

# Role and Value of the Corporate Medical Director

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**Abstract:** The role of the Corporate Medical Director (CMD) has received increased attention during the COVID-19 pandemic and has continued to evolve. This updated guidance addresses the role and value of the CMD in: health policy, strategy, and leadership; fostering a culture of health and well-being; supporting worker health and productivity/performance; addressing mental health; collaborating on employer benefits design; developing programs for global health, travel medicine, and remote/extreme environments; overseeing on- and near-site clinics; incorporating digital technology, artificial intelligence, and telehealth in health programs; supporting critical incident preparedness and business continuity planning; addressing workplace hazards; and overseeing periodic executive health examinations.

**Keywords:** Occupational Health, Occupational Medicine, Leadership, Physician Executives, Corporate Health

During the COVID-19 pandemic, corporate medical directors (CMDs) assumed an essential role in guiding their organizations through unprecedented events, which resulted in an increased recognition of the importance of that role.<sup>1-3</sup> The intense focus on addressing

the challenges of the pandemic, however, may have created the mistaken impression that pandemic support is the primary purpose of CMDs. While pandemic support is a critical function, CMDs, also known as Chief Medical Officers or Chief Health Officers, have a much broader mission.

This mission begins with articulating the importance of health for business success. Corporate medical directors lead the development and implementation of a strategy to optimize their organization's investment in health for employees and their families, which may also extend to customers and communities. This strategy includes developing and fostering a culture of health and well-being. To achieve goals related to the strategy, CMDs collaborate internally across the organization and with a wide spectrum of external stakeholders.

Many of the efforts of the CMD are directed at maintaining and enhancing worker health and productivity, leading to improved performance. This includes providing resources and programs that address both physical and mental health. With the overall medical responsibility for the company, CMDs collaborate with and provide oversight for health and welfare benefits, health and well-being related programs, and clinic operations. They also participate in business continuity (BC) and critical incident planning and support. Increasingly, their role extends to community health advice for the organization in connection with rising demands to satisfy sustainability and Environmental, Social, and Governance (ESG) challenges.

Since publication of the ACOEM Guidance Statement on the Role and Value of the Corporate Medical Director in 2018,<sup>4</sup> the role has become increasingly prominent and has continued to evolve. This guidance statement provides updated information on this evolution. The original publication also contained advice for the new CMD. As that advice has not changed, it is not part of this update.

## HEALTH POLICY, STRATEGY, AND LEADERSHIP

The CMD has a major opportunity within the corporate environment to shape health policy for better business outcomes and positive impacts on workers and their families, customers, and communities. At

the same time, many businesses before the COVID-19 pandemic were unable to conceptualize the return on investment in a strategic CMD role. Some eliminated the role completely or filled the position with nonmedically qualified candidates to reduce cost. While any "corporate" role is considered a business overhead cost, it is critical for the occupational medicine community to articulate the business case for the unique value-added skills and competencies of a fully trained and experienced CMD.

The COVID-19 pandemic shined a spotlight on the need for a more equitable, agile, and resilient health ecosystem inside and outside corporations to protect worker health and well-being as well as business integrity. Since the peak of the pandemic, the potential value of the CMD has evolved into a role influencing corporate decisions across a broader spectrum of diversity, health, equity, and inclusion.<sup>5</sup> These decisions are directly relevant to external investors whose behaviors are already driven by ESG criteria and where the "H" for health in ESG is becoming an increasingly important consideration.<sup>6</sup>

To be both effective and relevant, the CMD must quickly and deeply understand the corporate mission and values as well as its core business, products, or services. They must be acutely aware of current, shifting, and future business contexts. This demands regular, multistakeholder dialog. A wide range of relevant data can be drawn on to support a health business case from employee surveys, health risk assessments, health safety and security risk assessment and reporting systems, health care, disability, workers' compensation, and people data systems. From the multiple data sources available, CMDs can identify the health risks to the workforce, direct and indirect influencers of health, and potential gaps that may need future investment. The CMD can also quantify the return on value through correlations between well-being program outcomes and business costs such as employee engagement and retention, disability-related workdays lost, and safety losses.

The successful CMD offers businesses a clear roadmap for their vision with clearly defined objectives, regular milestones to measure progress, and methodologies for data analysis. It is often necessary to integrate

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local and global outcome measures within existing corporate reporting scorecards to ensure the health strategy is seen and understood at all levels of the organization.

The CMD provides leadership to their team to align and integrate their activity with the other relevant corporate departments such as safety, benefits, communications, HR, legal, facilities, and security. A trusted oversight and governance role elevates the value of the CMD beyond regulatory compliance, transactional, lowest-price, and commoditized approaches towards health interventions and services including Employee Assistance Programs (EAP), health insurances, and well-being offerings.

Occasionally, the CMD is required to make decisions that are unpopular with management and/or employees based on an ethical perspective. They need to positively influence the ethics of the organization, often expressed in a “code” of ethics or conduct, and seek the support of relevant authorities in adopting and implementing high standards of ethics in the workplace. Ethical guidelines for occupational medicine have been developed by the American College of Occupational and Environmental Medicine,<sup>7</sup> the Faculty of Occupational Medicine of the Royal College of Physicians,<sup>8</sup> and others.<sup>9</sup>

Many corporations study the cost of labor, supplies, and operations when considering expansion of their operations. Corporate medical director input into new business or acquisition processes builds awareness into the process. Unfortunately, operational health and potential workers’ compensation costs are rarely included in forecasts or models before facilities are operational. Similarly, potential community impacts may be underestimated. Corporate medical directors can encourage well-defined and predefined health impact assessments, health literacy advice to allay community concerns, and well-designed well-being, ergonomic, risk, and exposure prevention programs to reduce worker harm.<sup>10</sup> Concerted efforts to redress such foreseeable public health risks are more complex to administer and more costly if not addressed proactively.

