New England College of Occupational and Environmental Medicine

Volume 2 Issue 5

Summer 2002

NECOEM Reporter

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Ground Zero: Testimony before the Environmental Protection Committee of New York City

March 8, 2002

The essential deficiency in addressing the problem of *air quality* at and near the World Trade Center site has been the incomplete portrayal of the problem as an *environmental* problem. **The problem is not air quality *per se* but potential and actual human illness.** Thus, the primary governmental agency involved with *air quality* outside of Ground Zero has been the Environmental Protection Agency. The EPA has collected enormous amounts of environmental data, which, despite very considerable effort, have nonetheless failed to quiet legitimate concerns. We believe that the problem of *air quality* should be largely re-defined as one of *ill health, potential or actual*, of the various involved parties, including Ground Zero workers, near Ground Zero workers and downtown residents. If the problem is re-defined in this manner, health agents, not an environmental agency, gain preeminence in analyzing and addressing the threats to health in and around Ground Zero.

If this distinction seems thin, consider these questions: Six months after September 11, how much information do we have about the health of people who worked at or lived near the WTC destruction? How many people are affected, and what is the extent and nature of their health problems? The answers to these questions, sadly, are absent. We have anecdotes but no systematic understanding of the true toll of September 11 on health. Compare this with the availability of tens of thousands of envi-

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The 2007 Rule: Reductions in diesel exhaust emissions

Sandra D. Stratford, MD, MSc

Effective since March 19, 2001, the EPA "2007 Rule", Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements, requires up to 95% reduction in the major components of diesel exhaust emissions by the year 2007. The D.C. U.S. Circuit of Appeal recently upheld the rule. Diesel engines emit nitrous ox-

ides (NOx), non-methane hydrocarbons (HC) and particulate matter (PM). Specifically, the 2007 rule sets reductions of 95% and 90% for NOx and PM respectively. The standard will be phased in from 2007 to 2009 for NOx and HC: 50% of manufacturers' sales for 2007, 2008, 2009 engines and 100% sales for 2010. EPA has the authority to regulate any fuel component that significantly impairs the performance of emission control technology. Consequently, the rule also requires a 97% reduction in the sulfur content of diesel fuel. As of 2006, the maximum sulfur content of diesel fuel will be reduced from 500 ppm to 15 ppm. It is estimated that under the new requirements, by the year 2030, NOx emissions for heavy duty vehicles will be reduced by 2.6 million tons and PM emissions by 109,000 tons, significantly reducing this source of NOx and PM emissions.

How did we get here?

The national mobile source emission control program, since its inception in the early 1970s, has issued motor vehicle standards to reduce air pollution. The early standards focused on emissions of HC, NOx and CO (carbon monoxide). 1990 Clean Air Act (CAA) Amendments added new elements to the mobile source emissions control programs. Whereas the primary focus on attainment of the National Ambient Air Quality Standards (NAAQS) for ozone, CO, NOx and PM continues, CAA amendments have also led to the development of programs that focus on highway motor vehicles (passenger cars, light duty trucks and heavy duty trucks and truck engines), including focus on controls for hazardous air pollutants emitted from motor vehicles and their fuels. Since 1970, emission limits for HC, NOx and CO from cars have been steadily declining.

The Health Assessment Document for Diesel Exhaust, July 2000 SAB Draft (http://www.epa.gov/ncea/dieslexh.htm) which represents the agency's first comprehensive review of the potential health effects from ambient exposure to diesel engine exhaust attempts to identify and characterize the potential human health effects of diesel exhaust (DE). DE is composed of both gaseous and particulate components. Formaldehyde, acetaldehyde, acrolein, benzene, 1,3 butadiene and polycyclic aromatic hydrocarbons (PAHs) are the gaseous components with toxic relevance. The particulate components or diesel particulate matter (DPM) are composed of elemental carbon (EC), adsorbed organic compounds and small amounts of sulfate, nitrate, metals and other trace elements. DPM consist of fine (< 2.5 microns) and ultrafine (< 100 nm) particles and are therefore highly respirable. Due to the large surface areas, they are superior carriers for adsorbed inorganic and organic compounds. Whereas elemental carbon comprises a high fraction of DPM, PAHs and their derivatives comprise about 1% or less of the DPM mass. Many of the organic compounds present in the particulates and in the gases are known to have mutagenic and carcinogenic properties.

