PULMONARY PERSPECTIVES®

Resurgence of black lung among U.S. coal miners

BY CARA N. HALLDIN, PHD, MPH; AND A. SCOTT LANEY, PHD, MPH

The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention.

Dr. Halldin

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Advances in technology over the last century, as well as the exportation of many high exposure jobs, nearly eliminated lung diseases caused by occupational exposure to respirable dust (the pneumoconioses) in the United States. One such example of this near elimination is black lung, or coal workers' pneumoconiosis (CWP), following the 1969 Federal Coal Mine Health and Safety Act.

The Act established permissible exposure limits to respirable dust, designed to prevent the most severe forms of CWP from occurring, and a national respiratory health screening program for underground coal miners. Between 1970 and the mid-1990s, disease prevalence plummeted from nearly 35% to less than 5% prevalence among longer tenured miners, and from 3% to less than 1% in miners with less than 10 years of mining tenure (Hall NB, et al. *Curr Environ Health Rep*. 2019;6[3]:137).

Many assumed that this was the last we'd hear of black lung – that the cases of disease existing in the 1990s were likely caused by exposures that occurred prior to the 1969 Act, and within a few years, no further cases would be detected.

This appeared to be an entirely reasonable assumption in the 1990s given the 30 years of declining prevalence and the continuous technological advances designed to continue reductions in dust exposures. In fact, the precipitous decline in black lung was briefly viewed as a public health triumph, as the most severe forms appeared to be near eradication in the United States just 2 decades ago (Attfield MD, et al. *Am J Public Health*. 1992;82[7]:971; Attfield MD, et al. *Am J Public Health.* 1992;82[7]:964).

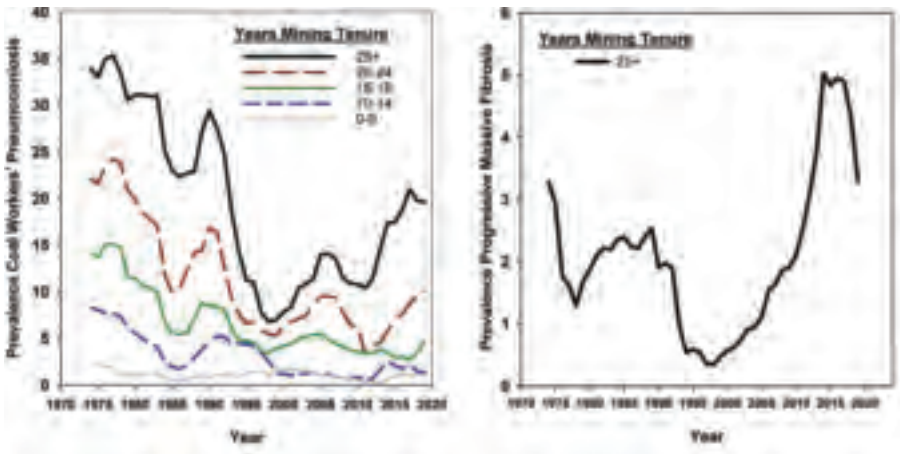

Figure 1. Prevalence of coal workers' pneumoconiosis and progressive massive fibrosis among working underground coal miners participating in the NIOSH Coal Workers' Health Surveillance Program, in Kentucky, Virginia, and West Virginia 1974-2019. Data are presented as the 5-year moving average percentage; surveillance is conducted on a 5-year national cycle (Data from NIOSH CWHSP [Coal Workers' Health Surveillance Program CWHSP Data Query System accessible: http://webappa.cdc.gov/ords/cwhsp-database.html]).

However, what has since been observed is a strong and ongoing resurgence of the potentially deadly fibrotic interstitial disease starting in the early 2000s (Figure 1), with the most striking increase observed in the Central Appalachian states of Kentucky, Virginia, and West Virginia (Blackley DJ, et al. *Am J Respir Crit Care Med.* 2014;190[6]:708; Blackley DJ, et al. *Am J Public Health.* 2018;108[9]:1220).

