

Incorporating Lifestyle Medicine Into Occupational Medicine Practice

ACOEM Guidance Statement

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Abstract: Lifestyle medicine (LM) utilizes evidence-based therapeutic lifestyle changes to address lifestyle factors that impact health, performance, and injury risk and recovery. By integrating LM principles into clinical care, workplace policies, and programs, along with other evidence-based methods, occupational and environmental medicine clinicians and medical directors can enhance worker health and performance, manage chronic disease, and facilitate faster recovery from injury and illness. This guidance addresses approaches that can be used in the clinic and workplace to address tobacco, substance misuse, nutrition, physical activity, overweight/obesity, sleep, mental well-being, and social connectedness.

Keywords: clinical care, workers' compensation, workplace injuries, corporate medical director, workplace policy, workplace programs

As a preventive medicine specialty, occupational medicine has long recognized that personal and lifestyle factors affect health, performance, and injury risk and recovery. Incorporating lifestyle medicine (LM) principles into occupational medicine clinical practice and workplace programs can aid occupational and environmental medicine (OEM) physicians in achieving their goals for workers and organizations.

The World Health Organization (WHO) defines health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.”¹ It follows that wellness is not just the absence of disease but also the promotion of health in the many dimensions of life. Swarbrick's eight-dimension framework of wellness includes physical, intellectual, emotional, social, spiritual, vocational, financial, and environmental domains.²

Workplace occupational health programs are starting to adopt a more holistic view of employee health and well-being to focus on “Whole Health.” According to the National Institutes of Health, the concept of whole health has evolved for many years under several names such as salutogenesis, patient-centered care, people-centered care, integrated care, and population health.³⁻⁸ The National Institute for Occupational Safety and Health describes a holistic model, called Total Worker Health®,⁹ for improving the safety and health of workers through an integrated approach that prioritizes safety while simultaneously engaging in other workplace initiatives to advance overall worker well-being. Additionally, the Samuels Institute developed the Optimal Healing Environment framework comprising psychological, spiritual, physical, and behavioral components of health care and addresses individuals' relationships, health-creating behaviors, and physical environment as contributions to well-being.^{10,11}

Occupational medicine programs that embrace some of these concepts can help their workforce patient populations improve metrics of work-related injury and illness prevention and recovery. Just as important, when occupational medicine clinicians contribute to the overall health of the individual worker and collective workforce, they can make a meaningful impact on organizational metrics because healthy employees are safer, are more engaged, have lower health-related costs, and are more productive both at home and work.

OEM CORE COMPETENCY IN HEALTH AND PRODUCTIVITY

OEM encompasses a multifaceted domain at the intersection of worker health and organizational dynamics. The American College of Occupational and Environmental Medicine (ACOEM) has developed ten core competencies for the profession. One core competency, Health and Productivity,¹² underscores OEM physicians' critical role in identifying and addressing individual and organizational health factors within the workplace to optimize worker health and enhance overall human performance. Despite its significance, it is sometimes overshadowed by other competencies more conventionally associated with OEM practice, such as injury treatment or work fitness. However, addressing lifestyle and health behaviors is an important complement to medical treatments. Potential areas of organizational impact include healthcare spending reduction, productivity enhancement, individual worker health and recovery, leadership engagement, workplace culture, strategic planning, and human performance.

DEFINITION OF LIFESTYLE MEDICINE

The American College of Lifestyle Medicine (ACLM) has developed six pillars as the foundation of their approach to using therapeutic lifestyle interventions as the primary modality to treat chronic conditions. Lifestyle medicine (LM) is the use

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of evidence-based, lifestyle, therapeutic interventions, including a whole-food, plant-predominant eating pattern, regular physical activity, restorative sleep, stress management, avoidance of risky substances, and positive social connection, to prevent, treat, and reverse disease.¹³ Lifestyle behavior change is recommended as a first-line treatment in many chronic disease guidelines. Increasingly, there is a recognition that medications and procedures have been insufficient to alter the negative trajectory of our collective health.¹⁴

Increasingly, evidence suggests that poor lifestyle habits combined with environments that discourage healthy behaviors result in adverse changes in our epigenetics, microbiome, neuroplasticity, and cellular function, which leads to chronic inflammation and clinical disease. Improved lifestyles and environments have the potential to slow chronic disease progression¹⁵ and, in some cases, are associated with disease reversal, prescription medication reduction, and elimination of advanced inflammatory-related chronic disease.¹⁶ For example, lifestyle-based intensive cardiac rehabilitation programs such as those by Ornish, Esselstyn, and Pritikin exceeded the clinical outcomes of traditional approaches in preventing recurrent cardiac events and arterial plaque progression.¹⁷

Lifestyle medicine complements other evidence-based approaches including the Agency for Healthcare Research and Quality (AHRQ) recommendations on patient centered lifestyle modifications that result in decreasing health disparities,¹⁸ or professional society practice guidelines such as the American College of Cardiology's intensive sessions on the emerging science of LM¹⁹ or those from the American Academy of Family Physicians (AAFP).²⁰ An occupational medicine residency that included formal training in LM reported that residents found the training to be enjoyable and planned to use the strategies in their future career.²¹