Also linked to serious respiratory health problems, is particulate matter, of which diesel is one of the sources. The key categories of health effects associated with ambient particulate matter include premature mortality, aggravation of respiratory and cardiovascular disease (as indicated by increased hospital admissions and emergency room visits, school absence, work loss days and restricted activity), aggravation of asthma, acute respiratory symptoms, chronic bronchitis and decreased lung function. Diesel particles are a component of both coarse and fine PM, but fall mostly in the fine and ultrafine range. Exposure to fine particulate is closely associated with premature mortality and hospital admissions for cardiopulmonary disease. Specifically, increased mortality associated with fine PM was observed in cities with longer term average fine PM concentrations in the range of 16 to 21 ug/m^3.

Early to mid–1990's estimates suggest that annual average DE exposure from on road engines alone was in the range of about 0.5 to 1 ug/$DPMm^3$ of inhaled air in many rural and urban areas, respectively. For urban areas, they may approach $4ugDPM/m^3$ of inhaled air. Extrapolating from several epidemiologic studies, morbidity and mortality effects of diesel PM exposure have been calculated in California. For the year 2000, it is estimated that an average of 2592 cases of chronic bronchitis, 1673 asthma related emergency room visits and close to 4000 hospital admissions for COPD, pneumonia, cardiovascular disease and asthma are a result of ambient diesel PM.

NIOSH (National Institute for Occupational Safety and Health) in 1988 estimated that 1.35 million workers were occupationally exposed to diesel exhaust emissions. Occupations include mine workers, railroad workers, bus and truck drivers and maintenance workers, garage workers, loading dock workers, firefighters, heavy equipment operators and farm

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ronmental sample results, which, interestingly, have mostly failed to explain why people downtown have not felt well.

During November 2001, information first became available that a high proportion of fire fighters who had worked at Ground Zero had persistent respiratory symptoms and abnormal pulmonary function. We then decided to offer medical evaluations to a group of workers who were the least likely to receive appropriate medical attention for occupational health, that is, day laborers. These are the building clean-up workers who were responsible for cleaning up the many contaminated office and residential buildings near Ground Zero.

Consider the problem this way: In the weeks and months following September 11, there were, in essence, two columns of workers marching south on Church Street towards the field of ruin called Ground Zero. In one column were the fire fighters, the iron workers, the crane operators and the police. They work for big-name employers like New York City, Bechtel, Turner Construction and belong to unions, well-organized to protect their members. They have health insurance and predictable paychecks. At Vesey Street, they turned right to enter Ground Zero, which they and the entire world knew to be a dangerous and unpredictable worksite. They were given respirators and other protective gear and worked under the watchful eye of OSHA, EPA and other inspectors. They worked under immensely bright lights and have been deservedly acclaimed for uniquely difficult work. Even so, many of these workers sustained injuries. Some of these workers are now ill, and many more have not yet been properly evaluated.

There was another column of workers marching down Church Street. Their skin was a little darker, and they knew very little English, indeed probably as much as the grandparents of the neighboring fire fighters and iron workers. At Vesey Street, they turned not right to enter Ground Zero, but left to enter the Verizon building, One Liberty Plaza, and the other skyscrapers that border Ground Zero. They were the building clean-up workers, a transient group numbering in the thousands, whose work would allow many thousands more to return to their offices in the finance, legal, and communications industries on which this city depends. Few building clean-up workers belonged to unions, and they worked for companies with names that ring bells in few households. Their relationship with their employers was tenuous and temporary. Few had health insurance. They knew and learned nothing about the dust they would clean up. They generally were not given respirators or complete protective equipment. They were given mops and rags and bags and told to remove the inches of dust that coated floors, walls, and desks of the offices they entered. There were no bright lights, and there were no inspectors checking the hazards of their indoor work environments. Some of these workers are now ill, and many more have not yet been properly evaluated.

