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Journal articles marked with an asterisk indicate an IWH scientist or adjunct scientist is included in the list of authors.

***Carlin L, Zhao QJ, Bhatia D, Taenzer P, Flannery J, and Furlan AD. "Keep trying": a qualitative investigation into what patients with chronic pain gain from Project ECHO. SAGE Open Medicine. 2024;12:20503121241254941.**

<https://doi.org/10.1177/20503121241254941> [open access]

Abstract: OBJECTIVE: The study aims to investigate the patient perspective on the pathway from healthcare practitioners' presentations of their cases at a Project ECHO (Extension for Community Healthcare Outcomes) tele-clinic to the management of those patients' chronic pain. INTRODUCTION: Managing patients with chronic and complex pain constitutes a prevalent, stressful challenge in the primary care setting. Primary care physicians typically have received little training in treating such patients and, until recently, have relied heavily on opioid and other pharmaceutical therapies as part of their regimen. Project ECHO Ontario Chronic Pain and Opioid Stewardship is an interprofessional telementoring program connecting pain specialists to primary care practitioners with the aim of supporting them in managing their patients with chronic pain, although the patients concerned do not generally participate in the telementoring sessions. While a number of papers have described the benefits accruing to healthcare professionals through participating in Project ECHO, there has been little exploration concerning patients' perceptions of their care subsequent to case presentation. METHODS: Using data from in-depth interviews with 20 patients along with their associated case presentation forms and the recommendations following the presentation, we look at the alignment of patient and practitioner views and inquire about the patient's perceptions of how Project ECHO affects them. RESULTS: Results suggest that the impact on patients is indirect but positive: most respondents express pleasure in contributing to research around chronic pain management, though only two of them identified a direct impact on their own treatment. They also appreciated their practitioner's efforts to bring expert attention to the patient's situation. CONCLUSIONS: Patients

whose cases are presented to Project ECHO sessions experience positive emotions at being part of the process of research and quality improvement, regardless of changes in their own conditions. This study highlights the importance to patients of their practitioners' commitment to managing their chronic pain

***LaMontagne AD, Aberg M, Blomqvist S, Glozier N, Greiner BA, Gullestrup J, Harvey SB, Kyron MJ, Madsen IEH, Hanson LM, Maheen H, Mustard C, Niedhammer I, Rugulies R, Smith PM, et al. Work-related suicide: evolving understandings of etiology & intervention. American Journal of Industrial Medicine. 2024; [epub ahead of print].**

<https://doi.org/10.1002/ajim.23624> [open access]

Abstract: Previously published analyses of suicide case investigations suggest that work or working conditions contribute to 10%-13% of suicide deaths. Yet, the way in which work may increase suicide risk is an underdeveloped area of epidemiologic research. In this Commentary, we propose a definition of work-related suicide from an occupational health and safety perspective, and review the case investigation-based and epidemiologic evidence on work-related causes of suicide. We identified six broad categories of potential work-related causes of suicide, which are: (1) workplace chemical, physical, and psychosocial exposures; (2) exposure to trauma on the job; (3) access to means of suicide through work; (4) exposure to high-stigma work environments; (5) exposure to normative environments promoting extreme orientation to work; and (6) adverse experiences arising from work-related injury or illness. We summarise current evidence in a schema of potential work-related causes that can also be applied in workplace risk assessment and suicide case investigations. There are numerous implications of these findings for policy and practice. Various principle- and evidence-based workplace intervention strategies for suicide prevention exist, some of which have been shown to improve suicide-prevention literacy, reduce stigma, enhance helping behaviours, and in some instances maybe even reduce suicide rates. Prevailing practice in workplace suicide prevention, however, overly emphasises individual- and illness-directed interventions, with little attention directed to addressing the working conditions that may increase suicide risk. We conclude that a stronger emphasis on improving working conditions will be required for workplace suicide prevention to reach its full preventive potential

***Shadaan R. Multiscalar toxicities: counter-mapping worker's health in the nail salon. Labour. 2024; 93(1):195-222.**

[doi unavailable as of June 14, 2024]

***Shahidi FV, Tracey M, Gignac MAM, Oudyk J, and Smith PM. Unpaid overtime and mental health in the Canadian working population. American Journal of Industrial Medicine. 2024; [epub ahead of print].**

<https://doi.org/10.1002/ajim.23622> [open access]