OEM clinicians and medical directors looking for tools to integrate LM principles can begin by exploring resources such as the American Medical Association's (AMA) 50 credits of LM CME,²² the ACLM online course about LM and food as medicine,²³ the AAFP guide on LM,²⁴ the ACLM's LM Residency Curriculum,²⁵ the Health Meets Food program utilized in more than 60 medical schools,²⁶ ACPM's LM resources,²⁷ an open-source program from the University of South Carolina School of Medicine,²⁸ or programs delivered in-person or online.^{29,30}

CLINICIANS' INCORPORATION OF LM INTO OEM

As OEM physicians seek to improve the health and well-being of their patients,

they may consider incorporating principles of LM into their patient encounters either by directly addressing these topics or referring patients. The following section explores the topics of the six pillars of LM and provides examples and descriptions of how to integrate them into the daily clinical operations of an OEM physician. This is followed by a discussion of the integration of LM principles into organizational policies and programs.

TOBACCO

Despite declines in rates of smoking, tobacco remains the major preventable cause of death, disease, and disability in the US, causing 480,000 deaths per year.³¹ Of those continuing to smoke, nearly 70% want to quit with about half making a quit attempt each year.³² Smoking harms nearly every organ of the body³⁰ and increases the risk of injury.³³

The US Preventive Services Task Force (USPSTF) recommends that “clinicians ask all adults about tobacco use, advise them to stop using tobacco, and provide behavioral interventions and US Food and Drug Administration (FDA)–approved pharmacotherapy for cessation to nonpregnant adults who use tobacco.”³⁴ Approved drugs can be used alone or in combination, such as combining two forms of nicotine replacement therapy (NRT) or adding NRT to another medication.^{35–38} Using an adaptive approach to treatment, adjusting medications based on patient response, can also increase quit rates.³⁹ Brief tobacco dependence treatment can be effective,⁴⁰ but higher-intensity interventions with increased frequency of counseling improve the chance for success.^{38,41,42}

There is uncertainty about the role of electronic cigarettes for smoking cessation, and none are approved by the FDA for that purpose. Many people who use electronic cigarettes to assist with quitting end up continuing to use both.^{43,44} Those who switch to exclusive electronic cigarette use may have lower exposure to some carcinogens and toxins.⁴⁵ However, dual use is associated with a greater risk of pulmonary and cardiovascular disease⁴⁶ and lung cancer⁴⁷ than smoking cigarettes alone. Electronic cigarettes are not an approved treatment for smoking cessation. The USPSTF recommends that clinicians pursue cessation interventions with proven effectiveness and established safety.³³

It has been estimated that smokers make an average of six quit attempts before quitting successfully. However, some smokers may make 30 or more attempts.⁴⁸ Relapse should be seen as part of the process, rather than failure. Clinicians who are not able to provide smoking cessation treatment can re-

fer patients to other resources such as quit lines, which are operated in all 50 states and can be accessed at 1-800-QUIT-NOW,⁴⁹ and may offer free or discounted NRT.

SUBSTANCE MISUSE AND SUBSTANCE USE DISORDER

Substance misuse and substance use disorder affect more than 48.7 million people 12 years or older in the US, including 29.5 million with an alcohol use disorder, 27.2 million with a drug use disorder, and 8.0 million people who had both an alcohol use disorder and a drug use disorder.⁵⁰ Results from the 2022 National Survey on Drug Use and Health estimate that 61.9 million US adults had used marijuana in the past year and 42.3 million used it in the past month.⁵¹ The same survey estimated a past-year prevalence of opioid use of 8.9 million US adults and past-month prevalence of 2.9 million adults. The direct and indirect economic cost of substance misuse is estimated to be \$249 billion for alcohol misuse and \$193 billion for illicit drug use.⁵² Substance misuse includes excessive alcohol consumption, abuse of prescription or recreational drugs, and the use of illicit drugs. Alcohol and drugs can have detrimental effects on physical and mental health. They can lead to substance use disorders (SUD) as well as medical complications including liver damage, cardiovascular complications, respiratory issues, mental health disorders, neurological conditions, and even death due to overdose or other injury.^{53,54} Substance misuse can also impair individuals' judgment and decision making, can result in legal consequences, and can contribute to workplace accidents and injuries in addition to its potential strain on interpersonal relationships.

Prescription drugs, particularly narcotics, amphetamines, or tranquilizers, are often part of a mental health treatment program or a pain management program, and there are no uniform policies that currently exist in terms of prescribed medication and job safety considerations. There is a complex interaction between job description, job safety requirements, and use of medications of various sorts, prescription or not.

This often goes along with people who drive, fly, work underwater, or do a variety of different tasks with safety considerations. Maintaining the health and wellness of an individual in order to continue doing the task not only minimizes safety injuries, Occupational Safety and Health Administration (OSHA) recordables, and other negative metrics in terms of running a workplace but also maintains the health of the individual and a more productive and fulfilling perspective of life.

Clinicians can screen for substance misuse with validated questionnaires such

as the (AUDIT)-C, CAGE, or the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST).⁵⁵ Assessment of a patient with potential alcohol use disorder includes asking the patient about current and past alcohol use and treatment, the quantity and frequency of alcohol use, and symptoms related to alcohol use disorder or other substance use in addition to conducting a comprehensive medical history, physical examination, and relevant laboratory testing.