We at the Center for the Biology of Natural Systems of Queens College, together with the New York Committee for Occupational Safety and Health (NYCOSH) and the Latin American Workers Project, have had the opportunity to examine a large number of these building clean-up workers. With funding from the September 11th Fund (United Way and New York Community Trust), we set up a mobile medical monitoring unit at Barclay and Broadway, 1 ½ blocks from Ground Zero, on January 14, 2002. Prior to testing, we were not certain whether building clean-up workers near Ground Zero were ill; whether they needed proper medical attention; or whether they would even be able to find our mobile unit.

After the first few days of screening, these uncertainties vanished. Nearly 100 building clean-up workers greeted us on January 14, wanting medical testing, and the waiting list grew to 500 people within a matter of days. We received many calls from people who worked or lived near Ground Zero wanting our free examination, even if they were not building clean-up workers targeted for our services. It quickly became clear that there was a large untapped reservoir of people near Ground Zero, workers and residents alike, who felt ill or were concerned.

Since January 14, we have examined 415 building clean-up workers. We performed work histories, medical interviews, physical examinations, breathing tests, blood and urine tests and respirator fit-testing. We also provided participants with double cartridge respirators to prepare them for their next dusty job. We provided all of this free to the participants, enabled by the generosity of the September 11th Fund.

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The demographic characteristics of the examined group were as we expected. Nearly all are Hispanic immigrants, mostly from Colombia and Ecuador. They range in age from 25 to 45 with the occasional person over age 45 or under 25. Virtually none have health insurance or a personal physician. Most worked performing indoor building clean-up for 6 to 12 weeks near Ground Zero and stopped with 4 to 8 weeks prior to examination.

Nearly all of the building clean-up workers who volunteered for screening have current health symptoms, which first appeared or worsened after September 11. The symptoms fall into two broad categories: irritation of the upper airways (cough, sore throat, nasal congestion, chest pain) and systemic symptoms (headache, fatigue, dizziness, poor appetite). The pattern of symptoms in this group of workers was clear and consistent, even if their exact genesis is not. The irritant symptoms are readily comprehensible, given the presumed presence of fiberglass, crushed glass and other components of the indoor dust. The origin of the systemic symptoms is more obscure. **But the temporal onset of these symptoms in relation to work after September 11 makes the general issue of causation straightforward. These clean-up workers were well and now, after weeks of sweeping and mopping World Trade Center dust, many are now ill.** One of the striking findings among these ill workers is the persistence of symptoms, almost universally reported, despite cessation of work.

We also found that, among the hundreds of building clean-up workers that we examined, rarely were they provided with adequate personal protective equipment, including respirators, for their work near Ground Zero. In fact, the minority of clean-up workers who had their own respirators were not provided with the sufficient disposable filters for proper operation. We even heard from some clean-up workers that they were told by the employer not to wear their own respirators, lest co-workers be frightened into thinking that the dust they were removing contained asbestos or was otherwise toxic.

We now learn that the dust in these buildings was toxic and that cleaning that dust was harmful to human health. This importance of this finding for public health is this: As we step away from Ground Zero, where we know that the health of many fire fighters has been compromised, we learn that another group of workers has been affected, the building clean-up workers. They were still made ill by the dust that they gathered to discard. This should provide no measure of reassurance to others who were involved with building clean-up in lower Manhattan.

We make the following recommendations:

1. **Make appropriate occupational and environmental medicine evaluation and care accessible and affordable to all people, workers and residents alike, at or near Ground Zero**, who report symptoms related to September 11 or who are concerned about personal health impacts of exposures deriving from Ground Zero.

2. **Enhance the capacity of the New York City Department of Health to assess, judge, and act on issues of environmental and occupational health.** The relative silence of this Department in the past six months demonstrates a lack of senior leadership and resources, which urgently requires correction.

3. **Charge appropriate city agencies to develop and promote strict guidelines for indoor building clean up that will correct the gross deficiencies demonstrated by the treatment received by the building clean-up workers that we studied.**

4. **Direct the New York City Department of Health to improve immigrant occupational health.** Recent immigrants have always and will always perform many of the most hazardous jobs in our city, before and after September 11. Our work demonstrates clearly that they are the least protected and most neglected workers among us.

Thank you for the opportunity to testify today.

