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.

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


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 (AGRICON: 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, 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.

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...
investigated, and there needs to be a concerted effort to come
to a consensus on what ‘tolerance’ to shift work means. Pro-
spective studies would increase our understanding of which
individual factors are associated with the development of tol-
erance over time, especially if they collect participants’ com-
plete occupational histories. Taking a paucity of evidence on
these issues into account, the presentation will identify areas
for future research with the goal of increasing evidence-based
harm mitigation strategies for shift workers.

**S-319 NIGHT SHIFT WORK AND CANCER RISK: WHERE DO WE
STAND, WHERE SHOULD WE GO?**

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**Introduction** Night shift work was re-reclassified in 2019 by
IARC/WHO as a probable human carcinogen (Group 2A) for
humans, with limited epidemiological evidence for breast,
prostate and colorectal cancer.

**Objectives** The objective of this talk is to provide an overview
of the evidence on night shift work and cancer in epidemi-
ological studies with a focus on breast cancer, to discuss
strengths and limitations of existing studies and summarize
areas for future research studies and policy actions.

**Methods** Among others, results from a pooled analysis of 5
population-based case-control studies of breast cancer using a
common definition of night work (at least 3 h between mid-
night and 5 a.m.) will be presented. Results from a systematic
Cochrane review on the effect of years of night shift work on
cancer incidence will be summarized.

**Results** Women who ever worked at night had higher odds
for breast cancer compared to never night workers (OR 1.12
95% CI 1.00–1.25) in the pooled analysis. The risk was
higher among pre-menopausal women (1.26; 1.06–1.51),
high shift-work intensity and ER+ tumors. Our systematic
review included 20 studies on breast cancer (12 case-control
and 8 cohort studies). In preliminary meta-analysis, a non-lin-
ear dose-response relationship was found, with a 7% risk
increase in breast cancer after 20 years of night work (95%
CI: 1.01–1.15). This finding was stronger in studies that
reported lifetime occupational history and case-control
studies.

**Conclusions** Night shift work of high intensity and long dura-
tion tends to increase the risk of breast cancer. Findings are
stronger in studies with lifetime occupational history, among
pre-menopausal women and positive hormone receptor sub-
types. Other shift work research domains that need to be con-
sidered in future studies include 1) patterns of night work
schedules 2) susceptible groups e.g. chronotype 3) critical
exposure windows 4) co-exposures with occupational
carcinogens.

**S-325 GENDERED OCCUPATIONAL INEQUALITIES AND HEALTH
OVER LIFETIME: HOW CAN WE WORK THEM IN?**

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**Introduction** Major economic and social changes occurred over
the last 50 years, such as the increased participation of women in the labour market and the development of non-
standard forms of employment. These trends question the
importance of work/employment conditions in the shaping of
social inequalities in health over the life course. We thus
hypothesize that (1) precarious occupational trajectories may
contribute to ill health in adulthood, and that (2) they may
affect genders differently.

**Methods** We used the French SIP (Santé Itinéraire Profession-
nel) national survey that collected information on occupational
career and major health events of people aged 40–74 in
2006. We described poor employment conditions in terms of
job instability, career discontinuity, qualification trends and ver-
satility. We then applied multiple correspondence analysis and
 hierarchical ascending classification to identify patterns reflect-
ing the accumulation of precarious employment conditions
over job histories. Finally, we quantified the association
between the type of occupational trajectory and self-reported
health (Mini European Health Module) through multivariate
logistic regression.

**Results** We included more than 9500 participants of working-
age or < 5-years retirees at the time of the survey. The clas-
sification showed that women were over-represented among
most precarious trajectories. We also found that people with
precarious trajectories more often reported less than good self-
perceived health, currently experiencing longstanding illness or
health problem, and activity limitation due to health problems.

The trend of increasing ill health across work trajectories (sta-
ble/qualified/continuous trajectories serving as a reference) was
similar among men and women, although adjusted ORs were
slightly higher among women.

**Conclusion** We bring evidence that women experienced more
precarious employment trajectories in France over the last de-
cades than did men, with similar health outcomes among men
and women. We now seek to expand our gendered perspec-
tive by taking into account hazardous working conditions as a
potential mediating pathway.

**S-337 EXPOSURE TO PESTICIDES AND CANCER OF THE
LYMPHOHEMATOPOIETIC SYSTEM IN THE AGRICOH
COHORT CONSORTIUM**

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**Objective** Pesticide exposure has been associated with certain
cancer outcomes among farmers and applicators spraying pesti-
cides. In the AGRICOH consortium of agricultural popula-
tions, we have evaluated cancer risk and pesticide exposure in
three large cohort studies: The French Agriculture and Cancer
Study - AGRICAN (FR), Agricultural Health Study (US), and
Cancer in the Norwegian Agricultural Population (NO)
studies.

**Methods** Estimates of lymphohematologic cancers from the
three cohorts (FR, US and NO) were analysed individually
and then meta-analysed to yield more robust estimates of
associations. Ever–never exposure to 33 chemical active ingre-
dients from 14 chemical groups of agrochemicals was assessed
using questionnaire information (US) and Crop Exposure