Treatment strategies may include referral to an experienced mental health and substance use provider, perhaps in collaboration with the employer's Employee Assistance Program (EAP), depending on the referral rules specific to each organization. The OEM physician can also monitor the employee's treatment progress, advocate for workplace accommodations, and provide education and support while ensuring confidentiality and privacy. The Substance Abuse and Mental Health Services Administration (SAMHSA) national helpline (1-800-662-HELP) is a no cost, confidential, 24/7, treatment referral and information service in English and Spanish for individuals and families facing mental health challenges or substance use disorder.⁵⁶

NUTRITION

Nutrition is a foundational pillar of LM. Dietary intake exerts a significant and thoroughly documented impact on many prevalent noncommunicable chronic diseases such as diabetes, hypertension, hyperlipidemia, cardio and cerebrovascular disease, and others.⁵⁷ The ACLM promotes a whole-food, plant-predominant diet as the most effective dietary pattern to prevent, treat, and reverse chronic illness in general. However, other nutritional interventions have also been shown to yield benefits for specific conditions or individuals, and individual assessment and modifications are necessary to optimize results and impact.⁵⁸ In particular, two well-studied diets, which have been the topic of Cochrane reviews, include the DASH diet⁵⁹ and the Mediterranean diet.⁶⁰

The Dietary Guidelines for Americans are developed by the United States Department of Agriculture and provide general guidance for a healthy diet.⁶¹ It is beyond the scope of this work to provide an in-depth review of all approaches to healthy eating, but general guidelines are as follows. Foods found in high frequency in healthy diets include fiber, fruits, vegetables, legumes, whole grains, nuts, seeds, and nutrient-dense foods. On the other hand, foods found in low frequency in healthy diets include saturated fats, trans fats, cholesterol, sodium, ultraprocessed foods, calorie-dense foods, and red meats.⁶²

A clinician must first have an accurate understanding of a patient's nutritional habits before he or she can recommend any interventions to improve upon the same. A variety of simple evidence-based assessments are available to the occupational health clinician, ranging from informal tools such as a 24-hour recall, 3-day food record, and generic food frequency questionnaires, to more formal analyses including the Starting the Conversation questionnaire⁶³ and the AAFP Lifestyle Medicine Assessment Screening Tool.⁶⁴

Consistent tracking yields the dual benefits of valuable dietary data as well as an effective standalone intervention with proven benefits of weight loss.⁶⁵ Providing general educational resources such as the ACLM "Plate" and "Food as Medicine" materials during clinical encounters is a similarly passive approach but may be beneficial. A formal nutrition prescription is an example of a more active intervention but requires more specific knowledge and consideration of a particular individual's current dietary intake and health status.⁶⁶ In general, nutrition prescriptions should include the specific type of food, the amount of recommended intake, and the frequency of ingestion. OEM clinicians should also consider referring patients to their personal physician or a registered dietician or other nutritionist for specialized care.

PHYSICAL ACTIVITY

The 2020 WHO guidelines on physical activity recommend reducing sedentary lifestyle.⁶⁷ Individuals with predominantly sedentary jobs in the workplace were found to have a higher risk of mortality and cardiovascular disease.⁶⁸ Physical activity is defined as "any bodily movement that is produced by the contraction of skeletal muscle and that substantially increases energy expenditure."^{69,70} Many scientific and health-related organizations recommend that adults should achieve the equivalent of 150 to 300 minutes of moderate-intensity physical activity and two or more sessions of muscle-strengthening exercises each week.⁷¹ Individuals who meet these recommended levels of physical activity experience numerous, well-documented health benefits, including lower risk of all-cause mortality, lower risk of multiple chronic noncommunicable diseases, and improved mental health and cognition.⁷²⁻⁷⁴

Clinicians can determine a patient's physical activity level through simple, direct questions⁷⁵ about the average number of minutes per day spent doing moderate to vigorous physical activity.⁷⁶ However, more detailed information can be obtained using the FITT paradigm (Frequency, Intensity, Type, and Time).⁷⁷ Additional options to assess a

patient's physical activity include more thorough questionnaires, self-report logs (virtual and hard copy), direct observation, and an ever-growing list of wearables and other technologies.^{78,79}

If these assessments demonstrate an inadequate level of physical activity, the clinician can consider various levels of intervention directly or via referral. Although a simple pre-exercise screening questionnaire is recommended prior to certifying an individual's safety to engage in physical activity, recent professional guidelines have significantly relaxed previous clearance protocols.⁸⁰ Many working adults who are healthy enough to be employed will likely meet the criteria for physical activity clearance without further evaluation.

Direct interventions range from brief, simple education and counseling to formal exercise prescriptions addressing the four domains of the FITT framework and the principle of progression (FITT-P) with multiple follow-up visits. Potential referral options include physical therapists, certified personal trainers, strength and conditioning specialists, and exercise physiologists.⁸¹