Abstract: Background: Unpaid overtime-describing a situation where extra hours are worked but not paid for-is a common feature of the labor market that, together with other forms of wage theft, costs workers billions of dollars annually. In this study, we examine the association between unpaid overtime and mental health in the Canadian working population. We also assess the relative strength of that association by comparing it against those of other broadly recognized work stressors. Methods: Data were drawn from a survey administered to a heterogeneous sample of workers in Canada (n = 3691). Generalized linear models quantified associations between unpaid overtime,

stress, and burnout, distinguishing between moderate (1-5) and excessive (6 or more) hours of unpaid overtime. Results: Unpaid overtime was associated with higher levels of stress and burnout. Relative to those working no unpaid overtime, men working excessive unpaid overtime were 85% more likely to report stress (prevalence ratios [PR]: 1.85, 95% confidence interval [CI]: 1.26-2.72) and 84% more likely to report burnout (PR: 1.84, 95% CI: 1.34-2.54), while women working excessive unpaid overtime were 90% more likely to report stress (PR: 1.90, 95% CI: 1.32-2.75) and 52% more likely to report burnout (PR: 1.52; 95% CI: 1.12-2.06). The association of excessive unpaid overtime with mental health was comparable in magnitude to that of shift work and low job control. Conclusions: Unpaid overtime may present a significant challenge to the mental health of working people, highlighting the potential role of wage theft as a neglected occupational health hazard.

Ayoubkhani D, Zaccardi F, Pouwels KB, Walker AS, Houston D, Alwan NA, et al. Employment outcomes of people with Long Covid symptoms: community-based cohort study. *European Journal of Public Health*. 2024; 34(3):489-496.

<https://doi.org/10.1093/eurpub/ckae034> [open access]

Abstract: Background: Evidence on the long-term employment consequences of SARS-CoV-2 infection is lacking. We used data from a large, community-based sample in the UK to estimate associations between Long Covid and employment outcomes. Methods: This was an observational, longitudinal study using a pre-post design. We included survey participants from 3 February 2021 to 30 September 2022 when they were aged 16-64 years and not in education. Using conditional logit modelling, we explored the time-varying relationship between Long Covid status =12 weeks after a first test-confirmed SARS-CoV-2 infection (reference: pre-infection) and labour market inactivity (neither working nor looking for work) or workplace absence lasting =4 weeks. Results: Of 206 299 participants (mean age 45 years, 54% female, 92% white), 15% were ever labour market inactive and 10% were ever long-term absent during follow-up. Compared with pre-infection, inactivity was higher in participants reporting Long Covid 30 to <40 weeks [adjusted odds ratio (aOR): 1.45; 95% CI: 1.17-1.81] or 40 to <52 weeks (aOR: 1.34; 95% CI: 1.05-1.72) post-infection. Combining with official statistics on Long Covid prevalence, and assuming a correct statistical model, our estimates translate to 27 000 (95% CI: 6000-47 000) working-age adults in the UK being inactive because of Long Covid in July 2022. Conclusions: Long Covid is likely to have contributed to reduced participation in the UK labour market, though it is unlikely to be the sole driver. Further research is required to quantify the contribution of other factors, such as indirect health effects of the pandemic.

Becene I, Shah A, Nguyen K, West M, Berrill J, Stuart J, et al. In their own words: a qualitative survey of healthcare providers' experiences with personal protective equipment during the COVID-19 pandemic. *Annals of Work Exposures and Health*. 2024; 68(5):535-549.

<https://doi.org/10.1093/annweh/wxae026> [open access]

Abstract: BACKGROUND: At the beginning of the coronavirus disease (COVID-19) pandemic, healthcare personnel (HCP) faced a dire shortage of personal protective equipment (PPE). This shortage has been identified as a major source of distress among HCP during the early COVID-19 pandemic, though the specific consequences of this shortage have not been identified in the qualitative literature. METHODS: We sought to fill this gap by conducting a qualitative analysis of PPE related free-text comments from online surveys completed by 923 HCP during Spring 2020. RESULTS: We found that HCP used words such as "required" and "had" to describe how their use of non-

standard PPE was imposed on them by their workplace, suggesting that they felt little control over their protection at work. HCP described cleaning PPE with novel methods, such as bleach, alcohol, hydrogen peroxide, and UV light, in addition to creating their own PPE out of materials such as garbage bags, sheets, and cloth. Furthermore, HCP expressed frustration with PPE policies at their workplaces, which continued throughout the early pandemic due to the rapidly changing guidelines and the inability to express their opinions to their institutions. The combination of these concerns left HCP scared of being infected with COVID-19 while at work and subsequently infecting their loved ones at home. CONCLUSION: It is critical that healthcare institutions understand HCP's experiences with and feelings towards PPE, as providing the proper protection is vital in ensuring an adequate HCP workforce