The local health care system, emergency response, population health, and safety factors may all influence the productivity of the workforce. By developing trusted relationships with local medical experts, the CMD provides connections with the healthcare system. Consultation with the local and national health departments provides important knowledge about the population health needs as well as a vehicle for minimizing harm should critical incidents arise.

The CMD must clearly articulate to senior executives a compelling vision of how health contributes to success for the corporation along with focused priorities, key performance indicators to measure success, resources needed, risks to delivery, and the

business risks arising from a failure to deliver on their health vision. These actions and behaviors to achieve C-suite support require the CMD to exchange their white coat for the “business suit” and the opaque medicalized terminology for the language of business. They demonstrate that the CMD is a credible business leader and much more than an expert in medicine.

## CULTURE OF HEALTH AND WELL-BEING

An important role of the CMD is leading their organizations in establishing and fostering a culture of health. The US Centers for Disease Control and Prevention has defined culture of health as:

“The creation of a working environment where employee health and safety is valued, supported and promoted through workplace health programs, policies, benefits, and environmental supports. Building a culture of health involves all levels of the organization and establishes the workplace health program as a routine part of business operations aligned with overall business goals. The results of this culture change include engaged and empowered employees, an impact on healthcare costs, and improved worker productivity.”<sup>11</sup>

Many organizations have expanded this traditional definition to include addressing social determinants of health<sup>12</sup> as well as the health of the communities in which a company operates.<sup>13</sup> These efforts address “the conditions in which people are born, grow, work, live, and age” and also include forces that shape their daily life including income, social support, early childhood development, education, employment, housing, and genders.<sup>12</sup> These goals align with Healthy People 2030’s five overarching goals: “Create social, physical, and economic environments that promote attaining the full potential for health and well-being for all.”<sup>14</sup> Furthermore, to address the link between well-being and diversity, equity, and inclusion, CMDs can ensure that well-being programs specifically target these issues.

Corporate medical directors work collaboratively across their organization to influence the culture. Partnerships can include cafeteria services, facilities, safety, well-being, and benefits. The goal is to integrate health within the entire enterprise strategy to support employees and the business.

Worksite well-being programs are an essential component of an organization’s culture of health. However, there has been debate over their value. The literature is filled with conflicting studies that attempt to measure the value of worksite-based well-being programs and services.<sup>15–17</sup> Most experts in

the field of health promotion agree that comprehensive integrated programs are needed as individual stand-alone programs do little to address the health risks in a population. Corporate medical directors should pursue a comprehensive approach to create a healthy culture with a supportive environment and ongoing strategically designed programs that are refreshed and updated. This approach has been shown to be beneficial for employee health and also for businesses.<sup>18–20</sup> A culture of health enables employers to reduce their health care cost trends and support a high energy, engaged, productive workforce.<sup>21</sup>

Central to the success of a well-being program is leadership alignment and visible support from both senior and middle management as well as worker representative groups. While the goal may be a global program with consistent branding, key messages, and measures, it is critical to understand the individual sites’ health and well-being challenges and target local programs to address their specific culture and needs. This could vary widely depending on the needs of different work locations.

Many organizations have chosen to integrate health protection “safety” and health promotion “well-being” applying the concept of Total Worker Health advocated by the National Institute for Occupational Safety and Health.<sup>22</sup> The National Institute for Occupational Safety and Health posits that by aligning the two missions, organizations are better able to create a culture that focuses on ways to keep workers safe and healthy. By better coordinating distinct environmental, health, and safety policies and programs into a continuum of activities, employers enhance overall employee health and well-being while preventing work-related injuries and illnesses.<sup>23</sup>

Companies with highly effective health and productivity programs that have supported a culture of health have reported better financial performance than their peers.<sup>24–27</sup> In general, the stock price of companies that have received various awards for their comprehensive worksite-based well-being and safety programs have outperformed a group of benchmarked companies and financial indexes.<sup>25–27</sup>

## WORKER HEALTH AND PRODUCTIVITY/PERFORMANCE

There is a growing awareness of and a vast amount of published research on the association of workers’ health and their productivity/performance. Although work from home was not uncommon in some industries such as financial services call centers, it became the norm globally during the COVID-19 pandemic and continues in the postpandemic period. The impact of work from home on worker health and productivity/performance has been reported in several published studies.<sup>28–30</sup> These studies report mixed results on worker

health and productivity associated with the pandemic such as increased low back pain, weight gain, stress, and decreased productivity, among other outcome measures.

The CMD understands and guides the data analysis of the relationships between worker health and the economic impact of lost productivity on an organization. However, the reductions in worker productivity due to health-related problems are an indirect cost to corporations and society that is largely unmeasured. Absenteeism, disability time off work, and impaired on-the-job productivity (also termed “presenteeism”) costs are significant contributors to an incomplete estimate of the total loss of productivity resulting from impaired health.

