleep test confirmed OSA was present in the vast majority—81 percent of those tested, as shown above. We also confirmed an association between OSA and GERD (acid-reflux) and OSA and comorbid GERD with chronic rhinosinusitis. And, we found that severe OSA was associated with early WTC exposure. For this reason, OSA was considered a WTC-associated condition and may be eligible for diagnosis and free treatment under the WTC Health Program. OSA causes more than just snoring. It can result in daytime fatigue, leading to accidents. And, moderate to severe OSA has been associated with lung and heart disease, early dementia and early mortality. The good news is that it is easily treated and affected persons can remain on full duty. Given the high prevalence of this condition in our workforce and the potential for serious health consequences, we encourage our members to discuss the need for sleep testing with our physicians at your next WTC monitoring or treatment exam.

## SECTION 2: DISEASE SURVEILLANCE

► As of 2011, 440 cases of cancer were diagnosed post-9/11 in FDNY WTC-exposed male Firefighters as compared with an expected number of 393 cases for similarly aged U.S. males without known fire or WTC exposures. Analyses will be updated and available in 2017.

### Cancer in FDNY Firefighters from 9/11/2001 to 9/10/2011



FDNY was the first group to publish an analysis of post-9/11 cancers in WTC-exposed rescue/recovery workers (*The Lancet*, 2011). We assessed cancer in 9,853 men who were employed as Firefighters on January 1, 1996. Cases were confirmed by matches with state tumor registries or through appropriate medical record documentation of self-reported cancers.

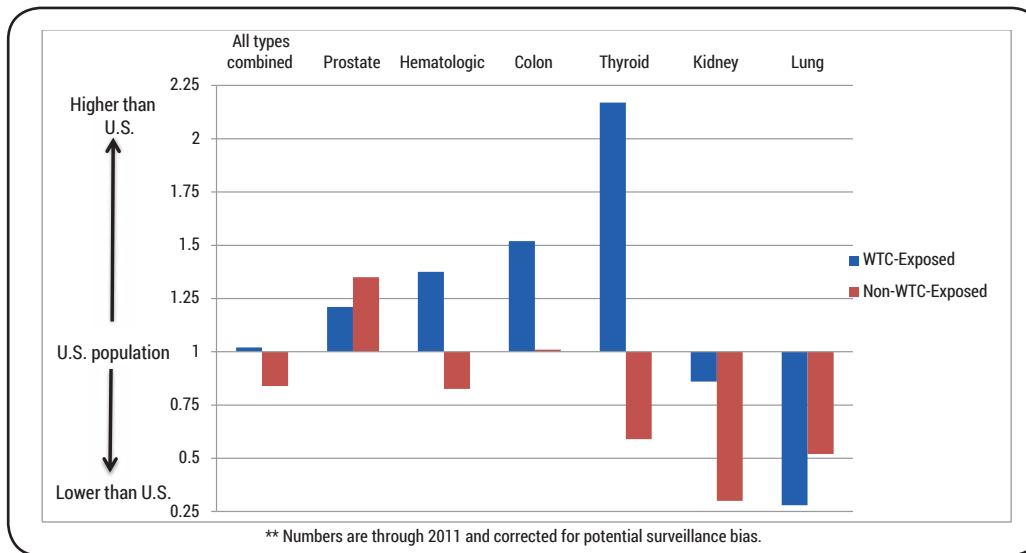
We compared rates in WTC-exposed and non-WTC-exposed Firefighters to rates from comparable individuals in the U.S. population, as reported from the National Cancer Institute Surveillance Epidemiology and End Results (SEER) reference population. In this figure, we show that some cancer rates were elevated as compared to the U.S. reference population, but others were not. For example, the rate of thyroid cancer for WTC-exposed Firefighters was more than twice the U.S. rate, but the rate of lung cancer for WTC-exposed and non-WTC-exposed Firefighters was about half the rate for U.S. men, presumably because we have fewer tobacco smokers than the U.S. male population.

For the most part, Firefighters WITHOUT WTC-exposure were similar, in that some cancers were modestly higher

and others lower, than similarly aged U.S. males without known fire or WTC exposures. This is good news and is likely due to lower smoking rates, stringent pre-employment health requirements and greater physical health and fitness standards in our Firefighters than the general population. In WTC-exposed FDNY Firefighters, however, the cancer incidence rate was slightly higher, about 10 percent higher than in the equivalent general male U.S. population and the rate was ~19 percent higher in WTC-exposed FDNY Firefighters, compared with non-WTC-exposed FDNY Firefighters. Studies in other WTC-exposed populations reported similar overall findings, with cancer incidence about 14-15 percent higher in the WTC-exposed population than expected, based on the general population.

## SECTION 2: DISEASE SURVEILLANCE

### Cancer Cases: WTC-Exposed and Non-WTC-Exposed Firefighters as Compared to the U.S. Population 9/11/2001 to 9/10/2011



► Some cancer rates were elevated in WTC-exposed Firefighters.

Taken together, these findings demonstrate a modestly increased likelihood of cancer in WTC-exposed workers. This was unexpected, given that our original analysis included only the first seven years post-exposure (2001-2008) and many cancers are thought to take decades to develop. These data were instrumental in convincing the federal government to include cancers as WTC-related conditions, now eligible for WTC Health Program benefits. Many cancers (hematologic, lung, colon, breast, etc.) were added to WTC Health Program coverage starting in October 2012. Prostate cancer was added in October 2013, and in 2014, the list was expanded to include additional hematologic myeloid cancers, brain cancers, pancreatic cancer, invasive cervical cancer and other rare cancers.

The cancer figures in this book have been updated through 9/10/2011. Cancer reports take several years to be completed. We will continue to update these figures every two

to five years, with the next update scheduled to be available around 2017. We also are working on additional follow-up studies, including one in collaboration with the National Institute for Occupational Safety and Health (NIOSH), comparing cancer rates in FDNY Firefighters to cancer rates in Firefighters from Chicago, Philadelphia and San Francisco.

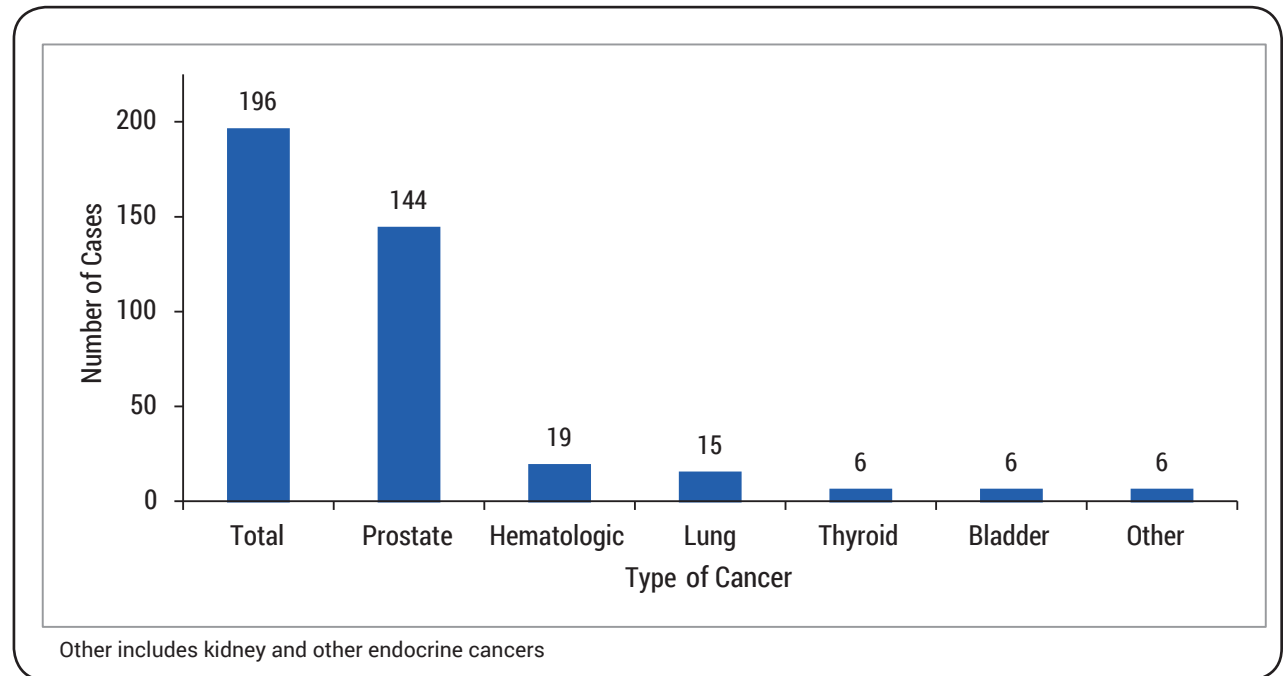
These findings demonstrate the importance of continued follow-up of the WTC-exposed workforce and call for renewed cancer prevention efforts, such as greater emphasis on tobacco cessation, avoidance of carcinogens on the fireground (SCBA, bunker gear use, clean hoods), healthy diet and exercise programs.



## SECTION 2: DISEASE SURVEILLANCE

- Early detection is the best chance for cure.

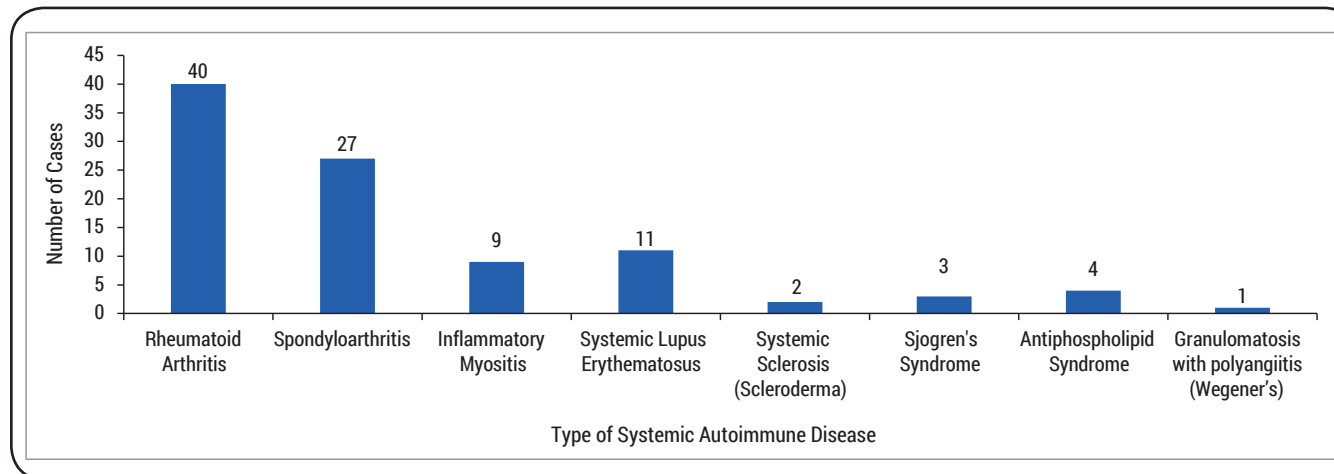
### “Early” Detection of Cancers by FDNY WTC Medical Monitoring Cancer Screening Exams



Because of the cancer screening tests included in our FDNY WTC Health Program, nearly 200 Firefighters and EMS personnel have had “early” diagnosis of their cancer(s), primarily prostate cancer. Our hope is that cancer screenings not only will provide “early” diagnosis, but also through early treatment, higher cure rates and lower mortality rates. To that end, we have partnered with all of the major medical institutions in this area, including Memorial Sloan Kettering, NYU, Mount Sinai, Montefiore/Einstein, LIJ/North Shore (Northwell), Stony Brook and Robert Wood Johnson Medical Centers, to provide our members with the best cancer treatment possible. And, our FDNY WTC Cancer Case Management Nurses are there to help our members navigate through this process, from diagnosis to treatment to eventual cure.

## SECTION 2: DISEASE SURVEILLANCE

### Rheumatologic Autoimmune Diseases in FDNY WTC Rescue/Recovery Workers: 9/11/2001-9/10/2013



► The FDNY WTC Health Program began to track the specific autoimmune diseases after 9/11. As of 9/10/2013, we identified 97 cases, including 59 confirmed and 38 “probable” cases.

FDNY was the first group to publish analyses of post-9/11 rheumatologic autoimmune diseases in relation to WTC exposure in FDNY rescue/recovery workers (*Arthritis & Rheumatism*, 2015 and *Mayo Clinic Proceedings*, 2016). Typically, these diseases are rare in middle-aged males. Rheumatoid arthritis (40 cases) was the most common autoimmune diagnosis in our population, followed by spondyloarthritis (27 cases), inflammatory myositis (nine cases), systemic lupus erythematosus (11 cases), systemic sclerosis (two cases), Sjögren's syndrome (three cases), antiphospholipid syndrome (four cases) and granulomatosis with polyangiitis (Wegener's) (one case). While in the first study we did not find a statistically significant association between early WTC arrival time (acute exposure) and these diseases, we did find an association with chronic WTC exposure: The risk of having one of these autoimmune diseases increased by 13 percent for each month worked at the site (95 percent CI 1.02-1.26). In the latter study, we found that overall FDNY rates were not significantly different from expected rates in a non-Firefighter, non-WTC-exposed, male cohort. However, when examining the occurrence of these diseases according to level of WTC exposure, we found that those with the lower WTC exposure group had 10 fewer cases than expected, whereas those with the higher WTC exposure group had 7.7 excess cases.

Our findings have prompted the other WTC Health Programs and the WTC Health Registry to expand their surveillance efforts to include these diseases, as early detection can facilitate early treatment, which has been shown to minimize organ damage and improve quality of life. Just as we did for cancer, we have petitioned the federal government to add rheumatologic autoimmune diseases as WTC-covered health conditions. They have promised to consider this after at least one of the other WTC health program clinical centers shows a similar effect in their enrollees.

# **SECTION III:**

## **MENTAL HEALTH ASSESSMENT**

**Mental Health Questionnaire Data ▲**

**9/11-Related Loss ►**

**Symptoms of Post-Traumatic Stress Disorder by WTC Arrival Time ►**

**Symptoms of Depression by WTC Arrival Time ►**

**Symptoms of Depression Over Time by Retirement Status ►**

**PTSD and Depression Comorbidity ►**

**Depression and Obstructive Airways Disease (OAD) Comorbidity ►**

## MENTAL HEALTH QUESTIONNAIRE DATA

After 9/11, the mental health portion of our first screening/monitoring questionnaire asked FDNY rescue/recovery workers (Fire and EMS) about their emotional well-being through questions aimed at identifying symptoms and behavioral patterns related to stress, especially post-traumatic stress disorder (PTSD), and anxiety. It examined changes in respondents' ability to function in their personal and professional lives, which could have resulted from the 9/11 disaster. Problems that members reported to us included issues with anger, irritability and anxiety; memory and concentration; changes in eating, sleeping and exercise patterns; and, increases in alcohol and tobacco use. The mental health questionnaire also collected data on the number of people using our counseling services and the types of counseling used.

Later questionnaires added questions about other mental health symptoms, including those consistent with depression. We rely on validated mental health questionnaires to indicate "probable" mental health conditions. Our findings show the persistent impact of the 9/11 tragedy, with the greatest effects reported by FDNY rescue/recovery workers who either were at the WTC site during the morning of the collapses or who lost loved ones (family, coworkers and friends) on 9/11. We also found that there was substantial overlap in health conditions, as most of those with PTSD also developed anxiety and depression and many had physical health problems as well. Since we did not collect mental health information pre-9/11, we present these data from 9/11 forward to demonstrate trends in mental health symptoms and conditions during the past 15 years.



Manhattan CSU: Director and staff

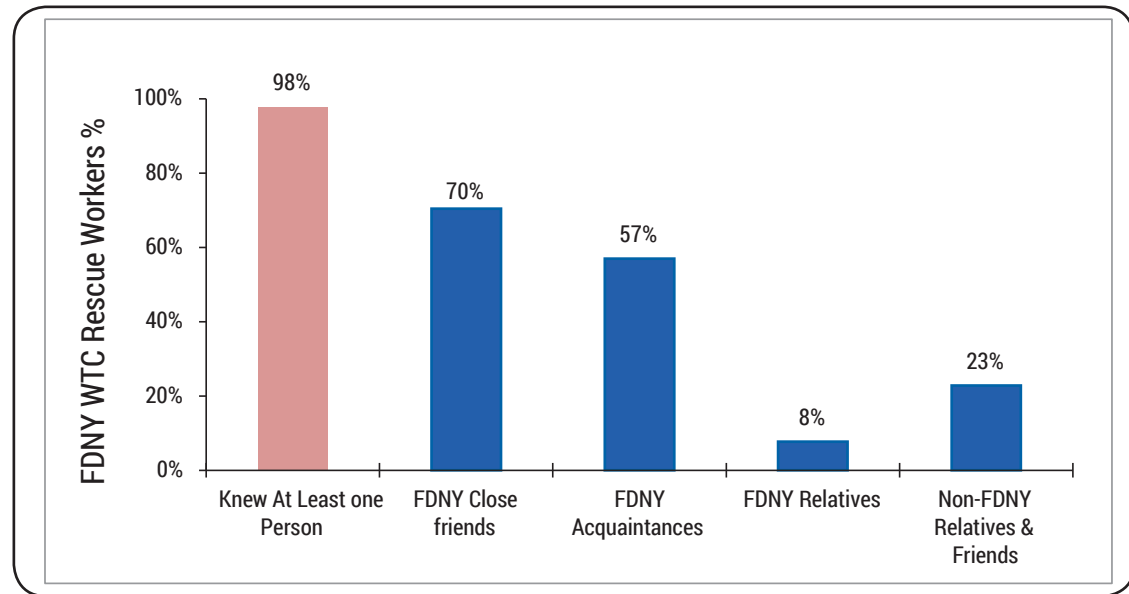


## SECTION 3: MENTAL HEALTH QUESTIONNAIRE DATA

► The majority of FDNY members reported close ties to someone lost at the WTC site.