Steven Markowitz, MD
Director, Center for the Biology of Natural Systems
Queens College
City University of New York

Ethics Column:

Kim Pearson, MD, MPH

Just before lunch on a twice-as-busy Tuesday following a Monday holiday you are pulled out of a DOT physical for the second time. Your overwhelmed secretary apologizes, then tells you that you have an important call. The safety officer from a lucrative but fickle client company wants to speak with you about an employee that he is sending in from the worksite for evaluation of an injury.

You have encountered this "Safety" before. He receives incentive pay from the employer when his injury numbers are low. When you have had to call him about employees in the past, he has regailed you with slurs on the employees character, motivation, and minimized the mechanism of injury in each case.

You have an uncomfortable feeling about taking this call. Several possible courses of action race through your mind simultaneously:

1. Take the call immediately. We need this guy's business to make our margins and stay financially solvent in order to continue our work on behalf of employees everywhere. Besides, your strength of character makes you completely impervious to influence, either conscious or unconscious from any external source.

2. Take the call, but delay the conversation until after you see the employee. Use a good excuse with the safety that makes you sound like superdoc. I suggest "I'm sorry, I'm in the middle of reattaching a head and can't give your concerns the attention they deserve. I'll call you as soon as I finish closing."

3. Ignore the call. Tear the pink slip into many pieces and put them in different trash cans. When confronted, deny ever receiving the message.

4. Reach your breaking point. This is just one too many tightropes to walk while balancing conflicting duties on a cross-pole. After all, you are a doctor! Climb up on your soapbox and take a stand here and now for employees everyhere. Inform this errant safety officer that you will never succumb to his influence, and that his attempts to prejudice you against your future patient reflect poorly upon his character as well as his skills in injury prevention. When your boss calls a few moments later, use strategy 2 or 3 (see above), depending upon the diameter of your secretary's pupils as she gives you the message.

5. Resign, effective immediately.

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workers. Highest exposures have been reported for coal and non-coal miners: 10ug/m^3 – 1,280ug/m^3 (Rogers and Whelan 1999). Reported levels for railroad workers were 39 ug/m^3 for engineers, 131 ug/m^3 for locomotive shop workers and 191 ug/m^3 for hostlers (Woske 1988). Railroad clerks had exposures of 17ug/m^3. Exposures for firefighters operating diesel engine vehicles ranged from 4ug/m^3-748ug/m^3, for airport ground crew and public transportation system personnel, 7 ug/m^3 to 98 ugm/m^3 (Birch, Cary 1996) and dock workers, 6ug/m3-61ug/m^3 NIOSH 1990. For mechanics, road and local truck drivers, levels ranged from 2-7 ug/m^3 for truckers and 5-28 ug/m^3 for mechanics (Zaebst 1991). Bus drivers and parking garage attendants have exposures of 1-3ug/m^3 and 2ug/m^3, respectively.

The EPA has concluded that diesel exhaust is likely to be carcinogenic to humans by inhalation at occupational and environmental levels of exposure. In the draft Health Assessment, 30 epidemiologic studies of lung cancer risk and occupational exposure to diesel emissions were reviewed. 16 of the 22 most relevant studies showed increased lung cancer risk ranging from 20 to 167%. Whereas the major difficulty with the occupational studies considered was the lack of measurement of actual diesel exhaust exposure, strong evidence for linking diesel exhaust and cancer comes from a study of 55,407 railroad workers in the US (Garshick1988). Relative risks (RR) of statistical significance were 1.57 and 1.34 for ages 40-44 and 45-49 in 1959, respectively, after exclusion of workers exposed to asbestos. This demonstrated that those workers with 20 or more years of exposure since 1959 (the approximate date for the introduction of diesel engines) had the highest RR. A follow-up study performed in 2000 demonstrated a RR of 1.44 for the 40-44 age group when adjusted for smoking.