OVERWEIGHT/OBESITY

Overweight and obesity are commonly defined based on body mass index (BMI) measured in kg/m², with BMI >25 kg/m² designating overweight and BMI >30 kg/m² indicating obesity (with lower cutoffs for some ethnic/racial populations). Although this metric is imperfect and other measures, such as percentage of body fat and the waist-to-hip ratio, may more accurately indicate risk, BMI is easily determined and used most often.^{82,83} Obesity is associated with an increased risk for a wide variety of health issues including type 2 diabetes,⁸⁴ cardiovascular disease (coronary, artery disease, heart failure, hypertension, hyperlipidemia, and metabolic syndrome),^{85,86} cancers (breast, colorectal, esophageal, kidney, gallbladder, uterine, pancreatic, liver, and prostate cancer),^{87,88} musculoskeletal disorders (osteoarthritis, back pain),⁸⁹ obstructive sleep apnea,⁹⁰ gastrointestinal and hepatic diseases (steatohepatitis),⁹¹ gallbladder disease, gastroesophageal reflux disease (GERD),⁹² dementia,⁹³ kidney disease,⁹⁴ and increased mortality associated with COVID-19 infection.^{95,96}

Overweight and obesity are also associated with increased odds of sustaining an injury, ranging from 15% (overweight) to 48% (Class III obesity) higher risks.⁹⁷ In the workplace, overweight and obese workers were 25% to 68% more likely to experience injuries than other workers.⁹⁸ With surgery, obesity is associated with increased odds of postoperative infection, venous thrombo-embolism, and renal complications⁹⁹ as well as delayed functional recovery in trauma patients.¹⁰⁰ Obesity is also associated

with increased costs among workers' compensation claimants sustaining severe but not minor injuries.¹⁰¹

Although patients with obesity may believe that they need to obtain a normal weight to attain health benefits, weight reduction of 5% to 10% results in significant clinical benefits.^{77,79,102–104} Further weight reduction may provide additional advantages.^{98,99}

Patients with obesity are at increased risk for and should be assessed for food insecurity¹⁰⁵ and eating disorders, including binge-eating disorder and night-eating syndrome.¹⁰⁶ The USPSTF recommends that clinicians offer or refer adults with BMI of 30 kg/m² or higher for intensive, multi-component behavioral interventions.^{107,108} An energy deficit is required to achieve weight loss.⁷⁷ A variety of dietary approaches can help achieve weight loss as long as they produce a realized energy deficit.^{77,109,110} Lifestyle medicine may result in a weight loss of 2% to 9% at 1 year; however, weight regain over time is common.¹¹¹ Pharmacotherapy and surgery should be considered for those who cannot achieve and maintain clinically meaningful weight loss.^{112–114} Pharmacotherapy may need to be continued indefinitely to prevent weight regain.¹¹⁵

SLEEP

OEM physicians should be knowledgeable about the diagnosis and treatment of fatigue and sleep disorders.¹¹⁶ The prevalence of insomnia in adults ranges from 12% to 20% and includes these three symptoms: difficulty falling asleep, difficulty staying asleep, and waking too early.¹¹⁷ The daytime consequences of chronic insomnia include fatigue, difficulty concentrating, and irritability.¹¹⁸ However, in one study, 47% to 67% of patients did not seek medical attention for difficulty sleeping.¹¹⁹

The recommended number of hours of sleep by age group¹²⁰ is 7 to 9 hours for ages 18 to 64 years and 7 to 8 hours for ages 65 years and older. A minimum of 6 hours may be appropriate for those aged 18 to 64 years and perhaps as low as 5 hours for individuals 65 years and older. It is not recommended to sleep more than 10 hours a day for adults under age 65 or more than 9 hours a day for people aged 65 and older.

The diagnostic criteria for insomnia (DSM-5/ICSD-3) include dissatisfaction with sleep quality or quantity and one or more of the following: difficulty falling asleep, difficulty staying asleep, or early morning wakening. Sleep disturbance occurs despite adequate opportunity for sleep, and the sleep difficulty occurs for 3 months' duration and at least three times per week (chronic insomnia).^{121,122}

The risk factors for insomnia include depression, female gender, age, lower socioeconomic status, concurrent medical/

psychiatric disorders, divorced or separated (vs married or never married), and race (Black vs White).¹¹¹ A number of comorbid conditions commonly seen by the OEM physician that are associated with insomnia include chronic pain, coronary heart disease, stroke, diabetes mellitus, hypertension, behavioral and mental health disorders (depression, stress, anxiety, SUD), sleep apnea, restless leg syndrome, and others such as urinary problems or neurological issues.^{123–126} Poor sleep quality affects alertness, learning, memory, thinking, and executive functions, which can also impact work performance.^{127,128}

The clinician can obtain valuable information regarding potential sleep disorders from one of the evidence-based sleep questionnaires such as the Sleep Timing Questionnaire (STQ), Pittsburgh Sleep Quality Index (PSQI), actigraphy, a sleep diary, or from a patient's wearable devices. In addition, there are several healthy lifestyle behaviors that may prevent insomnia and foster better sleep hygiene. These habits include limiting or eliminating naps; limiting alcohol, caffeine, and tobacco; avoiding late night meals; limiting "screen time" prior to bedtime, consuming a healthy diet; getting regular physical activity; using a consistent sleep schedule; and using the bedroom only for sleep.¹²⁹

Should lifestyle changes be insufficient to manage insomnia not related to obstructive sleep apnea or restless leg syndrome, the next steps would include cognitive behavioral therapy (CBT) and then a combination of CBT and pharmacotherapy.^{130–133}

MENTAL WELL-BEING

Mental illnesses are among the most common health conditions in the US, with more than one in five adults living with a mental illness. About 1 in 25 US adults live with a serious mental illness, such as schizophrenia, bipolar disorder, or major depression.¹³⁴ The USPSTF recommends screening for depression and anxiety disorders in adults, including pregnant and postpartum persons, regardless of risk factors.

