

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.

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##### 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