The lost productivity related to absences associated with sick days and incidental absences is usually limited and either not tracked or poorly tracked by most organizations. The relationship between productivity and health, both physical and psychological, is largely underappreciated. Employees with various chronic medical conditions, such as asthma, diabetes, migraine headache, and arthritis, experience brief episodes of absenteeism, which do not lead to more extended short-term disability absences, and therefore, their impact on lost productivity is underestimated by most organizations. However, engaging employees with chronic medical conditions in appropriate disease management programs has been found to improve on-the-job productivity and reduce the likelihood of absenteeism.<sup>31–33</sup>

Short-term disability benefits provide salary continuation income for workers, which generally begin after a defined number of consecutive workdays off for an illness or injury. Comprehensive management of workers’ compensation losses includes prevention by identification of potential workplace hazards, early provision of appropriate medical services, and flexible arrangements for return to work from a work-related illness or injury. Thus, safety is an important component of a total workplace health and productivity management program directed by the CMD in partnership with other groups and as part of the broader employee health strategy of the organization. It is well documented that when safety is a high priority in an organization, the accident rates typically decline dramatically.<sup>34–37</sup>

Presenteeism is the reduction in a worker’s on-the-job productivity because of acute illness, injury, chronic medical condition or a variety of other factors including caregiving for others. Studies have shown the association between health risks and presenteeism.<sup>38–40</sup> Studies of cohorts of employees followed over time demonstrate that employees who reduced their number of health risks also showed improvement in their productivity.<sup>41,42</sup> Conversely, employees

whose number of health risks increased, in general, had lower on the job productivity/performance. Several estimates have indicated the costs of presenteeism may greatly exceed the costs related to absenteeism and disability for an organization.<sup>43,44</sup>

Yano et al<sup>45</sup> reported on the association of employee health risk factors and employer management programs with corporate profits in 1593 companies in Japan. Carefully designed workplace well-being programs have been shown to impact these costs by addressing health risks and medical conditions. In the United States, the term presenteeism refers to the loss of employee productivity due to illness or medical conditions. However, in Europe, presenteeism is viewed from the perspective of the psychological impact of lost productivity rather than the employer’s economic impact. It has been suggested that as a result of the COVID-19 pandemic, the measurement of presenteeism may need to be revised because countless employees are now working from home for part or all of their workweek.<sup>46</sup>

## MENTAL HEALTH

Mental health disorders represent one of the top 10 leading causes of disease burden globally and are a primary area of focus for the CMD. The World Health Organization predicts that depression will be the top cause of disability globally by 2030. In addition to “technostress”<sup>47,48</sup> caused by the tsunami of digitization solutions in the workplace, the COVID-19 pandemic has exacerbated the prevalence of mental health conditions around the world.<sup>49</sup> An estimated 15% of working-age adults have a mental health disorder, resulting in 12 billion lost workdays annually globally to depression and anxiety at a cost of US \$1 trillion.<sup>50</sup> Because mental health disorders have a peak onset of incidence in the working age population, the CMD has a unique ability to address the unmet needs of this population for the mutual benefit of the individual and employer. Mental health and substance abuse (MH/SA) conditions are often underdiagnosed and undertreated, resulting in avoidable personal distress, mental costs, absenteeism, disability, and lost on-the-job productivity. Investment in mental health treatment<sup>51</sup> services globally has been lagging.<sup>52–54</sup> At the same time, there is a global deficit of qualified mental health professionals to address this growing need for behavioral health care.<sup>55</sup>

For the best outcomes, the CMD needs to encourage the integration of workplace interventions. This includes strategies to promote “good work,” reduce work-related risk factors for behavioral health problems, promote mental health awareness, and improve access to available resources to mental health problems, regardless of the cause.<sup>56</sup>

A UK government–commissioned report, *Thriving at Work*,<sup>57</sup> sets out a framework and core standards to guide employers of all sizes to better support individuals with mental health conditions in the workplace. The UK Health and Safety Executive also describe key areas of work design that, if not properly managed, are associated with poor health, lower productivity, and increased accident and sickness absence rates.<sup>58</sup> International standards, such as ISO 45003,<sup>59</sup> are available to guide psychological risk assessment. The CMD has an invaluable role in assisting the organization’s response to workplace risks and improvement opportunities that benefit individual mental well-being and productivity.

Given the widespread effects and influence of these disorders on worker performance/productivity, the CMD can address mental ill-health with multiple points of impact in the workplace. The CMD also has a particular role advising the employer of evidence-based interventions that reduce psychosocial risks arising from work organization and culture as well as supporting employees with mental health problems. These programs and interventions can address mental health stigma and be integrated within benefit plan design, EAP offerings, disability management plans, and employee/manager education programs.<sup>60–62</sup> Along with this, the CMD can ensure appropriate data collection, facilitate analysis, and make recommendations to improve management.<sup>63</sup>

The workplace is an important location for interventions aimed at preventing the development of and aiding employees experiencing depressive disorders. Several studies have demonstrated the value of worksite programs to decrease the risk of mental health disorders such as depression and stress.<sup>64–69</sup> There have also been several reports of successful workplace MH/SA interventions.<sup>70–73</sup>

Stress is one of the most frequent health risks cited by employees who respond to health risk appraisals (HRAs) globally. However, the sources of stress vary greatly from individual to individual and from country to country. While stressors may be intrinsic to the workplace, they frequently include factors outside work, such as financial worries, interpersonal/family relationships, and chronic health conditions.

