Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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that time, very little was said about the organization of shift work, as the concern with work environment and illnesses were focused on other stressors. The fact is that 24-hour society is here to stay due to the continuous production processes and the need for uninterrupted services that are offered and necessary to the society. For the last decades thousands of publications have highlighted the negative effects of shift and night work on health, quality of life and safety at work. The dissemination of information in both scientific journals and non-scientific media reports has shown the non-glamorous and less apparent sides of the problems faced by those who work during the night, on weekends, on public and religious holidays while most of the population is resting and or enjoying free time. The intrusion of work at nighttime and consequent daytime rest lead to a biological mismatch and partly explain chronic health problems and malaise faced by shift and night workers. There are several consequences already well-studied, such as sleep, metabolic and cardiovascular disturbances, mental health symptoms, a less effective immune system and the still controversial requiring further studies- cancer development. But there are other shift work issues directly or indirectly associated with malaise, issues to be yet reconciled and solved, in addition to the biological ones. These include living and working conditions. At the occupational level, the organization of work schedules such as work hours during day and non-daytime, daily and weekly working hours, recovery time within and between shifts, how healthy the work environment is, including policies of respect and health promotion is essential and can be the source of the mentioned problems and possible solutions. Regarding safety at work, it is necessary to pay attention to sleepiness, which changes throughout the 24 hours. Interventions to improve sleep duration and quality are required to maintain alertness and adequate performance, especially during hours of greater sleepiness. It is also necessary to investigate the combined effects of environmental and organizational factors and how occupational exposures can be mitigated. My presentation will focus on several aspects related to biological, work and social issues, as well as health issues, including sleep and health of healthcare workers during the new coronavirus pandemic. The presentation will include what has now become commonplace in 24-hour society - the extension of working hours, particularly those carried out using telework environments, which are associated with domestic and professional overload. And finally, a brief comment at the future of decent work - what awaits workers and services, while we, day workers, are resting.

**PLO5**

**Occupational cancer: Future opportunities and challenges**

**Lin Fritschi and Renee Carey**

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Occupational cancer is estimated to cause 350 000 deaths and 7 million DALYS worldwide every year. These numbers, from the Global Burden of Disease project, are the best estimate we have. However, they are almost certainly underestimates, as they only include a limited number of carcinogens and are based on prevalence data from the early 1990s. This presentation is therefore focused on these two issues: the identification of occupational carcinogens; and determining who is exposed to those carcinogens. Identifying carcinogens is a difficult and time-consuming process. Thousands of new chemicals are introduced every year, and only a very small proportion have been assessed by any of the major international organizations. The biggest challenge to speeding up the process is the reliance on traditional epidemiological studies in humans, which need long time periods (often decades), high-quality records and measurements, and a very large stable workforce. Other approaches such as rodent and mechanistic studies, while more rapid, still require a huge investment of resources. Challenges also arise from the lack of co-ordination between the different regulatory and scientific organizations meaning that the same agents can (confusingly) be assigned different carcinogenicity ratings. An exciting opportunity in this area is the recent development of in silico or computational methods, and the push to develop internationally accepted protocols to use these tools. Determining exposure to established carcinogens is necessary not only for identifying who is exposed to carcinogens, but also where inspection and education campaigns should be focused. Exposure assessments are traditionally in the form of individual workplace measurements by highly trained specialists using customized equipment and well-equipped laboratories. These assessments are typically conducted in large companies with in-house expertise or the funds for consultants. In the past, national bodies conducted large-scale surveys or collected measurements from representative samples of the workforce. However, with nearly two-thirds of the workforce in high income countries now working in small and medium sized enterprises, national surveys a thing of the past, and the move of many dirty industries to low-income countries, the likelihood that representative data are being collected is minimal. These challenges need to be met by a change of approach, from expert measurements to new opportunities including the development of low-cost real-time wearable devices, online applications which assess work practices of individuals, and the opportunity to collect anonymous data to provide a more comprehensive understanding of exposure patterns in the community. There are exciting developments in the areas of identifying carcinogens and determining exposure to those carcinogens which we hope can be taken up in not only the high income countries, but also in low income countries, where the need is much greater.

**PLO6**

**Emerging workplace health and safety threats—has the pandemic changed the trajectory?**

**Margaret M. Kitt**

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Prior to the pandemic we imagined emerging health and safety threats in terms of the Future of Work related to the workplace, work, and the workforce. The occupational safety and health community viewed these emerging threats in terms of the impact of new technologies, globalization, changes in employment patterns, and an increasingly diverse and aging working population. While we still give considerable attribute to these influencing factors, the COVID-19 pandemic may have changed the trajectory of the threats associated with the Future of Work,
temporarily at least. Additionally, we may see workplace health and safety benefits emerging from the pandemic. The use of some technologies accelerated over the past several years while the attitudes and expectations of many workers and employers are changing, at least in some sectors. This presentation will explore the potential impact of the pandemic on the trajectory of the Future of Work- has it changed significantly or just made course corrections?