Health providers have access to multiple survey instruments including Emotional Well-being SF 36, Patient Health Questionnaire 2 (PHQ-2), Patient Health Questionnaire 9 (PHQ-9), the WHO-5 Well-being Index, and the Generalized Anxiety Disorder 7 (GAD-7) questionnaire. For patients who screen positive for depression and/or anxiety, the OEM physician should facilitate a follow-up assessment with a specialist to confirm the mental health disorder. Providers should also encourage lifestyle changes, non-pharmacological management plans, self-management, social support, community resources, online resources, psychotherapy, and/or pharmacotherapy when appropriate.

If indicated, the OEM physician can implement reasonable workplace accommodations to support mental health needs, such as flexible work schedules or modified duties. If the employee has been on leave, the clinician can assist in a return-to-work plan. In situations where an employee is experiencing a mental health crisis at work, the physician can provide immediate support and intervention, including coordinating emergency medical care if necessary. In all cases, the physician can collaborate with the employer's EAP or other mental health resources to ensure that employees have access to confidential counseling services and other support programs.

SOCIAL CONNECTEDNESS

Social connectedness can be defined as the experience of belonging to a social group or network.¹³⁵ It includes the interrelated components of social support, social networks, and the absence of perceived social isolation.¹³⁶ Social connectedness includes face-to-face contact with others as well as through electronic social media. Social connectedness can be beneficial or malevolent, depending on the source. Multiple studies show the association of positive social connectedness with improved mental¹³⁰ and physical¹³⁷ health as well as decreased mortality.¹³⁸

Positive social connectedness has had beneficial effects on workers, leading to higher morale and performance during good times¹³⁹ and resilience and healing during bad times. At least one industry stressing a Psychological Climate for Caring with social connectedness as one of its priorities has reported improved performance in its workers.¹⁴⁰ During bad times, such as the COVID-19 pandemic^{141–144} or other disasters,^{145–148} healthcare workers and first responders found social connectedness to be a source of restoration and healing. Lack of positive social connectedness has been shown to lead to depression in workers,^{149–152} which can result in poorer work performance, absenteeism, or presenteeism. A lack of positive social connectedness can further act as a risk factor for other pillars of LM. For example, it can be associated with poor stress management, insufficient restorative sleep,¹⁵³ and substance misuse.¹⁵⁴

The goal is to provide adequate screening for social connectedness, promote a psychological climate for caring in the workplace, and implement tools for patients to find positive social connectedness with social networks that are wholesome, responsible, supportive to the worker, and supported by scientific data. A variety of social connectedness screening tools were compiled and summarized by the Foundation for Social Connection.¹⁵⁵

INCORPORATION OF LM INTO WORKPLACE POLICIES AND PROGRAMS

LM principles can also be incorporated at the workplace level through organizational policies and programs, creating health-promoting environments, and through the design of employee health benefits. These approaches should be regularly evaluated using data to recognize successes as well as opportunities for continuous improvement.

TOBACCO

Smoking is associated with increased direct and indirect costs for employers.^{156–159} These costs are lower for ex-smokers.^{149,160} To encourage smokers to quit and protect employees and customers from environmental tobacco smoke, employers should enact tobacco-free campus policies,¹⁶¹ which should also ban electronic cigarettes.¹⁶²

Employers can also offer worksite smoking cessation programs, which can include individual counseling and group programs.¹⁶³ Financial incentives may increase quit rates.^{164–166} Employer-provided health insurance, under the requirements of the Affordable Care Act, must cover screening for tobacco use and at least two tobacco cessation attempts per year for those who use tobacco products. For this purpose, a cessation attempt includes coverage for four tobacco cessation counseling sessions of at least 10 minutes each (including telephone counseling, group counseling, or individual counseling) and all FDA-approved tobacco cessation medications (including both prescription and over-the-counter medications) for a 90-day treatment regimen when prescribed by a healthcare provider.¹⁶⁷

The best practice approach goes beyond this minimum to provide “coverage for smoking cessation treatment that is comprehensive, barrier-free, and widely promoted.”^{36,168} Reducing barriers includes eliminating or minimizing “barriers to accessing cessation treatments such as copayments, coinsurance, deductibles, annual or lifetime dollar limits, and prior authorization.”¹⁶²

Assessing employer smoking cessation efforts include measuring smoking prevalence, smoking cessation program participation, quit rates, and reductions in direct and indirect costs. Although quitting smoking has immediate benefits that increase over time,¹⁶² the smoking cessation-associated reduction in healthcare costs and smoking-related morbidity and mortality may not be evident for several years depending on factors such as the amount and number of years of smoking and the presence of comorbidities.^{169,170}

SUBSTANCE MISUSE AND SUBSTANCE USE DISORDER

The prevalence and costs of substance misuse for an individual employer can be es-

timated using the National Safety Council's cost calculator.¹⁷¹ US data show that 70% of all adults with an alcohol or illicit drug use disorder are employed, making the workplace an important setting to address SUDs.¹⁷² Over 15% of US workers report being impaired by alcohol at work at least one time during the past year.¹⁷³ The 13.6 million workers with a SUD represent nearly 9% of all employed adults. The National Council on Alcoholism and Drug Dependence estimates that SUD costs US employers \$81 billion each year in lost productivity, absenteeism, turnover, workplace accidents, healthcare costs, disability, and workers' compensation.¹⁷⁴

OEM physicians can promote overall well-being and support for SUD by implementing programs including EAPs for information and referrals for employees exhibiting poor quality of work, attendance issues, and people who realize their substance misuse is causing problems with their work or home life. Alcohol- and drug-free policies that discourage substance misuse are another important strategy for the workplace, as is fitness for duty and return-to-work policies. The benefits plan design should support the employees' ability to engage in professional treatment that includes counseling, medication-assisted treatment, and screening for mental disorders that frequently coexist with SUD.