In general, an HRA that includes self-reported questions on MH/SA as well as productivity questions (absenteeism, presenteeism/performance) is extremely useful to determine the economic burden of MH/SA disorders in a global organization, especially for populations outside the United States, where medical and pharmaceutical cost data are not available, or are not paid for directly by the employer. Research has demonstrated that depression and stress, as identified on HRAs, are associated with major economic losses in the workplace including lost productivity/performance.<sup>74,75</sup>

The CMD has a natural leadership role to play in an employer's response to the human and economic costs incurred as a result of MH/SA disorders. In partnership with other departments and functions including EAP, benefits, work/life, health promotion, HR, learning and development, employee relations, security, and others, the CMD can initiate and contribute to company programs, policies, and services that decrease the direct and indirect costs associated with MH/SA disorders. Lack of access to trained mental health providers is a global issue demanding a transformation in the way such care is delivered, which may include artificial intelligence models.<sup>76,77</sup>

The application of artificial and augmented intelligence (AI) promises improvements in both clinician decision making and in which individuals receive timely, accurate, and contextualized mental health care. At the same time, factors such as uncertainty in the robustness of AI and machine learning models, and demographic biases in algorithms, demand vigilance, and advice from the CMD in a workplace setting to ensure the risks are highlighted and managed as the technology advances.<sup>78</sup> Meta analyses of Internet-delivered CBT interventions suggest that approximately half of all clients with anxiety disorders and depression respond, and about a third are able to reach remission.<sup>79</sup>

## BENEFITS DESIGN

There are two broad categories of employee benefits, those that are voluntarily provided by the employer and those that are legally mandated (e.g., workers' compensation statutes in the United States, statutory maternity pay and industrial injury disablement benefits regulations in the United Kingdom and European Union, unemployment insurance in India, and the civil code in Egypt). The following discussion focuses solely on the voluntary category.

Employer-provided benefits are the noncash portion of total compensation. These play a vital role in helping employers attract and retain talent and enhance workforce productivity. For example, 60% of human resources managers in a US survey reported that employee benefits were extremely or very important to employees for staying with their current employer and ranked the top benefits as health related, retirement savings and planning, leave, family care, and flexible work.<sup>80</sup>

Employee benefit packages are affected by numerous business considerations such as the country, culture and legal requirements, supply, and type of employee (e.g., hourly vs. salary, knowledge, creative, technical employees), competitor benefit packages, size of workforce, cost and affordability, organized labor, and collective bargaining. Em-

ployee benefits vary by employer but generally fall into the following four main types: health and well-being benefits, financial and retirement benefits, paid time-off and leave benefits, and work-life balance and fringe benefits.<sup>81</sup>

Employers can choose to provide the same benefits to all employees or to provide different benefits packages to different categories of employees. In the United States and in many countries,<sup>82</sup> this requires the employer to establish a "bona fide employment classification" that is consistent with the employer's usual business practice, often referred to as classes of employees that are similarly situated.<sup>83</sup> Bona fide employment classes may be defined by factors such as differing occupations or geographic location, full-time/part-time/contract status, membership in a collective bargaining unit, date of hire, or length of service. Finally, employee benefits administration may be managed directly by the employer (often preferred by large employers) or by Professional Employer Organizations—mostly appealing to small to medium employers. These are entities that contract with an employer to manage administrative processes such as benefits plans and designs in addition to other human resources functions such as payroll or regulatory compliance.<sup>84</sup>

Companies have often not fully utilized the expertise of CMDs in benefits strategy and administration. However, CMDs can make meaningful contributions in areas such as the following: healthcare plan design and access to coverage, analysis of medical trends and cost drivers, disability and sick leave benefit management, and work-life benefits that support health and well-being.

Regarding healthcare benefits, the CMD typically works in partnership with the benefits teams or health plan to help determine the extent of coverage and out of plan benefits that may be appropriate in each region. This may include benefits not available in every location. In the United States, for example, access to abortion services and transgender affirming care may be limited in certain states.<sup>85,86</sup> In developing countries, certain preventive services benefits such as HIV prevention or vaccinations may not be part of standard health insurance offerings or are provided by government programs (e.g., UK National Health Service). Under such circumstances, the CMD may weigh in on the value of expanding certain benefits coverage and determining centers of excellence. This may be particularly relevant for multinational corporations operating in low- or middle-income countries. They often also serve as a clinical escalation point when there are disputes regarding access to employee health benefits or denials of coverage by health plans.

Mental health benefits and services are in demand now more than ever, with one-quarter of US adults reporting a mental health diagnosis such as depression or anxi-

ety,<sup>87</sup> with similar results in the United Kingdom.<sup>88</sup> While US adults may be among the most willing to seek professional help for emotional distress, they are also among the most likely to encounter access or affordability issues. Working closely with the benefits team, the CMD can help develop a strategy to remove barriers to care through broader access to EAPs, on-site counseling, virtual behavioral health, and primary care practices with mental health providers. Corporate medical directors can help benefits professionals assess the quality of available mental health services, which may vary depending on location and type of service offered.

The CMD works collaboratively with the benefits team to understand medical cost drivers, the value of condition and disease management programs, pharmacy benefits managers, pharmacy plan design, and the effectiveness of well-being incentives (e.g., smoking cessation) on health outcomes. Evidence-based decision making is critical to avoid creating programs for which there may be significant cost but little efficacy.

The CMD is also instrumental in oversight of absence management programs, particularly sick time, medical leaves, and accommodations for those with both short-term and permanent disabilities. Employers report multiple direct and indirect benefits after making accommodations,<sup>89</sup> including retaining valued employees, increasing productivity and employee diversity, and saving other insurance costs. Close oversight of the disability management process is critical to effectively support best outcomes for both the employer and employee.

Workers' compensation is commonly managed by the corporate insurance or risk management groups along with property, fire, auto, umbrella, kidnap and ransom, reinsurance, and many other insurance areas. Because workers' compensation covers work-related injuries and illness, the CMD has an important role in ensuring that employees receive appropriate care as well as collaborating with safety, management, and other departments to prevent problems. With expertise in ergonomics and other risk areas, the medical teams can help identify and support changes in risks that reduce injuries and illnesses. Corporate medical directors can ensure excellence in medical management of work injuries through on-site clinics and targeted referral and oversight of outside specialists. Corporate medical directors can also oversee appropriate restrictions and accommodations to support early return to work rather than using carrier-provided panels of providers.

