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### THE ROLE OF ENVIRONMENTAL ASSESSMENT IN WORKPLACE COVID-19 OUTBREAK INVESTIGATION TO UNDERSTAND SARS-COV-2 TRANSMISSION

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**Introduction** SARS-CoV-2 is a highly transmissible novel virus that has caused the COVID-19 pandemic. Evidence is required to support effective mitigation strategies. Existing evidence has shown that the virus can be transmitted mainly through three routes: close-range airborne (droplets and aerosols), longer range inhalation of aerosol, contact with contaminated surfaces. However, their relative importance is not well understood. It is also unclear how environmental conditions can alter the dynamics of the virus transmission.

**Objectives** The COVID-OUT (COVID-19 Outbreak investigation to Understand Transmission) study aims to understand SARS-CoV-2 transmission routes, transmission risk factors, and the role they play in COVID-19 outbreak in workplaces.

**Methods** This study is part of the UK COVID-19 National Core Study (NCS) on Transmission and the Environment. The study has a series of field studies to investigate outbreaks in a range of workplaces. Each field study has serial measurements of workers and measurements in the work environments. Environmental assessment is an essential component of the study. Its data can be combined with epidemiological and laboratory data to generate hypotheses of the causes of an outbreak and can also be used to support simulation models to characterize the relative contribution of transmission routes.

**Results** So far three outbreak workplaces have been investigated. Preliminary findings and lessons learnt will be presented.

**Conclusion** The field study data collection is led by a team of occupational hygienists from the Health and Safety Executive (HSE) who work closely with epidemiologists, public health investigators, microbiologists, environmental exposure specialists to ensure critical data are collected and findings are interpreted appropriately. Occupational hygienists are skilled in assessing physical, chemical and biological hazards in workplace settings. They are equipped with established tools and frameworks for assessing risks of various hazards which can be adapted and applied in COVID-19 outbreak investigations.

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### CANCER INCIDENCE IN AGRICULTURAL WORKERS: AN INTERNATIONAL CONSORTIUM OF AGRICULTURAL COHORT STUDIES (AGRICOH)

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**Introduction** Agricultural work can expose workers to potentially hazardous agents including known and suspected carcinogens.

**Objectives** We aimed to evaluate the cancer incidence in agricultural cohorts in an international consortium, AGRICOH, relative to the respective general populations.

**Methods** For 24 cancer sites/types and all cancers combined, we estimated standardized incidence ratios (SIRs) and 95%

confidence intervals (CIs) in eight cohorts that were linked to respective cancer registries: France (AGRICAN: n=128,101), the United States (AHS: n=51,165, MESA: n=2,177), Norway (CNAP: n=43,834), Australia (2 cohorts combined, Australian Pesticide Exposed Workers and Victorian Grain Farmers: n=13,134), Republic of Korea (KMCC: n=8,432), and Denmark (SUS: n=1,899). We then combined the SIR estimates across cohorts by random-effects meta-analysis.

**Results** During nearly 2,800,000 person-years, 23,188 cancers were diagnosed. We observed an elevated risk for melanoma of the skin (number of cohorts included=3, meta-SIR=1.18, 95% CI: 1.01–1.38) and multiple myeloma in women (n=4, meta-SIR=1.27, 95% CI: 1.04–1.54) and prostate cancer (n=6, meta-SIR=1.06, 95% CI: 1.01–1.12) compared to the general population. For several cancer sites, including bladder, breast (female), colorectum, esophagus, larynx, lung, and pancreas and all cancers combined, the risk was lower in the agricultural cohorts than in the general population (n=7, sex-adjusted meta-SIR for all cancers combined=0.83, 95% CI: 0.77–0.90). The direction of risk was mostly consistent across cohorts while for some cancer sites, such as liver and lung in men and women, and stomach, colorectum, and skin in men, the SIR varied greatly across cohorts.

**Conclusion** Our findings suggest that agricultural workers have a lower risk of various cancers and an elevated risk for prostate cancer, multiple myeloma (female), and melanoma of skin (female) compared to the general population. The observed excesses and deficits of cancer incidence in agricultural workers may be largely due to underlying differences in risk factors and warrant further investigation of specific agricultural exposures.

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### SHIFT WORK AND THE INDIVIDUAL

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**Introduction** Working in shifts and/or at night requires, among other things, adjusting sleep times, meal times and time for socializing. These bio-psycho-socio adaptations, when combined with wakefulness (i.e., work and exposure to environmental stimuli) during usual sleep and rest periods, have been linked to a number of negative health, wellbeing and performance outcomes. While the understanding of these negative consequences is primarily based on inductive inferences, deductive inferences for a successful identification of vulnerable or tolerant people are currently rather inconclusive.

**Objectives** Determination of tolerance factors for shift and night work to reduce or avoid negative consequences for health, well-being, and performance

**Methods** Quantitative research studies

**Results** One challenge to mitigate or avoid the negative consequences of shift and night work is the disparity between the individuality of shift work regulations and the inter-individual differences between employees on a biological, psychological and sociological level.

**Conclusion** The understanding of shift work tolerance is preliminary. The studies available on this topic differ in many aspects of study methods such as definitions of exposure and outcome variables and confounders considered. Future studies need to specify the exact shift work schedule that is