- ▷ 98% of FDNY rescue/recovery workers lost someone they knew on 9/11/01
- ▷ Of the 98%, 70% lost FDNY close friends
  - ▷ 57% lost FDNY acquaintances
  - ▷ 8% lost FDNY relatives
  - ▷ 23% lost non-FDNY relatives and close friends

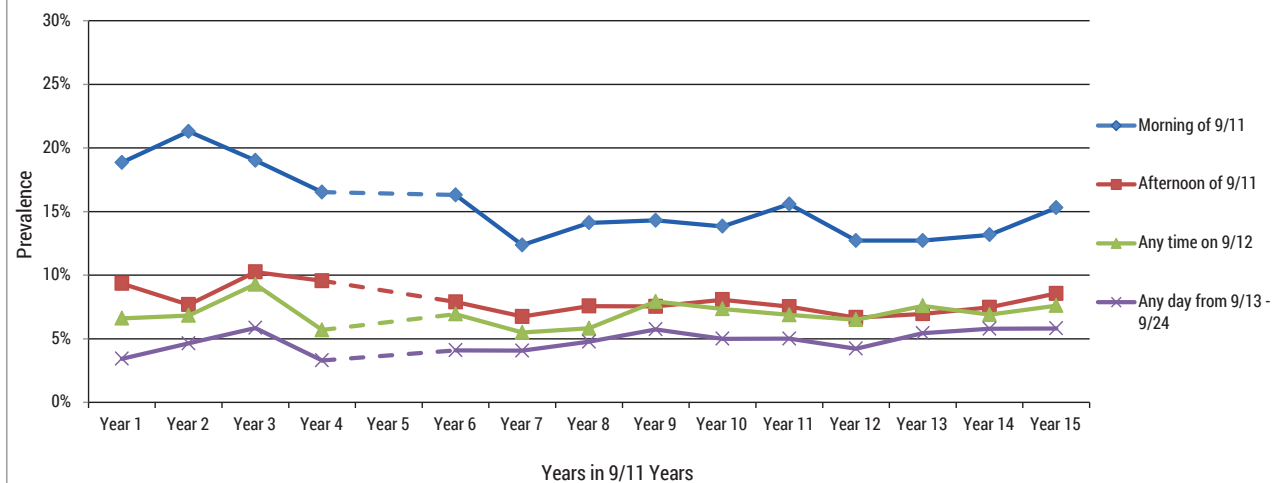
### 9/11-Related Loss



An overwhelming 98 percent of FDNY rescue/recovery workers (Fire and EMS) knew at least one person who died at the WTC site and many knew more than one person. In addition to being members of the FDNY family, the 343 rescue/recovery workers we lost that day held multiple, diverse roles as spouses, fiancés, significant others, fathers, sons, brothers, friends and coworkers. The close bonds formed between those who sacrificed their lives and those who survived help to partially explain the extent of our members' suffering in the aftermath of 9/11. We found that members whose firehouses suffered greater losses were more likely to have symptoms of PTSD. Despite the loss of their loved ones, our members dedicated themselves to serving NYC and rebuilding this Department.

## SECTION 3: MENTAL HEALTH QUESTIONNAIRE DATA

### Symptoms of Post-Traumatic Stress Disorder (PTSD) by WTC Arrival Time



\*Data for Year 5 is unavailable

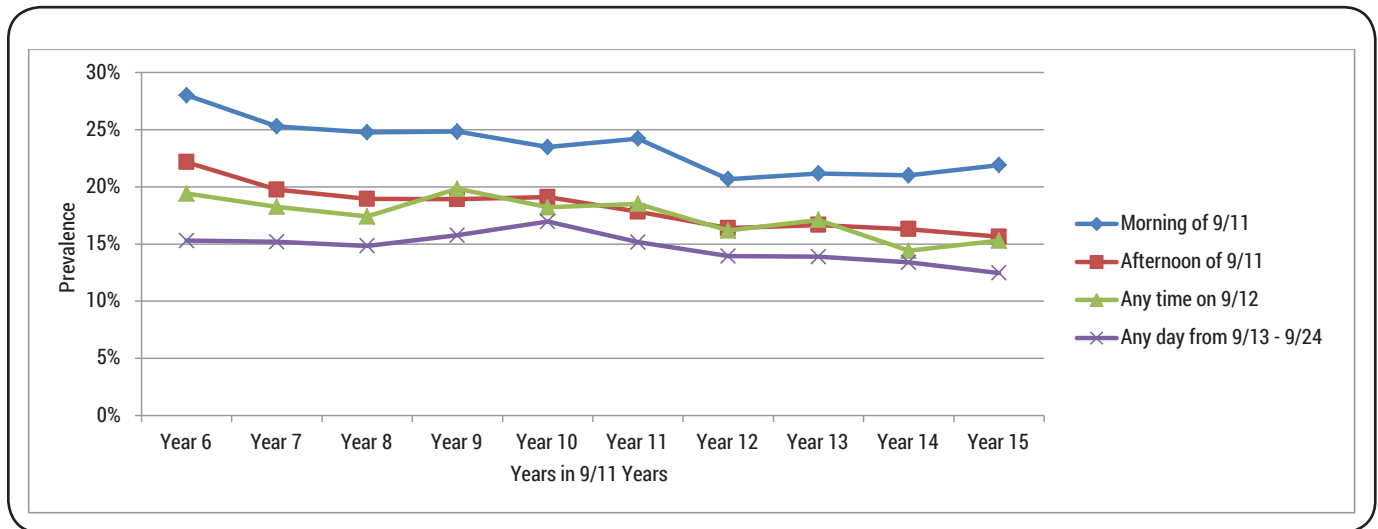
► Early arrival at the WTC remains a strong predictor of PTSD, even years after 9/11.

Nearly 15 years after the WTC attacks, we find that about eight percent of the WTC-exposed FDNY rescue/recovery workers (Firefighters and EMS personnel) meet criteria for “probable PTSD” based on symptom reports. Consistent with the medical literature, we use the term “probable” because this finding is based on self-administered questionnaires completed at the FDNY WTC monitoring exam, rather than on psychiatric diagnostic interviews. As you can see in the chart, PTSD symptom rates generally declined from those we observed in the first year post-9/11, but this rate still remains higher than that found in the general population of U.S. males, which is closer to two percent. We also find that nearly 15 years after 9/11, the number of members with probable PTSD continues to show an association with early arrival at the WTC. Firefighters who arrived at the WTC site during the morning of 9/11 were the most likely to be symptomatic immediately post-9/11 and to remain so over time. PTSD may persist or develop in association with physical injuries or illnesses sustained during or after the event or in conjunction with changes in health behaviors post-event.

## SECTION 3: MENTAL HEALTH QUESTIONNAIRE DATA

- Arrival group remains associated with depression, even years after 9/11.

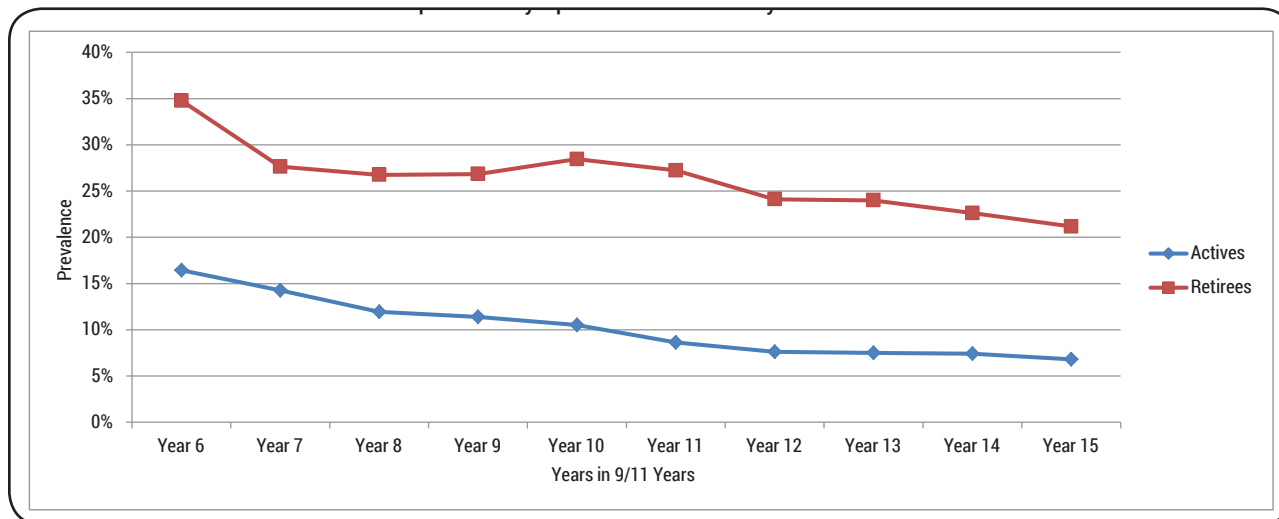
### Symptoms of Depression by WTC Arrival Time



Nearly 15 years post-9/11, 16 percent of the WTC-exposed FDNY rescue/recovery workers (Fire and EMS) screened positive for probable depression. Again, we use the term “probable” because this finding is based on self-administered questionnaires at the FDNY WTC monitoring exam, rather than psychiatric diagnostic interviews. High probable depression rates remain associated with early arrival to the WTC site and were similar in Firefighters and EMS personnel. Symptoms of depression are further increased in retirees. Previous studies of non-FDNY WTC-exposed populations also found widespread depression symptoms, but to a lesser extent. A study on male war veterans found that increased rates of depression were associated with the trauma of war even 20 years later. The rates of probable depression shown here are much higher than the rates of depression among male adults in the general U.S. population.

## SECTION 3: MENTAL HEALTH QUESTIONNAIRE DATA

**Depressive Symptoms Over Time by Retirement Status**

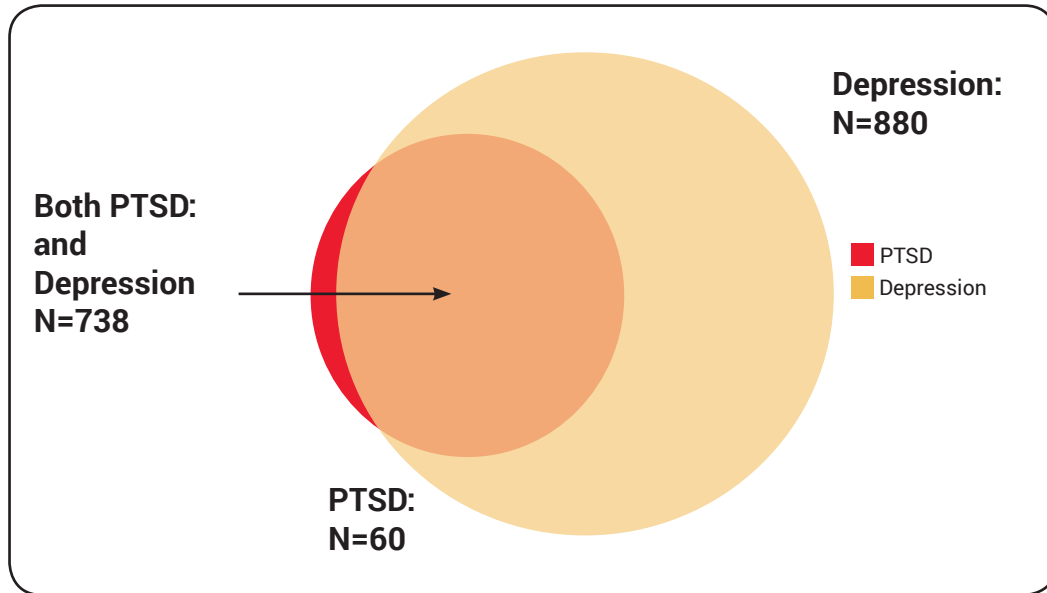


► Prevalence of depressive symptoms are consistently higher among retired than active FDNY WTC rescue/recovery workers.

Examining depressive symptoms by retirement status, retired FDNY rescue/recovery workers consistently had a higher prevalence of probable depression than their active (i.e., not retired) counterparts. At year six, nearly 35 percent of retirees had symptoms consistent with depression, compared to 16 percent of actives. We see that over time, depressive symptoms decrease for both groups such that by year 15, probable depression affected 21 percent of retirees and seven percent of actives. The above graph highlights the importance of the FDNY WTC Health Program's coverage of retirees so that they could access free mental health counseling and other services.

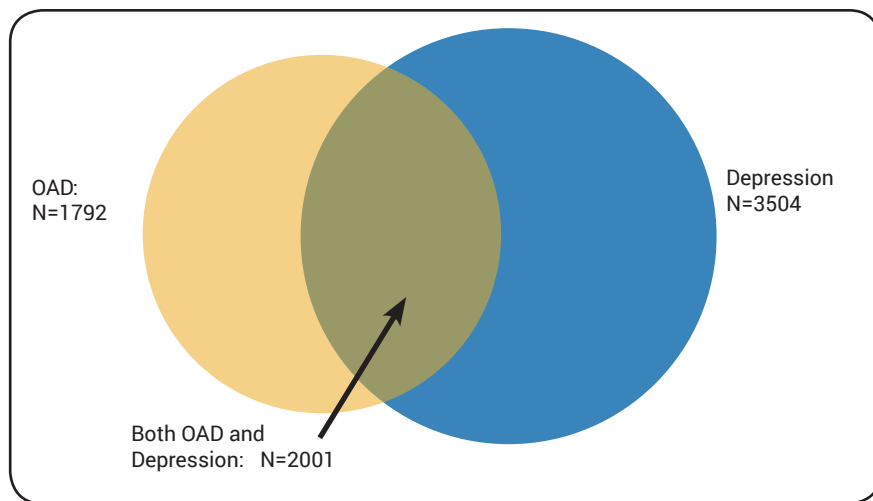


### PTSD and Depression Comorbidity in 2015



More than 90 percent of members with probable PTSD also have symptoms consistent with depression. Similarly, more than 40 percent of members with probable depression also have symptoms consistent with PTSD. Since the level of depression among persons with PTSD was so high, continued monitoring and treatment of both conditions together, in this population and in any population suffering from post-disaster mental health trauma, is necessary. Future studies are needed to determine if long-term PTSD increases the likelihood of developing depression.

### Comorbidity of Depression and Obstructive Airways Disease (OAD) Since 9/11



► Obstructive airways diseases and depression sometimes occurred in the same members.

In addition to the overlap between probable PTSD and depression, there is also overlap between “probable depression” and diagnoses of OAD (asthma, chronic bronchitis and COPD/emphysema) since 9/11. For FDNY WTC-exposed rescue/recovery workers, 36 percent of those with probable depression also had OAD, while 53 percent of those with OAD also had depression. Rates of probable depression, with or without OAD, are similar between FDNY EMS workers and FDNY Firefighters (35 percent). Rates of OAD, however, with or without probable depression, are higher in Firefighters (26 percent) than in EMS personnel (13 percent). OAD is not a psychosomatic disease, as we found significant associations between these health conditions and a loss of pulmonary function. We present this information on the overlap between probable depression and OAD because we and others have shown that chronic conditions, involving both physical and mental health disorders, have a negative impact on the quality of life. And, this argues strongly for a combined treatment approach.





FDNY 15 year WTC Memorial Service at St. Patrick's Cathedral on 9/10/2016



**SECTION IV:**  
**FDNY RETIREMENT**  
**AND**  
**DISABILITY DATA**

## SECTION IV: FDNY RETIREMENT AND DISABILITY DATA

### FDNY RETIREMENT AND DISABILITY DATA

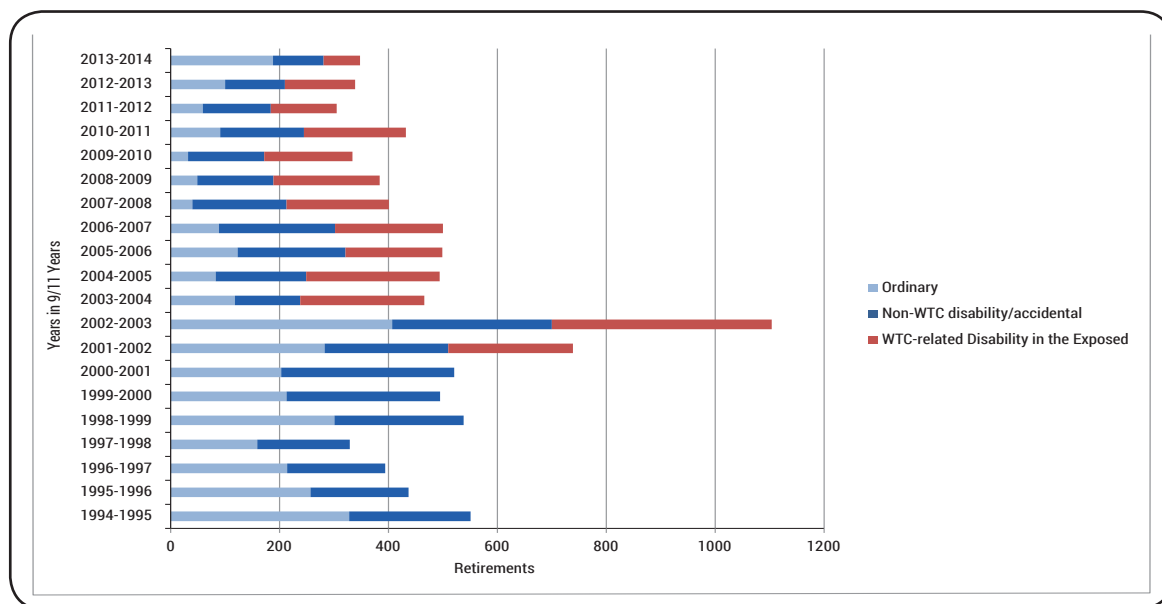
The inclusion of WTC-exposed retired responders in the FDNY WTC Health Program highlights an important achievement of FDNY advocacy efforts. Initially, FDNY provided diagnostic and treatment care for active Firefighters and EMS personnel who sustained work-related injuries and illnesses, such as orthopedic injuries, burns and, in some cases, respiratory injuries. After retirement, access to medical care for service-connected injuries and illness was limited and available only through private health insurance and workers compensation. Between 2005 and 2006, the FDNY WTC Health Program increased program eligibility to include WTC-exposed retirees. The provision of free treatment to retirees enabled the WTC Health Program to more effectively serve its membership. Data from the FDNY WTC Health Program was used to expand coverage under the NY State WTC Pension Bill.