Preventable illness and death can

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Testimony by MMS to the Committee on Commerce and Labor, Boston, MA

On May 28, 2002 William Patterson, M.D., the chair of the Massachusetts Medical Society's Committee on Environmental and Occupational Health, gave testimony on new legislation drafted by Senator Marc Pacheco (D. Taunton). This legislation would provide for the setting of Workers' Compensation medical rates at usual and customary fees. The MMS has been working for the last few years to move forward similar legislation. The hearing was very gratifying as both Committee on Commerce and Labor chairman Representative William Greene Jr. (D. Billerica) and Senator Pacheco asked well informed questions about the current system. Witnesses in favor of the bill included representatives of the trial bar and labor unions. Opponents included the state Division of Health Care Finance and Policy and the insurance industry. DHCFP representatives objected to the complexity of developing rates based on usual and customary. Insurance representatives claimed the low rates applied to no physicians as all rates are negotiated. Both Senator Pacheco and Representative Greene were highly critical of the opponents and strongly desirous of moving the bill forward. At this late stage, the session ends this summer, it is unlikely that a bill could get through in time to sustain a possible veto. However, the bill shows good momentum for the next session and still has a shot this year.

Dr. Patterson opened the hearing as the first witness and was strong and articulate in his public statements. He also stayed through the hearing in order to respond to the testimony in opposition and was able to have good informal discussions with legislators and staff after the meeting. Staff are often critical but silent participants in the hearing process. Advocates should always remember that it is the staff who often draft actual bills and compile evidence for the consideration of legislators.

Dr. Patterson's testimony stressed that he has been practicing in occupational and environmental medicine and taking care of workers' compensation patients in Massachusetts for more than 20 years. He objected to the state's basis for determining worker's compensation reimbursement for physicians by working off the Medicaid fee schedule. Effective points made were that, according to data provided by Workers' Compensation Research Institute, Massachusetts workers' compensation reimbursement rates are the second lowest in the nation. The percentage of workers' compensation dollars paid to health care providers in Massachusetts is the lowest in the nation: approximately 27% of Massachusetts' workers' compensation costs go to providers, compared to 30-50% in most states. According to the National Association of Insurance Commissioners' 1999 profitability reports, Massachusetts ranks among the top ten states in profits on insurance transactions (17.1%) and returns on net worth (11.1%) for workers' compensation insurers. Senator Pacheco was particularly assertive in questioning an insurance association representative on this point. He also showed an awareness of the disturbing possibility that many patients who are covered under workers compensation actually seek treatment and pharmacy coverage under their primary insurance coverage. This practice shifts costs away from workers compensation insurers and on to other medical insurers.

A recent Boston Globe front page story documented reduced availability of specialty physicians to Massachusetts residents. In order to attract good physicians to treat Massachusetts workers, and to retain the highly qualified professionals we have now, we need to pay them fairly for their expertise. The health care system in Massachusetts can no longer continue to provide access to high quality care when those who use the system pay only a fraction of the costs of providing care.

The current workers compensation law allows insurers to negotiate higher fees with individual physicians for particular cases. The MMS strongly supports this provision, which allows surgeons and other specialists to be reasonably compensated for their services. This provision is frequently used and works well for all concerned. In essence this model allows the payment of usual and customary fees.

Workers must have access to care. Physicians must be reasonably compensated for their services. Employers must be asked to share in the real costs of treating their workers. Insurers must not be allowed to make excessive profits in a system where their costs and risks are so limited. These are the basic points we are trying to make.

As Director of Regulatory and Legislative Affairs for the MMS, I have worked many issues over the past 15 years. Few seem as straightforward as this one.

William J. Ryder Esq.

Please contact Senator Pacheco (617-722-1551), and Representative Green (617-722-2030), to add your voice to this important issue.

Massachusetts Cardiovascular Health Initiative

Overview

The Massachusetts Cardiovascular Health Initiative is a collaborative program established to promote cardiovascular health throughout the state. The current effort of this collaboration is the development of a Statewide Plan. This plan will include specific strategies for policy and environmental changes that will promote heart healthy behaviors including physical activity, nutrition, smoking cessation and controlling blood pressure and cholesterol for the general population and those who have been identified as at-risk for cardiovascular disease.

To achieve this goal in the work place, the Initiative is forming partnerships with organizations and agencies who influence healthcare and health costs in work sites. Together these partnerships will be a catalyst for developing or changing systems and policies in Massachusetts to promote optimum cardiovascular health.

If you are interested in more details or participating in the Work Site Advisory Group, please contact Kathy Foell at 617-624-5469 or kathy.foell@state.ma.us.