Furthermore, CMDs can recommend modification of workers' compensation coverage to handle situations not ordinarily covered by standard policies. These can be structured through the workers' compensation benefit and management design by using self-insured

and self-administered premiums to support on-site clinics as well as to pay for ergonomic improvements and other selected risk reduction efforts, or to pay for the groups not typically included in workers' compensation coverage.

Input from the CMD is also important when implementing other benefits and perks for employees. Many employers are offering a range of new services and the CMD should provide input on the selection of telemedicine options, medical advocacy programs, family planning, and fertility programs. There is also a role in helping design and select healthy food alternatives, physical activity programs, and educational seminars. Given the importance of understanding the impact of benefit programs on the health and well-being of employees and their families, the role of CMD is critical to optimize value in any benefits strategy.

### GLOBAL HEALTH, TRAVEL MEDICINE, AND REMOTE/ EXTREME ENVIRONMENTS

Globalization has brought about rapidly changing working conditions that present a challenge to the protection and promotion of employee health and safety. Globally, work-related diseases and injuries were responsible for the deaths of 1.9 million people in 2016.<sup>90</sup> While seen by some as a threat to local culture, globalization can lead to improvements in worldwide medical delivery systems and progress in population health. Corporate medical directors have an important role not only to ensure the health of workers but also to contribute positively to productivity, quality of products and services, work motivation, job satisfaction, and therefore the overall quality of life of individuals and society.<sup>91</sup> As evidenced by recent events, globalization and travel play key roles in the spread of infectious diseases, both communicable and vector mediated, for which occupational health must prepare the workforce. In addition, there is an evolving role for CMDs as climate change drives expanded risks for vector-borne and other infectious disease spread.

An important consideration when addressing global health is the company's structure and philosophy regarding the organization and alignment of global operations. This affects how that philosophy translates into a health strategy and the benefits offerings in all regions. The implementation is also influenced by the need to balance both mandated requirements (such as laws or union agreements) as well as the guidelines related to corporate culture.

Each region and country of the world has its own traditions (or lack of) regarding the practice of occupational medicine. For example, in most industrialized countries, the duties of the CMD are diverse and en-

compass many facets of employee health—both on the job and off. But in many developing countries, where it is most needed, a focus on occupational health is often absent.<sup>92</sup>

Without careful assessment and action, extreme and remote environments create conditions, which may be challenging to employee health. These may include high or low temperatures and elevations, radiation, stress, availability of safe food and water, poor outdoor air quality, quality of healthcare facilities, infectious diseases, or other factors. Characteristics of each individual employee such as age, physical and mental fitness, lifestyle habits including sleep, and medical conditions must be considered, because they too affect employee health in a remote or extreme location.

It is also important to assess operational risks. These may include the following:

- The physical environment, including noise, vibration, stress, radiation, thermal, and ergonomic issues.
- Potential chemical exposures including toxic chemicals, dusts/mists/fumes, sensitizers, carcinogens, and hydrocarbons.
- Biologic risks in the extreme or remote environment including wildlife endemic diseases (malaria or yellow fever, for example), and food- and water-related diseases (such as typhoid or cholera).
- Psychological risks to the worker in an extreme or remote environment include issues with isolation, communication problems, cultural difficulties pertaining to local laws, religion or language, leisure and recreational opportunities, substance misuse, and other stressors.

These risks often extend to families accompanying expatriate workers. The CMD can evaluate these health issues and prepare the corporation's employees to mitigate such health risks.

Employers have a duty of care for employees who travel on business. The CMD plays a key role in supporting traveler's health by establishing and implementing policies and operations.<sup>93</sup> This includes selecting and overseeing travel medicine providers, medical evacuation vendors and processes, as well as setting up clinical care abroad for global enterprises where local medical care is needed. Caring for the health of business travelers is a core role for the CMD, who can assess the high-risk locations in which the company operates, and the specific risks and threats faced by employees as they travel to other locations.<sup>94</sup> In an emergency situation, the CMD works closely with HR and security teams to address the health needs of an employee and/or their family.

Corporate medical directors can also set up systems to guide employees who are

taking personal trips or extending business trips that address health, safety, and security. This includes recommendations for vaccinations and medications. With an increasing number of workers pursuing adventure travel, which may include extreme or even dangerous vacations, the CMD may be able to provide advice that reduces risks or recommend alternative vacation plans.

### ON- AND NEAR-SITE CLINICS

The subject of on- or near-site clinics for primary care delivery and/or occupational healthcare surfaces for virtually all CMDs in a variety of ways. On- or near-site clinics may already exist, and a comprehensive review is required. The scope of services may need to be expanded, reduced, or refined. There may be reasons to look at outsourcing the staffing or management of the clinic versus providing services in-house. Alternatively, there may be a need to look at near-site clinical services, as well as selecting community partners, in providing services, which raises the issues of quality oversight and assessing procedures. According to a survey conducted by Mercer,<sup>95</sup> among employers in the United States with more than 5000 employees, the percent with on- or near-site clinics providing primary care had grown to 31% in 2020, while 25% had clinics providing occupational services. Aside from convenience, studies have reported decreased absenteeism, improved productivity, positive reception by employees and employers, and a return on investment of 1.5:1 or higher associated with on-site clinics.<sup>96</sup> An on-site employer-provided primary care clinic may also reduce external healthcare visits.<sup>97</sup>

The on-site clinic approach should fit into the broader employer health strategy. Health protection and health promotion are strategic objectives, and the clinics are tactics for delivering that strategy. On- or near-site clinic services, in addition to occupational and nonoccupational health care, might include well-being, EAPs, physical therapy, surveillance, travel medicine, return to work, disability management, and more.