## SECTION 4: FDNY RETIREMENT AND DISABILITY DATA

### Type of Retirement in FDNY Responders (1994-2014)\*



\* Ordinary is retirement not due to a service-connected physical or mental health condition. WTC-related is disability retirement as defined by the "WTC bill" or a WTC-related health condition, such as respiratory disease, cancer, PTSD or sinusitis. Non-WTC related disability is all other disability retirements.

FDNY WTC-exposed responders are eligible for disability pensions. In the seven years before 9/11, there were more than 3,000 retirements, 49 percent of which were "3/4" service-connected, disability retirements. There was an unprecedented number of retirements in the years immediately after 9/11 (see figure above). By 9/11/2014, 13 years later, there were more than 6,000 retirements, 74 percent of which were "3/4," service-connected, disability retirements. Of those receiving "3/4," service-connected disability retirements, 54 percent were associated with WTC-related injuries or illnesses. Data on EMS disability retirements were not available to us at the time of publication. We note that although FDNY physicians provide the initial impairment evaluation for FDNY's pension board, NYCERS and the 9/11 Victims Compensation Fund, FDNY physicians do not participate in the final evaluation and disability decisions by these entities.

By now, more than 60 percent of FDNY WTC-exposed rescue/recovery workers have retired. Unlike other retirement disabilities, the WTC retirement disability bill can be applied for even after retirement, typically for worsening or new onset respiratory diseases or cancers. But the goal is to remain healthy after retirement. To help do so, we encourage your continued participation in the FDNY WTC Health Program's annual monitoring exams, including our cancer screening programs (colonoscopy, mammogram, low-dose chest CT, etc.) and treatment visits.

► 60 percent of FDNY WTC-exposed rescue/recovery workers now are retired.

► 54 percent of Firefighters receiving "3/4" service-connected disability post-9/11 were for WTC-related conditions.



FDNY WTC Memorial at Engine 10/Ladder 10

# **SECTION V:**

## **PARTICIPATION IN PHYSICAL AND MENTAL HEALTH SERVICES PROVIDED TO WTC-EXPOSED MEMBERS**

### **The Zadroga Act ▲**

- Annual Monitoring Visits to the FDNY WTC Health Program ►**
- Number of Treatment Visits to the FDNY WTC Health Program ►**
- NIOSH-Certified Aerodigestive Conditions ►**
- NIOSH-Certified Cancers ►**
- Case Managers for Cancer and Severe Respiratory Diseases ►**
- Smoking Status of the WTC-Exposed Cohort ►**
- FDNY Tobacco Cessation Program ►**
- Smoking Status Affects Lung Function Recovery ►**
- The Impact of WTC-Certified Illnesses (Physical and Mental Health) on Health Care Utilization ►**
- “Free” Prescription Medication Program ►**

### **Mental Health Services ▲**

- Number of Patients and Visits to the Counseling Service Unit ►**
- NIOSH-Certified Mental Health Conditions ►**

## SECTION V: PARTICIPATION IN PHYSICAL AND MENTAL HEALTH SERVICES PROVIDED TO WTC-EXPOSED MEMBERS

### THE ZADROGA ACT OF 2010 AND ITS REAUTHORIZATION IN 2015

**T**he Zadroga Act of 2010 provided our program with the funding needed to continue services through June 30, 2016. The 2015 Reauthorization of the Zadroga Act by Congress has extended funding for an additional 75 years. None of this would have been possible without your participation, our data-driven advocacy and the immense help we received from the Mayor, the NYC Congressional Delegation, the Fire Commissioner, the Chief of Department, our Fire and EMS unions, the International Association of Fire Fighters (IAFF) and other labor unions/organizations throughout this City and country, such as police, construction and communication workers.

This funding comes with some rules and regulations that have presented challenges to providing the health care services that you need and deserve. Working collaboratively with our federal government funding agency, the National Institute for Occupational Safety and Health (NIOSH), we have overcome these challenges. With the recent reauthorization in 2015, additional changes may occur, but we are confident, given our experience, expertise and your support, that we can meet these new challenges. Changes in key program elements that already have occurred are described below.

- ▶ The Zadroga Act required that all FDNY WTC-exposed members be formally enrolled in the federally run WTC Health Program. To avoid interruption

of services, FDNY successfully advocated for automatic enrollment of all FDNY WTC rescue/recovery workers (Firefighters, EMS and civilians - active and retired), who were at the WTC during the collapse/rescue/recovery effort (9/11/2001 to 7/2002) and received FDNY WTC medical monitoring and treatment services prior to 7/1/2011.

- ▶ The Zadroga Act required certification of illnesses and conditions as WTC-related by the federal WTC Health Program Administrator at NIOSH for continued receipt of free medical treatment at the WTC Health Program. This certification is done by condition category and not by specific diagnosis. NIOSH-certified categories include WTC-related upper airway (e.g., rhinosinusitis, vocal cord abnormalities); respiratory, either obstructive airways diseases (e.g., asthma, bronchitis, emphysema) or interstitial lung diseases (e.g., sarcoidosis, pulmonary fibrosis); gastrointestinal (e.g., gastroesophageal reflux or GERD); mental health (e.g., post-traumatic stress disorder, anxiety, depression, substance abuse); cancer; or associated conditions (e.g., obstructive sleep apnea).
- ▶ FDNY was successful in advocating so that members receiving treatment in our program for these categories prior to 7/1/2011 were automatically certified by NIOSH.



## SECTION 5: THE ZADROGA ACT OF 2010 AND ITS REAUTHORIZATION IN 2015

- ▶ Since 7/1/2011, the FDNY WTC Health Program automatically submits certification requests for any new WTC-related covered condition when medical documentation is complete. Nearly all of our submitted certification requests have been approved by the NIOSH WTC Health Program Administrator. This high certification rate is a measure of the quality of care we provide and the credibility we have with the NIOSH WTC Health Program Administrator.
- ▶ As of 7/1/2016, more than 9,000 Firefighters and 900 EMS personnel have been certified in at least one health category. Of those, more than 8,700 Firefighters and 700 EMS personnel have at least one physical health certification and more than 3,500 Firefighters and 370 EMS personnel have at least one mental health certification.
- ▶ As of 7/1/2016, more than 1,300 Firefighters and 70 EMS personnel have been certified with at least one cancer diagnosis.
- ▶ These certifications allow us to continue to provide treatment services, including medications, for these certified conditions at no cost to our members.
- ▶ In addition, certification information is provided to the Victims Compensation Fund (VCF) by the feder-

al WTC Health Program Administrator so that WTC exposure and illness verification no longer are necessary. We also have worked closely with the VCF to help them design an impairment/disability medical form to assist patients with complicated medical issues. And, we have worked with FDNY to provide VCF with necessary financial information, all in an effort to streamline the process. Notably, FDNY members were among the first to receive VCF awards.

- ▶ Recently, we provided NYCERS with WTC exposure status for an additional 239 EMS members, so that their retirement disability awards can move forward.
- ▶ Along with the FDNY Family Assistance Unit, the National Fallen Firefighters Foundation, the International Association of Fire Fighters and NIOSH, we also have worked with the Justice Department to streamline the process for awarding public service officer benefits (PSOB) awards to those with WTC-related conditions, especially cancers. Awards now are being issued.
- ▶ Enrollment, certification and contact status can be verified or updated at a WTC medical monitoring or treatment exam or by calling 718-999-1858.

Enrolled (Fire and EMS)	15,375
Mean age on 9/11	44
Firefighters	13,199
% of Firefighters Male	99.7%
EMS	2,176
% of EMS Male	78%
At least 1 monitoring exam	15,247 (99%)
At least 7 monitoring exams	12,238 (80%)
Monitoring exam within last 24 mo.	12,851 (84%)

Numbers as of 7/1/2016



## SECTION 5: THE ZADROGA ACT

### MEDICAL MONITORING & TREATMENT EXAMS

**FDNY Headquarters**  
9 MetroTech Center  
Brooklyn, NY 11201-3857  
(718) 999-1858  
(718) 999-0088 (fax)

**Staten Island**  
1688 Victory Boulevard  
Staten Island, NY 10314  
(718) 815-4111

**Fort Totten**  
Fort Totten Building 413A  
Bayside, NY 11364  
(718) 352-2140

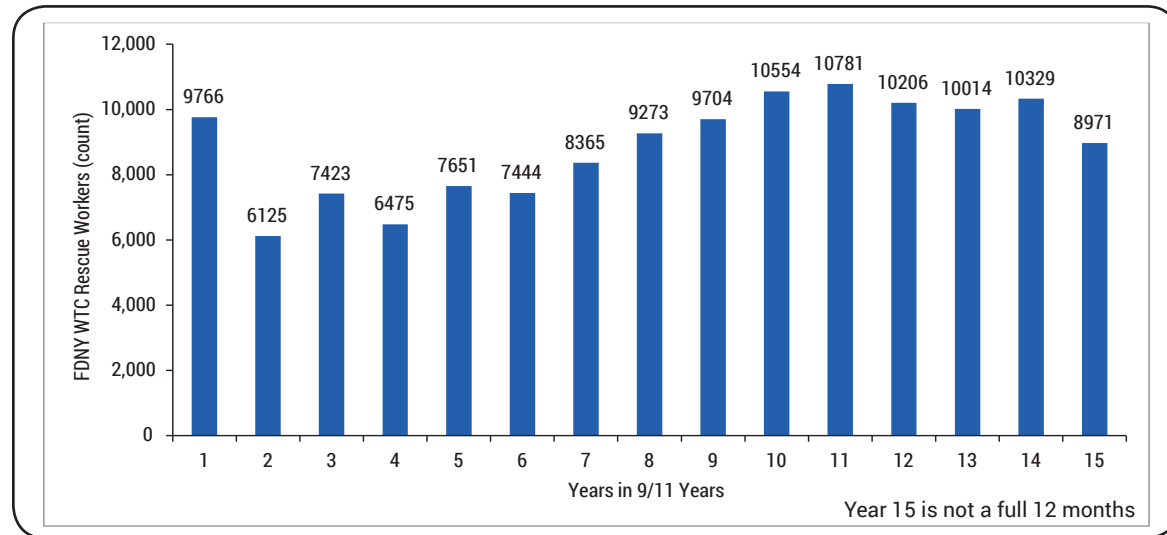
**Commack**  
66 Commack Road  
Suite 200  
Commack, NY 11725  
631-858-2190

**Orange County**  
2279 Goshen Turnpike  
Middletown, NY 10941  
(845) 695-1029

**Tobacco Cessation Program**  
9 MetroTech Center  
Brooklyn, NY 11201-3857  
Fort Totten Building 413B  
Bayside, NY 11364  
(718) 999-1942

- Our members continue to come to the FDNY WTC Health Program for annual monitoring visits.

### Annual Monitoring Visits to the FDNY WTC Health Program

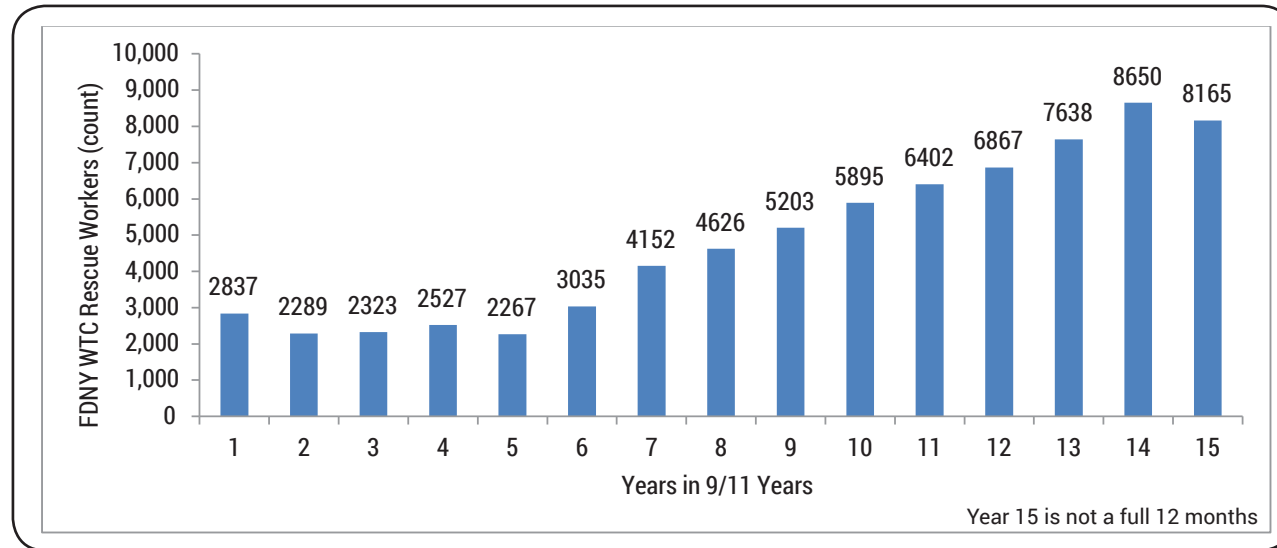


Our goal is to provide a WTC medical monitoring exam annually to every member who served at any WTC site during the rescue/recovery effort. In the first post-9/11 year (9/11 to 9/10/02), nearly 10,000 of our members received a WTC Health Program monitoring exam at FDNY. As of July 1, 2016, more than 15,300 FDNY WTC-exposed members received an initial monitoring exam; 14,835 (97 percent) received at least one follow-up monitoring exam; and 12,238 (80 percent) received seven or more post-9/11 monitoring exams.

Continued participation is one measure of program success. In each of the past four years, more than 10,000 members have continued to receive their annual monitoring exams. One reason for this success is our ability to improve health by understanding and then fulfilling, the needs of our members. WTC medical monitoring exams now include revised physical and mental health questionnaires, chest x-rays every two years, pulmonary function tests, blood pressure measurements, blood and urine tests, cardiograms (if needed) and a physician evaluation. In addition, based on age, gender and other risk factors, NIOSH FDNY WTC Health Program medical monitoring now includes cancer screening tests, such as blood cell counts and differentials for hematologic malignancies, low-dose chest CT scans for lung cancer, upper GI endoscopies for gastroesophageal cancer, colonoscopies for colon cancer, mammography for breast cancer and PAP smears for cervical cancer. Prostate-specific antigen blood tests (PSA) to screen for prostate cancer are provided through a separate funding source. Follow-up tests for elevated levels are provided through the NIOSH FDNY WTC Health Program.

FDNY strongly encourages participation in the monitoring program in order to track changes in your health, provide you with age-appropriate cancer and other screening tests and deliver WTC-related medical treatment and medication, all at no cost to you.

### Annual Treatment Visits to the FDNY WTC Health Program for a Physical Health Condition



► In addition to monitoring exams, thousands of FDNY members visit the FDNY WTC Health Program for treatment of WTC-related physical health conditions each year.

Years before the Zadroga legislation was enacted, FDNY BHS started a treatment program for WTC-related conditions. Based on information from these early BHS visits, we were the first to describe the WTC Cough Syndrome (cough, obstructive airways disease [asthma and chronic bronchitis], rhinosinusitis and gastrointestinal reflux) and document that treatment was effective (*New England Journal of Medicine*, 2002). In December 2006, FDNY BHS received funding to expand monitoring and treatment services for WTC-related physical and mental health illnesses. We hired dedicated, WTC-focused physicians who received specialized training and remain available for initial treatment evaluations and interventions. Referrals also can be made to our in-house lung specialists (Drs. Prezant, Weiden, Nolan, Diaz and Malasky) with more than 80 appointment slots available weekly. Referrals also are available at treatment visits for external (non-FDNY) doctor visits, such as ENT doctors (for sinus and throat problems), GI doctors (for acid reflux) and cancer specialists. When indicated, highly WTC-exposed FDNY rescue/recovery workers are offered chest CT imaging and other specialized diagnostic tests. Recognizing that medications have been effective, but costly for members, the City and their unions, NIOSH continues to fund a no-cost prescription medication program for WTC-related conditions (respiratory, sinus, GERD, mental health, musculoskeletal injuries and cancer), which is described later in this report. Not including monitoring exams, as of 7/1/2016, there have been 322,022 treatment visits by 13,024 FDNY WTC-enrolled members to our WTC Health Program for physical health treatment.

