

spatiotemporal modelling to investigate spatial and temporal variation in major trauma.

**Methods** A retrospective review of major trauma was conducted using the population-based Victorian State Trauma Registry (Victoria, Australia) from 2008 to 2018. Coordinates of ambulance attended major trauma event locations were mapped to small statistical areas. Bayesian spatiotemporal modelling was used to investigate spatial and temporal patterns and generate forecasted counts in each small area to 2023.

**Results** Over the 11-year period, there were 28,630 major trauma patients with known event coordinates. Substantial spatial variation in the incidence of all major trauma was observed. Generally, area-specific incidence rates were higher in regional areas than metropolitan areas. Global temporal trends in the incidence of major trauma demonstrated a significant increase, with relative increases greater in regional areas compared to metropolitan areas.

Differences in spatial and temporal variation were observed between causes of injury. For motor vehicle collisions, area-specific incidence rates were higher in regional areas than metropolitan areas. Conversely, for low falls, area-specific incidence rates were higher in metropolitan areas than regional areas.

**Conclusion** Spatiotemporal forecasting enables the identification of small areas of relatively high incidence and of increasing incidence over time. Furthermore, these models can be used to derive forecasted counts of trauma counts that can be used to inform injury prevention activities at the small spatial area.

#### 4F.004 PREDICTIVE INTELLIGENCE TO PREVENT WORKPLACE INJURY

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Preventing workplace injury is critical, however to effectively target preventative activities we need an understanding of the future risk of a workplace. Innovative methods from predictive analytics offer an opportunity to predict future risk of workplace injuries and strategically target preventative regulatory activity.

Predictive models were built to predict the likelihood of a workplace injury, as well as the occurrence of eight distinct hazard types; mental, body stressing, chemical, vehicle, hit by moving object, hit object with body, sound, and fall injuries. Gradient boosting machine algorithms from Machine Learning were utilised, leveraging a range of administrative data from WorkSafe Victoria, such as past injuries, inspections, incidents and workplace details. The model development process involved collaboration with health and safety stakeholders and subject matter experts.

The models varied in predictive accuracy from 69% to 91%, with body stressing injuries having the strongest predictive accuracy. The predictive power of input features offers insight into lead indicators of workplace injury. While there was variation of feature importance across models, features such as past claims, workplace remuneration and geographic location were consistent lead indicators.

Emerging techniques from predictive analytics can provide an important evidence base on which to direct preventive approaches. Workplace risk scores produced by the models can inform the implementation of strategic workplace inspections and other initiatives to create safer workplaces. Future model development will involve expanding the input features and outcomes to enhance the utility of this new application of predictive analytics.

#### 4G – WHS – Mental Health, March 24, 2021

##### 4G.001 IMPROVING WORKER MENTAL WELLNESS – FROM THE OFFICE TO FRONT LINE WORKERS

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**Context** Mental health is one of the major health issues affecting workers worldwide, and in Australia represents 12% of the overall burden of disease. It is estimated one in five working Australians will experience an affective, anxiety or substance use disorder in any given year and the cost of mental health conditions to Australian business is estimated at \$10.9 billion per year.

**Process** WorkSafe Victoria, through the Institute for Safety, Compensation and Recovery Research (ISCR), has invested in a range of research projects over the past ten years to increase our understanding of how to design and improve workplace mental health programs. This has involved systematic reviews of available evidence, environmental scans of best practice initiatives globally, evaluations of current programs and analysis of workplace compensation claims data. ISCR has been actively translating the findings of this research to inform the development of new workplace mental health programs, including WorkSafe Victoria's current \$50 million (AUD) state-wide WorkWell initiative.

**Outcomes** This research has led to many unique insights, however some of the major overall findings are:

1. Programs that effectively prevent work-related mental health conditions deliver a financial return to companies.
2. Workload management for office workers is critical to preventing work-related stress and effective tools exist to assist organisations to better manage workload.
3. No single intervention is effective at preventing and supporting frontline workers experiencing vicarious trauma, instead a multi-faceted approach tailored to the workplace setting is recommended involving both worker and employer.

##### 4G.002 EFFECTIVENESS OF EMPLOYEE ASSISTANCE PROGRAMS IN MITIGATING WORK-RELATED STRESS & TRAUMA

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There has been more of a focus on the need to protect workers mental health in the workplace with the emergence of a more holistic approach to psychological safety management

reflected in changes both to the work health and safety legislation and the newly introduced ISO 45001 standards.

