New York University School of Medicine

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Final Progress Report

The NYU/Bellevue World Trade Center Monitoring (WTC) program was established in 2002 to screen and monitor emergency responders who volunteered or came to work as part of the search, rescue and recovery operation after the September 11th tragedy.

It is now known that the collapse of the towers resulted in the combustion of more than 90,000 liters of jet fuel. An initial cloud of dust and smoke enveloped the area in all directions. Fires in the 16-acre site continued for more than three months after the event, with a pervasive odor in the surrounding community that was detectable throughout this time. Analyses of the initial settled dusts revealed cement, glass and particulate matter including gypsum (calcium sulfate), calcium carbonate (calcite), cement dust, and glass fibers. The settled dusts were alkaline, with a pH of aqueous suspensions of settled dusts ranging from 9.3 to 11.5. Metals such as chromium, magnesium, manganese, aluminum, barium, titanium and low levels of lead were detected in the dusts. Ferrous and ferric compounds were detected in the area by imaging spectroscopy. Particles were also noted to contain polycyclic aromatic hydrocarbons, polychlorinated biphenyls, and organochlorine pesticides.

The health effects of some of these individual substances are known, however, the cumulative health effects of the exposures is difficult to predict. It is, therefore, crucial that we continue to monitor the responders for known or potential health effects from the exposures. Our program will continue to do so under the new World Trade Center Health Program contract. Since the start of the program, specific goals were established to meet the needs of these responders. As of June 30, 2011, our progress in meeting these goals are as follows.

Specific Aim 1.

To perform longitudinal health evaluations in a population of World Trade Center (WTC) responders. This includes but not limited to members of the Fraternal Order of Police and New York City Police Department, New York City day laborers, and Metal Trades Council, 32 BJ, communication workers union and community organization such as the Beyond Ground Zero Network. We will screen for medical complications associated with the WTC disaster with a focus on sinus disease, upper and lower respiratory diseases, gastroesophageal diseases and mental health disorders. We will also keep records of all late emergent diseases such as cancers that possibly may arise from this population.

Our staff continues to diligently work on recruitment and retention of responders including symptomatic and asymptomatic registrants. Patients are called in a timely manner for their yearly medical visits. Patients who don't show for visits are placed on a list and called again at later dates to schedules an appointment. Every effort is made during these calls to update patient information such as new addresses, phone numbers, whether they want to continue in the program and any new medical diagnoses. The no show rate was 20% and a reschedule rate of 19%. Our social worker, Trace Rosel, also does outreach to various organizations whose members participated in rescue and

recovery after 9/11 to encourage workers to initiate or continue monitoring. We also participate in mailings to our cohort providing any updates about the program or offering our services during times of increased stress such as around holidays and during the anniversary of the event.

All participants continue to receive a mental health questionnaire, an exposure questionnaire and medical questionnaire. They also receive routine laboratory test including lead and iron level, spirometry and a complete physical exam as per the protocol developed by all five centers. All exams are now currently performed yearly and take an average of four hours to complete. We continue to see participants two days weekly due to space limitations. Despite this, we have been able to meet our proposed patient visit goals for the past few years. Based on our analysis, we met the goal of seeing 670 monitoring patients in the extension period 7/1/2010 to 6/30/2011, a total of 685 monitoring visits were conducted.