## SECTION 5: THE ZADROGA ACT

### Certified Lower Airway Disease:

- 1,126 active Firefighters
- 4,078 retired Firefighters
- 149 active EMS members
- 259 retired EMS members

### Certified Upper Airway Disease

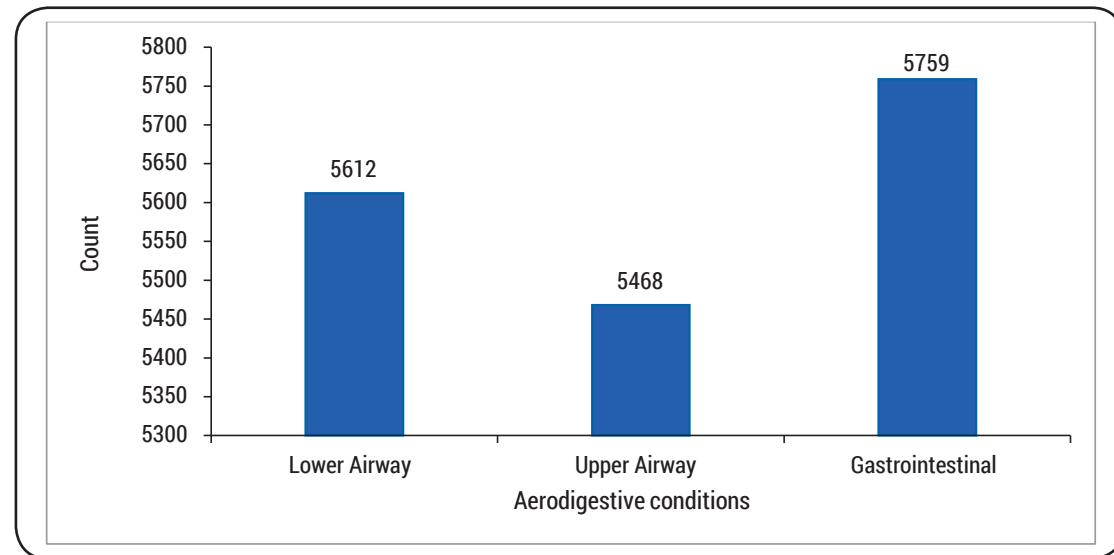
- 1,445 active Firefighters
- 3,674 retired Firefighters
- 136 active EMS members
- 213 retired EMS members

### Certified Gastroesophageal Reflux Disorders (GERD)

- 1,231 active Firefighters
- 4,107 retired Firefighters
- 178 active EMS members
- 243 retired EMS members

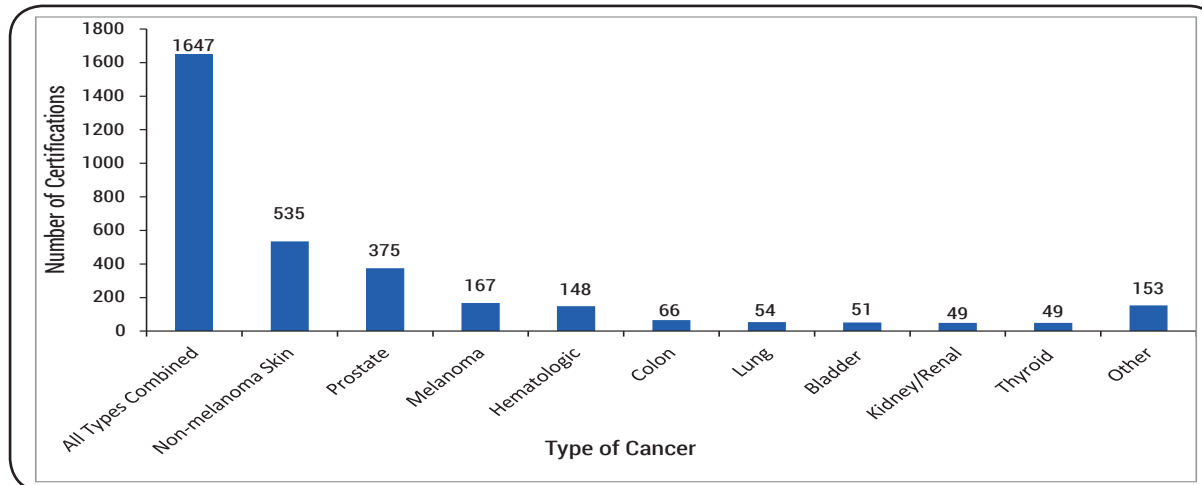
► Persons may be certified for more than one condition.

### NIOSH-Certified Aerodigestive Conditions



As of 7/1/2016, more than 9,445 Firefighters and 915 EMS personnel have been certified in at least one health category. Of those, 8,714 Firefighters and 757 EMS personnel have at least one physical health certification. Currently, the most common certified condition is GERD, which has affected thousands of our members. The next most common certified condition is lower respiratory diseases, most often due to airway obstruction as found in asthma, chronic bronchitis and/or chronic obstructive pulmonary diseases (e.g., COPD/emphysema). Lower respiratory conditions were associated with WTC exposure (earlier arrival time) and lower levels of lung function. Previous studies found that the group of FDNY rescue/recovery workers with asthma, bronchitis and COPD/emphysema cases had the lowest level of lung function, indicating that respiratory injury post-WTC exposure was associated with both obstructive airways disease and functional impairment. Lower respiratory disease also includes certifications for interstitial lung diseases (e.g., sarcoidosis and pulmonary fibrosis), which have been far less common, but can have far more serious consequences. Upper airway disease (rhinosinusitis, polyps, vocal cord abnormalities) similarly was associated with earlier WTC arrival time, but was not associated with reduced lung function. These relationships between early WTC exposure and current aerodigestive diseases remain, even 15 years after the WTC attack.

## NIOSH-Certified Cancers



► In 2012, cancers were added to the WTC Health Program as certified conditions.

FDNY was the first group to publish an analysis of post-9/11 cancers in WTC-exposed rescue/recovery workers (*The Lancet*, 2011) demonstrating an increased incidence of cancers in WTC-exposed FDNY Firefighters, as compared with non-exposed FDNY Firefighters and the general U.S. male population. Studies in other WTC-exposed populations from the WTC Health Registry and the non-FDNY responder cohort reported similar overall findings when compared to the U.S. general population. These data were instrumental in convincing the federal government to include cancers as WTC-related conditions, now eligible for WTC Health Program benefits. In October 2012, many cancers (hematologic, lung, colon, breast, etc.) were included under the WTC Health Program coverage. Prostate cancer was added in October 2013 and, in 2014, the list was expanded to include additional hematologic my-

eloid cancers, brain cancers, pancreatic cancer, invasive cervical cancer and other rare cancers. To be certified, the federal WTC Health Program Administrator at NIOSH required that the cancer not occur soon after the WTC exposure, as those cancers occurring early were unlikely to be WTC-related, as most cancers take years to develop after an initial exposure. Specifically, the rule stated that hematologic cancers first must have occurred 1.5 years after the last day of WTC exposure; solid tumors first must have occurred four years after the last day of exposure; and mesothelioma first must have occurred 11 years after the last day of exposure. As of July 1, 2016, 1,438 people had at least one cancer certification; the total number of cancer certifications was 1,647, as some patients had more than one cancer type requiring certification.

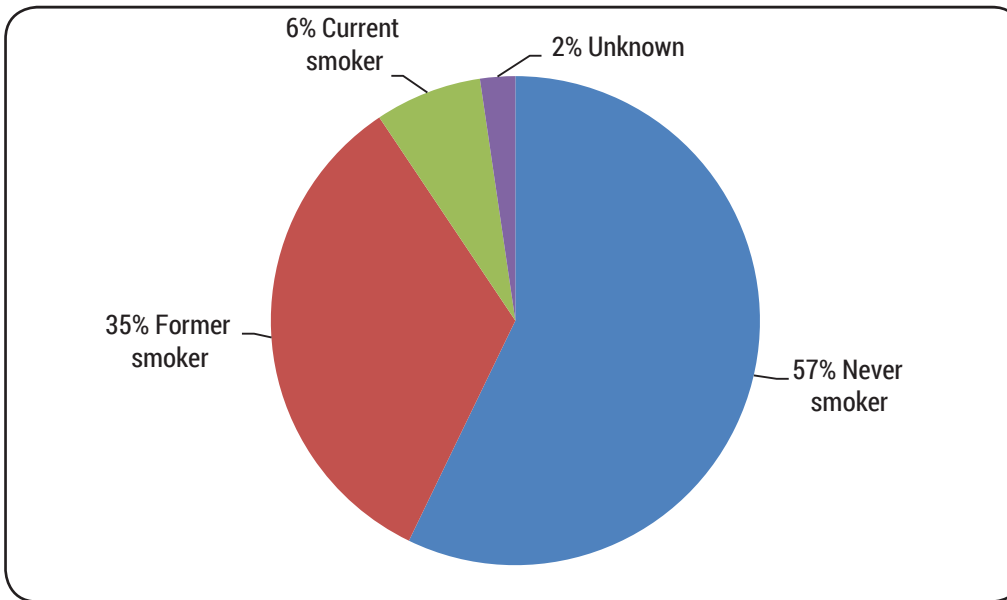
### WTC HEALTH PROGRAM ADDS CASE MANAGEMENT FOR CANCER AND SEVERE RESPIRATORY DISEASES

The need for specialized care and close follow-up became apparent after cancers were certified as covered conditions under the WTC Health Program and as we identified patients with very severe respiratory diseases (including two requiring lung transplantation). To provide this level of care, we expanded our program to include a specialized oncology and respiratory case management unit. The cancer patients are followed by Dr. Ellen Koffler and a trained nursing and social work staff directed by Laura Wilson, RN. Patients with serious respiratory diseases are followed by Dr. David Prezant and a trained nursing staff directed by Patricia Ternes, RN. Nurses Laura Wilson and Patricia Ternes have worked with the FDNY WTC Health Program for close to a decade and are very familiar with the needs of the patient base.

As of 2016, the case management staff closely follows 946 patients with cancers or severe respiratory diseases. These patients receive numerous special services, including home oxygen, chemotherapy, radiation therapy, intravenous medications at home or at special treatment facilities and hospice care. Our case management team also includes FDNY's amazing Family Assistance Unit, whereby volunteer FDNY retirees drive these patients and their families to doctor and hospital visits.



### Smoking Status of the FDNY WTC Health Program Members

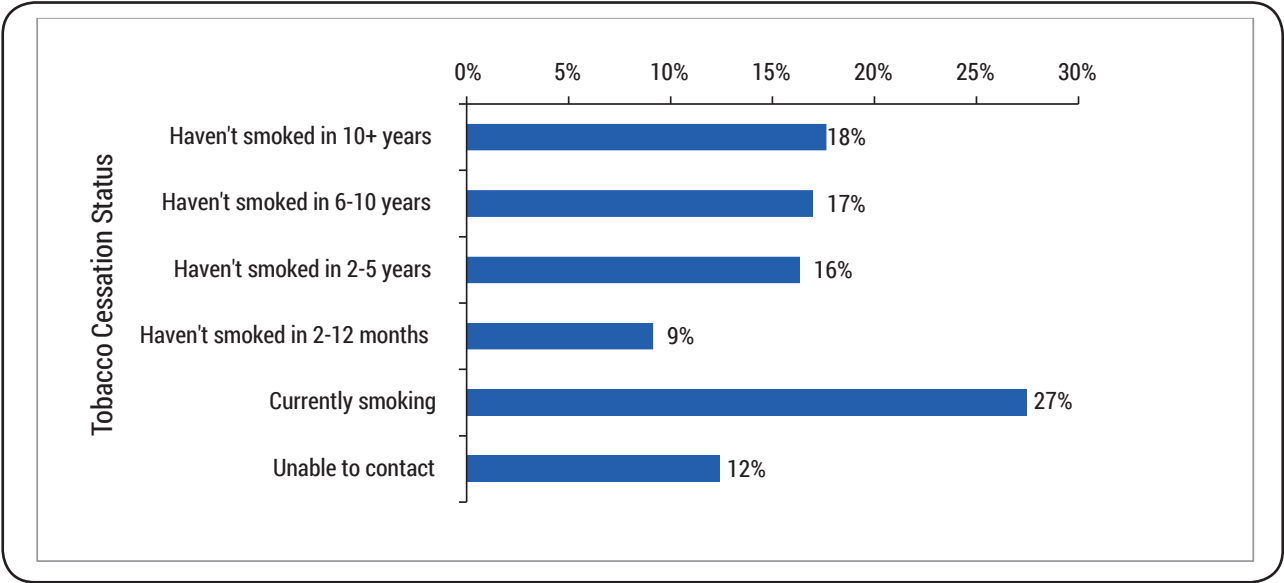


► About six percent of FDNY workers currently smoke—a rate much lower than the rate in NYC overall.

Since respiratory health and cancer prevention are so important to our FDNY membership, we track smoking behaviors in our members and offer free tobacco cessation services. As can be seen in the chart above, 57 percent of our members never smoked, a proportion that is similar to the proportion of those who never smoked among NYC men. The good news is that the proportion of former smokers is very high and the proportion of those who never smoked is growing, resulting in only six percent of our members reporting that they currently are smoking—about one-third of the current smoking rate for NYC men. In part, this is due to the free tobacco education and cessation treatments we have provided since 9/11. For many, 9/11 was a reachable, teachable moment for tobacco cessation. While we cannot undo the harmful WTC exposure, we can prevent future exposures to cigarette smoke; exposures that are known to result in increased rates of heart and lung disease and cancer.

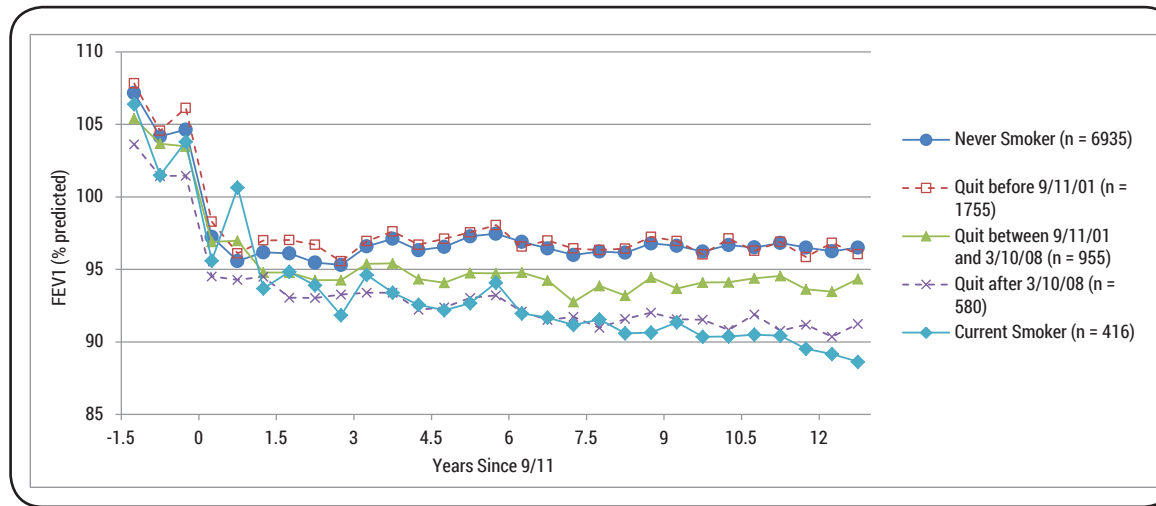
► Of 134 early participants in “Tobacco-Free with FDNY,” 10 years later, about 70 percent remain former smokers.

FDNY Tobacco Cessation Program “Tobacco-Free with FDNY”



To help you quit, we continue to offer our members a free, confidential, tobacco cessation and nicotine replacement program, “Tobacco-Free with FDNY.” To date, more than 900 members have participated in this program. In an early study of 220 FDNY and family members that we published in *Chest* (2006), 47 percent, 36 percent and 33 percent had stopped smoking at three, six and 12 months of follow-up, respectively. We currently have exciting information from the 153 FDNY members (not family members) who originally participated in the “Tobacco-Free with FDNY” program and successfully stopped smoking by 2002. Of the 134 members whom we have been able to reach for verification, more than 70 percent remain tobacco-free. We are proud to have such excellent tobacco cessation rates; in fact, our quit rates are among the best in the nation. This free program meets once weekly, alternating between FDNY BHS and Fort Totten. Call 718-999-1942, if you want to make an appointment.

## Pulmonary Function Over Time in Firefighters—Impact of Cigarette Smoking and Cessation



The major impact on lung function was WTC exposure. However, cigarette smoking had a smaller effect that was reversible with cessation.

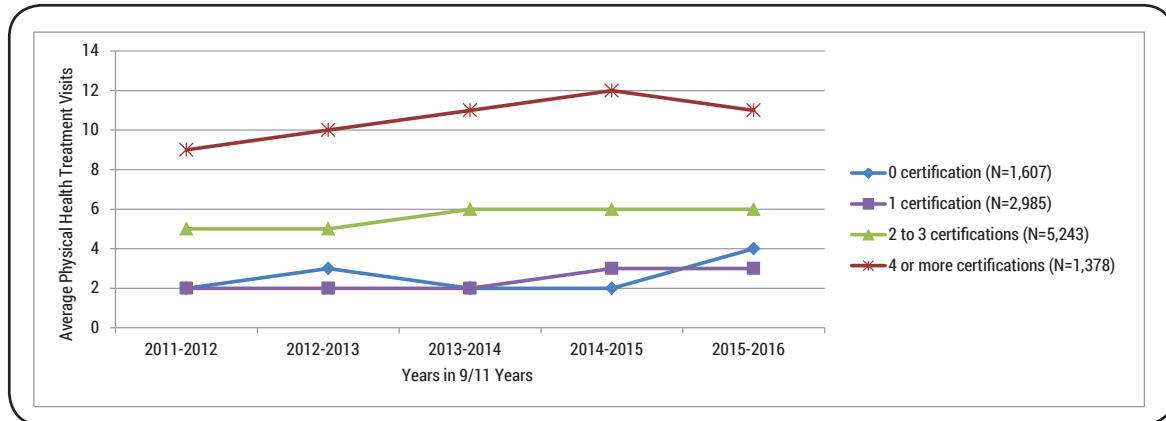
- By 2014, those who never smoked and early quitters (smokers who quit before 9/11) had the best lung function, compared with current smokers, who had the worst.
- Firefighters who quit after 9/11, but before 3/2008, had better lung function than those who quit after 3/2008.
- This was also true for EMS (not shown).
- A similar figure with a more comprehensive explanation is shown in Section 2.

## SECTION 5: THE ZADROGA ACT

► Members with more certifications (more WTC-related health conditions) require more medical care.

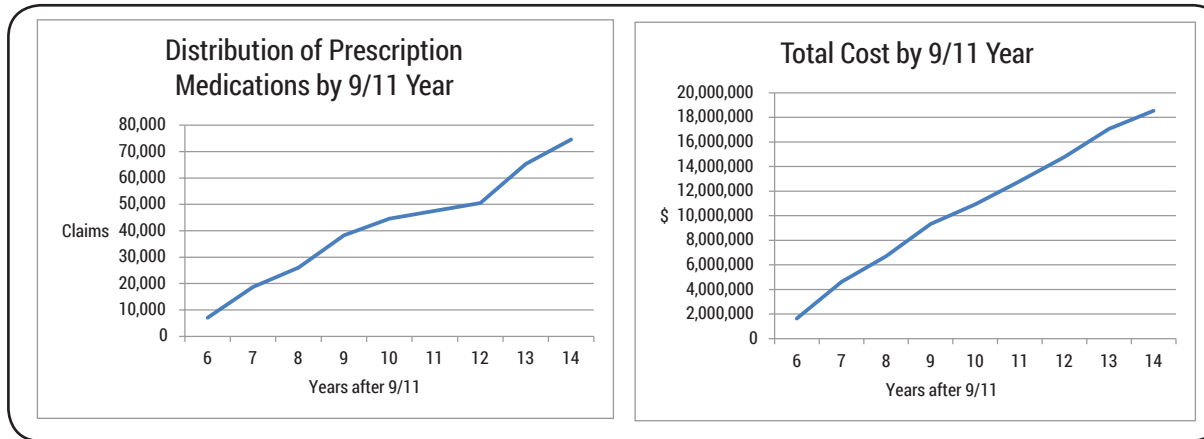
► The FDNY WTC Health Program, providing unlimited care at no cost, is responsive to the health needs of its members.