Drug-free workplaces in some cases use urine screening programs, and others use devices to check alcohol levels. Many workplaces have specific mandates if they are part of the Department of Transportation or are contractually obligated to do testing based upon the kind of work they do.

Managers can be trained to recognize the signs of SUD, how best to approach employees with their concerns, and how to support them in accessing assistance. Fostering a supportive and nonjudgmental workplace culture can help employees feel comfortable seeking treatment for substance misuse issues without fear of stigma or discrimination. Programs and policies need to be evaluated to measure their effectiveness on a group level to maintain confidentiality and continuously updated with evidence-based methods. Available resources include the Department of Labor's Recover-Ready Workplace Initiative¹⁷⁵ and tool kit as well as NIOSH substance use and work information.¹⁷⁶

A systematic review of workplace-based interventions for the prevention and treatment of substance misuse found only a few studies that examined implementation in the workplace. Results revealed barriers including lack of engagement with e-health interventions, reluctance to seek help among male employees, and confidentiality concerns. Tailoring interventions to each workplace and removing barriers to entry were found to improve outcomes.¹⁷⁷

NUTRITION

A cornerstone of LM and certainly one of the key components of the whole health approach is nutrition. Where applicable, establishing guidelines for healthy food in cafeterias, snack bars, special events, and vending machines is a foundation for an onsite nutrition program. A well-integrated program looks at not only healthy offerings but also how food is placed and priced in the cafeterias, as well as augmented resources to help employees make good decisions regarding meal planning and food choices.

The Centers for Disease Control and Prevention (CDC) has helpful resources on structuring cafeteria pricing and layouts for better decision-making by employees.¹⁷⁸ The Food Service Guidelines¹⁷⁹ include specific food and nutrition standards that are based on the most current Dietary Guidelines for Americans and sustainability standards for food and food service operations. The Food Service Guidelines call for food and nutrition standards that support healthier choices.

OEM physicians are also poised to work with the sourcing and procurement team on structuring contracts with external suppliers to provide higher percentages of healthy food options. They can also consult with the wellness team or food service vendor on food placement and layout of onsite cafeterias. A systematic review found five studies focused on improving the workplace food environment and four studies focused on nutrition education using various channels. Improvements in nutrition knowledge, self-efficacy, and improved BMI and blood biomarkers were associated with each of the interventions.¹⁸⁰

PHYSICAL ACTIVITY

Organizational policies that can positively affect employee physical activity include paid exercise time, walking meetings, and scheduled physical activity breaks.^{181,182} The built environment of the workplace can also be designed to promote physical activity¹⁸³ through on-site gyms; facilitation of active commuting; strategic positioning of supply, delivery, and waste locations in the workplace to encourage movement throughout the day; promotion of stair use as the easy and attractive option; and other similar strategies. It is important to note that organizational policy and structural or environmental changes like these can often have greater long-term impact¹⁸⁴ on worker physical activity compared to temporary or short-term programs.

Workplace programs designed to improve employee physical activity can include passive educational materials, active coaching, seminars, workshops, group exercise classes,¹⁸⁵ workplace sports teams,¹⁸⁶

exercise challenges, and other similar programs. Organizational benefits such as wearables¹⁸⁷ to track steps or other physical activity, active workstations such as treadmill desks,¹⁸⁸ and free or reduced cost gym memberships¹⁸⁹ have been shown to have a positive impact on employee physical activity.

Measurable outcomes of workplace initiatives surrounding physical activity can include both work-centered and worker-centered metrics. The main categories of worker-centric outcomes are measurements of (1) health behavior such as time spent in various intensities of physical activity, steps per day, or time spent in sedentary behavior and (2) health/disease-focused outcomes such as anthropometric measurements (weight and BMI),¹⁹⁰ fitness,¹⁷⁹ metabolic health indicators (lipids, blood glucose),¹⁹¹ mental health,¹⁹² and specific medical diagnoses. Organizational outcomes of interest that have been shown to be positively impacted by workplace physical activity initiatives include absenteeism, presenteeism, productivity, return on investment, and job satisfaction.^{193–196}

OVERWEIGHT/OBESITY

Employers' direct and indirect costs rise with increasing BMI of employees.^{197–199} Employers can support employees seeking to maintain a healthy weight, lose weight, or sustain weight loss through a comprehensive approach to a culture of health, policies, environments, programs, and health benefits.²⁰⁰ Company policies can support a healthful environment and ensure that onsite dining, catering, and vending machines offer healthy options. Facilities can be designed to encourage physical activity including open stairwells, walking paths, and onsite fitness facilities.¹⁹⁰

Programs can support a culture of health at work and can be onsite, offsite, and virtual. These can include commercial weight loss programs,²⁰¹ coaching, and access to a dietitian or nutritionist. Financial incentives for weight loss were effective in one company program, although this trial was conducted at a time when pharmacotherapy for weight loss was less effective than current pharmaceuticals.²⁰² More research is needed to determine the effectiveness of digital health tools for obesity.^{203,204}

Benefits plan design elements that support weight maintenance and weight loss include discounted fitness center memberships for employees and families, employee assistance plans, and coverage for behavioral counseling, dietary counseling, obesity disease management programs, pharmacotherapy, and centers of excellence for bariatric surgery.

