07D.5 SUBJECTIVE COGNITIVE DECLINE AMONG US WORKERS AGED ≥ 45 YEARS BY OCCUPATION, BRFSS, 2015–2016

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Background Subjective cognitive decline (SCD) is one of the earliest noticeable symptom of dementia, including Alzheimer's disease. Some studies have shown that half of older adults with subjective memory complaints go on to develop more severe cognitive decline within 7–18 years. The objective of this study was to examine the prevalence of SCD among US workers and to identify occupations with a high prevalence of SCD, even after adjustment for common risk factors.

Methods Data from the 2015–2016 Behavioral Risk Factor Surveillance System were used to examine the prevalence of SCD among US workers aged ≥ 45 years who were currently employed or were employed at some point in the past 12 months. SCD is defined as frequent confusion or memory loss within the previous 12 months. Only states ($n=28$) that collected data on both industry/occupation and cognitive decline were included in this study.

Results The overall prevalence of SCD among US workers aged ≥ 45 years was 6.2%, and was higher for workers 65 years and older. The prevalence was significantly higher among Veterans (8.3%) compared to non-veterans (5.9%). 29.2% of those with SCD reported that they need assistance with day-to-day activities and 35.1% had discussed confusion/memory loss with a healthcare professional. The prevalence of SCD was significantly lower among workers in management, business and financial operations, Healthcare practitioners and technical, and office and administrative support occupations. While workers in building and ground cleaning and maintenance, and personal care and service occupations had elevated prevalence of SCD.

Conclusion Cognitive decline is an important public health issue affecting older workers and their ability to work. SCD prevalence is much higher among occupations that are less mentally challenging which indicates that interventions to improve or maintain cognitive functioning may help older workers to remain productive and in the workforce.

07D.6 ABSTRACT WITHDRAWN

Mini-Symposium 5: Climate Change

07E.1 SOLUTIONS TO PREVENT OCCUPATIONAL HEALTH AND PRODUCTIVITY EFFECTS OF HEAT

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In the context of global warming and rising workplace temperatures, the European Commission funded HEAT- SHIELD

project is creating a sustainable inter-sectoral framework to prevent heat- induced health effects in working people and improve quality and productivity of important industries (i.e. manufacturing, construction, transportation, tourism and agriculture). Strengthened occupational epidemiology services is an essential component of this framework.

The project is producing a series of outcomes including: (i) implementation of appropriate technical and biophysical solutions to counter the heat- induced risk to workers' health for key industries; (ii) development of an online open access service to anticipate and warn about extreme heat events; (iii) dissemination of scenario-specific guidelines aimed at maintaining workers' health, well-being and productivity in spite of global warming; (iv) assessment of the health, social, and economic benefits of implementation of such guidelines and their impact on reducing inequalities. This paper at EPICOH will present up-to-date results of the analysis of preventive solutions and their testing.

For example, in order to ensure agricultural workers, remain healthy and productive the following steps should be followed:

1. Have a plan for how to deal with heat stress
2. Give workers training on signs and symptoms of heat strain
3. Pay attention to weather forecasts.
4. In hot weather give workers time to physiologically acclimatize
5. Reschedule physically demanding work to cool times
6. Provide short breaks every 30 min in cool areas
7. Hydration: make sure workers drink 500 ml (2 glasses) of water before the work shift starts and when the work shift end, further encouraging them to drink plenty in the evenings. Also, make sure workers have access to water throughout the day.
8. Workers should wear light, breathable, light-coloured, loose fitting clothing unless special protective clothing is needed.

07E.2 RISK FACTORS FOR HEAT STRAIN – COMPARING INDOOR AND OUTDOOR WORKERS IN THE CHANGING CLIMATE SCENARIO

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Background Predicted rise in global mean temperatures of 2°C–3°C and much larger increases in some regions due to Climate Change is expected to impact workers' health because of physiological limits due to the Wet Bulb Globe Temperature (WBGT). Such temperatures rise implies increasingly large increases in regions where outdoor and indoor work is restricted due to physiological decrements and reduced work capacity.

Aim We compare the potential health and productivity risks for indoor and outdoor workers in select Indian workplaces.

Methods The study population was a random sample of ~1300 outdoor and indoor workers from various occupations in Indian workplaces. We conducted seasonal WBGT exposures, quantitative physiological heat-strain measurements and captured self-reported health symptoms through questionnaires. The risk definition included symptoms of heat-strain, self-reported heat-illness, and reduced work capacity/productivity loss.