**Health Care Utilization for Physical Illnesses by Number of Certifications**



Approximately 40 percent of FDNY members have more than one NIOSH-certified health condition. The varied number of illnesses and organ systems affected by WTC exposure and the impact each has on the other (comorbidities) adds to the burden of suffering experienced by our members. As shown in this figure, between the years 2007 and 2016, members who have four or more certifications (physical or mental health-related) require the most frequent and sustained medical care. FDNY WTC Health Program provides unlimited care, at no cost, to our members with any number of WTC-related certified health conditions, including free cancer care at some of the most respected medical centers in this country, such as Memorial Sloan Kettering Cancer Center, NYU Langone, Mount Sinai, Montefiore/Einstein, LIJ/North Shore/Northwell, Stony Brook, Robert Wood Johnson and Columbia Presbyterian.

### WTC Health Program Prescription Medications



Since 2006, the FDNY WTC Health Program has provided free medications for WTC-related conditions. Express Scripts was the pharmacy benefits manager through the end of 2012, when the federal government awarded the contract to Walgreens (CSC/Emdeon). In 2016, the federal government will be choosing a new pharmacy benefits manager. Overall, this benefit has been very popular, providing medications without co-payments or deductibles to FDNY WTC Health Program members for certified WTC-related health conditions, both physical (including cancer) and mental health. The need for this benefit is shown by the annual growth in the figures above.

During the most recent period (9/11/2015-7/1/2016), the most common physical health medications filled by our program were proton pump inhibitors (used for acid-reflux/GERD), beta-adrenergic agents (bronchodilators for lower respiratory diseases, such as asthma) and anti-inflammatory steroid sprays/inhalers (used for upper respiratory diseases, such as rhinosinusitis and lower respiratory diseases, such as asthma). The most expensive medications, however, are for cancer chemotherapy and the treatment of sarcoidosis when it affects the joints or heart. On a much smaller scale, the three most common mental health medications filled by our program were all used to treat depression: selective serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake-inhibitors (SNRIs) and norepinephrine and dopamine reuptake inhibitors (NDRIS). Examples include Zoloft (sertraline), Wellbutrin (bupropion), Cymbalta (duloxetine) and Lexapro (escitalopram). These medications are consistent with treatments needed for the most common NIOSH-certified mental health conditions described earlier.

Because prescription drug costs have been rising, the FDNY WTC Health Program has worked closely with the NIOSH WTC Health Program Administrator to utilize generic medications when they compare favorably to brand-name medications. Gradually, we have been implementing this change, first with medications for GERD/acid reflux and, in 2014, for nasal sprays and rescue inhalers. Recently, the generic-first program was initiated for all medications covered by the WTC Health Program. Brand names are available when there is no generic equivalent or there is a rare medical contraindication to the use of the generic. Our members have had no problems accepting this switch, knowing that brand names are available for those who require them and cost savings from this generic-first program are spent on other urgent clinical needs, such as cancer treatment.







## CSU COUNSELING SERVICES

The FDNY Counseling Service Unit (CSU) has been responding to the mental health needs of the FDNY community for more than 30 years. Prior to 9/11, CSU consisted of 11 full-time counselors, mostly providing counseling for family issues, personal stress or bereavement, working at one Manhattan location.

In response to the WTC attacks and the tragic loss of 343 members of our FDNY family, CSU quickly adapted and expanded their programs by tapping into counselors from two partner organizations—the International Association of Fire Fighters (IAFF) and the National Fallen Firefighters Foundation (NFFF). CSU staff visited every firehouse and EMS station and added satellite locations to provide mental health services to members and their families, including the families of deceased FDNY rescue/recovery workers. Because CSU had significant experience with our members, programs were developed to meet their specific needs. For example, Post-9/11 Trauma Groups were available at several FDNY CSU locations, which were established in members' communities. Peer counselors were deployed throughout FDNY. Two weeks following 9/11, CSU facilities were operational in Staten Island, Fort Totten (Queens) and later in Suffolk and Orange Counties.

Now, 15 years later, our dedicated CSU staff continues its mission of caring for the mental health of our members (both active and retired). Their collective experience, along with de-identified aggregate analyses of the mental health questionnaire information, administered as part of the FDNY WTC Health Program annual monitoring exams, have helped identify mental health concerns and their relation to work done at the 9/11 disaster site. Immediately after 9/11, the most frequent conditions were post-traumatic stress disorder (PTSD) and grief/bereavement. CSU

was there to help our members deal with this “new normal.” While we continue to see these problems, we increasingly have identified members with difficulty adjusting to situations, such as retirement and/or chronic illnesses, most notably cancers and respiratory illnesses, which adds to the growing numbers with depression and anxiety. For some, this has led to self-medication and substance abuse. New programs introduced by CSU recognize the changing and varied needs of our members, focusing on retirement issues, depression and PTSD. We also are able to apply this knowledge to helping other first responders after other disasters, such as Hurricane Sandy.

WTC-related mental health services have continued under the Zadroga Act as part of the FDNY WTC Health Program. As with WTC-related physical health conditions, certification by the NIOSH WTC Program Administrator is required for treatment and we automatically submit certification requests for any member with appropriate documentation. As of 7/1/2016, more than 3,500 Firefighters and 370 EMS personnel have at least one mental health certification, allowing them to continue to receive treatment services, at no cost to them, through our WTC Health Program.

CSU also works with FDNY BHS and the FDNY WTC Health Program to publish a quarterly newsletter, FDNY WTC Health Program, and assists in the maintenance of an updated BHS, WTC Health Program and CSU websites on the FDNY DiamondPlate.

If you have stress or mental health concerns, please call the WTC Health Program or the CSU at any of the locations listed in the panel on the right of this page. These calls and any services you receive under the WTC Health Program are confidential and not part of your BHS medical record.

### FDNY CSU LOCATIONS

**Manhattan Counseling Unit**  
251 Lafayette Street,  
3rd Fl, NYC 10012  
(212) 570-1693 (24-Hour Line)

**Staten Island Counseling Unit**  
1688 Victory Boulevard  
Staten Island, NY 10314  
(718) 815-4111

**Fort Totten Counseling Unit**  
Fort Totten Building 413A  
Bayside, NY 11364  
(718) 352-2140

**Brentwood Counseling Unit**  
Liberty Project Center  
Suffolk County Community College  
Crooked Hill Road  
Brentwood, NY 11717  
(631) 851-6888

**Orange County Counseling Unit**  
2279 Goshen Turnpike  
Middletown, NY 10941  
(845) 695-1029

**Substance Abuse Day-Treatment Program**  
594 Broadway, Suite 500  
(212) 925-6671

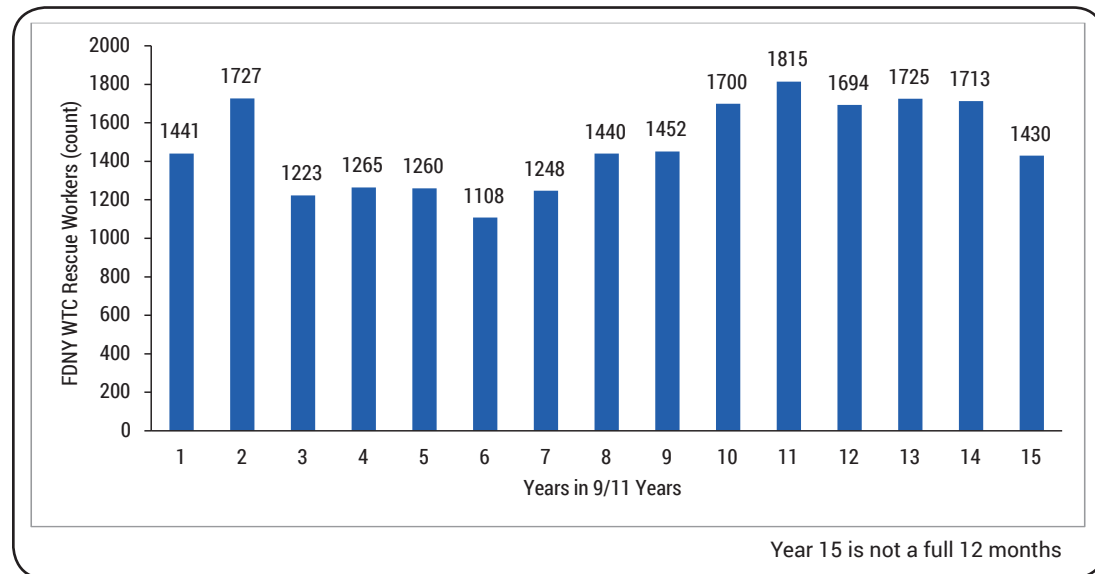
**FDNY Headquarters**  
9 MetroTech Center  
Brooklyn, NY 11201-3857  
(718) 999-1858  
(718) 999-0088 (fax)

**Tobacco Cessation Program**  
9 MetroTech Center  
Brooklyn, NY 11201-3857  
Fort Totten Building 413B  
Bayside, NY 11364  
(718) 999-1942

## SECTION 5: MENTAL HEALTH SERVICES

► Since 9/11, more than 1,000 FDNY members (does not include family members) visit FDNY CSU for mental health services each year.

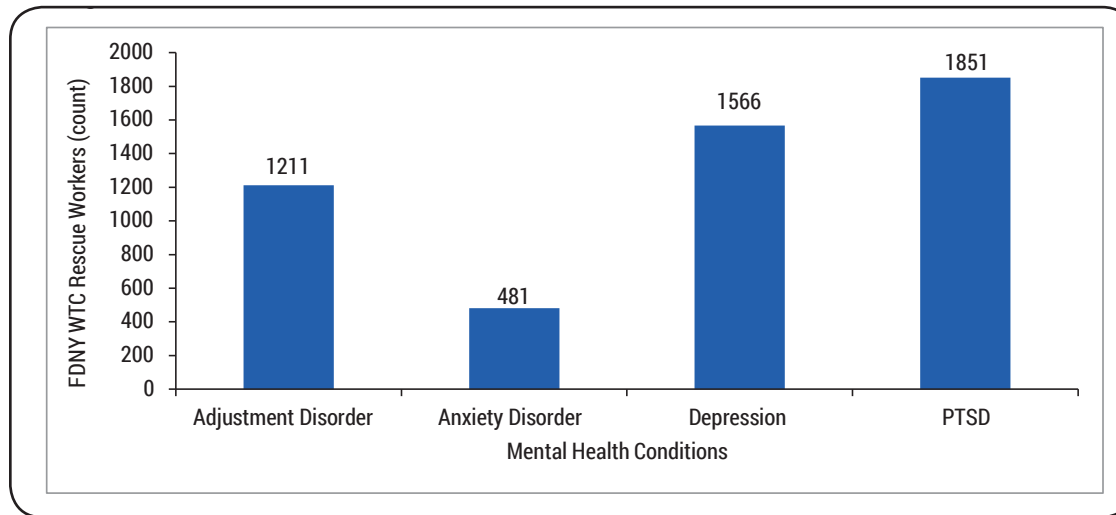
**Annual Mental Health Treatment Visits**



Many members who worked at the WTC site did not allow themselves the time to grieve for those lost or to adjust to their new normal, so mental health problems tended to surface later, once the search slowed and members had more time to process their emotions. Sometimes, this process was delayed until after retirement. FDNY CSU-trained peer counselors provided initial support and encouraged members to seek professional counseling and treatment from trained mental health practitioners (social workers, psychologists and psychiatrists) at CSU or, when needed, from other organizations. Referrals to private practitioners also are available through the WTC Health Program. Since 9/11, there have been 125,520 visits by 4,632 WTC-enrolled members to our WTC Health Program for mental health counseling or treatment, of whom 3,347 (72 percent) had at least one WTC certification for a mental health diagnosis. When appropriate, prescription medications also are available, at no charge, for members with certified WTC-related mental health conditions. The increase in use of CSU counseling services post-9/11 reflects a greater acceptance by our members of the need for counseling. The continued utilization of these services indicates that our members understand the need to talk these issues out in a setting where they are understood and accepted.

## SECTION 5: MENTAL HEALTH SERVICES

### NIOSH-Certified Mental Health Conditions



As of 7/1/2016, more than 3,500 Firefighters and 370 EMS personnel have at least one mental health certification. Increasingly, adjustment to retirement and/or the development of physical health problems (such as cancers or respiratory illnesses) have created yet another “new normal” for our members. We continue to encourage our members to take advantage of these specialized services, when needed.

- ▶ Depression and PTSD are the most common NIOSH-certified mental health conditions.
- ▶ Just as in physical health, persons may be certified for more than one mental health condition.





FDNY Lieutenant Terrence Jordan retired due to WTC-related emphysema. On oxygen, he is shown with family and friends at the Tunnel to Towers Run/Walk.



# **SECTION VI:**

## **QUALITY OF LIFE, MEMBER SATISFACTION AND QUALITY OF CARE**

**Health-Related Quality of Life Questionnaire Data ▲**

**Health-Related Quality of Life Assessments ►**

**Physical Health-Related Quality of Life ►**

**Mental Health-Related Quality of Life ►**

**Health Survey Scales (SF-12, version 2) ►**

**Current Self-Rated Health Status ►**

**Change in Self-Rated Health Status ►**

**Quality of Care ▲**

**Member Satisfaction with the FDNY WTC Health Program ►**

**FDNY WTC Health Program Exceeds National Quality Measures ►**

### QUALITY ASSESSMENTS - QUALITY OF LIFE, MEMBER SATISFACTION AND QUALITY OF CARE

Increasingly, health care experts have recognized that health-related quality of life is an important outcome. The Centers for Disease Control and Prevention (CDC) has defined health-related quality of life as “an individual’s or group’s perceived physical and mental health over time.” As the FDNY WTC Health Program has expanded to provide early diagnosis and treatment for an increasing number of WTC-related physical and mental health conditions, it was our hope and expectation that our members would notice improvements in their health-related quality of life, in either the physical or mental health component. To track members’ perceptions of their health status, we added a validated health-related quality of life questionnaire, the Short-Form 12 (SF-12), to our monitoring exams in 2008 and introduced an updated version (SF-12, version 2) in 2015.

The SF-12 asks about functional health and well-being in eight scales, including Mental Health, Social Function-

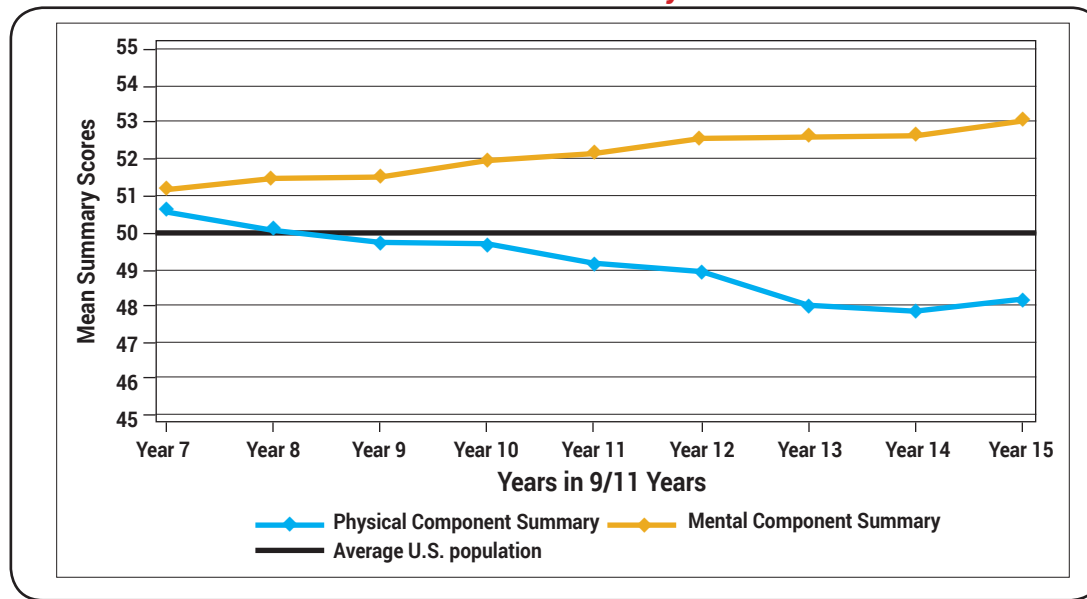
ing, Vitality, General Health, Pain, and Physical Functioning. These scales are used to construct two summary measures: the Physical Component Summary and the Mental Component Summary. The SF-12, version 2, allowed us to calculate scores for each individual scale, in addition to the two summary scores.

- For both scale and composite measures, higher scores indicate better perceived health quality of life.
- A score of ~50 corresponds to the norm of the general U.S. male population.

Self-assessed, health-related quality of life has been shown to be a robust predictor of mortality and morbidity, often superior to objective measures of health. Our goal at the WTC Health Program is to utilize all measures, including health-related quality of life surveillance data to identify members with poor perceived health, so we can offer additional health care interventions and treatments.

## SECTION 6: HEALTH-RELATED QUALITY OF LIFE QUESTIONNAIRE DATA

### Health-Related Quality of Life (HrQoL) Assessments Among FDNY WTC Rescue/Recovery Workers



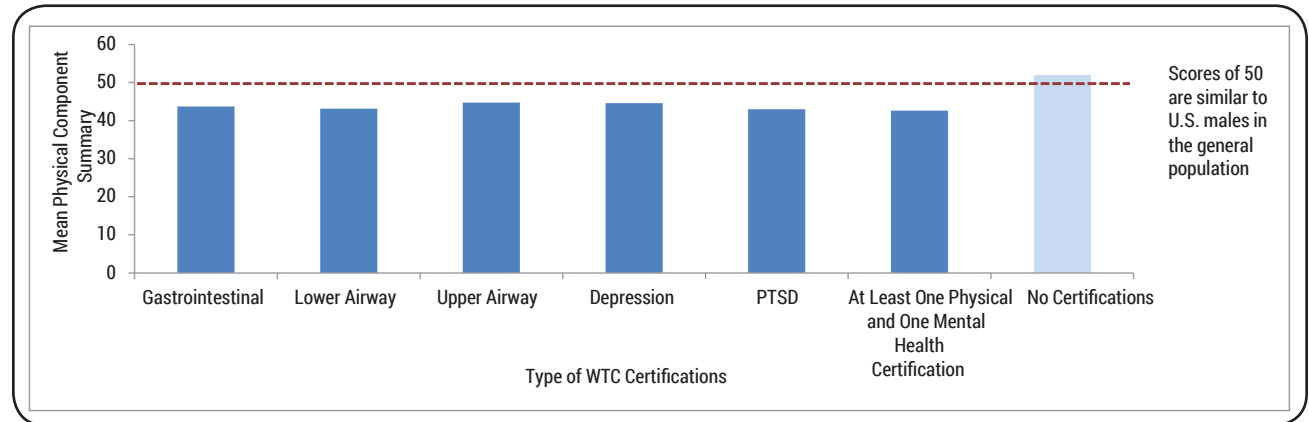
► Over time, mental health-related quality of life improves, but physical health-related quality of life declines.