Of great concern is the resurgence of complicated Black Lung (progressive massive fibrosis [PMF]), which is completely disabling and leads to premature mortality. The prevalence of PMF is higher today than when NIOSH started formally tracking the disease in the 1970s, especially among specific populations. Since the mid-2000s, NIOSH and others have described the following(Hall NB, et al. *Curr Environ Health Rep.* 2019;6[3]:137):

- Increasing prevalence and severity of CWP both nationwide and specifically in Central Appalachia.
- Rapid progression of CWP.
- Increases in the frequency of lung transplantation for CWP.
- Severe disease among surface coal miners with no underground mining tenure.
- Increased severity of disease among former and retired miners.
- Hundreds of cases of PMF among coal miners seeking care at clinics in eastern Kentucky and southwestern Virginia.
- Increasing numbers of miners with PMF filing for federal black lung compensation.
- Radiologic and pathologic indications of increased respirable silica exposure among coal miners.
- Premature mortality in miners diagnosed with CWP.
- Underutilization of a secondary prevention worker removal program designed to reduce the exposure of miners with disease.
- Former miners with severe disease describing extreme pressure to operate. outside of applicable protective federal standards in order to increase productivity

In our surveillance work, we have talked to many miners who, after having months or years' worth of extensive workups for pneumonia, sarcoidosis, lung cancer, and/or diseases other than the pneumoconioses, have eventually learned that they actually had dust-induced lung disease attributable to their work. Additionally, through our evaluation of the transplantation data, it has become clear that dust-related lung disease is likely underreported or underrecognized among those receiving lung transplants.

Finally, through analysis of mortality data, it is apparent that CWP is also underreported as a cause of death among miners with black lung. We mention these points to emphasize how important it is to document

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a full occupational history for proper diagnoses, early intervention, and improved public health information to inform primary and secondary disease prevention efforts.

Resources for clinicians

CWP is most commonly identified using plain posterior-anterior chest radiography and presence/severity of fibrotic change is described using an international standard established by the International Labour Office (International Labour Office. Guidelines for the use of the ILO international classification of radiographs of pneumoconioses. Geneva: International Labour Office; 2011).

In the United States, NIOSH operates the B Reader Training and Certification Program, which offers a free self-study syllabus, https://www.cdc.gov/niosh/topics/chestradiography/breader.html, and in-person training courses on occasion, to assist physicians in learning and demonstrating continuous competency in classifying chest radiographs of dust-exposed workers according to the ILO Standards (Halldin CN, et al. *J Occup Environ Med.* 2019;61[12]:1045).

The B Reader Program and ILO Standards are currently undergoing a decade-long revision process where both will feature digitally acquired chest radiograph images. This process should be fully complete in the following months.

To educate miners, mine operators, and others about the risks of respirable dust, NIOSH produced an educational video, "Faces of Black Lung," in 2008 that featured two miners in their 50s and 60s who had complicated Black Lung. Because of the resurgence of disease and particularly severe cases being identified among much younger miners, NIOSH recently released an updated version of the video, "Faces of Black Lung II," where three Kentucky underground miners, ages 39, 42, and 48, describe the incredible disability and quality of life lost due to a disease caused by gross overexposure of respirable coal mine dust.

Unfortunately, the 42-year-old miner died from complications stemming from Black Lung less than a year after filming his part in the video, and the other two miners have been advised to be evaluated for lung transplantation.

Access the video here: https://www.cdc.gov/niosh/docs/video/2020-109d/default.html. We hope that these men's stories will help younger miners relate to the risks of respirable coal mine dust and help others understand the severity of disease as all three of these men struggled to breathe just describing their day to day tasks.

Parting message

No one should ever have to consider a lung transplant at the age of 40 because they went to work attempting to provide for their family. No one should ever be faced with end-of-life planning while their kids are in grade school because of a disease they acquired at work. Respirable coal mine dust is the only cause of black lung, and the coal mining industry has the necessary tech-

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nology and tools to prevent harmful exposures to respirable dust, and, together with miners, must successfully and consistently implement dust suppression controls. There is no cure for black lung; it's irreversible and can be first recognized and continue to progress even after a miner has left exposure. However, early identification and appropriate intervention can prevent progression to the most disabling manifestations.

The role of the clinician is to be part of the early identification of black lung through including CWP in the differential diagnosis for unusual or unexpected respiratory illness in otherwise healthy primarily working aged miners. The public health community must continue to monitor disease prevalence in working populations and implement policies and recommendations to support the efforts of those on the frontline – the miners, industry, and health-care workers.