Results WBGT exceeded threshold limit values for moderate/heavy work for 73% outdoor workers ($28.9^{\circ}\text{C} \pm 2.4^{\circ}\text{C}$) and 67% indoor workers ($28.8^{\circ}\text{C} \pm 3.5^{\circ}\text{C}$). Heat stress and heat-strain indicators were significantly associated ($p=0.0001$) and outdoor workers had 2.2 times greater risk of heat-strain during hot seasons (95% CI: 1.695–2.937). Compared to indoor workers, the outdoor workers ran a higher risk of self-reported health decrements (OR: 6.4; 95% CI: 3.884–10.350; $p=0.0001$), dehydration (OR: 3.0; 95% CI: 2.352–3.999) and productivity losses (OR: 8.0; 95% CI: 4.911–13.382). In select occupations, while indoor workers exposed to chronic high-heat had a higher percentage of kidney stones (9%), the outdoor workers with long years of heat exposures had the higher risk of reduced kidney function (14%) due to repeated dehydration, volume depletion, and Acute Kidney Injury.

Conclusion We discuss implications for workers' health and productivity as climate modeling shows seriously increasing outdoor and indoor heat problems without suitable control measures for cooling. Strong protective labor policies and research are imperative to avoid serious health impacts and to maintain productivity.

07E.3 ABSTRACT WITHDRAWN

07E.4 ESTIMATING ECONOMIC IMPACT OF HEAT ON CHINA'S LABOR PRODUCTIVITY: NEW EVIDENCE FROM A CGE MODEL

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High heat exposure and heat-related health impacts is a well-known occupational health hazard. Though recent studies have quantified high heat impacts on labor productivity in occupational group, little is known about the scale of economic impacts of labor productivity losses, resulting in inadequate policy response. Besides, sectors that suffer most from heat, such as agriculture, service and construction, have extensive inter-dependent relationship with other sectors in the economy. Therefore, it is also important to include these indirect impacts, to avoid the underestimation of the economy-wide impacts.

Computable general equilibrium (CGE) model can capture direct and indirect economic impact of heat on labor productivity and do the comprehensive analysis. In this study, we used WBGT to estimate future labor productivity changes. Meanwhile we employed a China dynamic CGE model (CHEER) with 2012 as base year in the paper to investigate the economic impacts of heat on labor productivity and to find out the specific sectors' losses and the whole-economy losses in China. Taking temperature projections (daily maximum temperature, daily minimum temperature, and daily average temperature) under RCP scenario, population projections (demographic age structure and employment structure) under SSP scenario in China as input

and dividing China's economic sector into 22 sectors in our model, we analyzed 22 sectors' economic impacts in the long term.

Based on these scenarios, our study quantifies the full scope of economic impact of heat on labor productivity and analyze the changes of GDP, specific sectors output and industrial structure in the future. Our study could contribute to the understanding of social cost of carbon in China. A range of measures for different economic sectors were also suggested to reduce future economic loss from heat in China. Future research needs were discussed at the end of the paper.

07E.5 NEW INITIATIVES IN INTERNATIONAL COLLABORATION FOR DESCRIBING THE OCCUPATIONAL HEAT HAZARDS VIA EPIDEMIOLOGICAL STUDIES AND MODELLING

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The negative effects of heat stress on work tolerance are well known. In order to optimise exercise tolerance in the heat, various physiological strategies can be employed to alter heat strain such as optimising work-rest cycles, maximising aerobic fitness, heat acclimatisation, pre-exercise cooling and fluid ingestion. In order to optimise workers' health and productivity in the heat, there is an urgent need for collaborative efforts across various disciplines. A holistic heat management programme requires accurate quantification of the impact due to heat stress before formulating and evaluating the eventual heat mitigation strategies. The International Commission on Occupational Health Scientific Committee on Thermal Factors can serve as an effective platform for dedicated scientists to network and for active research and analysis specific to protection of working people from excessive heat and cold exposures in current and future work environments, including analysis of climate change impact and mitigation analysis. This platform will enable members of Scientific Committee of Thermal Factors to become co-authors on reports in major scientific journals, to collaborate across country boundaries, to get recognition for their own research work, and to be part of future funded global activities.

Occupational Cancer-3

08A.1 ESTIMATING THE BURDEN OF LUNG CANCER DUE TO OCCUPATIONAL EXPOSURE TO RADON GAS

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Background Radon is a well-known cause of lung cancer. Our goal was to estimate the prevalence and level of occupational exposure to radon, and to estimate the current lung cancer burden caused by radon exposure in Canadian workplaces.

Methods Highly exposed (i.e. underground) workers were assigned exposure proportions at the national level using