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Welcome to the 21st edition of *Working Well!*

In 2014, we developed an idea to share usable information on health, wellness and safety and create an opportunity for our client companies to cross feed anonymous anecdotes on work safety and prevention. We are pleased to have distributed this publication for the last seven years, and we believe it has been educational for employers and their workers.

This edition features an article by Wes Boose, MD, MPH, on post-acute sequelae of SARS-CoV-2 infection. The COVID-19 pandemic brought an enormous challenge to the medical community — not only in diagnosing and treating the disease, but in developing a vaccine. Now the challenge is to learn the long-term ramifications for those who were infected. Ongoing studies involving multiple specialties will be necessary to evaluate and treat post-acute illnesses from COVID-19.

The next article, “Occupational and Environmental Medicine Scope of Practice,” provides insight into the areas of expertise of occupational medicine specialists. It is a vast discipline, partnering with multiple entities in private, governmental and international sectors with wide-open opportunities for research, knowledge and service.

Donna Padgett and Michelle Surrett optimize this edition with timeless information in their articles on the annual topics of cold injuries and influenza, respectively. Finally, in the “Practitioner Pearls” section, Michelle outlines recommended adult vaccinations. These are, of course, in addition to flu vaccination and now COVID-19 vaccination.

Lexington Medical Center Occupational Health appreciates your patronage and support through the years. We are honored to serve our client companies and their workers. I am retiring this November, so please comment or send any health, wellness or safety topics or any work safety tips that we can share with our readers to Dr. Boose at [wdboose@lexhealth.org](mailto:wdboose@lexhealth.org) or Sibyl Taylor at [swtaylor@lexhealth.org](mailto:swtaylor@lexhealth.org).

– Dana Rawl, MD, MPH

# Post-Acute Sequelae of SARS-CoV-2 Infection (PASC)

WESLEY D. BOOSE, MD, MPH

We are approaching the two-year mark of when the World Health Organization declared COVID-19, the disease caused by SARS-CoV-2, a pandemic on March 11, 2020. Worldwide cases and deaths, as of November 15, 2021, were reported at 253 million and 5.1 million, respectively. Sadly, the U.S. has experienced the greatest number of reported cases at 47 million and reported deaths at 762,000.

While we should look back to examine our response to this public health emergency for ways to improve on future responses to COVID-19 waves and other pandemics, we must always look forward to new issues arising out of the COVID-19 pandemic. Specifically, we should look at the growing number of COVID-19 patients who continue to experience a variety of symptoms well past the time they recovered from their initial illness. This post-acute COVID-19 condition has come to be identified by many names, including chronic COVID, long COVID, or long-haul COVID, but the medical profession seems to accept post-acute sequelae of SARS-CoV-2 infection (PASC) most widely.

So, what is PASC? There appears to be no universal definition currently. The Centers for Disease Control and Prevention uses the post-COVID-19 condition as an umbrella term for the wide range of health consequences present for four or more weeks after infection with SARS-CoV-2. The World Health Organization describes the post-COVID-19 condition as a disorder that occurs in individuals with a history of probable or confirmed SARS-CoV-2 infection, usually three months from the onset of COVID-19 with symptoms that last for at least two months and cannot be explained by an alternative diagnosis. Outside these two public health authorities,

this condition seems to be identified more frequently and attributed to anyone who tested positive for SARS-CoV-2 and presents with persistent fatigue, chest pain, cough, headaches and “brain fog” (mild subjective cognitive impairment) for more than four weeks after the acute illness.

How many PASC cases are there? Early post-COVID-19 follow-up studies from around the globe (Michigan, Italy, United Kingdom and China) seem to indicate that around 30 to 80 percent of hospitalized cases experience prolonged symptoms lasting anywhere from 60 days to six months after hospital discharge. Other data and surveys (Scientific Report, June 23, 2021) found that one-third of non-hospitalized patients also experience prolonged symptoms more than four weeks after resolution of the initial illness, and roughly 3 percent of those surveyed experienced symptoms past 12 weeks. These symptoms include fever, headache, fatigue, cough, shortness of breath, chest pain, palpitations, “brain fog,” sleep disorders, diarrhea, anxiety and depression that can persist for months and range from mild to debilitating. For patients who were hospitalized, risk factors for experiencing prolonged symptoms were age (50 and older), multiple medical problems and individual medical conditions, including hypertension, obesity, and psychiatric



## Following initial COVID-19 infection, there are a myriad of sequela that involve pulmonary, cardiovascular, neurologic and other systems.

and immunocompromised conditions. When applying these estimates to actual case numbers (47 million cases in the U.S.), we estimate that five to 10 million people will experience some sort of PASC infection.