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The Energy Information Agency projects that coal will continue to be a substantial source of U.S. energy production and consumption well into the mid- to late-century. Unfortunately, Black Lung has made a resurgence and is killing miners, and each of us has a role to play in eliminating it once and for all.

We will continue to carry out our mandate to screen working coal miners for respiratory disease; however, given the continued contraction of the coal mining industry, it's much more likely for cases of disease to be recognized in the clinic setting. Therefore, we reiterate our previous plea to clinicians: when identifying an individual with interstitial fibrosis consider their full occupational history.

Dr. Halldin and Dr. Laney are from the Surveillance Branch, Respiratory Health Division, National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, Morgantown, WV.

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VOL. 15 • NO. 2 • FEBRUARY 2020

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Medical workers screened thousands of travelers at Wuhan train stations for symptoms of 2019-nCoV infection until the Chinese government canceled planes and trains leaving the city.

2019 Novel Coronavirus: What clinicians need to know

BY M. ALEXANDER OTTO
MDedge News

As the 2019 Novel Coronavirus story unfolds, the most important thing for clinicians in the United States to do is ask patients who appear to have the flu if they, or someone they have been in contact with, recently returned from China, according to infectious disease experts.

"We are asking that of everyone with fever and respiratory symptoms who comes to our clinics, hospital, or emergency room. It's a powerful screening tool," said William Schaffner, MD, professor of preventive medicine and infectious diseases at Vanderbilt University Medical Center, Nashville, Tenn., and adviser to the Centers for Disease Control and Prevention (CDC).

In addition to fever, common signs of infection include cough, shortness of breath, and breathing difficulties. A few patients in Wuhan, China, the epicenter of the outbreak, have had diarrhea, vomiting, and other gastrointestinal symptoms. In more severe cases, infection can cause pneumonia, severe acute respiratory syndrome, kidney failure, and death. The incubation period appears to be up to 2 weeks, according to the World Health Organization (WHO).

If patients exhibit symptoms and either they or a close contact has returned from China recently, take standard airborne precautions and send specimens – a serum sample, oral and nasal pharyngeal swabs, and lower respiratory tract

CORONAVIRUS // *continued on page 7*

Fewer lung cancer deaths lead to record drop in overall cancer mortality

BY ANDREW D. BOWSER
MDedge News

Declines in death rates for lung cancer and melanoma have gained momentum in recent years, fueling a record drop in cancer mortality, the American Cancer Society says.

Lung cancer death rates, which were falling by 3% in men and 2% in women annually in 2008 through 2013, dropped by 5% in men and nearly 4% per year in women annually from 2013 to 2017, according to the society's 2020 statistical report.

Those accelerating reductions in death rates helped fuel the biggest-ever single-year decline in overall cancer mortality, of 2.2%, from 2016 to 2017, their report shows.

According to Rebecca L. Siegel and coauthors, the decline in melanoma death rates escalated to 6.9% per year among 20- to 49-year-olds over 2013-2017, compared with a decline of just 2.9% per year during 2006-2010. Likewise, the melanoma death rate decline was 7.2% annually

MORTALITY // *continued on page 6*

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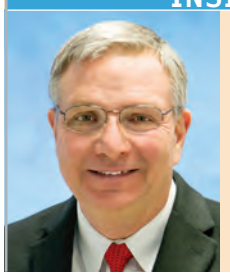

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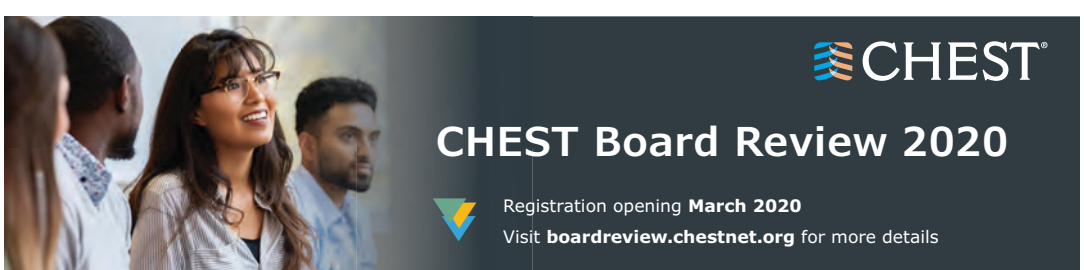

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LDCT scans key to mortality decline // *continued from page 1*

for the more recent time period, compared with just 1.3% annually in the earlier time period. The finding was even more remarkable for those 65 years of age and older, according to investigators, since the declines in melanoma death rates reached 6.2% annually, compared with a 0.9% annual increase in the years before immunotherapy.