Letter to the editor: IME. Does "I" stand for insurance or independent?

May 10, 2002

Re: Editorial Comments vis a vis IME (Independent Medical Exam not Insurance Medical Exam)

Dear Dr. Naparstek:

I am troubled by the editorial that appears in **Volume 2, Issue 4, Spring 2002** Issue of the **NECOEM Reporter** critical of the concept of IMEs and doctors who would lower themselves to perform them. Quite apart from its tone of moral superiority, the editorial lists compassion, confidentiality and advocacy as constituents of a physician's professional identity, but notably overlooks objectivity. Our goal as physicians is not necessarily to make people feel good but to practice evidenced based medicine which sometimes includes giving people information that they may not wish to have or that may be uncomfortable for the individual (as well as the physician). Furthermore, the well crafted, independent medical examination by definition can just as well support and affirm an individual's medical claim as undermine it.

The editorial describes the doctor/patient relationship as a mutually fulfilling dance designed to make everyone engaged feel good. Since when is the doctor/patient relationship a synonym for co-dependency? I firmly believe that "the truth can set you free" and supporting a patient in his or her misperceptions, pursuit of unproven remedies and view of themselves as victimized, is ultimately destructive. Similarly, where an individual has in fact been injured or made ill, the independent medical examination very powerfully advocates for that individual. Like it or not, physicians have always been gate-keepers for the sick role. We protect and advocate for our patients who are ill and attempt to return all our patients to normalcy and productivity even if it means confronting self-destructive habits, perceptions and beliefs. The best therapists, I have observed, are those for whom the patients' ultimate outcome is the highest priority and the therapists' own enrichment either financially or emotionally is secondary.

In the practice of medicine, the customer **isn't** always right and many times our most potent therapeutic maneuver is to honestly point that out to our patients. Supporting a patient in his or her delusions is destructive. Quackery which takes advantage of a patient's vulnerability and lack of knowledge and milks them for financial gain is no less an abdication of the doctor/patient relationship. There are a lot of ways doctors can become sloppy and self-serving. Evidenced based medicine is the one way we can all best serve. A well done IME (**I** for **Independent!)** fits comfortably under that umbrella.

Respectfully submitted,

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N E C O E M

"NECOEM is a not-for-profit, regional component society of the American College of Occupational and Environmental Medicine, the pre-eminent organization of occupational and environmental physicians in the United States.

NECOEM has over 200 physician members and is dedicated to preventing and treating occupational injuries and illnesses. NECOEM provides continuing medical education for its physician members in order to enhance the care that they provide to men and women in the workplace. NECOEM is an advocate for workplace safety, occupational health research, raising public awareness of occupational and environmental health issues, guiding public policy, and recognizing outstanding achievement by individuals in occupational and environmental health."

The editorial Board welcomes letters to the editor. Write to NECOEM at the above address. The editor reserves the right to edit letters for publication purposes

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be attributed to air pollution. Young children, the elderly and those with chronic cardiac and respiratory disease appear to be more sensitive to its effects. The EPA estimates that under the new U.S. requirements, prevention of 8,300 premature deaths, 5,500 cases of chronic bronchitis, 17600 cases of acute bronchitis, 360,000 asthma attacks and 386,000 cases of respiratory symptoms in asthmatic children will result. In addition, 1.5 million lost workdays, 7,100 hospital visits and 2,400 emergency room visits for asthma will be prevented.

Next Steps?

The "2007 rule" is a good story. However, what is needed is an integrated approach to health research on diesel emissions, which delineates quantitative exposures, both occupational and non-occupational and more accurately relates data to health effects. Presently, it is difficult to determine how past and present exposures differ regarding their physical and chemical nature and impact on health. For occupational and environmental health professionals, the unanswered questions are not only what are the workplace and ambient exposure levels, but also what is the net effect? What are the biophysiologic mechanisms of action and the health endpoints relative to exposure levels? Are there biomarkers for exposure and increased susceptibility? With this information, we can develop relevant medical surveillance protocols and PPE requirements. Further research will help to define the health implications of future regulatory changes and benefits to public health.

Sandra D. Stratford, MD, MSc
CareGroup Occupational Health Network