To evaluate the success of efforts to support overweight employees in meeting

their weight loss and weight maintenance goals, employers can review program process measures, such as program participation rates,²⁰⁵ utilization of healthier employer cafeteria and vending machine options, and outcome measures including changes in BMI, reductions in percentage of body fat, improvement in biometric screening measures (blood pressure, blood glucose, hemoglobin A1C lipid levels), and reductions in direct and indirect costs.

SLEEP

Poor sleep can result in increased absenteeism, decreased productivity, and avoidable workplace vehicle and nonvehicle accidents and injuries. Fatigue and poor sleep are estimated to cost employers an estimated \$1967 per employee per year in lost productivity and an estimated \$1.23 million annually in lost workdays.^{206–211} The cost of poor sleep for an employer can be estimated using the National Safety Council's Employer Cost Calculator for Fatigue²¹² indicating the number of employees likely to suffer from a sleep disorder (eg, obstructive sleep apnea, insomnia, restless legs syndrome, shift work disorders) and the percentage of workplace injuries caused by sleep disorders.

Traditionally, fatigue and sleep have not been included in employer health and well-being programs. However, given the prevalence and economic impacts, employers should provide employees with sleep education in their wellness newsletters, training on the signs and symptoms of fatigue and its relationship to work-related accidents, and questionnaires to identify potential sleep disorders. Such information should be incorporated into motor vehicle drivers' safety initiatives for those businesses where driving a motor vehicle is part of the job. Employers should monitor workplace environment factors, which might play a role in employee alertness including lighting, temperature, noise,²¹³ and optimizing shift work schedules to minimize sleep disruptions.²¹⁴

The components of a workplace sleep program might include sleep health education and awareness, training of workplace healthcare professionals on the diagnosis and treatment options for fatigue/sleep disorders, and inclusion of sleep improvement interventions in workplace health initiatives. Employer benefits to support sleep include the EAP, coverage for sleep studies and sleep centers of excellence, Cognitive Behavioral Therapy—Insomnia (CBT-I), pharmaceutical coverage, and coverage for obstructive sleep apnea screening and treatment.^{215–218}

Real-time impairment technology to detect fatigue is already in use in industries such as aviation, transportation, and healthcare.^{219–221} This strategy typically puts the focus on worker safety rather than

catching wrongdoing and is a cutting-edge technology to improve well-being and prevent accidents and injury.

Evaluation of the effectiveness of fatigue and sleep interventions might include monitoring workplace accidents and injuries, shift-work scheduling that requires employees to attend meetings before or after their shift, sleep-related medical costs, sleep-related short-term disability costs, sleep-related productivity loss, and employee self-reported sleep duration and quality metrics.

MENTAL WELL-BEING

Estimates of the lifetime prevalence of mental illness among Americans range from 30% to 50%,^{222,223} which is associated with more than \$200 billion in annual healthcare costs and lost productivity at work.^{224,225} Mental health conditions are a significant contributor to absenteeism and presenteeism^{226,227} as well as increased employee turnover.²²⁸ Poor working environments including discrimination and inequality, excessive workloads, low job control, and job insecurity pose a risk to mental health. Mental health conditions can also affect productivity by impacting self-confidence, work engagement, physical capability, job performance, and aggravation of other non-mental health diseases.

For several decades, the majority of US employers have recognized the importance of mental health to the health and productivity of the workforce. As a result, they have often provided mental health services through EAPs at no cost. EAP services can be delivered through many channels including telehealth, face-to-face, digitally, and at a growing number of major US companies by EAP counselors at the workplace. The EAP addresses a wide range of mental health concerns and SUDs including stress, depression, anxiety, panic disorders, substance misuse, family/relationship issues, violence in the workplace, and many others.

OEM physicians should be knowledgeable on the response to workers with mental health issues in the workplace, in collaboration with other resources such as the EAP, HR, benefits, and legal departments.²²⁹ Employers can also help mitigate mental health conditions by promoting awareness through training and interventions that improve mental health literacy, strengthen skills to recognize and act on mental health conditions at work, and empower workers to seek support.²³⁰ A study of the Federal Occupational Health Program EAP, which provides services for 1.8 million US Federal employees, showed significant improvement from pre- to post-EAP intervention on measures of productivity, work and social relationships, perceived health status, attendance, tardiness, and functioning.²³¹ The American Psychological Association has recognized

companies with robust behavioral health programs with an annual award²³² as has Mental Health America.²³³

A synthesis of systematic review studies of workplace mental health interventions found that comprehensive programs, such as those incorporating both mental and physical health interventions, or targeted interventions for particular anxiety disorders, had a greater level of research evidence to support their effectiveness than other types of interventions.²³⁴ In addition, the authors concluded that positive workplace outcomes result from mental health workplace programs that provide high-intensity interventions, access to clinical treatment, and support in navigating disability management resources.