De Dios Perez B, das Nair R, and Radford K. Development of a job retention vocational rehabilitation intervention for people with multiple sclerosis following the person-based approach. *Clinical Rehabilitation*. 2024; 38(7):965-978.

<https://doi.org/10.1177/02692155241235956> [open access]

Abstract: Objective: To describe the process of developing a job retention vocational rehabilitation intervention for people with multiple sclerosis. Design: We used the person-based approach, to develop interventions through an iterative process incorporating stakeholders' views, resulting in an intervention that is likely to be more acceptable, contextually relevant, and implementable for end-users. Phase 1 combined the results of a systematic review and interview study to develop the guiding principles and intervention logic model. Phase 2 involved conceptual testing and refining the intervention with stakeholder feedback. We present the final intervention following the template for intervention description and replication. Participants: We recruited 20 participants for Phase 1 (10 people with multiple sclerosis, four employers, six healthcare professionals), and 10 stakeholders (three people with multiple sclerosis, seven healthcare professionals) for Phase 2 to contribute to the intervention refinement process. Results: Stakeholders described the need for an individually tailored intervention to support people with multiple sclerosis to manage symptoms and workplace relationships. A stepped-care approach and remote support were deemed essential. The resulting intervention involves an initial assessment of employment needs, vocational goal setting, up to 10 h of tailored support (e.g., reasonable adjustments, employer engagement, legal rights), and a final review to discuss future steps. People with multiple sclerosis can include their employer for advice to optimise the management of the employee with multiple sclerosis at work. Conclusion: The person-based approach provided a rigorous framework to systematically understand the vocational needs of people with multiple sclerosis and develop a vocational rehabilitation intervention.

Ervin J, LaMontagne AD, Taouk Y, and King T. Trajectories of job insecurity and the probability of poorer mental health among prime working-age Australian women and men. *Social Science & Medicine*. 2024; 349:116902.

<https://doi.org/10.1016/j.socscimed.2024.116902> [open access]

Abstract: Precarious and insecure employment arrangements are important social determinants of health. Prior evidence has consistently found perceived job insecurity to be associated with poorer mental health. Nonetheless, several key under-researched areas remain in the existing evidence base. This study addresses some of these gaps by examining trajectories of job (in)security and assessing the effect of various persistent job security trajectories on subsequent mental health of both men and

women. Utilising 15 waves of data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey, we employed group-based trajectory modelling (GBTM) to identify trajectories of job (in)security through men and women's prime working years (from baseline age of 28-38yrs to 41-51yrs) across 14 years (waves 5-18), before subsequently examining the associations between these estimated trajectories and mental health at wave 19 (aged 42-52yrs). We identified four distinct trajectories of job (in)security for both men and women: persistently secure, becoming more secure, becoming less secure, and persistently insecure. Examining the association between these trajectories and mental health, we found that chronic exposure to any amount of persistent job insecurity (improving, worsening or persistently insecure) is detrimental to the mental health of both men and women. Furthermore, a somewhat incremental or dose dependant effect was found, with persistent job insecurity associated with the largest declines in mental health scores. Given mental health disorders are a substantial cause of disability globally, our study provides evidence that developing policy and practice interventions to reduce job insecurity (as an increasingly recognised and highly modifiable social determinant of mental health) has considerable potential to enact positive population health improvements

Hussain R, Zaidi SFA, Pedro A, Lee H, and Park C. Exploring construction workers' attention and awareness in diverse virtual hazard scenarios to prevent struck-by accidents. *Safety Science*. 2024; 175:106526.