On-site clinics can offer a variety of occupational and nonoccupational medical services to address the needs and culture of the organization. They may be focused on primary personal care, occupational health, acute/urgent care, or all three. There are pros and cons to each of these options and each can work well.<sup>98</sup> Corporate health functions must not be viewed simply as "the Health Services Clinic." The current role of the corporate health function emphasizes the value of the clinic, beyond the services provided by the physician, nurse practitioner/physician assistant, and clinic nurse functions.

The CMD must understand, and the company must comply with a wide variety of local, state, country, and other regulations

related to on-site clinics. This complex area requires knowledgeable legal, regulatory, licensing, and taxation expertise. For example, certain countries require a defined medical staffing level based on the number of employees while other countries may also define the scope of services provided at the workplace.

Requirements for the electronic health records (EHRs) for on-site clinics is particularly complex and important. These records must comply with regulations, which are country specific and perform functions, if occupational medicine focused, not ordinarily found in standard clinical EHRs. This includes medical surveillance examinations, travel medicine visits, immunizations, exposure management, hearing conservation record-keeping, and much more. The number of available commercial occupational medicine EHR products is limited, and none are ideal. They can be expensive and often require ongoing upkeep, back-up, and data security. Therefore, selection of the most appropriate EHR is an important function for the medical and IT teams collaborating with the CMD. The budget for the on-site clinic also requires careful planning and expertise to ensure the clinic is operating within the context of the benefit and tax laws as well as in coordination with the other health plan offerings.

## DIGITAL, AI, AND TELEHEALTH

The pace of change in digital technology is driving a staggering transformation in all aspects of daily life, including health care. This presents a great opportunity for innovation aimed at improving patient access, equity, experience, and outcomes. The CMD is uniquely qualified and positioned to evaluate the strengths and weaknesses of health-related digital offerings.

The global COVID-19 pandemic created rapid adoption of digital technologies and the transition to telehealth/telemedicine because of limited physical access and transportation to healthcare providers and facilities, healthcare provider shortages, and the desire to avoid exposure for patients and physicians. Despite the rapid adoption, significant challenges for this digital transformation remain.<sup>99,100</sup> These challenges include the following:

- Expensive EHR systems that may be contributing to healthcare provider “burnout.”
- Lack of interoperability between EHRs and other technologies such as digital applications.<sup>101</sup>
- Inadequate reimbursement of digital solutions (e.g., telehealth visits, remote monitoring).
- Equity issues (e.g., Internet access, health literacy).

While a variety of definitions and categorizations have developed for the meaning of “digital” in health, from the perspective of

the CMD, digital healthcare consists of various tools that engage patients for clinical purposes.<sup>102–104</sup> These include eHealth that includes web- and Internet-based services, telehealth, and telemedicine as well as mHealth, such as mobile phones and applications, text messaging, tablets, and phone calls. Digital health includes technology tools targeting and gathering physical and behavioral parameters, lifestyle, well-being, and fitness activities. These trackers capture, store, and transmit health data of individuals (monitored physical actions and physiologic processes such as blood pressure and heart rate) and are intended to motivate users to take personal control of their health. Along with the data, these solutions often provide general and targeted health information to educate the user and encourage their efforts. These tools do not require evidence-based studies to be released.<sup>105,106</sup>

On the other hand, digital medicine includes evidence-based software and hardware products that measure or intervene for health, including curing, mitigating, treating, and preventing disease. It focuses on a variety of medical conditions and diseases, such as diabetes, hypertension, and musculoskeletal conditions. These fall under the regulatory authority of the Food and Drug Administration, which applies approval or oversight. The various functions of digital medicine include the following:

- Remote monitoring for efficiency—(e.g., thermometers or blood pressure cuffs) providing automatic uploads into the patient record and eliminating manual input.
- Remote monitoring and management for improved care—referred to as prescription digital therapeutics, delivering evidence-based interventions to prevent, manage or treat medical conditions or diseases independently or in combination with medications or other treatments such as diabetes, substance use disorders, and insomnia.<sup>107</sup>
- Clinical decision support—tools built into EHRs to highlight changes, abnormal test results, or care guidelines to assist health professionals with care decisions.

In addition, health IT digital systems support the physician and patient interaction, facilitating improved patient participation and engagement, cost-effectiveness, and better patient outcomes.<sup>108–110</sup> Health IT also supports telemedicine and virtual visits. In addition, point of care/workflow enhancement systems (which includes EHRs and health information exchanges) facilitate communication capability to promote coordination and sharing of clinical data to enhance referrals to specialty care and care transitions.