**PL07**

*Preventing infectious diseases in the workplace*

Franklin Muchiri

*International Labour Organization, Switzerland*

**PL08**

*Mental health, sickness absence prevention and return to work*

Karen Nieuwenhuijsen

*Coronel Institute, Amsterdam UMC, Amsterdam, The Netherlands*

Mental health problems constitute a major occupational health problem causing substantial productivity losses. In line with the central theme of this conference, in this talk I will highlight solutions. Which strategies can prevent workers from developing mental health problems? Which interventions enhance return to work once mental health problems occur? What are the challenges and new avenues for future occupational healthcare?

Prevention of sickness absence

The WHO framework guides workplaces in creating a working environment that promotes, supports and protects the mental and social wellbeing of all workers. Nevertheless, additional strategies are needed, such as selectiven prevention, targeting groups at high-risk of developing mental health problems. These can be occupational groups such as healthcare workers and teachers, but also workers with informal care responsibilities. An alternative approach is indicated prevention, screening for early indicators of mental ill health in workers. I will review methods to identify high-risk workers along with the evidence on the effectiveness of preventive interventions based on these assessments.

Return-to-work strategies

Evidence on effective return-to-work strategies is accumulating. In a review including over 12,000 depressed workers, the combination of symptom treatment and support with work was most effective and reduced sick leave with 25 days over one year. The strategies for early identification of workers at risk of a late return to work are emerging. However, effective interventions for vulnerable groups such as precarious workers are still lacking.

**PL09**

*Occupational health: Challenges and solutions in the COVID-19 era*

Doo Yong Park

*Korean Occupational Safety and Health Agency, Republic of Korea*

**PL10**

*The new WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury*

Frank Pega

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Introduction: Previously, the World Health Organization (WHO) and International Labour Organization (ILO) produced separate estimates of the work-related burden of disease. Since 2016, following requests from Member States and United Nations reform, these Specialized Agencies have developed and produced a single set of interagency estimates, supported by over 200 individual experts in 35 countries. These are the new WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury (WHO/ILO Joint Estimates). In 2019, a Collaboration Agreement was signed to establish and regularly produce these estimates.

Materials and Methods: WHO and ILO harmonized their estimation methods for 39 established pairs of occupational risk factors and health outcomes. For additional pairs, the agencies conducted 15 systematic reviews and meta-analyses of the latest bodies of evidence. To date, from these systematic reviews, the evidence has been judged as sufficient to produce WHO/ILO Joint Estimates for two of the additional pairs: stroke and ischemic heart disease attributable to exposure to long working hours (>55 hours/week).

Using the global Comparative Risk Assessment framework, estimates were produced for the 39 established pairs. Additionally, the disease burden was quantified for the two additional pairs. For these, population attributable fractions were calculated by combining risk ratios obtained in the WHO/ILO systematic reviews, with data on prevalence of exposure to long working hours obtained from new WHO/ILO exposure databases (>2,300 surveys). The population-attributable fractions were applied to WHO's burden of disease envelopes. Global, regional and national estimates were produced for 183 countries, by sex and age, for the years 2000, 2010 and 2016.

Results: An estimated 1.88 (95% uncertainty range 1.84–1.92) million deaths and 89.72 (95% uncertainty range 88.61–90.83) million disability-adjusted life years (DALYs) were attributable to the 41 included occupational risk factor-health outcome pairs, globally in 2016. Diseases accounted for 80.7% of the deaths and 70.5% of the DALYs, whereas injuries accounted for 19.3% of deaths and 29.5% of DALYs. Almost 40% of deaths and 26% of DALYs were due to exposure to long working hours, establishing this as the occupational risk factor with the largest burden.

While the absolute numbers of work-related deaths and DALYs increased from 2000 to 2016, rates per 100 000 working-age population decreased. Disproportionately large burden is carried by the WHO African Region (for DALYs), South-East Asia Region, and Western Pacific Region (for deaths), as well as males and older age groups.

Conclusions: The WHO/ILO Joint Estimates highlight the large work-related burden of disease, particularly the newly quantified burden from exposure to long working hours. They can be used as indicators for monitoring workers' health and to aid development and evaluation of laws, policies and actions to prevent exposure to occupational risk factors and the attributable disease burdens. To progressive quantify more of the work-related burden of disease,