<https://doi.org/10.1016/j.ssci.2024.106526> [open access]

Abstract: Repetitive tasks in construction reduce workers' attentiveness of hazards on sites. This decline in attentiveness can be influenced by their situation awareness level. However, research on the relationship between attentiveness and situation awareness is scarce in the construction safety domain. This study employs eye-tracking techniques to investigate how visual attention changes due to variations in workers' situation awareness levels. A virtual reality-based experiment was conducted to evaluate the situation awareness level of individual workers and examine its relationship with attentiveness towards different hazards using the situation awareness global assessment technique and linear regression analysis. The experimental findings reveal that the overall trend of allocating attention toward hazards declined over time. Furthermore, the attentiveness of workers varied depending on their situation awareness levels and the type of hazardous condition. Throughout the experiment, the group with a low situation awareness failed to sustain their vigilance toward hazards as effectively as the group with a high situation awareness. The outcomes of this study will help construction safety trainers understand variations in workers' vigilance behavior over time and, thus mitigate the risk of accidents owing to inattentiveness at job sites.

Kainalainen A, Korhonen P, Penttinen MA, and Liira J. Job stress and burnout among Finnish municipal employees without depression or anxiety. *Occupational Medicine*. 2024; 74(3):235-241.

<https://doi.org/10.1093/occmed/kqae019>

Abstract: Background: Job burnout is associated with job stress but also with mental health symptoms, depression and anxiety. Aims: This study aims to evaluate the effect of job stress on burnout without the effect of depression and anxiety. Methods: A cross-sectional study was conducted in 2015 among 673 employees (88% female) from four public service sectors in Pori, Finland. Job burnout was assessed with the Bergen Burnout Indicator (BBI-15). Job stress was assessed by combining psychological risk factors (demand control, effort rewards and mental

workload). Respondents who reported symptoms of depression and anxiety were excluded from the analyses. Results: Of the eligible study subjects ($n = 617$), 10% reported symptoms of at least mild burnout but only 1% severe burnout. The burnout symptoms varied from 6% to 21% by sector of public service. Job burnout was cumulatively associated with job stress factors. One job stress factor increased the risk of burnout 2-fold (relative risk [RR] 2.13; confidence interval [CI] 0.97-4.68), two factors 6-fold (RR 6.56; 2.92-14.80), and three factors even more (RR 23.5; CI 8.67-63.8). Similar trends were observed in the analysis of job burnout components (exhaustion, cynicism and professional inadequacy). Conclusions: Our results indicate that job burnout is also strongly associated with job stress in employees who do not have depressive or anxiety symptoms. As job burnout may precede clinical depression or reduce productivity and well-being at work, it is essential to perform surveys to monitor burnout symptoms among the workforce, and design interventions to prevent remarkable job strain.

Kelly NR, Osa ML, Luther G, Guidinger C, Folger A, Williamson G, et al. Preliminary evaluation of a brief worksite intervention to reduce weight stigma and weight bias internalization. Evaluation and Program Planning. 2024; 104:102434.

<https://doi.org/10.1016/j.evalprogplan.2024.102434>

Abstract: Weight-based discrimination (WBD) is common and associated with reduced physical and emotional functioning. WBD is common in the workplace, yet no studies have evaluated a WBD intervention delivered in a worksite setting. This study evaluated the feasibility, acceptability, and preliminary effectiveness of a 3-hour, remote-delivered WBD intervention at a large public university. Six workshops including 94 participants (41.76 ± 9.37 y; 92.8% women) were delivered December 2020 through May 2021; 88.3% of participants enrolled in the study and 88.8% of enrolled participants completed pre- and post-intervention surveys. Participants strongly agreed the workshop contributed to a more inclusive work environment ($M=4.98 \pm 0.2$; 1 =Strongly Disagree to 5 =Strongly Agree); and was highly needed (4.9 ± 0.3) and liked (4.8 ± 0.5). Qualitative feedback cited benefits of remote delivery in providing body size anonymity and wanting access to intervention materials and more time for discussion and action steps to reduce WBD. Participants experienced significant, medium reductions in explicit weight bias ($ps < .001$), significant, small reductions in weight bias internalization ($p < .001$), and statistically non-significant ($p = .08$), small-to-medium reductions in implicit bias. Targeting worksites as a delivery mechanism has the potential to reduce WBD, thereby improving the health and well-being of diverse employees and creating a more inclusive workspace.

Lohne FK, Xu K, Fimland MS, Palarea-Albaladejo J, and Redzovic S. Association between musculoskeletal pain and exposures to awkward postures during work: a compositional analysis approach. Annals of Work Exposures and Health. 2024; 68(5):522-534.