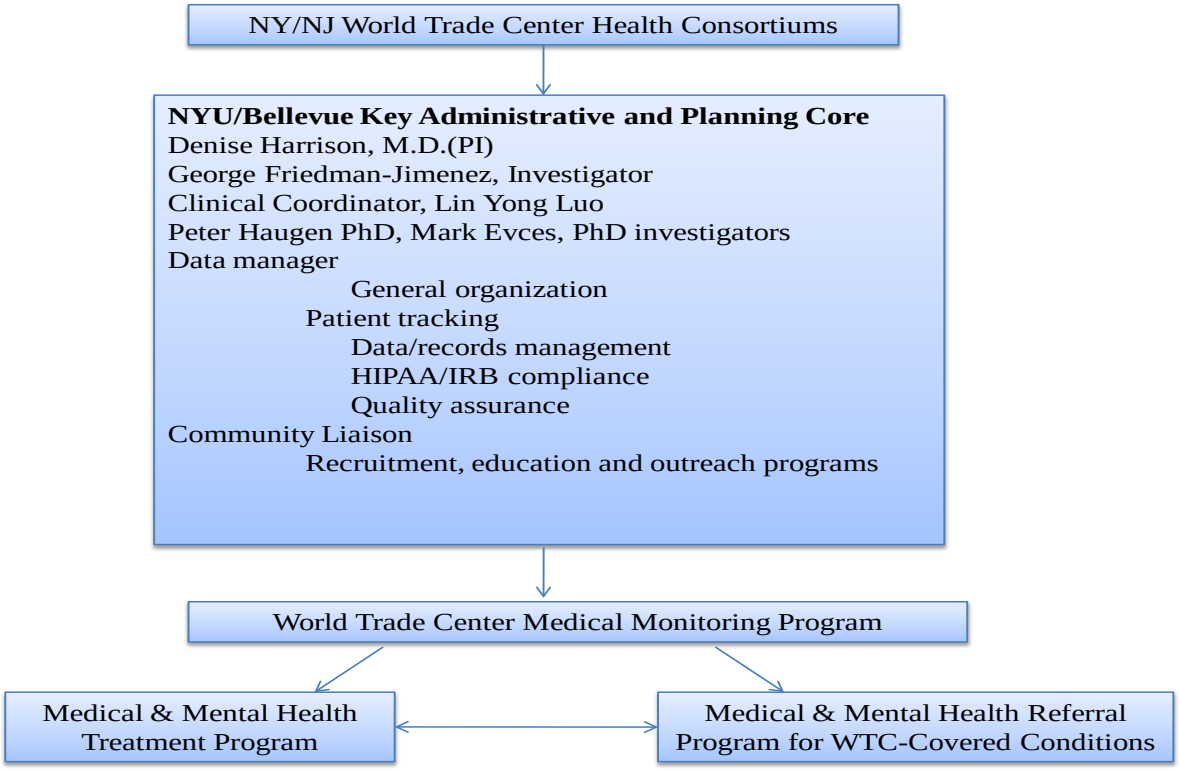
The WTC monitoring program has a specific focus on certain conditions that are thought to be related to the exposures sustained during the 9/11 tragedy. In order to maintain and increase our cohort, the exam we offer is comprehensive and patients are usually informed on necessary health screenings relevant to their age. Patients are often counseled on issues such as risk factors for diabetes, weight control, and importance of blood pressure control, cholesterol and smoking cessation. Many responders might not get to go to their primary care physicians regularly so these are offered to improve retention.

Participants who are identified with potential World Trade Center conditions are referred to the treatment program for further treatment and assessment that could provide further insight into the pathophysiology of these diseases. Interesting questions have arisen in the WTC treatment program such as, what is underlying pathology in the so call WTC cough that is not responsive to treatment and also gastroesophageal reflux that is not responsive to treatment.

Similar to findings in the other clinical centers, the majority of our participants are presenting with complaints related to the aerodigestive tract, mainly asthma, sinus disorders, GERD, cough and shortness of breath and interstitial lung diseases. The top mental health diagnoses include depression, PTSD and anxiety disorder. In addition, the questionnaires also include inquiry regarding diseases of interest in our WTC cohort such as cancers, other respirator diseases such as pulmonary fibrosis and sarcoidosis.

We will continue to work with the other Clinical Centers of Excellence to identify new and emerging diseases and to document response to treatment. Our staff continues to participate in the monthly WTC Steering Committee meeting and participate in monthly meetings of clinical and administrative staff. At these meetings, the needs of our patient populations within the various groups are discussed, and there is also effort made to improve the program such as improving data recording, establishing protocols for various issues that arise in the program, updating the list of covered conditions and medications and making referrals to various specialties.