Compared to the average U.S. male population, FDNY WTC-exposed rescue/recovery workers (Fire and EMS) report a higher (“better”) mental health quality of life, but a lower (“worse”) physical health quality of life. The physical quality of life scores were lowest in persons who retired with a “3/4” or service-connected disability, compared with scores in non-disabled retirees, and highest in active FDNY rescue/recovery workers (not shown).

## SECTION 6: HEALTH-RELATED QUALITY OF LIFE QUESTIONNAIRE DATA

► FDNY WTC rescue/recovery workers with certified WTC-related health conditions have poorer physical health quality of life scores than the average general U.S. population.

### Health-Related Quality of Life Assessments by WTC Certifications Physical Health-Related Quality of life

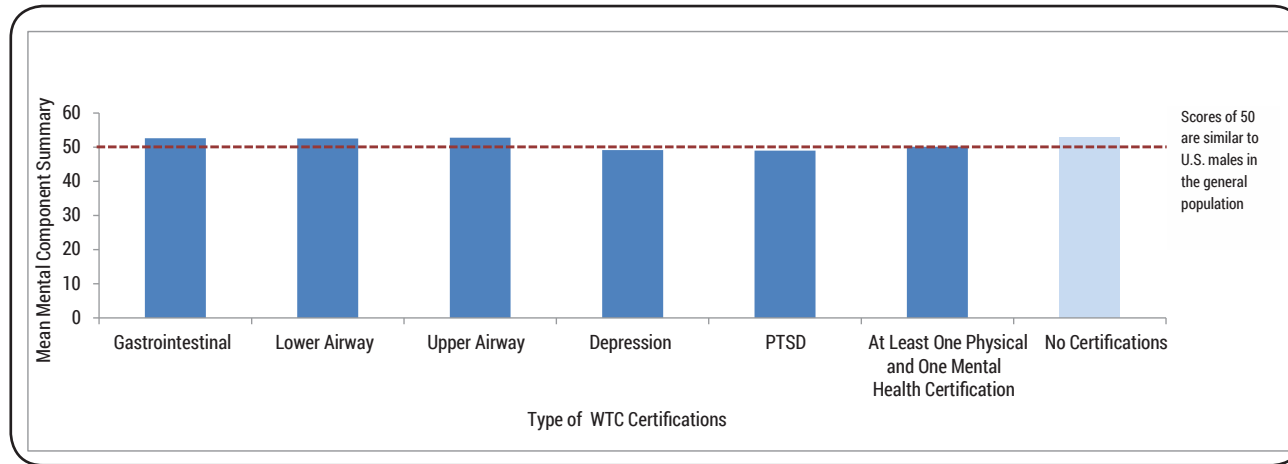


We examined health-related quality of life measurements for those who are certified with common WTC-related conditions, as listed above. Again, the higher the score, the better the member feels about his/her quality of life. Members with diagnoses of certified WTC-related physical or mental health conditions scored lower than the average physical health quality of life score of 50 for U.S. men in the general population. Not surprising, our WTC-exposed members who have both physical and mental health conditions have the lowest average physical health quality of life scores. This highlights the importance of offering our members with both physical and mental health conditions a treatment approach that combines physical health treatment and mental health counseling.



## SECTION 6: HEALTH-RELATED QUALITY OF LIFE QUESTIONNAIRE DATA

### Health-Related Quality of Life Assessments by WTC Certifications Mental Health-Related Quality of Life



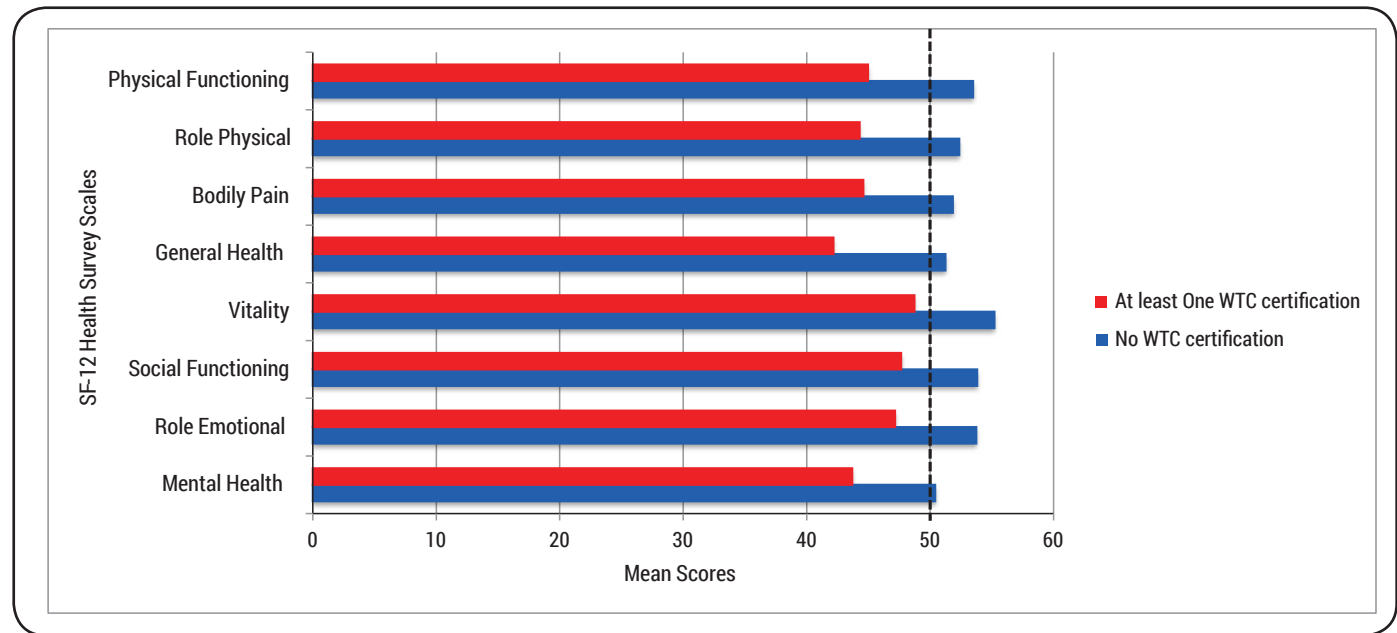
► FDNY WTC rescue/recovery workers with certified WTC-related health conditions have similar mental health quality of life scores compared to the average general U.S. population.

We also examined the mental health component of the survey for members with a common WTC-related condition and found average scores at or above the average scores for mental health quality of life, the average being a score of 50 for U.S. men in the general population. We believe this is, in large part, due to our FDNY culture—strong enough to seek help when necessary from family, friends, coworkers, labor, management and the FDNY WTC Health Program.

## SECTION 6: HEALTH-RELATED QUALITY OF LIFE QUESTIONNAIRE DATA

► FDNY WTC workers who are certified with at least one WTC-related health condition score lower on each individual health survey scale than those who are not certified with a WTC-related health condition.

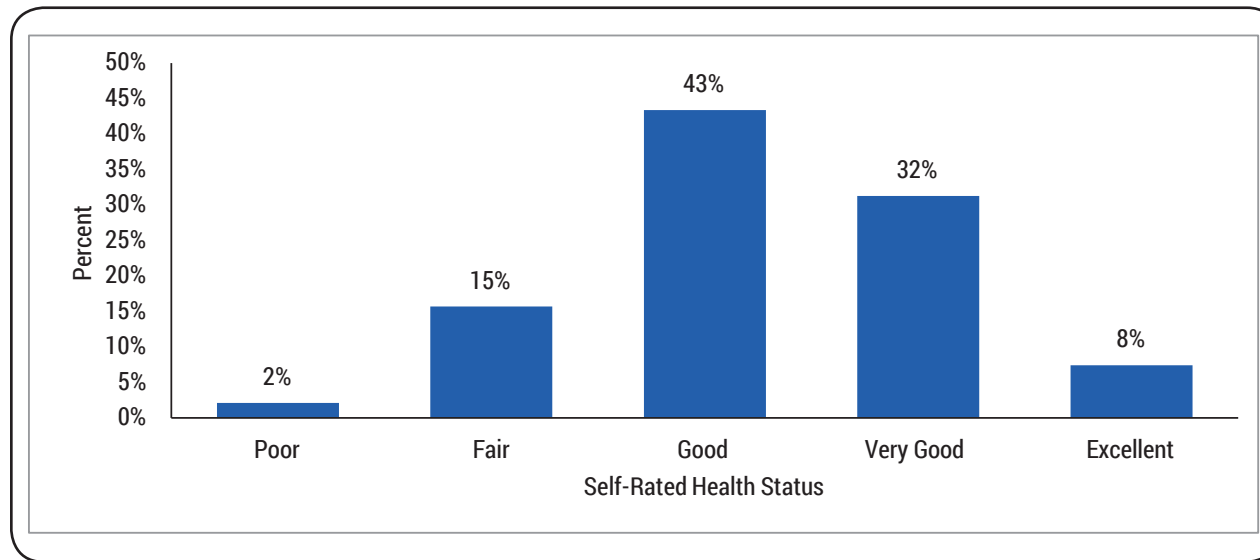
### Health Survey Scales (SF-12, Version 2)



The SF-12, version 2, allowed us to assess eight individual health scales as depicted in the figure above. For example, the role physical scale describes respondents' answers to questions about limitations in work or other activities in the past four weeks due to physical health problems. Similarly, the role emotional scale describes respondents' answers to questions about limitations in work or other activities in the past four weeks due to depression, anxiety or other mental health problems. These eight scales are used to construct summary physical and mental component scores, as seen in previous figures. FDNY WTC rescue/recovery workers with at least one diagnosis of a physical or mental health condition have lower scores than those with no WTC certifications and the average general U.S. population in every health scale. This indicates that WTC-certified illnesses have had a negative impact, not only on overall health-related quality of life, but on more specific areas, such as function and pain. In the future, the FDNY WTC Health Program will work with our members toward identifying and providing treatment approaches that, hopefully, can reverse this trend.

## SECTION 6: HEALTH-RELATED QUALITY OF LIFE QUESTIONNAIRE DATA

### Current Health Status Among FDNY WTC Rescue/Recovery Workers Who Reported Serious Health Concerns



► More than 83 percent of members rated their current health as good, very good or excellent on their most recent health WTC medical monitoring questionnaires. And this was true even in those who reported serious health concerns during or shortly after their rescue/recovery work at the WTC disaster site.

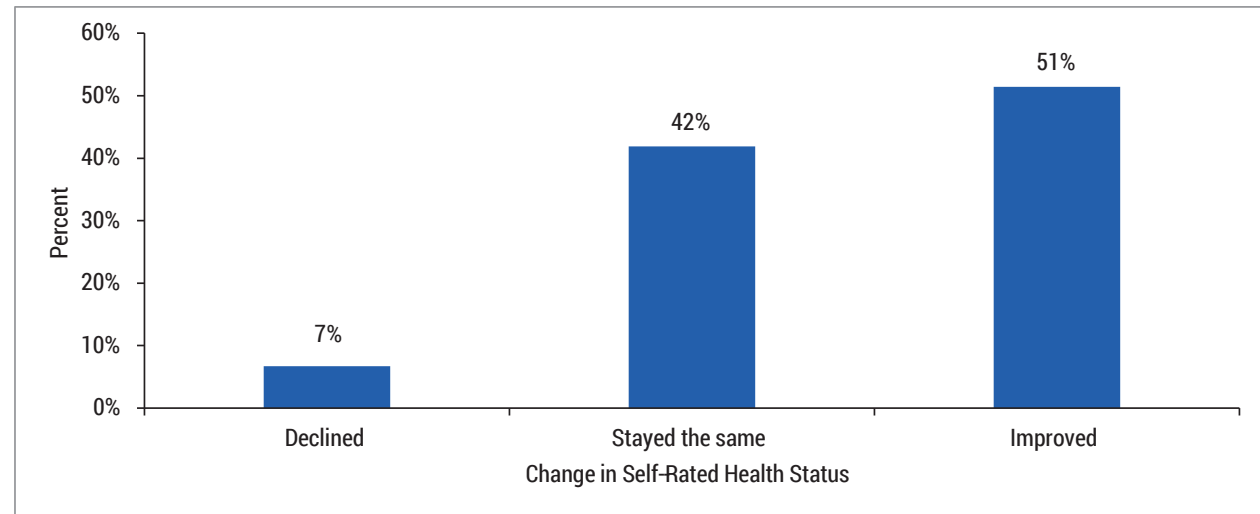
In their first post-9/11 health questionnaire (10/2/2001-9/26/2002), FDNY members were asked to report their health concerns arising from work at the WTC disaster site. Nearly 93 percent of respondents or 8,430 individuals believed that their WTC exposures caused or would cause future health problems or caused loved ones to be concerned about their health. Now, 15 years later, more than 83 percent of FDNY members rate their current health as good, very good or excellent. And, most importantly, our members agree that the FDNY WTC Health Program, providing regular monitoring evaluations and free medical treatment (including medications), has, in large part, been responsible for these current positive perceptions of health status.

It is important to note, however, that many of those who initially did not have post-9/11 health concerns eventually were diagnosed with at least one certified physical or mental health condition. This highlights the benefit of ongoing post-disaster surveillance as, over time, problems may emerge that were not apparent initially.

## SECTION 6: HEALTH-RELATED QUALITY OF LIFE QUESTIONNAIRE DATA

► Half of FDNY WTC-exposed rescue/recovery workers appear to have improved self-rated health status among those who previously rated their general health as “Fair” or “Poor.”

### Change in Self-Rated Health Status Among FDNY WTC Rescue/Recovery Workers



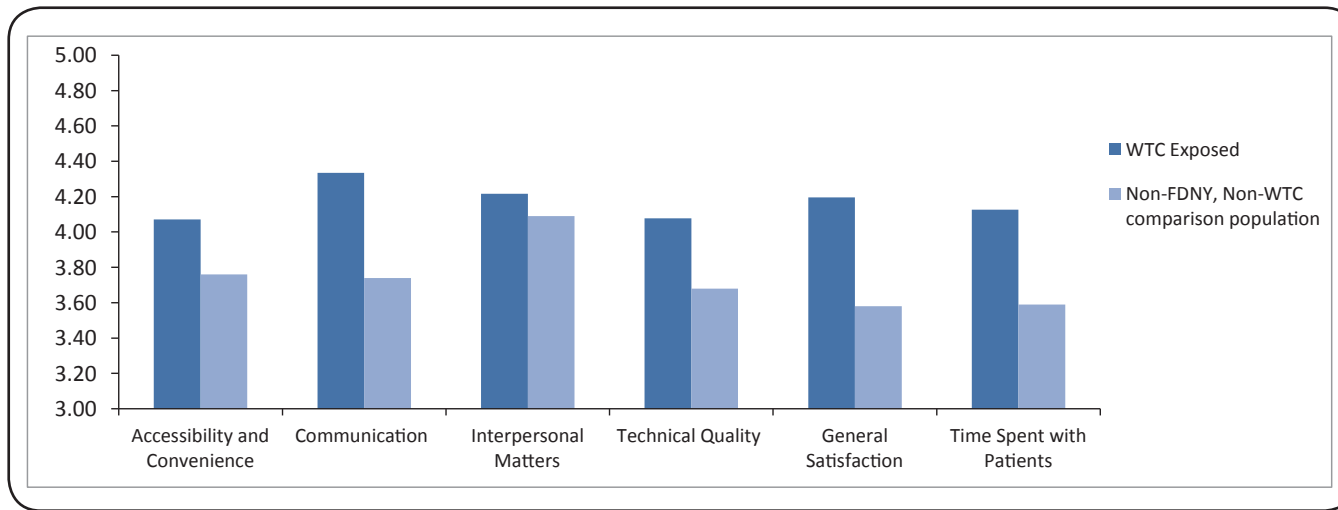
In all of our mental health surveys, we asked respondents to rate their general health status on a Likert scale: Excellent, Very Good, Good, Fair or Poor. In their initial survey, taken, on average, six years after 9/11, about 2,200 respondents rated their health as either Fair or Poor. Among these same respondents, we examined their most recent survey, taken, on average, 14 years after 9/11. As shown in the above figure, about 51 percent reported an improvement in their self-rated health status, while seven percent declined and 42 percent remained the same. We are encouraged by those who reported an improvement, which we believe may be attributed, in part, to the FDNY WTC Health Program. We also urge any member who rated his/her health status poorly to contact our Program or other professionals to discuss any concerns.



## SECTION 6: QUALITY OF CARE

### Member Satisfaction with FDNY WTC Health Program Services

► Member satisfaction with FDNY WTC Health Program services is very high.



During 2014, we asked our members to complete an anonymous survey, describing their satisfaction with the quality of health care they receive at the FDNY WTC Health Program. We did this because we recognize the importance of patient satisfaction, which has been shown to be related to key health outcomes, including patient adherence to medical recommendations and treatment regimes, including medication use. We adapted questions from a nationally validated questionnaire, which asks about health care satisfaction in several discrete areas: communication with the medical staff, satisfaction with interpersonal behavior, technical quality of the office, accessibility and convenience, general satisfaction with care and satisfaction with the amount of time spent with each patient. The figures above represent information compiled from almost 1,000 members and the findings are striking: Satisfaction with FDNY WTC Health Program is very high, well above the level of satisfaction experienced by those in a comparison population of non-WTC, non-FDNY patients using other outpatient services. The FDNY WTC Health Program scored higher in every single category, reaching statistical significance in areas of general satisfaction, communication and time spent with patients.