Other organization-wide approaches to address mental health might include strategies to improve work hour or location flexibility, autonomy, supportive supervision, and others which were described in a special issue of the *Journal of Occupational and Environmental Medicine*.²³⁵ Employers can support workers with mental health conditions to participate fully and equitably in work through reasonable accommodations, return-to-work programs, and supported employment initiatives including incentives to reinforce healthy behaviors.

SOCIAL CONNECTEDNESS

Because many adults spend the majority of their waking hours at work, relationships in the workplace can have a significant influence, both positive and negative, on employee health and well-being.²³⁶ OEM physicians can support organizational efforts to improve social connectedness by developing and implementing a policy for providing a positive Psychological Climate for Caring for the workers.²³⁷ In addition, a company-wide screening program¹⁵⁵ for depression and positive social connectedness can be useful while providing a list of known positive sources for social connectedness for the worker to consider.

Encouraging positive social interactions among employees may include options such as holiday parties or picnics, potentially including families, or intramural sports activities. Additional ways to improve connections and communication include periodic brief group meetings between workers and managers and creating a workplace website for social interaction opportunities.

Positive social connectedness has been shown to improve workers' psychological well-being, thereby improving work performance.²³⁸ Its presence has been shown to improve resilience during adverse times and increase work efficiency during better times. Its absence can have adverse effects on workers, increasing anxiety and depres-

sion, which can result in absenteeism and presenteeism, and can adversely affect other pillars of LM, such as nutrition, substance misuse, stress management, and psychological well-being.

SUCCESSFUL WORKPLACE PROGRAMS

Addressing lifestyle health risk factors is an essential component of comprehensive employer well-being programs. Health risk assessments (HRAs) are commonly used to assess LM behaviors including physical activity, smoking, alcohol intake, and nutrition, in addition to other risk factors such as those measured in biometric tests. A 2023 Kaiser Family Foundation study of over 2000 US corporations reported that 54% of all large companies and 36% of all small firms offered an HRA to their employees.²³⁹ HRAs can help identify areas that programs should focus on and track population health changes over time. As health risks increase or decrease, research has shown an association with changes in healthcare costs, absenteeism and disability, workers' compensation costs, and worker productivity/performance.^{240–244} It is also important to recognize that programs can help healthy people at low risk to remain at low risk.²⁴⁵

Successful workplace programs share common features including a long-term focus, goal setting, and the use of data to track results. Vanderbilt University reported long-term improvement in lifestyle health risk factors including physical activity and smoking cessation associated with their comprehensive workplace health promotion program over seven years.²⁴⁶ A multiyear program at Glaxo utilized the readiness for change model and asked employees to commit to maintaining or improving their health behaviors. Participants demonstrated an increase in physical activity, fruit and vegetable consumption, and engagement with health enrichment activities.¹⁹⁴ Employers have also reported that reducing health risk factors can prevent or delay the onset of diabetes mellitus using multicomponent programs incorporating educational activities and interventions targeting dietary changes and increased physical activity.^{247,248}

Investing in the health of employees is also good business because the health of employees has been found to be associated with employee productivity and performance, healthcare costs, absenteeism, disability, and workers' compensation costs.^{249–264} Evidenced-based comprehensive employer well-being programs have been associated with a reduction in health risk factors and may generate a return on investment (ROI).^{194,233,234,265}

Several studies in the US as well as internationally have found an association

between the stock market performance of publicly traded companies that offer comprehensive employee well-being programs and various measures of their stock performance and corporate profitability. This includes studies of companies that received the ACOEM's Corporate Health Achievement Award (CHAA)²⁶⁶ and the C. Everett Koop National Health Award. Although correlation is not the same as causation, the stock market performance of the award-winning companies versus S&P 500 results suggests that companies focused on integrating the health and safety of their workforce can yield greater value for their investors, demonstrating a competitive advantage in the marketplace.^{250,267}

Another example of these types of innovative approaches has emerged in Japan, where its aging population is causing a decrease in the working-age population and difficulty in maintaining the social security system that provides for medical care and pensions. Extending the healthy life expectancy of the population became a policy issue for Japan, and as part of this, Health and Productivity Management initiatives led by the Japanese Ministry of Economy, Trade and Industry were launched in 2014.^{268,269} It is unique in that the economic ministry, not the health ministry, was in charge of the initiatives. The Industrial Safety and Health Law requires employers to conduct general health examinations and stress checks for employees, an occupational safety and health management system for each workplace, and an occupational health physician for larger workplaces. These regulations are changing the mindset of Japanese employers to go beyond compliance to seeking genuine improvements in employee well-being as well as the bottom-line health of the company.^{270–272}

CONCLUSIONS

OEM physicians have the unique training and expertise to manage population health as well as individual health. Incorporating LM principles in OEM practice can help workers maintain and improve their health and performance, reduce the risk of illness and injury, and enhance recovery. All strategies, policies, and interventions should include an assessment component to evaluate their effectiveness in meeting organizational goals. OEM physicians are encouraged to stay abreast of the current research and published evidence-based guidelines to best meet the needs of individual employees as well as the organization as a whole.

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