Monitoring and Treatment Organization



Specific Aim 2.

To perform long-term mental health screening of a population of WTC responders for persistent post traumatic stress disorders and depression.

Our Mental Health experts not only have interest in the diagnoses and treatment of the common disorders affecting our patients, such as PTSD and depression, they also are interested in the ways in which different factors such as ethnicity, occupations, personalities and psychosocial issues might affect acceptance of diagnoses and treatment. The Mental Health screening, monitoring and treatment aspects of our program have had the biggest improvement over the past year. Dr. Peter Haugen continues to work with us four days weekly two in the treatment program and two in the monitoring. Dr. Mark Evces works with us four days a week, two in monitoring and two in treatment. Both are in charge of supervising our mental health externs that rotate through our program. Our social worker, Trace Rosel, also works with them in identifying patients that need follow up and providing counseling.

All mental health experts are involved in administering the mental health questionnaire to participants in the monitoring program two days a week. Having training in mental health allows them to be better able to identify mental health problems in our participants. In working to identify mental health issues, they are able to get members to become more aware of these issues and to be more accepting of medical intervention.

Both Dr. Haugen and Trace Rosel also participate in conferences dealing with mental health issues in the WTC Health Program. They provide vital input in discussions regarding optimal level of mental health care for the WTC population. Dr. Haugen also participates in lectures/conferences to externs that deals with treatment modalities and efficacy of treatment of PTSD in our cohort

As part of our continuing efforts to provide quality care to participants, we have piloted quality assurance measures in mental health and expanded the mental health program to include additional opportunities to encourage post-doctoral candidates to work with our psychologists. Dr. Haugen and Dr. Evces developed a post-doctoral fellowship guideline for our program which has been adopted by our institution at NYU School of Medicine as the model for all psychologist post-doctoral fellows. We have had really strong candidates for both externships and internships through these expanded efforts.

Specific Aim 2a.

To develop a referral program for responders with medical or mental health complaints to medical and mental health specialists with experience with WTC-associated health issues.

We continue to use physicians hired by the program to see the majority of patients referred to the WTC treatment program. Patients in need of specialized care are referred to specialist in the Bellevue Hospital clinic network, participants seen in our centers are referred most often to gastroenterology, ENT, dermatology and neurology. These referral physicians are usually in the Bellevue Hospital healthcare system. Access to these referral records are readily available in the Bellevue patient information system and are used to gather data regarding diagnoses and treatment for our program. Currently we continue to share a psychiatrist, EarNose and Throat (ENT), gastroenterology and cardiology with the other NIOSH sponsored program at Bellevue Hospital.

Specific Aim 3.

To develop responsive outreach and educational programs for responders and their families and for local physicians to improve understanding of medical and mental health issues associated with the WTC disaster.

Outreach, Retention, and Social Work: Bellevue WTC Medical Monitoring and Treatment Program Outreach-- The objective goal of our program's outreach efforts has been to collaborate with other 9/11-related agencies and WTC Medical Monitoring Program clinical centers, to participate in organized events, such as health fairs, cultural events, and family-centered activities. Recent events have included NYPD health fair and a baseball game hosted by the Brooklyn Cyclones in honor of the 9/11 first responders. The focus of the program's outreach has been to reach out to the population of first responders who may not be familiar with the WTC MM&T program or services or has been unwilling to come back for follow up visits.

Retention
One of our greatest assets has been utilizing the annual WTC Medical Monitoring exam as an opportunity to identify possible challenges or obstacles that our patients may face when scheduling their annual exam. During a patient's visit, our social worker can play a vital role in exploring these obstacles. In our clinical setting, the social worker has the opportunity to meet with patients and inquire about their experience before, during and after the exam. If obstacles are identified, the social

worker is available to provide assistance and ascertain information which may be of importance to more comprehensive retention efforts. Areas of concern often includes, how to talk to your physician about your symptoms, concerns about accessing social services, and difficulty in asking for mental health services. Having a successful monitoring visit probably ensures the best outcome in terms of retention for this program. A successful visit encourages pts to tell their colleagues about their experience. For example, many new patients reveal it was the advice of a colleague which provided the encouragement to schedule a visit. During a monitoring visit, the social worker is also available to provide support to the patient and stress the importance of scheduling a follow-up exam, in addition to identifying obstacles that may prevent the patient from scheduling the annual exam.