Dr. Fontaine

Dr. Patel

Smoking cessation has been the main driver of progress in cutting lung cancer death rates, according to the report, while in melanoma, death rates have dropped after the introduction of immune checkpoint inhibitors and targeted therapies.

By contrast, reductions in death rates have slowed for colorectal cancers and female breast cancers, and have stabilized for prostate cancer, Ms. Siegel and coauthors stated, adding that racial and geographic disparities persist in preventable cancers, including those of the lung and cervix.

"Increased investment in both the equitable application of existing cancer control interventions and basic and clinical research to further advance treatment options would undoubtedly accelerate progress against cancer," said the investigators. The report appears in CA: A Cancer Journal for Clinicians.

While the decline in lung cancer death rates is good news, the disease remains a major killer, responsible for more deaths than breast, colorectal, and ovarian cancer combined, said Jacques P. Fontaine, MD, FCCP, a thoracic surgeon at Moffitt Cancer Center in Tampa.

"Five-year survival rates are still around the 18%-20% range, which is much lower than breast and prostate cancer," Dr. Fontaine said in an interview. "Nonetheless, we've made a little dent in that, and we're improving."

Two other factors that have helped spur that improvement, according to Dr. Fontaine, are the reduced incidence of squamous cell carcinomas, which are linked to smoking, and the increased use of lung cancer screening with low-dose computed tomography.

Squamous cell carcinomas tend to be central rather than peripheral, which makes the tumors harder to resect: "Surgery is sometimes not an option, and even to this day in 2020, the single most effective treatment for lung cancer remains surgical resection," said Dr. Fontaine.

Likewise, centrally located tumors may preclude giving high-dose radiation and may result in more "collateral damage" to healthy tissue, he added.

Landmark studies show that low-dose CT scans reduce lung cancer deaths by 20% or more; however, screening can have false-positive results that lead to unnecessary biopsies and other harms, suggesting that the procedures should be done in centers of excellence that provide high-quality, responsible screening for early lung cancer, Dr. Fontaine said.

While the drop in melanoma death rates is encouraging and, not surprising in light of new cutting-edge therapies, an ongoing unmet treatment need still exists, according to Vishal Anil Patel, MD, director of cutaneous oncology at the George Washington Cancer Center.

Response rates remain lower from other cancers, sparking interest in combining current immunotherapies with costimulatory molecules that may further improve survival rates, according to Dr. Patel.

In 2020, 606,000 cancer deaths are projected, according to the report. Of those deaths, nearly 136,000 are attributable to cancers of the lung and bronchus, while melanoma accounts for nearly 7,000 deaths.

The report notes that variation in cancer incidence reflects geographical differences in medical detection practices and the prevalence of risk factors, such as smoking, obesity, and other health behaviors. "For example, lung cancer incidence and mortality rates in Kentucky, where smoking prevalence was historically highest, are 3 to 4 times higher than those in Utah, where it was lowest," the investigators wrote.

Cancer mortality rates have fallen 29% since 1991, translating into 2.9 million fewer cancer deaths, the report says.

Ms. Siegel and coauthors are employed by the American Cancer Society, which receives grants from private and corporate foundations, and their salaries are solely funded through the American Cancer Society, according to the report.

chestphysiciannews@chestnet.org

SOURCE: Siegel RL et al. CA Cancer J Clin. 2020;70(1):7-30. doi: 10.3322/caac.21590.

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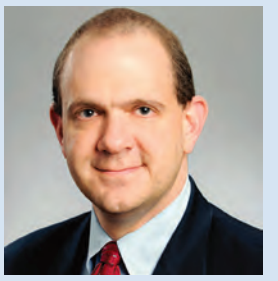

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CHEST PHYSICIAN (ISSN 1558-6200) is published monthly for the American College of Chest Physicians by Frontline Medical Communications Inc., 7 Century Drive, Suite 302, Parsippany, NJ 07054-4609. Subscription price is $244.00 per year. Phone 973-206-3434, fax 973-206-9378.

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