Artificial intelligence (AI) provides great opportunities to incorporate, evaluate, and analyze vast amounts of data in real time to re-

duce manual errors and waste, meet reporting requirements, enhance efficiency by improving processes and information management, and support human decision making.<sup>111–114</sup>

AI domains can be classified as a continuum: rule based, machine learning, and deep learning/neural networks.<sup>115</sup> This includes speech and image recognition and large language models that transform conversations into medical documentation or produce chatbots such as ChatGPT (Generative Pre-Trained Transformer) that use natural language processing and predictive modeling to generate conversational dialog. Large language model AI is being assessed for applications in healthcare, retail, and other industries.<sup>116</sup> In addition, AI can be applied to autonomous robotic systems to perform complex physical and communication tasks.<sup>117</sup>

Currently, AI is being used in health care to facilitate a variety of information acquisition, monitoring, and processing requirements including EHR reviews for cancer and other registry reporting, medical image processing,<sup>118</sup> supporting diagnoses and predicting outcomes, performing and analyzing literature reviews, and processing data from multiple connected devices for monitoring patients in their homes and in medical settings.<sup>119</sup>

Rapidly evolving data-driven digital technology along with the pace of systemic change in the workplace and in society requires human involvement, surveillance, and oversight to be leveraged effectively. Corporate medical directors can integrate their clinical experience and insights to assess how digital offerings impact individuals and populations. Despite the vast amount of information used by technology, there are always some data that will be absent, leading to errors or bias.<sup>120</sup> Other risks include the potential bias in population data used to define algorithms, which may not reflect the diversity of users, in addition to the susceptibilities to security risks.<sup>121</sup> The CMD can navigate the benefits offerings and identify redundancies and gaps to assure selection of the most effective solutions to improve health and reduce patient reluctance. Successfully implementing digital health solutions into employer benefit plans, disease management interventions, and workplace health and safety programs and processes will help employers and employees address future global health challenges.

## CRITICAL INCIDENT PREPAREDNESS AND BC PLANNING

The CMD has another important role that requires much preparation and testing, which is responding to critical incidents and emergencies. Unfortunately, critical incidents occurring within or impacting worksites are all too common around the globe. Therefore, building

plans, which expect the unexpected, is vitally important to life safety and continuation of the business. The CMD provides critical medical expertise before, during, and after an emergency and in implementing prepared plans.

Business continuity planning for critical events is a core activity for all corporations. Plans are developed to minimize business interruptions and speed recovery. A range of possible scenarios with variable likelihoods and impacts are modeled and threat mitigation plans are developed. Very few risks are considered material enough to make it onto the corporation's group risk register. In their Global Risks 2022 report, the World Economic Forum highlighted a number of societal health-related risks with billion dollar consequences.<sup>122</sup> These include pandemics and more recently the health risks from climate change, where CMDs may be called upon for advice on mitigation.

Most BC threats may be mitigated at a local/site/plant level. The modeling of tabletop scenarios and practice drills are part of an integrated risk analysis. As a minimum, each major worksite and the company overall should anticipate the most impactful threats which they consider most likely and have corresponding critical event plans. Business continuity plans are typically designed around the structure of the business units in contrast to emergency preparedness and response plans, which follow the predefined incident command structures such as that modeled in the National Incident Management System.<sup>123</sup>

Health threats such as global pandemics, epidemics, or localized outbreaks of infectious disease have the potential to disrupt business on a local, regional, or global scale and detailed planning is required. Pandemic planning is a subset of both emergency preparedness and response as well as BC planning.<sup>124–127</sup> In light of the heightened involvement of CMDs during the COVID-19 pandemic, it may seem self-evident that CMDs play a critical role during pandemics. However, it is important to recognize that the CMD needs to be in a central role in pandemic planning, pandemic support, and for other public health emergencies like influenza, Ebola, Zika, chikungunya, and even measles.<sup>128</sup>

While the COVID-19 pandemic is waning, the risk of a resurgence remains, as does the risk for a pandemic caused by influenza or another virus. The CMD has a key role in establishing crisis management plans for future pandemics and other foreseeable public health emergencies such as natural disasters (earthquakes, tsunamis, fires, and floods), chemical emergencies, radioactive threats, and bioterrorism. These plans should use advice from regulatory, government health and safety, and international agencies and should incorporate lessons learned during the COVID-19 pandemic and other past events.

Pandemic and crisis support includes helping to translate scientific and medical information for the organization to provide the best advice. It also includes interacting with public health authorities and vendors to support vaccination, access to medication, and nonpharmaceutical interventions. The CMD can decide which published or internal emergency phase approach<sup>129</sup> to use and participate in the incident command role and system. While the role of the CMD is to provide the best advice, it should be recognized that business leaders may make different decisions for nonscientific reasons.<sup>130</sup>

The CMD also needs to be prepared to deal with periodic communicable disease outbreaks, such as TB or measles, as well as other health threats.<sup>129</sup> It should be stressed that even with exhaustive planning, critical events seldom play out exactly as predicted, so planning and frameworks for response and leadership actions must be flexible if they are to be successful.

## WORKPLACE HAZARDS

It is essential to ensure that workers are protected from workplace hazards, which vary greatly by industry. Corporate medical directors must be knowledgeable about the full range of physical, chemical, biological, and radiological hazards present in the workplace and institute programs to prevent, reduce, or control exposure.<sup>131–133</sup> They should also be familiar with the relevant laws and regulations governing workplace hazards in the locations where they operate. Because not all hazards are covered or adequately addressed by regulations, CMDs should collaborate with other disciplines to ensure that workers are appropriately protected, including when they work with novel materials, such as nanomaterials,<sup>134</sup> newly synthesized chemicals, or with common hazards in the laboratory setting, such as laboratory animal allergens.<sup>135</sup> To address these hazards, the CMD and members of the medical organization should collaborate with safety professionals, facilities engineers, industrial hygienists, and toxicologists as needed. This collaboration should also include employees and management, so that programs are more likely to be embraced and implemented successfully.<sup>136</sup>

Prevention programs should include preplacement assessments when workers begin work or move to jobs with new hazards, required clearances, such as for respirators and industrial trucks, and medical surveillance. Medical surveillance programs should be designed to identify symptoms or findings related to specific exposures.<sup>137,138</sup> The results of the overall medical surveillance program should be analyzed, tracked over time, and shared with the organization.