In our clinical setting, special attention is paid to assisting patients with filling out their questionnaires and providing an explanation about the general procedures involved throughout the exams and addressing any special needs that may need additional attention throughout the day.

During the visit, our social worker (who also is trained to do psychological counseling) is available to meet with patients and provide a referrals for further mental health examination and/or social service referrals. Our social worker will also assess the needs of a patient and respond to any immediate crisis or provide education about available services such as worker's compensation, line of duty benefits, SSD, available health insurance coverage, immigration issues, vocational retraining, and emergency assistance.

As individuals who participated in the rescue and recovery efforts of 9/11 originate from diverse socio-economic backgrounds, their needs vary in range and complexity. Our social worker attends a monthly consortium-wide social work meeting to discuss obstacles to patient care, advocacy and development of additional resources and social services.

Our program recognizes the importance of continually expanding our knowledge base of available resources, therefore our social worker is a part of a consortium-wide social work resource guide task force, responsible for developing a comprehensive resource guide which will provide social workers program-wide with access to current resource materials for patients. This valuable resource guide will hopefully develop into a training manual for newly hired social workers joining the WTC Health program.

Ms. Rosel also worked with the Data Coordination Center at Mt. Sinai to focus on developing a wide scope of resources, directed by patient need, which may include victim services, language, educational and vocational training, senior services, family services, food assistance, clothing, dental services, veteran services, volunteer services, bereavement, and hospice care. This resource guide has been extremely useful to providing additional guidance to our responder population.

Specific Aim 4.

To provide comprehensive treatment to participants thought to have WTC related medical problems free of cost, this includes general medical care and referral to medical and mental health specialist and medications used to treat WTC related medical problems.

Medical Treatment Report

The start of our treatment program in November of 2006 was a valuable asset to improving our services to this population. We continue to see patients in the treatment program twice weekly for both mental and medical care. The number of patients seen in the treatment program has remained steady over the past year. To date a total of 952 patients were referred for treatment with a current no show rate and reschedule rate of around 20%. For the period 7/1/2010 to 6/30/2011, there were a total of 253 unique patients seen for medical treatment. To date from the start of the program, we have seen a total of 2059 medical patient visits with 497 unique patients. There are currently 34 unique patients for social work only services. Medical patients are more often treated for respiratory disorders such as asthma, cough, RADS, sinusitis, rhinitis, GERD, sleep apnea, sarcoidosis, skin disorder, and musculoskeletal disorders. Common referrals made include gastroenterology, Ear/nose and throat specialist, psychiatry, dermatology, sleep and neurology, access to these referral records are readily available in the Bellevue electronic medical record system, so care is easily coordinated. Common procedures ordered include CT Scans of the head and chest, MRI's, sinus CT, upper endoscopies, pulmonary function test and sleep studies all procedures are performed in Bellevue Hospital.

Many of the patients are reporting control of symptoms on medications and report return of symptoms if meds are discontinued. A small fraction of patients report no improvement in symptoms on medications. We continue to evaluate these patients to try to identify possible causes for non-response to treatment. Asthma, for example, has multiple etiologies, if patient cough is an allergy component then treating for allergies may give a greater response, we are also looking into the role mental health issues affecting medical treatment outcomes.

As outreach efforts continue, the program continues to enroll new members on a weekly basis. Many of these individuals differ from early enrollees in that they have lived longer with trauma-related sequelae, often without any psychological assessment or treatment. Chronic, untreated depression and anxiety, sometimes combined with alcohol abuse, often lead to the erosion of individuals' important relationships, support networks, and/or jobs. The loss of these protective factors can, in turn, lead to worsening of symptoms in a worsening downward spiral. Therefore, it continues to be essential to offer high-quality psychological assessment and treatment for new members in addition to continue to assess and treat existing members.