It is difficult to implement effective protective strategies for mental health and emotional wellbeing at work; especially, in consideration of our individual differences, our life experiences and the variance in mental health resilience we each bring to the workplace.

Specific work demands such as the level of control over work, social supports in the workplace, the emotional demands of the job, traumatic events, role ambiguity, role conflict, the meaningfulness of work, long working hours, and the quality of relationships with supervisors were common themes in work-related stress.

Exposure to dangerous working conditions (street outreach, working alone with clients), client-initiated violence; and regular dealings with clients who have experienced physical and/or emotional trauma, are all emotionally draining and present across diverse industry sectors.

With many organisations using Employee Assistance Programs (EAP) to mitigate these stressors, we look at just how effective are EAPs and what workplace supports work best.

## 5A – Child – School/Road, March 24, 2021

### 5A.001 CHILD SAFETY IN SCHOOLS: APPRAISAL FROM BENGALURU DISTRICT, INDIA

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**Context** Child injuries are a growing public health problem in India with nearly 5,00,000 child deaths in the last decade. They are susceptible to injuries owing to their difficulty in risk perceptions, curiosity, impulsivity and risk-taking behavior. A national report titled, Advancing Child Safety in India: Implementation is the Key, was released by National Institute of Mental Health and Neuro Sciences (NIMHANS) and Underwriters Laboratories. The report emphasizes the need to prevent child injuries and increase awareness about safety standards in schools amongst the key stakeholders.

**Process** Apart from the secondary research from key data sources, the report also includes the insights from safety appraisals conducted across 131 schools (public and private) in Bengaluru and Kolar districts. These schools were assessed and scored on physical infrastructure, road and fire safety and first-aid facilities.

**Analysis** Every day, about 165 children die in India due to an unintentional injury. From an official report in 2015, it is estimated that 60,445 children aged 0–18 years died as a result of injuries. Out of these, 45,636 deaths were due to unintentional injuries like road crashes, burns, drowning, poisoning and others in year 2015.

From the primary research, overall safety in schools was observed to be 50.8% of expected levels.

**Outcomes** A first of its kind technical and advocacy document that provides information for stakeholders to plan appropriate safety interventions for children in India.

**Learning Outcomes** Strict implementation of existing policies, programs and legislations is the key to reduce child injuries in India.

### 5A.002 CALL FOR ACTION TO ADDRESS SCHOOL BULLYING IN THE UAE: SCOPING REVIEW

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**Background** Schools in the United Arab Emirates (UAE) witnessed an increase in bullying prevalence (20% - 2005; 27% - 2016). National Bullying Prevention Strategy was established in 2018 with different ministries starting bullying prevention interventions. We aimed to map anti-bullying interventions for school children in the UAE.

**Methods** Studies addressing anti-bullying interventions in the UAE from 2010–2019 were included. We systematically searched six electronic databases (EMBASE, PubMed, PsycINFO, Scopus, Eric and Google Scholar). We also included grey literature and information from other meta-resources. Each anti-bullying intervention was mapped using its distribution across key sectors, level of public health practice and type of organization.

**Results** Among 1081 identified papers, only 2 were included in the study. Both papers were published in 2019 and used qualitative methods. From organization websites search, we found 22 multi-level interventions presented on the three levels of public health practice across the different sectors and different target stakeholders. Education and Justice's sectors contributed the most, 9 and 5 interventions respectively. The majority of interventions (8) were from federal level, followed by private level (6) interventions. Funding resources were mostly from governmental organization with 59% of all interventions and 50% of all were based on awareness approach. A total of 4 interventions were designed to address cyberbullying. A multi-sectoral collaboration was used to design 3 of the founded interventions.

**Conclusion** UAE is building capacity for bullying prevention. A framework to understand core knowledge base and theoretical models is being used to guide the design, delivery and outcomes evaluation is needed.

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### 5A.003 IMPACTS OF SAFE SCHOOL PROGRAMS WITH 8 INDICATORS IN JAPAN

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**Background** Although schools are taking great roles in student's safety, there are still children who get harmed physically and mentally including bullying. Moreover, there are growing risks including disasters in the communities. Therefore, further comprehensive efforts are now required at the community level as well as schools. To meet that need, Safe School Programs (SSP) based on eight indicators are drawing attention and have introduced to over 30 schools in Japan.

**Methods** To clarify the impacts of SSP, the comparison studies were made between the groups of SSP promoting schools and not SSP promoting schools. In addition, the longitudinal studies were made at the SSP promoting schools.