Evaluating PASC patients with the wide variety of symptomology will take a coordinated approach across several medical specialties (e.g., infectious disease, pulmonology, cardiology, neurology, psychiatry, etc.) and is probably best suited at larger tertiary medical centers with co-located specialties. Currently, there are no specific therapies or treatments for PASC other than treating the underlying the condition(s). This treatment may involve physical therapy, cardiopulmonary therapy, cognitive behavioral therapy, serial neurocognitive testing and social work. Once providers complete an

initial evaluation and develop a treatment plan, they can coordinate follow-up care with the patient's primary care team or an occupational medicine clinic if the PASC case falls under the auspices of worker's compensation. Further, an occupational medicine clinic, working with the various treatment teams, can offer a graded return-to-work plan that fits within the limitations of the employee's condition, as well as determine maximal medical improvement and impairment ratings.

In summary, following initial COVID-19 infection, there are a myriad of sequela that involve pulmonary, cardiovascular, neurologic and other systems. Named post-acute sequelae of SARS-CoV-2 infection or PASC, it is commonly seen and estimated to occur in 10 percent or more of all COVID-19 patients. PASC is a heterogenous condition owing to

multiple effects caused by the initial COVID-19 infection. The severity of the initial COVID-19 infection is not well correlated to the severity of PASC. Our understanding of PASC and the science behind it are rapidly evolving. Comprehensive strategic clinical evaluation is required to focus treatment efforts and return PASC patients to their normal or pre-disease functional status. 🌱

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# Occupational and Environmental Medicine Scope of Practice

DANA RAWL, MD, MPH



How many workplace disasters can you recall that occurred in your lifetime? I graduated from medical school in 1982, and I can remember the Union Carbide disaster in Bhopal, India in 1984. More than 2,000 people died from methyl isocyanate exposure as well as the Chernobyl nuclear meltdown in 1986, and people are still affected by radiation. We all know about work-related cancers and diseases, such as mesothelioma from asbestos exposure or black lung disease from working in coal mines. And what about environmental disasters such as the Exxon™ Valdez and Deepwater Horizon oil spills in 1989 and 2010, respectively. During the past evolution of the industrial age, there have been too many manmade disasters, diseases and catastrophes to count.

Some early clinicians noted the association of illnesses and diseases to the workplace. Even Hippocrates said to understand the disease, you should observe the environment. American physician Dr. Alice Hamilton devoted her work to industrial medicine and pioneered the concept of occupational medicine as a specialty of public health and preventive medicine in the 1920s. Author Rachel Carson gained widespread public attention of environmental consequences from the pesticide DDT with her book *Silent Spring*. Public attention and outcry from it culminated in regulatory actions to include the Occupational Safety and Health Act and the development of the Environmental Protection Agency in 1970. The government established both entities to set and enforce industry and workplace safety and pollution standards.

Even with governmental regulations, guidelines and standards, workplace accidents and injuries occur daily, causing devastating

injuries and death to workers and financial trauma to their families. In 2019, there were 5,333 fatal work-related injuries and 2.8 million nonfatal private workplace injuries and illnesses, which cost \$171 billion with an estimated 105 million lost workdays.

Traditional medicine's history is to diagnose and treat the patient for their existing maladies. There was little emphasis on preventing illness or injury, so caring for a patient was reactive, not proactive. Employers have a need to protect their workers from harm. From a business perspective, costs

in workers' compensation rates, lost work time and potential regulatory fines contribute to poor business outcomes. From a human perspective, good business depends on healthy, productive workers, and it is morally just for workers and the community to have a safe work environment.

The specialty of occupational and environmental medicine involves the study and management of health effects from extrinsic risk factors in the workplace or environment. It links clinical assessment and treatment of workplace injury and illness with the promotion of wellness and safety of workers and the prevention of disability. It is a multidisciplinary approach to recognizing, diagnosing, treating and preventing workplace injury and illness as a result of hazardous conditions or exposures in the workplace or the environment.

Current scope of practice for an occupational medicine physician is diverse and requires not only skills in clinical medicine, but specialized knowledge in the interactions of federal regulations and workers' compensation between employers and employees.

Clinically, occupational medicine physicians provide evaluation, diagnosis, treatment and management of work-related injuries

Occupational and environmental medicine is a multidisciplinary approach to recognizing, diagnosing, treating and preventing workplace injury and illness as a result of hazardous conditions or exposures in the workplace or the environment.

or illnesses. They provide a determination on causation of the injury or illness and can assess medical impairment. Causation determination may involve investigative skills using company walk-throughs and analysis of work conditions, environment and hazardous exposures. Recognizing and mitigating hazardous work exposures, whether physical or chemical, are paramount in prevention practice. An occupational practice may support an on-site entity that provides occupational and/or primary care services, allowing for a closer relationship with corporate management, safety supervisors and employees.