Dr. Denise Harrison continues to see patients one and half day per week, Dr. Susan Richman sees patients once weekly and Dr. Nishay Chitkara also sees patients once per week. We continue to share a psychiatrist, ENT doctor, gastroenterologist and cardiologist with the NIOSH funded WTC Environmental Health program. These doctors have expressed an interest in the environmental health effects of the WTC exposures as in pertains to their individual specialties.

MH Treatment Program

Since the inception of the mental health treatment program, our staff has provided 2742 visits across 190 unique patients. The three most common single psychiatric diagnoses for patients in both the monitoring and treatment programs are chronic PTSD, Anxiety Disorder NOS, and Major Depressive Disorder. Studies with a multi-site cohort have suggested a positive relationship between the presence of these diagnoses and the direct and protracted nature of our cohort's exposure to the aftermath of the attacks of 9/11/01 (Stellman et al., 2008). All three diagnoses – singly or with co-

morbidities - are frequently accompanied by psychosocial stressors and functional impairments, including marital instability or divorce, low levels of social support, and/or occupational impairment or unemployment.

The primary goal of the mental health treatment program is to provide the most effective treatment for our cohort psychiatric and psychosocial difficulties. Through individual, group, and couples psychotherapy, together with psychopharmacological adjunctive treatment and linking to concrete services, we reduce the overall number of symptoms, symptom intensity, and level of functional impairment in our treatment patients. Specifically, we accomplish this goal through:

1) **Integrating evidence-based practice into treatment.** As per the treatment guidelines developed by the American Psychological Association (APA) and International Society for the Study of Traumatic Stress (ISTSS), treatment in our program is initially integrative, involving at least one empirically-supported treatment (e.g., Cognitive Processing Therapy), but is also self-correcting – if one technique is not working, another is attempted, even if from a different modality. Patients requiring medication for mental health disorders are referred to a dedicated psychiatrist at Bellevue who is familiar with the exposures of the WTC population and their mental health needs. After the psychiatrist does the initial evaluation, Dr. Haugen, Dr. Evces and Trace Rosel and psychology externs under supervision provide additional counseling, with follow up with the psychiatrist as needed.

2) **Integrating practice-based evidence into treatment.**
To accomplish this, we have designed a system of data collection utilizing psychometrically sound and clinically relevant instruments together with standardized pathways by which these data are used to inform the practice of individual treatment providers *during treatment*. The development of such a standardized system for monitoring and managing service delivery also offers the opportunity to compare our service profile with relevant benchmarks that provide comparative indicators and descriptors. Finally, this treatment method allows for the testing of sophisticated hypotheses regarding the processes of psychotherapeutic action and change, and for their report in peer-reviewed formats (See Specific Aim 5). The process of collecting and analyzing clinical data will also contribute to the evidence-base of psychotherapy research and to specialist teaching and training.

3) **Provide evidence of our effectiveness.** This treatment method provides a framework for responding to the increasing demand in healthcare and other sectors to provide evidence of service quality and effectiveness and will help to establish the program as center of excellence in the field of trauma related mental health issues.

4) **Contribute to specialist teaching and training.** Peter Haugen, Ph.D., oversees weekly didactics meetings, including clinical cases and treatment techniques with our mental health staff. The treatment program is now an official placement site for the NYU/Bellevue Psychology Externship Program, with two psychology externs providing clinical services under supervision. In addition, the program has become a training site for the residency program of the NYU/Bellevue Department of Psychiatry, where psychiatric residents are made familiar with the WTC health effects and treatment of our specific population (see Specific Aim 5).