<https://doi.org/10.1093/annweh/wxae027>

Abstract: Objectives: This study aimed to explore the association between arm elevation and neck/shoulder pain, and trunk forwarding bending and low back pain among home care workers. Methods: Home care workers ($N = 116$) from 11 home care units in Trondheim, Norway, filled in pain assessment and working hours questionnaire, and wore 3 accelerometers for up to 7 consecutive days. Work time was partitioned into upright awkward posture, nonawkward posture, and nonupright time, i.e. sitting. Within a compositional approach framework, posture time compositions were expressed in terms of log-ratio coordinates for statistical analysis and modeling. Poisson generalized

linear mixed models were used to analyze the relationship between arm elevation in upright postures and neck/shoulder pain, and between trunk forward bending in upright postures and low back pain, respectively. Isotemporal substitution analysis was used to investigate the association of pain assessment with the reallocation of time spent in the different postures. Results: Time spent in awkward postures was modest, especially for the more extreme angles (60° and 90°). Adjusting for age, gender, and body mass index, our study suggested that the compositions of time spent by home care workers in awkward postures were significantly associated with pain assessment ($P < 0.01$). Isotemporal substitution analysis showed that reallocating 5 min from upright posture with arms elevated below to above 60° and 90° was associated with a 6.8% and 19.9% increase in the neck/shoulder pain score, respectively. Reallocating 5 min from a forward bending posture while upright below to above 30°, 60°, and 90° was associated with 1.8%, 3.5%, and 4.0% increase in low back pain, respectively. Conclusions: Although the exposure to awkward postures was modest, our results showed an association between increased time spent in awkward postures and an increase in neck/shoulder pain and low back pain in home care workers. As musculoskeletal pain is the leading cause of sickness absence, these findings suggest that home care units could benefit from re-organizing work to avoid excessive arm elevation and trunk forward bending in workers.

Manno CM, Glade R, Koch LC, Simon LS, Rumrill PD, and Rosen CC. Disability disclosure as an impression management technique used in the workplace: a grounded theory investigation. Work. 2024; 78(2):219-233.

<https://doi.org/10.3233/WOR-246007>

Abstract: BACKGROUND: In order to overcome obstacles to entry and inclusion in the workplace, individuals with disabilities engage in various impression management strategies to present themselves as the socially acceptable 'ideal employee.' OBJECTIVE: This study expands on previous disclosure research by asking individuals with disabilities to share their experiences of identity management and workplace challenges. METHODS: We leveraged qualitative research techniques to explore the reciprocal impact of workplace treatment and disclosure. RESULTS: Impression management emerged as an especially salient aspect of participants' disclosure decisions, and participants used an array of impression management tactics. Some employees with disabilities described positive experiences; however, we also learned that impression management can present unique challenges that may outweigh potential benefits. CONCLUSION: Our findings affirm that managing the image we project can be remarkably complicated and effortful when having a disability. This paper concludes with implementation recommendations for vocational rehabilitation counselors and human resource practitioners

McGill E, Bellos A, Nwosu A, Zetner A, Tyler A, Knox N, et al. Responding to and managing multijurisdictional outbreaks of COVID-19 in Canadian industrial worksite/work camp settings. Canadian Journal of Public Health. 2024; 115(3):425-431.

<https://doi.org/10.17269/s41997-024-00887-5> [open access]

Abstract: Setting: Early in the COVID-19 pandemic, the Public Health Agency of Canada (PHAC) and provincial/territorial (P/T) public health identified the need for a coordinated response to complex multijurisdictional COVID-19 outbreaks. The first large multijurisdictional industrial worksite COVID-19 outbreak highlighted the risk of transmission within these congregate work settings, the risk of transmission to the broader community(ies), and the need to develop setting-specific outbreak

response frameworks. Intervention: PHAC assembled a team to provide national outbreak support for multijurisdictional COVID-19 outbreaks in May 2020. The COVID-19 Outbreak Response Unit (ORU) worked with P/T partners to develop guiding principles for outbreak response and outbreak investigation processes, guidance documents, and investigation tools (e.g., minimum data elements and questionnaires). Outcomes: The ORU, P/T partners, and onsite industrial worksite health and safety staff leveraged outbreak investigation guidelines, industrial worksite outbreak process documents (including minimum data elements), and enhanced case questionnaires to respond to multiple COVID-19 outbreak investigations in industrial worksites. Clear roles/responsibilities and processes, along with standardized data, allowed for more efficient outbreak investigations and earlier implementation of mitigation measures. Implications: Multijurisdictional COVID-19 outbreaks highlighted the importance of public health collaboration with industry partners onsite. The assembly of a national outbreak response team was important to facilitate information sharing and provide technical support. Lessons learned and recommendations on outbreak preparation, detection, management, and communication are included to enhance a response framework applicable to future emerging or re-emerging pathogens with epidemic and/or pandemic potential.