### FDNY WTC Health Program Exceeds National Measures of Quality Control

We examined objective measures of clinical outcomes that are widely used to evaluate health services in the general community. Our FDNY WTC Health Program did far better than national norms. For example, during 2014-2015:

- ▶ A very small percentage (0.1 percent) of FDNY members with a respiratory illness had an asthma-related emergency department visit or hospitalization. This indicates that our members' symptoms are well controlled by their medications.
- ▶ 75 percent of FDNY members with persistent asthma were prescribed anti-inflammatory controller medications (inhaled or oral steroids, Singulair/montelukast and/or Xolair). This is important because studies repeatedly have shown that a better quality of life, better asthma control and fewer asthma symptoms occur when at least half of prescribed asthma medications are of the controller type versus the rescue type (e.g., inhaler).
- ▶ 97 percent of FDNY members diagnosed with Barrett's Esophagus received timely follow-up care from FDNY WTC physicians, free medications through our program and/or care from our external gastroenterology (GI) specialists that was authorized and paid for by the FDNY WTC Health Program.
- ▶ 87 percent of FDNY members who had sinus surgery received timely follow-up care from FDNY WTC physicians, free medications through our program and/or care from our external ENT specialists that was authorized and paid for by the FDNY WTC Health Program.

With your help and our dedicated staff, we will continue to work to maintain or exceed these measures of excellence.

# **SECTION VII:**

# **CONCLUSION**

**Summary ►**

**Appendix A—References and Other Publications ►**

**Appendix B—Personal Health Quizzes and Wellness Tips ►**



FDNY WTC 15 year Memorial Service  
at St. Patrick's Cathedral

### SUMMARY

**T**he FDNY WTC Health Program is committed to diagnosing, assessing and treating WTC-related illnesses—not only those that were obvious immediately after 9/11, but also later emerging diseases or conditions that may occur in the years ahead. This belief is shared by the Mayor, Fire Commissioner, Chief of Department, our labor unions and FDNY members and their families, all of whom have been strong advocates of federal resources to fully fund not only the FDNY WTC Health Program, but also our partner programs—the WTC Health Programs for non-FDNY responders (Mount Sinai, Stony Brook, LIJ/North Shore/(Northwell), NYU, Robert Wood Johnson Medical Center), the NYC HHC Environmental Health Center (Bellevue, Governors and Elmhurst Hospitals) for other survivors and residents and the WTC Health Registry at the NYC Dept. of Health and Mental Hygiene. This report has presented information on the 9/11 health effects in our FDNY WTC-exposed rescue/recovery workers (Firefighters, EMS and civilians - active and retired) from 9/11 to 7/1/16. It confirms that the WTC exposure was unique, its effects far reaching and widespread and that the FDNY WTC Health Program is providing the needed health care services.

Thankfully, for many of you, time and treatment have allowed physical and mental health problems to diminish in severity and, for some, to resolve entirely. But for others, these illnesses persist with a severity that affects the quality of their daily lives. For those with severe lung disease or cancer, life itself is threatened. Various health issues continue to present throughout our workforce. Pulmonary function tests continue to demonstrate the persistence of the unprecedented decline in lung function that occurred in the year following 9/11. Respiratory symptoms, such as shortness of breath, which may occur in conjunction with the loss of lung function, can impair our members' ability to function at work or in their personal lives. Mental health issues, such as PTSD, depression, anxiety and substance abuse, can cause serious problems, both at work and at

home. And, for some, new illnesses, such as cancer or autoimmune diseases may have occurred. Cancer surveillance and treatment now is covered under our WTC Health Program. We believe that similar coverage should be provided for other newly emerging diseases, such as certain rheumatologic, autoimmune diseases, and we are working with our partners to present a formal request to the federal WTC Health Program Administrator to add these conditions to our program's coverage in the same way that we did for cancer in 2012.

As of 7/1/16, the FDNY WTC Health Program has performed monitoring evaluations on 15,247 active and retired FDNY rescue/recovery workers. Regular assessments to identify problems, coupled with early treatments, provide the best opportunity for success, including the chance to win the fight against cancer and other late-emerging diseases when they arise. Options for diagnostic procedures vary by condition, but can include chest CT scans, sinus CT scans, ENT laryngoscopy, upper gastrointestinal endoscopies, colonoscopies, thyroid ultrasounds, abdominal/pelvic CT scans, PET/CT scans and MRIs.

"Tobacco-Free with FDNY" is a nationally renowned tobacco cessation program that can help our members who wish to "kick the habit." Thankfully, the percentage of our membership who continues to smoke is small. We urge them to take advantage of this program as it is well-known that smoking increases the risk of developing cardiopulmonary diseases and cancer and, as we have shown, reduces the degree of recovery from WTC-related declines in lung function.

For those with WTC-related mental health issues, FDNY CSU provides confidential counseling, psychiatric consultations and, if needed, CSU WTC-related substance abuse counseling, all at no cost to our members. We continue to offer WTC-related medications (respiratory, sinus, GERD, mental health and now cancer chemotherapy), cancer radiation therapy and, when necessary, WTC-related surgery at

no cost to you. All this has been done in an effort to remove financial barriers to effective care.

We advise all members who worked at any of the WTC sites to remain active in the FDNY WTC Health Program and come for annual medical monitoring, even if you currently feel fine. The monitoring exam may detect changes in body function that you are not aware of and that can be corrected or slowed with early intervention. Measuring your health status over time helps us identify worrisome trends and intervene appropriately. Continued participation also provides us with the information needed to change our programs in response to your needs and demonstrate to NIOSH, our federal funding agency, that continued funding of this program remains a vital need. Additionally, it helps us prove that new conditions, when justified by our data, should be added to the WTC Health Program's coverage.

While the main focus of the program is to assess your health and provide you with the necessary treatments, the information that is learned about 9/11 responders will be extremely valuable in understanding how to protect first responders in future emergency or disaster operations. Member participation extends beyond a visit to our WTC Health Program; we periodically contact members for case management follow-up and we urge members to contact us if any new physical or psychological issues arise. You are the best source of information about your own well-being and your active participation in this program will help us continue to work as a team in maintaining your health.

If you feel you have a medical condition that is related to your work at the WTC site that currently is not covered by the WTC Health Program, please bring it our attention. We may be able to develop data through our monitoring and treatment exams to support a petition to the federal WTC Program Administrator to add a recognized medical condition to the list of WTC Health Program-covered con-

ditions. A petition form also is available for you to do this on your own through a website at [www.cdc.gov/wtc](http://www.cdc.gov/wtc), but a successful petition is more likely to occur when it comes from our program's clinical center and is supported by the information that we have collected. Using our data to drive our advocacy, we were successful in having treatments for mental health and aerodigestive diseases added to the program in 2006, cancers added in 2012 and we soon hope to be able to do the same for rheumatologic autoimmune diseases.

This report has presented nearly 15 years of information and data that we have gathered from 9/11 through 7/1/16. It is a reflection of how the FDNY has responded to meet the needs of our members. It is clear that we continue to see members who are still suffering from a variety of conditions that can be attributed to WTC-exposure(s). It is also clear that only with long-term health monitoring and treatment will we be able to minimize the health impact on our members, as well as learn how this exposure correlates with long-term disease outcomes, such as emphysema, pulmonary fibrosis, cancer and depression.

We wish to thank all those who served so selflessly at the WTC on and after September 11, 2001. The FDNY WTC Health Program has been one of, if not the most successful, joint labor/management initiative of our time. It has served as a model for New York City and our nation. Your health and fitness are of paramount importance in fulfilling FDNY's mission to protect life and property in this great City. Our shared goal continues to be to maximize the physical and mental health of our workforce, both now and in the future. Working together, we will continue to make progress toward that goal. Our health is a gift that deserves our close attention.

Be well and stay safe.



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## SECTION 7: APPENDIX B—PERSONAL HEALTH QUIZZES AND WELLNESS TIPS

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9 MetroTech Center  
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(718) 999-0088 (fax)

**Manhattan**  
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3rd Fl, NYC 10012  
(212) 570-1693 (24-Hour Line)

**Staten Island**  
1688 Victory Boulevard  
Staten Island, NY 10314  
(718) 815-4111

**Fort Totten**  
Fort Totten Building 413A  
Bayside, NY 11364  
(718) 352-2140

**Commack**  
66 Commack Road  
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Commack, NY 11725  
631-858-2190

**Brentwood**  
Liberty Project Center  
Suffolk County Community College  
Crooked Hill Road  
Brentwood, NY 11717  
(631) 851-6888

**Orange County**  
2279 Goshen Turnpike  
Middletown, NY 10941  
(845) 695-1029

**Tobacco Cessation Program**  
9 MetroTech Center  
Brooklyn, NY 11201-3857  
Fort Totten Building 413B  
Bayside, NY 11364  
(718) 999-1942

**Substance Abuse Day-Treatment Program**  
594 Broadway, Suite 500  
(212) 925-6671

### Please take this personal physical health quiz.

We remain concerned about your health as WTC responders. These health quizzes are for your personal use and may be able to help you identify WTC-related illness. We hope this information will facilitate your decision on whether self-referral to the FDNY WTC Health Program or your own physician is necessary.

Have you experienced any upper respiratory conditions?

NOT COUNTING WHEN YOU HAVE A COLD, please put a check in the box next to any problems you have had in **THE PAST FOUR WEEKS OR REPEATEDLY IN THE PAST 12 MONTHS:**

- ☐ Nose irritation, soreness or burning
- ☐ Runny nose or postnasal drip
- ☐ Frequent nosebleeds
- ☐ Nasal or sinus congestion
- ☐ Sinus or face pain or pressure
- ☐ Frequent or unexplained headaches

Have you experienced any gastrointestinal conditions?

Please put a check in the box next to any problems you have had in **THE PAST FOUR WEEKS OR REPEATEDLY IN THE PAST 12 MONTHS:**

- ☐ Difficulty swallowing (feels like food gets stuck)
- ☐ Coughing after you lie down or eat
- ☐ Frequent nausea (at least two times/week)
- ☐ Frequent sour or acid taste in the mouth (at least two times/week)
- ☐ Frequent acid reflux/regurgitation into mouth (at least two times/week)
- ☐ Frequent heartburn/indigestion (at least two times/week)
- ☐ Blood in stool; frequent vomiting with or without blood
- ☐ Unexplained abdominal pain

NOT COUNTING WHEN YOU HAVE A COLD, please put a check in the box next to any problems you have had in **THE PAST FOUR WEEKS OR REPEATEDLY IN THE PAST 12 MONTHS:**

- ☐ Wheezing or whistling in your chest
- ☐ Difficulty taking in a full breath
- ☐ Shortness of breath
- ☐ Chest pain
- ☐ Frequent or usual cough (at least four times/day, four days/week, four consecutive weeks/year)
- ☐ Coughing up blood
- ☐ Have you experienced any of the above symptoms when exposed to irritants or chemicals or change in temperatures?

Please put a check in the box next to anything that has provoked your lower respiratory symptoms in **THE PAST FOUR WEEKS OR REPEATEDLY IN THE PAST 12 MONTHS:**

- ☐ Exercise or physical activity
- ☐ Strong odors
- ☐ Dust
- ☐ Allergens
- ☐ Temperature or humidity extremes
- ☐ Smoke or fumes

Have you experienced any of the following in the **PAST 12 MONTHS?**

- ☐ Breast mass or lump
- ☐ Swollen lymph nodes
- ☐ Unexplained bleeding from anywhere
- ☐ Unexplained weight loss
- ☐ Unexplained headaches

The checklist above is not a formal diagnostic tool. It is simply a list of symptoms associated with WTC-related illnesses. If you put a check in the box next to any of these problems and have them on a consistent or frequent basis and you were present at one of the WTC sites, you may have a WTC-related illness. Only a health care professional can formally diagnose this condition. Please contact your doctor or call the FDNY WTC Health Program at

718-999-1858 to make an appointment.

### Please take this personal stress quiz.

During the past two weeks, have you been bothered by any of the following problems? Please put a check in the box next to any problems you have.

- ☐ Little interest or pleasure in doing things
- ☐ Feeling down, depressed or hopeless
- ☐ Sleep difficulties
- ☐ Fatigue or lack of energy
- ☐ Change in appetite
- ☐ Feeling worthless or that you are a failure
- ☐ Difficulty concentrating
- ☐ Lack of motivation
- ☐ Feeling restless or fidgety
- ☐ Suicidal thoughts

**Do these symptoms affect your ability to function, either at home or work?**

☐ Yes or ☐ No

The checklist above is not a formal diagnostic tool. It is simply a list of symptoms associated with depression. If you put a check in the box next to MORE THAN ONE of these problems, you may have depression. Only a health care professional can formally diagnose this condition. Please contact your doctor or the FDNY Counseling Service Unit to learn what treatment options are available. A list of CSU locations and phone numbers can be found on this page. If you put a check in the box next to suicidal thoughts, you should call your doctor or the FDNY counseling unit 24-hour phone line immediately at 212-570-1693.

Have you lived through a scary and dangerous, life-threatening event? Please put a check in the box next to any problems you have had in **THE PAST MONTH.**

- ☐ I feel like the terrible event is happening all over again. This feeling often comes without warning.



## SECTION 7: APPENDIX B—PERSONAL HEALTH QUIZZES AND WELLNESS TIPS

- ☐ I have nightmares and scary memories of the event.
- ☐ I stay away from places that remind me of the event.
- ☐ I jump and feel very upset when something happens without warning.
- ☐ I have a hard time trusting or feeling close to other people.
- ☐ I get mad very easily.
- ☐ I feel guilty because others died and I lived.
- ☐ I have trouble sleeping and my muscles are tense.

### Do these symptoms affect your ability to function, either at home or work?

☐ Yes or ☐ No

The checklist above is not a formal diagnostic tool. It is simply a list of symptoms associated with Post-Traumatic Stress Disorder (PTSD). If you put a check in the box next to MORE THAN ONE of these problems, you may have PTSD. Only a health care professional can formally diagnose this condition. Please contact your doctor or the FDNY Counseling Service Unit to learn what treatment options are available. A list of CSU locations and phone numbers can be found on this page.

### Wellness Tips

#### WHAT YOU CAN DO TO FOSTER THE HEALING PROCESS

We are all concerned about WTC-related respiratory and mental health diseases. Cancer and heart disease are also concerns for all FDNY Firefighters, EMS and rescue/recovery personnel. Many of us are concerned that WTC exposures have had a further negative impact. Although none of us can take back our past exposures, there are many steps we can take to reduce our risk for developing illness in the future. Wellness involves the health of the whole person. The

body must be kept strong, fit and well-nourished, so it's able to resist disease and overcome injury. This is a team effort, combining mind, body and spirit. Wellness is more than just not being sick—it's a positive state of health. Wellness means taking responsibility for your own health by:

#### 1. Learning how to stay healthy

- Participate in the FDNY WTC annual medical examination, which now includes age- and gender-appropriate cancer screening tests.
- Respond to your body's warning signs and visit your health care provider—before something serious happens.
- Get an annual influenza vaccination.
- Get a pneumococcal vaccination, especially recommended for those with cardiopulmonary diseases.

#### 2. Practicing good health habits and giving up harmful ones

- Quit smoking now! Eliminate exposure to secondhand smoke. For help quitting, please call the FDNY Tobacco Cessation Program at 718-999-1942. It is free and confidential.
- Avoid alcohol abuse and drug use.
- Avoid occupational or recreational exposures that are known to exacerbate illness. Always wear your respirator when entering a hazardous environment.
- Get enough exercise. Adults need at least 30 minutes of physical activity on most days of the week.
- Eat right. Make smart choices from each food group every day.

If you have gastroesophageal reflux disease (GERD), diet modification (avoiding acidic foods, including most juices, red sauce, juices, caffeine, soda, alcohol and chocolate), not eating for several hours before lying down and weight control are integral to the management of this disease.

#### 3. Learning how to manage stress

- Try to relax. Go to a movie, a ball game or participate in religious, social or other activities that may make you feel better.
- Improve your environment. Small changes around your home or office help you feel in control.
- Plan your work to make efficient use of your time and energy.
- Be realistic. Set practical goals for yourself.
- Try to be with other people and confide in someone. It is usually better than being alone and secretive.
- Seek professional help. Don't ignore symptoms of stress.

Focus on your own wellness. You can be healthier, feel better, look better and live longer!

In 2008, with the other WTC Clinical Centers of Excellence and the New York City Department of Health and Mental Hygiene, we co-authored the *Clinical Guidelines for Adults Exposed to the World Trade Center Disaster*. This can help your primary care physicians to become familiar with what we have learned about identifying, evaluating and treating WTC-exposed individuals. These published guidelines show clinicians how to determine a patient's exposure history and identify many health problems that may have been caused or made worse by WTC exposure. It also offers algorithms to help clinicians diagnose, treat and manage WTC-related conditions. The guidelines are available on-line at <https://www1.nyc.gov/assets/doh/downloads/pdf/chi/chi27-6.pdf>

**FDNY WORLD TRADE CENTER HEALTH PROGRAM  
HEALTH IMPACTS ON FDNY RESCUE/RECOVERY WORKERS  
An Update 15 Years Later: September 2001-September 2016**

*The purpose of this publication is to update our members on important information the Department has gathered concerning the physical and mental health effects of 9/11 on our membership.*

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Each year on the anniversary of 9/11, two Towers of Light beam skyward in commemoration of the 2750 people killed in the attacks on the World Trade Center on September 11, 2001. The Towers of Light stand as a memorial, a symbol of hope, resiliency and reclamation of New York City's strength and identity.