5) **To provide fully-equivalent mental health-services to Spanish-speaking patients.** We have recently expanded the treatment team through the addition of a per-diem Spanish-speaking psychologist and Spanish-speaking psychiatrist. We also continue to share a psychiatrist with the WTC residents program here at Bellevue, however because of a backlog of patients we find it necessary to hire and additional psychiatrist and psychologist to meet the needs of our Spanish speaking patients.

Clinical Operations

The medical treatment and mental health counseling all take place in the same geographic area two days a week. This makes it easy for the mental and medical staff to work collaboratively in order to provide the most comprehensive multisystem approach to clinical care. As much as possible, patients are scheduled on the same day for both mental health and medical treatments; this allows for fewer days off from work for doctors visits.

We continue to work on trying to improve our treatment numbers on many levels. If given more space, we could be more flexible on the hours we offer to participants. Our current no show rate for the treatment program is 20% with aggressive outreach, and with more available time slots, we hope to reduce this no show rate. We have been looking into why many patients referred for treatment do not follow up. One of the main reasons is geography and many find it easier to go to physicians closer to their home or work. Since our treatment program was late in starting, many of our patients have already developed ongoing relationships with other physicians. Whenever possible, participants are encouraged to bring in diagnoses, diagnostic test and procedures from their physicians so we can add the information to our database as part of monitoring efforts. Mental Health patients who find it difficult to come to NYU are also referred to mental health workers involved in the New York City sponsored mental health program that provide services to WTC responders.

Research Interest

The mental health treatment program is working on designing and seeking funding for a Clinical Research Program (CRP) with the aim of improving the effectiveness of the psychological treatment provided to our cohort. This is accomplished through both a) patient-focused research (described previously in Specific Aim 4) and b) psychotherapy process and outcome research, which generates and tests hypotheses at the level of the population.

The primary goal of research framework will be based largely on the work of Hilsenroth (e.g., 2007). This hybrid model integrates the rigor of efficacy methods with the external validity of an effectiveness model (Seligman, 1996). Treatment outcomes are evaluated from three perspectives: patient self-report, therapist ratings, and external rater via digital video recording (Strupp, 1996). Measures include well-normed questionnaires evaluating psychiatric symptoms and syndromes, social functioning (work, family, leisure), and interpersonal functioning; well-operationalized behavioral criteria; and survey material designed to obtain patient assessment of changes in productivity at work, interpersonal relations, improvement on the presenting problem, satisfaction with treatment and global improvement. Multiple measures will be included specific to the Program's clinic population, including 9/11-related traumatic exposure and post-traumatic sequelae. Measures are administered longitudinally: prior to beginning treatment, at standardized points during the treatment, and at the termination of treatment. The systematic collection of data at more frequent intervals during treatment allows for providers to evaluate the treatment as they provide it and, if indicated, adjust accordingly,

enhancing effectiveness. Maximizing treatment effectiveness increases efficiency and cost effectiveness (Wampold & Brown, 2005). Hypotheses to be addressed include:

1) Evaluating therapeutic activities which differentially promote symptom reduction for both 9/11 and non-9/11-related stressors/exposure and the development of post-traumatic sequelae.
    a. The relationship between routine work-environment stress, posttraumatic outcomes, and psychotherapy processes and outcomes in law enforcement personnel.
2) The contribution of personality dimensions to psychotherapy outcome in first responders with posttraumatic stress disorder and other posttraumatic stress syndromes.
3) The role of various psychotherapy process variables (e.g., Posttraumatic cognitions; self-understanding of interpersonal patterns; therapeutic alliance; the relative use of various types of psychotherapeutic interventions) in predicting treatment outcomes, including drop-out and failure to respond to treatment.

Potential Pulmonary Research

Upper and lower respiratory symptoms are commonly reported in the WTC responders. These may or may not be associated with definitive findings on pulmonary function test, cardiology or radiologic work up. The current thought is that the majority of asthma seen in the WTC cohort is probably irritant induced asthma. However, some patients that developed asthma after 9-11 may have an allergic component as well or instead. Of particular interest is whether or not patients who are more recently diagnosed with asthma do so as a consequence of their exposure on 9-11.