An occupational health practice provides employer services that include post-offer physical examinations, fit-for-duty evaluations, return-to-work assessments, as well as Occupational Safety and Health Administration-mandated and Department of Transportation-guided physical examinations. Other evaluations and assessments include emergency response, firefighter, public service officer, and impairment and disability determinations. Screening and surveillance programs are also integral services provided by an occupational health practice. Exposure assessment, screening, analysis of testing and implementation of preventive actions are important and necessary functions for surveillance programs such as lead, hearing and respiratory.

In addition, occupational medicine providers consult on all types of safety, health, wellness and regulatory issues with company representatives. Periodic presentations and lunch-and-learn programs on topics important to companies are other ways to consult and disseminate information. Work-site visits also provide valuable opportunities to observe and discuss ergonomic issues, hazard exposures, safety and prevention topics with safety supervisors and managers.

On a national and international level, occupational medicine physicians engage in research through organizations such as the National Institute of Occupational Safety and Health, OSHA, Mine Safety and Health Administration, Centers for Disease and



Control and Prevention, and the National Institutes of Health. One notable current long-term study is evaluation of effects of hazardous exposures from the World Trade Center attack on September 11, 2001. The Agency for Toxic Substances and Disease Registry and the Environmental Protection Agency are organizations for toxicology and environmental studies and research. The World Health Organization and the U.S. military support international research and studies on occupational and environmental health. The scope of practice for occupational medicine physicians is vast, and demand for their services is high. Companies realize the added value when they partner with an occupational health practice. Further, national and international contributions in research and

studies from occupational medicine physicians are invaluable for global health and wellness. Put your local “occ doc” on your wellness team and be safe out there.🌿

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# Cold Injuries

DONNA PADGETT, ACNP

This quote from *Game of Thrones* by George R.R. Martin reminds us that, as winter approaches, we need to heighten our awareness of the potential dangers of exposure to the cold, especially in the workplace. Exposure to extreme cold or cold environments can put workers at risk of serious injuries due to cold stress.

Cold stress describes conditions that result when skin temperature, and eventually body temperature, is lowered due to exposure to extreme and/or prolonged cold. If the body is unable to warm itself, serious cold-related illnesses and injuries may occur and result in permanent tissue damage and even death. The most common types of cold stress include immersion (trench) foot, frostbite and hypothermia.

Immersion foot is a non-freezing injury that occurs after prolonged exposure to wet and cold conditions. It can occur in prolonged exposures to wet environments in temperatures up to 60°F. Symptoms of immersion foot are reddening of the skin, tingling pain, numbness, swelling and blisters. Initial treatment for immersion foot includes removing wet shoes/boots and wet socks, drying the feet and keeping them elevated, avoiding walking, and seeking medical attention immediately.

Freezing of the skin and tissues causes frostbite. The risk of frostbite increases in workers who have circulation problems (e.g., diabetics), people who are immobile, and people not dressed appropriately for extremely cold temperatures. Frostbite can cause permanent damage to body tissue



and, in severe cases, result in amputation. Symptoms are reddened skin with gray/white patches, tingling or stinging sensation, aching and numbness. The skin may feel hard, and blisters may occur.

Initial treatment for frostbite includes removing any wet clothing and/or shoes and protecting the affected area with loosely wrapped, warm, dry blankets or towels. Do not rub the affected area or use warm water or heating pads. Doing so may cause more damage. Seek medical attention immediately.

Hypothermia occurs when the core body temperature drops lower than 95°F. Prolonged exposure to very cold temperatures typically causes hypothermia, but it can also occur at temperatures above 40°F if the worker is wet. Early symptoms of hypothermia are uncontrolled shivering and fatigue. As the condition worsens, shivering may stop, and the worker may develop symptoms including loss of coordination, confusion, slurred speech, slowed pulse and breathing, which could lead to unconsciousness and possibly death. Because the worker's ability to think clearly and respond decrease, he or she may not realize his or her condition and fail to seek help.

Initial treatment for hypothermia includes moving the worker to a warm and dry area. Remove any wet clothing and wrap the entire body, including the head and neck but not the face, in layers of blankets. Place warm

water bottles or packs in the armpits, groin and neck. If the worker is alert, give him or her warm sweetened drinks, and seek medical attention immediately. Do not delay calling 9-1-1 if the worker shows any changes in mental status or pulse/breathing. Start cardiopulmonary resuscitation immediately if the worker has no pulse or isn't breathing.