**New York City Fire Department Members  
Who Made The Supreme Sacrifice  
In The Performance of Duty  
At The World Trade Center  
September 11, 2001  
Manhattan Box 5-5-8087**

First Deputy Commissioner William M. Feenan  
Office of Fire Commissioner  
Chief of Department Peter J. Ganci, Jr., COD  
Assistant Chief Gerard A. Barbara, Operations  
Assistant Chief Donald J. Burns, Operations  
Deputy Chief Dennis A. Cross, Battalion 57  
Deputy Chief Raymond M. Downey, SOC  
Deputy Chief Edward F. Geraghty, Battalion 9  
Department Chaplain Mychal F. Judge, OFM  
Deputy Chief Charles L. Kasper, SOC  
Deputy Chief Joseph R. Marchbanks, Jr., Battalion 12  
Deputy Chief Orio J. Palmer, Battalion 7  
Deputy Chief John M. Paolillo, SOC  
Battalion Chief James M. Amato, Squad Co. 1  
Battalion Chief Thomas P. DeAngelis, Battalion 8  
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Battalion Chief John J. Fanning, Haz-Mat Operations  
Battalion Chief Thomas J. Farrino, Engine Co. 26  
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Battalion Chief Joseph Grzelak, Battalion 48  
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Firefighter Joseph J. Angelini, Jr., Ladder Co. 4

Firefighter Faustino Apostol, Jr., Battalion 2  
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Firefighter Thomas P. Hannafin, Ladder Co. 5  
Firefighter Dana R. Hannon, Engine Co. 26  
Firefighter Daniel E. Harlin, Ladder Co. 2  
Firefighter Timothy S. Haskell, Squad Co. 18  
Firefighter Michael H. Haub, Ladder Co. 4  
Firefighter John F. Heffernan, Ladder Co. 11  
Firefighter Ronnie L. Henderson, Engine Co. 279  
Firefighter Joseph P. Henry, Ladder Co. 21  
Firefighter William L. Henry, Rescue Co. 1  
Firefighter Thomas J. Hetzel, Ladder Co. 13  
Firefighter Jonathan R. Hohmann, Haz-Mat Co. 1  
Firefighter Thomas P. Holohan, Engine Co. 6  
Firefighter Joseph G. Hunter, Squad Co. 288  
Firefighter Jonathan L. Ielpi, Squad Co. 288  
Firefighter William R. Johnston, Engine Co. 6  
Firefighter Andrew B. Jordan, Ladder Co. 132  
Firefighter Karl H. Joseph, Engine Co. 207  
Firefighter Angel L. Juarbe, Jr., Ladder Co. 12  
Firefighter Paul H. Keating, Ladder Co. 5  
Firefighter Richard J. Kelly, Jr., Ladder Co. 11  
Firefighter Thomas W. Kelly, Ladder Co. 15  
Firefighter Thomas J. Kennedy, Ladder Co. 101  
Firefighter Michael V. Kiefer, Ladder Co. 132  
Firefighter Robert C. King, Jr., Engine Co. 33  
Firefighter Scott M. Kopytko, Ladder Co. 15  
Firefighter William E. Krukowski, Ladder Co. 21  
Firefighter Thomas J. Kuveikis, Squad Co. 252  
Firefighter David J. LaForge, Ladder Co. 20  
Firefighter William D. Lake, Rescue Co. 2  
Firefighter Robert T. Lane, Engine Co. 55  
Firefighter Peter J. Langone, Squad Co. 252  
Firefighter Scott A. Larsen, Ladder Co. 15  
Firefighter Neil J. Leavy, Engine Co. 217  
Firefighter Daniel F. Libretti, Rescue Co. 2  
Paramedic Carlos R. Lillo, EMS Battalion 49  
Firefighter Robert T. Linnane, Ladder Co. 20  
Firefighter Michael F. Lynch, Engine Co. 40

Firefighter Michael J. Lyons, Squad Co. 41  
Firefighter Joseph Maffeo, Ladder Co. 101  
Firefighter William J. Mahoney, Rescue Co. 4  
Firefighter Joseph E. Maloney, Ladder Co. 3  
Firefighter Kenneth J. Marino, Rescue Co. 1  
Firefighter John D. Marshall, Engine Co. 23  
Firefighter Joseph A. Mascali, Rescue Co. 5  
Firefighter Keithroy M. Maynard, Engine Co. 33  
Firefighter Brian G. McAleese, Engine Co. 226  
Firefighter John K. McAvoy, Ladder Co. 3  
Firefighter Thomas J. McCann, Engine Co. 65  
Firefighter Dennis P. McHugh, Ladder Co. 13  
Firefighter Robert D. McMahon, Ladder Co. 20  
Firefighter Robert W. McPadden, Engine Co. 23  
Firefighter Terence A. McShane, Ladder Co. 101  
Firefighter Timothy P. McSweeney, Ladder Co. 3  
Firefighter Martin E. McWilliams, Engine Co. 22  
Firefighter Raymond M. Meisenheimer, Rescue Co. 3  
Firefighter Charles R. Mendez, Ladder Co. 7  
Firefighter Steve J. Mercado, Engine Co. 40  
Firefighter Douglas C. Miller, Rescue Co. 5  
Firefighter Henry A. Miller, Jr., Ladder Co. 105  
Firefighter Robert J. Minara, Ladder Co. 25  
Firefighter Thomas Mingione, Ladder Co. 132  
Firefighter Manuel Mojica, Squad Co. 18  
Firefighter Carl E. Molinaro, Ladder Co. 2  
Firefighter Michael G. Montesi, Rescue Co. 1  
Firefighter Vincent S. Morello, Ladder Co. 35  
Firefighter Christopher M. Mozzillo, Engine Co. 55  
Firefighter Richard T. Muldowney, Jr., Ladder Co. 7  
Firefighter Michael D. Mullan, Ladder Co. 12  
Firefighter Dennis M. Mulligan, Ladder Co. 2  
Firefighter Peter A. Nelson, Rescue Co. 4  
Firefighter Gerard T. Nevins, Rescue Co. 1  
Firefighter Dennis P. O'Berg, Ladder Co. 105  
Firefighter Douglas E. Oelschlagel, Ladder Co. 7  
Firefighter Joseph J. Ogren, Ladder Co. 3  
Firefighter Samuel P. Oitice, Ladder Co. 4  
Firefighter Patrick J. O'Keefe, Rescue Co. 1  
Firefighter Eric T. Olsen, Ladder Co. 15  
Firefighter Jeffrey J. Olsen, Engine Co. 10  
Firefighter Steven J. Olson, Ladder Co. 3  
Firefighter Kevin M. O'Rourke, Rescue Co. 2  
Firefighter Michael J. Otten, Ladder Co. 35  
Firefighter Jeffrey A. Palazzo, Rescue Co. 5  
Firefighter Frank Palombo, Ladder Co. 105  
Firefighter James N. Pappageorge, Engine Co. 23  
Firefighter Robert E. Parro, Engine Co. 8  
Firefighter Durrell V. Pearsall, Rescue Co. 4  
Firefighter Christopher J. Pickford, Engine Co. 201  
Firefighter Shawn E. Powell, Engine Co. 207  
Firefighter Vincent A. Princiotta, Ladder Co. 7  
Firefighter Kevin M. Prior, Squad Co. 252  
Firefighter Lincoln Quappe, Rescue Co. 2  
Firefighter Leonard J. Ragaglia, Engine Co. 54  
Firefighter Michael P. Ragusa, Engine Co. 279  
Firefighter Edward J. Rall, Rescue Co. 2  
Firefighter Adam D. Rand, Squad Co. 288  
Firefighter Donald J. Regan, Rescue Co. 3  
Firefighter Christian Regenhard, Ladder Co. 131

Firefighter Kevin O. Reilly, Engine Co. 207  
Firefighter James C. Riches, Engine Co. 4  
Firefighter Joseph R. Rivelli, Jr., Ladder Co. 25  
Firefighter Michael E. Roberts, Engine Co. 214  
Firefighter Michael E. Roberts, Ladder Co. 35  
Firefighter Anthony Rodriguez, Engine Co. 279  
Firefighter Matthew S. Rogan, Ladder Co. 11  
Firefighter Nicholas P. Rossomando, Rescue Co. 5  
Firefighter Paul G. Ruback, Ladder Co. 25  
Firefighter Stephen Russell, Engine Co. 55  
Firefighter Thomas E. Sabella, Ladder Co. 13  
Firefighter Christopher A. Santora, Engine Co. 54  
Firefighter John A. Santore, Ladder Co. 5  
Firefighter Gregory T. Saucedo, Ladder Co. 5  
Firefighter Dennis Scauso, Haz-Mat Co. 1  
Firefighter John A. Schardt, Engine Co. 201  
Firefighter Thomas G. Schoales, Engine Co. 4  
Firefighter Gerard P. Sikorsky, Rescue Co. 3  
Firefighter Gregory R. Schrang, Squad Co. 41  
Firefighter Stephen G. Siller, Squad Co. 1  
Firefighter Stanley S. Smagala, Jr., Engine Co. 226  
Firefighter Kevin J. Smith, Haz-Mat Co. 1  
Firefighter Leon Smith, Jr., Ladder Co. 118  
Firefighter Robert W. Spear, Jr., Engine Co. 26  
Firefighter Joseph P. Spor, Rescue Co. 3  
Firefighter Gregory M. Stajk, Ladder Co. 13  
Firefighter Jeffrey Stark, Engine Co. 230  
Firefighter Benjamin Suarez, Ladder Co. 21  
Firefighter Daniel T. Suhr, Engine Co. 216  
Firefighter Brian E. Sweeney, Rescue Co. 1  
Firefighter Sean P. Tallon, Ladder Co. 10  
Firefighter Allan Tarasiewicz, Rescue Co. 5  
Firefighter Paul A. Tegtmeier, Engine Co. 4  
Firefighter John P. Tierney, Ladder Co. 9  
Firefighter John J. Tipping, II, Ladder Co. 4  
Firefighter Hector L. Tirado, Jr., Engine Co. 23  
Firefighter Richard B. Van Hine, Squad Co. 41  
Firefighter Peter A. Vega, Ladder Co. 118  
Firefighter Lawrence G. Veling, Engine Co. 235  
Firefighter John T. Vigiano, II, Ladder Co. 132  
Firefighter Sergio G. Villanueva, Ladder Co. 132  
Firefighter Lawrence J. Virgilio, Squad Co. 18  
Firefighter Kenneth T. Watson, Engine Co. 214  
Firefighter Michael T. Weinberg, Engine Co. 1  
Firefighter David M. Weiss, Rescue Co. 1  
Firefighter Timothy M. Welty, Squad Co. 288  
Firefighter Eugene M. Whelan, Engine Co. 230  
Firefighter Edward J. White, Engine Co. 230  
Firefighter Mark P. Whitford, Engine Co. 23  
Firefighter Raymond R. York, Engine Co. 285



**FDNY members who became ill and lost their lives after performance of duty in the WTC rescue/recovery effort: as of 3/22/16**

- Firefighter Robert W. Dillon, Engine Co. 153
- Firefighter Vanclive A. Johnson, Ladder Co. 135
- Firefighter Russell C. Brinkworth, Ladder Co. 135
- Firefighter Edward V. Tietjen, Ladder Co. 48
- Firefighter Walter Voight, Ladder Co. 144
- Battalion Chief Kevin R. Byrnes, Battalion 7
- Firefighter Stephen M. Johnson, Ladder Co. 25
- Lieutenant Richard M. Burke, Engine Co. 97
- Firefighter Michael Sofia, Engine Co. 165
- Firefighter Joseph T. Callahan, Engine Co. 245
- Firefighter Joseph P. Costello, Battalion 58
- Firefighter William R. O'Connor, Ladder Co. 84
- Lieutenant Reinaldo Natal, Field Communications
- Paramedic Deborah Reeve, EMS Station 20
- Fire Marshal William Wilson, Jr., BFI, Manhattan Base
- Lieutenant Thomas J. Hodges, Engine Co. 313
- Firefighter Robert J. Wieber, Engine Co. 262
- Lieutenant Joseph P. Colleluori, Jr., Engine Co. 324
- Firefighter Michael J. Shagi, Engine Co. 74
- Firefighter William R. St. George, SOC Battalion
- Firefighter Raymond W. Hauber, Engine Co. 284
- Lieutenant Brian Ellicott, EMS Dispatch
- Firefighter William E. Moreau, Engine Co. 166
- Lieutenant John P. Murray, Engine Co. 165
- Firefighter Sean M. McCarthy, Engine Co. 280
- Firefighter Bruce M. Foss, Ladder Co. 108
- Firefighter Jacques W. Paultre, Engine Co. 50
- Firefighter Martin C. Simmons, Ladder Co. 111
- Firefighter Kevin M. Delano, Sr., Ladder Co. 142
- Lieutenant Vincent J. Tancredi, II, Ladder Co. 47
- Paramedic Clyde F. Sealey, Bureau of Health Services
- Firefighter Timothy G. Lockwood, Engine Co. 275
- Firefighter Edward F. Reilly, Jr., Ladder Co. 160
- Firefighter John F. McNamara, Engine Co. 234
- Lieutenant Thomas G. Roberts, Ladder Co. 40
- Captain Kevin J. Cassidy, Engine Co. 320
- Firefighter Joan R. Daley, Engine Co. 63
- Firefighter Richard A. Manetta, Ladder Co. 156
- Lieutenant Peter J. Farrenkopf, Marine Co. 6



- Battalion Chief John J. Vaughan, Battalion 3
- Firefighter Robert A. Ford, Engine Co. 284
- Paramedic Carene A. Brown, EMS Bureau of Training
- Firefighter James J. Ryan, Ladder Co. 167
- Lieutenant Robert M. Hess, Ladder Co. 76
- EMT Freddie Rosario, EMS Station 4
- Lieutenant Harry Wanamaker, Jr., Marine Co. 1
- Supervisor Communications Electrician
- Philip J. Berger, Outside Plant Operations
- Firefighter Vincent J. Albanese, Ladder Co. 38
- Firefighter John P. Sullivan, Jr., Ladder Co. 34
- Firefighter Roy W. Chelsen, Engine Co. 28
- Firefighter William H. Quick, Ladder Co. 134
- Lieutenant Andrew M. Borgese, Engine Co. 326
- Firefighter Willie T. Franklin, Jr., Engine Co. 65
- Firefighter John F. O'Neill, Ladder Co. 52
- Lieutenant Randy J. Wiebicke, Ladder Co. 1
- Firefighter Brian C. Malloy, Ladder Co. 80
- Lieutenant John A. Garcia, Ladder Co. 5
- Firefighter Anthony J. Nuccio, Ladder Co. 175
- Fire Marshal Steven C. Mosiello, COD's Office
- Firefighter Carl Capobianco, Ladder Co. 87
- Captain Emilio R. Longo, Ladder Co. 110
- Firefighter Raymond Ragucci, Engine Co. 5

- Deputy Chief William J. Guido, Marine Division
- Captain Sheldon Barocas, Engine Co. 251
- Firefighter Virginia A. Spinelli, Engine Co. 329
- Deputy Assistant Chief John S. McFarland, EMS Operations
- Lieutenant Robert J. Stegmeier, Ladder Co. 127
- Lieutenant Mark W. McKay, Ladder Co. 45
- EMT Anthony J. Ficara, EMS Station 43
- Lieutenant Patrick J. Sullivan, Ladder Co. 58
- Firefighter Michael F. Mongelli, Battalion 39
- Firefighter Lawrence J. Sullivan, Rescue Co. 5
- Firefighter Michael G. Behette, Ladder Co. 172
- Battalion Chief Thomas R. Van Doran, Battalion 3
- Battalion Chief Richard E. McGuire, Battalion 51
- EMT Joseph V. Schiumo, EMS Station 20
- Paramedic Ruben I. Berrios, EMS Station 20
- Firefighter Walter Torres, Engine Co. 328
- Battalion Chief John K. Corcoran, Battalion 52
- Firefighter Andrew D. Dal Cortivo, Engine Co. 227
- Lieutenant Martin T. Fullam, Ladder Co. 87
- Firefighter Charles L. Jones III, Ladder Co. 165
- Battalion Chief Richard D. Arazosa, Battalion 19
- Supervising Fire Marshal Emil K. Harnischfeger, BFI
- Lieutenant Douglas Mulholland, EMS Station 35
- Captain Peter J. Casey, Engine Co. 212

- Paramedic Rudolph T. Havelka, EMS Bureau of Training
- EMT Francis A. Charles, EMS Station 58
- Paramedic John W. Wyatt, Jr., EMS Station 22
- EMT Luis de Peña, EMS Station 13
- Firefighter Adolfo Otaño, Engine Co. 202
- Lieutenant Michael F. Cavanagh, EMS Station 16
- Deputy Chief Inspector James W. Mandelkow, BFP
- Lieutenant Thomas J. Greaney, Ladder Co. 175
- Firefighter Keith E. Atlas, Engine Co. 35
- Auto Mechanic Raffaele E. Scarpitti, Fleet Services
- Lieutenant John J. Halpin, Ladder Co. 33
- Captain William C. Olsen, EMS Station 23
- Lieutenant Steven B. Reisman, Engine Co. 307
- Firefighter Ronald R. Brenneisen, Ladder Co. 43
- Lieutenant John K. Gremse, Engine Co. 302
- Lieutenant Howard J. Bischoff, Ladder Co. 149
- Firefighter Daniel E. Heglund, Rescue Co. 4
- Firefighter Robert E. Leaver, Division 3
- Firefighter Cornell L. Horne, Ladder Co. 176
- Lieutenant Thomas Giammarino, EMS Station 31
- Firefighter Eugene J. McCarey, Ladder Co. 36
- Firefighter James J. Marshall, Sr., Ladder Co. 78
- Firefighter Charles S. Szoke, Ladder Co. 21
- Firefighter Richard E. Nogan, Ladder Co. 113
- Battalion Chief John J. Cassidy, Battalion 40
- Captain John R. Graziano, Ladder Co. 78
- Firefighter Gregory A. Chevalley, Ladder Co. 176
- Battalion Chief George D. Eysser, Battalion 35
- Captain John Gallagher, Engine Co. 251
- Lieutenant Keith M. Loughlin, Ladder Co. 109
- Captain Thomas J. Thompson, Engine Co. 306
- Lieutenant Harold E. McNeil Sr., EMS Station 31
- Lieutenant Gary J. Gates, Field Communications
- Firefighter Dennis J. Heedles Sr., Engine Co. 151
- Firefighter Nicholas J. DeMasi, Engine Co. 259
- Battalion Chief James N. Costello, Battalion 4
- Firefighter Frank D. Fontaino, Engine Co. 155
- Firefighter Michael P. Smith, Jr., Ladder Co. 58
- Firefighter Thomas J. Kelly, Ladder Co. 19
- Firefighter Joseph A. Morstatt, Ladder Co. 45
- Lieutenant Robert G. Alford, Engine Co. 231