In addition, if reproductive hazards are present in the workplace, reproductive health assessments should be offered to em-

ployees as part of their family planning process.<sup>139,140</sup> When appropriate, this may lead to work restrictions, which should be consistent with applicable laws. For organizations that create novel compounds, including medicines, CMDs may support efforts to set company specific occupational exposure levels.<sup>141</sup> The medical organization may also contribute to sections of company safety data sheets.

## PERIODIC EXECUTIVE HEALTH EXAMINATIONS

The value proposition for periodic executive health examinations (PHEs) or “executive physicals” is intuitively appealing. The hypothesis, supported by proponents of the practice, is that senior and therefore more highly compensated and “valuable” busy executives should undergo regular medical checks to identify health risk factors (e.g., high blood pressure, hyperlipidemias) or early signs of disease, which may benefit from early intervention and treatment. Such early detection might result in less time away from work and less costly treatment rather than when the condition manifests at a more advanced stage. In some scenarios, early detection may be lifesaving or life-lengthening. This represents a benefit to both the individual and the sponsoring corporation. In addition, HR professionals, specifically talent acquisition practitioners, point to the value of executive physicals as an expected benefit in a competitive marketplace for executive talent. Critics of the practice<sup>142</sup> point to the well-documented risks and limitations of untargeted health screening in PHEs.<sup>143</sup> Proponents argue that PHE improves the utilization of some recommended preventive services.<sup>144</sup> The value of PHE continues to be debated.<sup>145</sup>

Recommendations for screening tests, such as colon cancer screening, have been developed through evidence-based reviews by organizations such as the US Preventive Services Task Force<sup>146</sup> and the National Institute for Health and Care Excellence<sup>147</sup> in the United Kingdom. Executive health programs often incorporate health screenings and tests that go beyond those recommended under the assumption that more testing is better. However, this may lead to a high rate of false positives, false negatives, overdiagnosis, overtreatment, lack of equity, inadequate governance, and inappropriate additional follow-up testing, which runs counter to the doctrine of *primum non nocere*. A Cochrane systematic review and meta-analysis of 16 trials did not find beneficial effects of general health examinations on morbidity, hospitalization, disability, worry, additional physician visits, or absence from work.<sup>148</sup> This casts doubt on the scientific and ethical basis for offering such programs that go beyond evidence-based screening.

What is more difficult to quantify are the less tangible benefits of these programs.<sup>149</sup> The PHE is an opportunity to engage individuals in personalized preventive health care and may act as a stimulus for positive behavior change. This may be helpful for business executives who have put off addressing their health needs. Awareness that their employer is prepared to make a significant investment in their health and well-being may also strengthen the psychological contract between executive and employer and lead to greater commitment and discretionary effort. Many companies are increasingly investing in employee well-being and engaging executives in health promotion may add further strength to a culture of health and well-being within their organizations.

If a corporation does elect to offer an executive medical program, it is essential to include physician oversight and take the following factors into consideration. The program should be evidence-based and have clearly defined objectives. Periodic executive health examinations should only use safe and validated screening tests with acceptable sensitivity, specificity, and predictive values. Corporate medical directors should conduct a thorough assessment of the potential risks and benefits of the program and create a plan for follow-up, diagnosis confirmation, treatment, and ongoing care for individuals with positive screening results. The PHE program must respect ethical principles, including informed consent, privacy, confidentiality, and equity. Mechanisms to evaluate, monitor, and improve the screening program's effectiveness, including regular assessment of outcomes, diagnostic accuracy, referral rates, participation rates, and patient satisfaction need to be in place. Finally, executives must have clear and detailed information about the purpose, potential risks, benefits, and limitations of the program.

There are several approaches to delivery PHEs including in-house, outsourced, hybrid, or through the executives' own primary care physician. Each has its pros and cons.<sup>148</sup> When using the outsourced model, it is worth considering that vendors are incentivized to promote a "more is better" approach to service provision. The CMD is uniquely positioned to promote and maintain good medical practice in the workplace setting and ensure such services are procured and governed for the benefit of the employee.

## CONCLUSIONS

Corporate medical directors are physician executives with a broad range of business and health-related expertise, including clinical medicine. The role is broad and encompasses all corporate activities and programs that relate to health. Corporate medical directors lead health strategy development and

execution that includes occupational health, personal health, and organizational health. They collaborate with senior executives and other disciplines across the organization to achieve goals that support the overall health strategy. While the role is focused on strategy, culture, planning, prevention, program development, and service provision, CMDs must also respond to urgent or critical situations as they arise.

To summarize, CMDs provide medical leadership and expertise to ensure a company's health-related strategies, policies, and programs are effective, compliant, and aligned with the best practices in the field. The specific responsibilities can vary depending on the company's size, industry, location, and focus, but some common areas of concern include medical strategy development and goal setting, regulatory compliance and staying abreast of changes in laws and regulations, upholding high medical standards and safety within the organization, identifying health risks and implementing well-being programs to reduce risks, promoting a healthy work environment and culture of health, contributing to benefit plan design, managing healthcare costs, and handling medical emergencies or crises. The CMD plays a crucial role in providing medical expertise and strategic direction to the organization, ensuring that health-related initiatives align with the company's overall goals and objectives. Their work is essential in maintaining the health and well-being of employees, while also managing risks and compliance in a constantly evolving healthcare landscape.

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