Prevention is the best way to avoid cold stress and cold-related injuries and illnesses. Employers and workers should focus on planning, training and having the proper equipment and gear to prevent these types of injuries. The National Institute for Occupational Safety and Health provides specific recommendations for employers and workers. Find more information about cold stress and prevention at [CDC.gov/niosh/Topics/ColdStress/](https://www.cdc.gov/niosh/topics/coldstress/). OSHA also has a quick card reference for protecting workers at [OSHA.gov/sites/default/files/Publications/OSHA3156.pdf](https://www.osha-slc.gov/sites/default/files/Publications/OSHA3156.pdf). 🌿

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# Remember the Flu

MICHELLE SURRETT, FNP

People have been dealing with the COVID-19 pandemic since March 2020. So, while the flu has not only been out of mind, it's also largely been out of sight, too. According to the Centers for Disease Control and Prevention, between late September 2020 and August 2021, clinicians confirmed a little more than 2,000 cases of flu in the U.S. Per the CDC, in a typical flu season, the U.S. sees more than 200,000 confirmed cases of influenza during that same time frame. Estimates of the 2019-2020 flu season show that 38 million people were ill with flu.



Widespread mask wearing, remote work and school, and physical distancing likely contributed to the record-low number of flu cases last year. Experts fear this year, with the reopening of schools, people returning to on-site work and decreased adherence to pandemic precautions, could create a serious flu season.

The most effective action a person can take to prevent the flu is to get the flu vaccine. Dr. William Schaffner, medical director of the National Foundation of Infectious Diseases said, "Two reasons make getting vaccinated against the flu the wise choice. First, it's been proven year after year that you're in better shape to fight the flu if you get the vaccine. Second, by getting vaccinated against the flu, you help protect the people around you."

The CDC recommends a yearly flu vaccine for everyone 6 months of age and older, unless one's health care provider recommends not getting the vaccine because of a prior severe or allergic reaction to the vaccine or a history of Guillain-Barré syndrome.

Flu viruses constantly change. Vaccines released every year keep up with the rapidly adapting viruses. Despite what some people think, the flu vaccine will not make a person

sick with the flu. The vaccine triggers the immune system to produce antibodies to protect against the flu. It takes about two weeks for the body to develop antibodies, which is why it's important to get a flu vaccine early. The CDC recommends getting the vaccine by the end of October. Since flu season commonly peaks during February, people can benefit from vaccination even if they wait until after October because vaccination can offer protection for the remainder of flu season.

There are three types of influenza vaccines: quadrivalent inactivated influenza vaccine; recombinant influenza vaccine; and live attenuated influenza vaccine. There is no preference for one vaccine over another. Standard dose quadrivalent influenza shots are manufactured using virus grown in eggs. These vaccines are approved for people 6 months and older, but people should avoid them if they have an egg allergy. There is a quadrivalent cell-based influenza vaccine, which is grown in cell culture and is egg free. It is approved for people 4 years of age and older.

The recombinant vaccine contains a higher dose of antigen to help create a stronger

immune response. It is approved for people ages 65 and older since some older people may develop less immunity after receiving the vaccine. Finally, the live attenuated influenza vaccine is administered as a nasal mist. This vaccine contains live virus and should not be given to those who are pregnant or immunocompromised. It is approved for ages 2 to 49.

There are many flu vaccine options, but it's most important for people ages 6 months and older to get the vaccine. If you have questions about which influenza vaccine is best for you, talk to your doctor or other health care provider. 🌿

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# Adult Vaccines

MICHELLE SURRETT, FNP

Vaccines decrease the chance of getting sick, lower the likelihood of spreading certain diseases, and are one of the safest ways to protect one's health. Most people received childhood vaccinations, but the protection from some vaccines may decrease over time.

The Centers for Disease Control and Prevention recommends other vaccines for adults in addition to an annual flu vaccine. One example is Td/Tdap to protect against tetanus, diphtheria and pertussis (whooping cough), and clinicians recommend a booster every 10 years. Additional vaccines vary based on age, health conditions or previous childhood vaccines, such as:

- chickenpox
- hepatitis A
- hepatitis B
- human papillomavirus (HPV)
- measles, mumps, rubella (MMR)
- meningococcal (meningitis)
- pneumococcal (pneumonia)
- shingles

Adults can get vaccines at their health care provider's office, pharmacy, workplace, health department or other locations. Most health insurance plans cover the cost of recommended vaccines. Individuals should check with their insurance provider for coverage details. 🌿



Adults can get vaccines at their health care provider's office, pharmacy, workplace, health department or other locations.

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