Padamsee TJ, Montgomery C, Kienzle S, Straughn JB, Elmore A, Fulton-Kehoe DL, et al. Impacts of state-level opioid review programs on injured workers and their health care providers: a qualitative study in Washington and Ohio. *Milbank Quarterly*. 2024; [epub ahead of print].

<https://doi.org/10.1111/1468-0009.12705>

Abstract: Policy Points Workers' compensation agencies have instituted opioid review policies to reduce unsafe prescribing. Providers reported more limited and cautious prescribing than in the past; both patients and providers reported collaborative pain-management relationships and satisfactory pain control for patients. Despite the fears articulated by pharmaceutical companies and patient advocates, opioid review programs have not generally resulted in unmanaged pain or reduced function in patients, anger or resistance from patients or providers, or damage to patient-provider relationships or clinical autonomy. Other insurance providers with broad physician networks may want to consider similar quality-improvement efforts to support safe opioid prescribing. CONTEXT: Unsafe prescribing practices have been among the central causes of improper reception of opioids, unsafe use, and overdose in the United States. Workers' compensation agencies in Washington and Ohio have implemented opioid review programs (ORPs)-a form of quality improvement based on utilization review-to curb unsafe prescribing. Evidence suggests that such regulations indeed reduce unsafe prescribing, but pharmaceutical companies and patient advocates have raised concerns about negative impacts that could also result. This study explores whether three core sets of problems have actually come to pass: (1) unmanaged pain or reduced function among patients, (2) anger or resistance to ORPs from patients or providers, and (3) damage to patient-provider relationships or clinical autonomy. METHODS: In-depth semistructured interviews were conducted with 48 patients (21 from Washington, 27 from Ohio) and 32 providers (18 from Washington, 14 from Ohio) who were purposively sampled to represent a range of injury and practice types. Thematic coding was conducted with codebooks developed using both inductive and deductive approaches. FINDINGS: The consequences of opioid regulations have been generally positive: providers report more limited prescribing and a focus on multimodal pain control; patients report satisfactory pain control and recovery alongside collaborative relationships with providers. Participants attribute these patterns to a broad environment of opioid caution; they do not generally perceive workers' compensation

policies as distinctly impactful. Both patients and providers comment frequently on the difficult aspects of interacting with workers' compensation agencies; effects of these range from simple inconvenience to delays in care, unmanaged pain, and reduced potential for physical recovery. CONCLUSIONS: In general, the three types of feared negative impacts have not come to pass for either patients or providers. Although interacting with workers' compensation agencies involves difficulties typical of interacting with other insurers, opioid controls seem to have generally positive effects and are generally perceived of favorably

Wozniak D and Zahabi M. Cognitive workload classification of law enforcement officers using physiological responses. *Applied Ergonomics*. 2024; 119:104305.

<https://doi.org/10.1016/j.apergo.2024.104305>

Abstract: Motor vehicle crashes (MVCs) are a leading cause of death for law enforcement officers (LEOs) in the U.S. LEOs and more specifically novice LEOs (nLEOs) are susceptible to high cognitive workload while driving which can lead to fatal MVCs. The objective of this study was to develop a machine learning algorithm (MLA) that can estimate cognitive workload of LEOs while performing secondary tasks in a patrol vehicle. A ride-along study was conducted with 24 nLEOs. Participants performed their normal patrol operations while their physiological responses such as heartrate, eye movement, and galvanic skin response were recorded using unobtrusive devices. Findings suggested that the random forest algorithm could predict cognitive workload with relatively high accuracy (>70%) given that it was entirely reliant on physiological signals. The developed MLA can be used to develop adaptive in-vehicle technology based on real-time estimation of cognitive workload, which can reduce the risk of MVCs in police operations

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