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Injury prevention: achieving population-level change

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Injury remains a leading cause of death and disability for all sectors of the community in all regions of the world.[1–3] Since the 1960s when injury was conceptualised as a public health problem, there has been an escalation of knowledge relating to 'what works' to prevent injury. However, the rapid development of new injury prevention knowledge is quickly outstripping society's capacity to implement it.[4] This supplement of *Injury Prevention* brings together examples of empirical-based injury prevention research that demonstrate the state-of-the-art methods of achieving population-level reductions in injury-related harm. The issue also includes contributions that make the case for expanding existing public health paradigms of injury prevention beyond 'what works' and towards understanding the contexts and supports necessary for embedding effective injury prevention interventions within sustainable, synergistic systems of safety promotion.

Population health science is one orienting frame for understanding and addressing the conditions that shape large-scale distributions of injury outcomes. Galea and Keyes[5] describe how population health science can inform public health action in terms of 'what works' and 'when' and 'for whom'. They pose a series of considerations injury researchers can use to both uncover the causal architectures driving population-level distributions of injury, and provide injury practitioners with actionable solutions for population-level change. Ozanne-Smith and Li[6] apply a population health science lens to understanding decreases in injury rates in China, and describe how large-scale social changes such as urban-isation, poverty alleviation and access to health insurance can be considered as major drivers in population-level changes in injury outcomes. MacKay and Ryan[7] also take a social change perspective, arguing that injury prevention can be a by-product of salutogenic design through a human rights approach that addresses social, economic, political and cultural determinants of health and human development. Finally, Gielen *et al*[8] apply public health frameworks (the Haddon Matrix, Social Ecological Model) to operation-alise the temporal and multilevel elements central to population health science and to describe the interconnections between evidence-based fire prevention strategies and the systems within which they are embedded.

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Papers in this supplement also address key considerations that arise when public health practitioners and their partners are tasked with implementing constellations of injury prevention strategies in order to achieve population-level change. While much attention has been paid to the science of translating and implementing prevention strategies, a key challenge that remains is understanding and managing the *systems* within which injury prevention strategies are embedded.[9] Taylor *et al*[10] describe key features of a 'systemic approach' that have emerged from the Harlem Children's Zone and Promise Neighborhoods community-led prevention efforts. These key features reflect the ways in which communities are strengthening *systems* to drive population-level impact on injury and related health outcomes, rather than striving for fidelity to specific evidence-based programmes. Leonardo *et al*[11] describe a quality improvement model for building state public health capacity to test, implement and spread change ideas for reducing childhood injury and death, and Toprani *et al*[12] explain how a pilot injury prevention programme grew to absorb other system impacts (eg, building codes, home inspections, policy change, surveillance and civil liability) and resulted in significant injury reduction.

Caine *et al*[13] and Muir *et al*[14] present topic-specific examples of systemic interventions. Caine *et al*[13] explain the importance of implementing a comprehensive set of initiatives, including both upstream and downstream intervention efforts, aligned with the pathways to suicide. They demonstrate that intermediate outcomes that are socially important provide indicators of intervention success even before more distal outcomes (declining suicide rates) can be measured consistently. Muir *et al*[14] describe a process of how addressing the elements of a system (transport) shifted the paradigm for safety away from blaming individual road users and towards an approach that builds road and traffic systems designed to accommodate human error and increase safety at the population level.

Smith *et al*[15] use a systemic approach to reframe social marketing as a tool for modifying *common* attitudes underlying risky behaviours, versus targeting particular populations at risk. Finally, Bonander[16] provides an example of an innovative methodology that is designed to *account* for the complexity of population-level interventions (vs control for it). Some have argued that reliance on traditional research methods that privilege internal (vs external or ecological) validity under circumscribed conditions has constrained injury prevention inquiry to those approaches that are most easily studied using these methods.[17–19] Bonander[16] describes an application of the synthetic control method for evaluating the impact of state laws and regulations on opioid overdose, and provides insight on an emerging research methodology that is well suited for more complex, systems-level interventions likely to drive down rates of injury at the population level.

As the field of injury prevention has matured, we have seen an evolution of effort. The field was initially focused on describing the nature and extent of the problem of injury. Injury classification, injury incidence and burden of injury research were predominant. Over time, researchers shifted focus to the elucidation of injury causation and identification of effective countermeasures.[19] Now is the time for us to ask, what difference are we making? For over 20 years, the *Journal* has been building an injury prevention knowledge bank to support improvement in the injury-related health of our communities. In this supplement, we have

collected a set of manuscripts that describe approaches for achieving population-level change.

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