

ABSTRACT

The study of disaster risk is primarily aimed at identifying who may be at risk (vulnerable populations) from specific events (causes) so as to prevent and/or facilitate timely responses to them. These causes are predominantly defined by historical data rather than from forecasting potential risks. Many of the threats to health and security today are trans-national, whether it is the spread of an infectious disease, migration of displaced people, or the widespread impact of a weather event. There is a paucity of discussion and literature that attempts to describe new and emerging causes of disasters, or the potential impact of these events. Reasons for this may include perceptions of these causes as being non-traditional threats and, therefore, not readily interpreted as causes of disasters and thus not as disasters at all. They may include climate change, social disruptions such as terrorism, economic crisis, drug trafficking or increased drug usage. The risks and impacts are changing because of societal and social change, economic changes and rapidly changing technology and interconnectedness. Traditional views of disaster are limiting, as they do not include high-impact events that are not associated with emergency service responses. The health consequences of these events are complex to understand. Nevertheless, careful analysis of these events reveals alignment of their human impact against established criteria that define disasters. The aim of this paper is to examine emerging causes of disasters and non-traditional health threats, consider their relationship to contemporary emergency management risk assessment, and consider what is required for emergency management to adapt and confront this emerging reality.

Non-traditional health threats: redefining the emergency management landscape

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Introduction

In his First National Security Statement to Parliament on 4 December 2008, the then Australian Prime Minister, Kevin Rudd, broadened the consideration of traditional threats to national security to include that 'new and emerging challenges represent emerging non-traditional threats' (e.g. climate change, cyber security, food security, energy security, trans-national crime, globalisation and demographic changes), which introduce further sources of vulnerability in the Australian community (Rudd 2008). To these, financial collapse, economic crisis and the public health consequences of cascading natural disasters could be added (Little 2002). Other authors (Barnes, Bergin & Nicola 2014) have placed this Prime Ministerial Statement as the pivotal point in initiating an awareness of non-traditional threats in the Australian context. A 2015 Monash University Disaster Resilience Initiative (MUDRI) Forum, entitled 'Broadening Resilience to Emerging Non-traditional Events', and a 2016 national conference on this theme further consolidated non-traditional events on the national landscape for emergency management.

The *National Strategy for Disaster Resilience* has identified that disasters are increasing in their complexity and frequency (Attorney-General's Department 2011). Priorities for prevention and mitigation have been firmly embedded within this strategy; however, this is dependent on a whole-of-government approach to analyse and manage causal factors of disasters to achieve disaster risk reduction. Further support for action on activities that enhance mitigation, risk awareness and disaster risk reduction were demonstrated in the final report of the Productivity Commission (Productivity Commission 2014), which was accepted by the Australian government in 2016 (Attorney-General's Department 2016).

Background: emerging disaster risk

The theme of non-traditional threat and emerging disasters, and the need to develop robust risk assessment practices, is evident when analysing contemporary global events. The rapid destabilisation in political relationships between East and West was not predicted, nor the extent or speed to which this occurred. Breakdown in relationships resulting in government destabilisation contributes to protracted population emergencies, such as the

Ukrainian Crisis and the Syrian refugee crisis in Europe (Guha-Sapir *et al.* 2015).

Arnold (2002) postulated that future disaster risks during this 21st century would include: population growth, environmental degradation, global warming, deforestation, infectious diseases, hazardous materials, chemical warfare, nuclear risks, economic imbalance and cultural tribalism. Further to this, Arnold predicted that 'there will be more natural and anthropogenic disasters of every type, as well as some not yet imagined'.

Burkle (2010) identified the evolving nature of complex emergencies and the globalisation of public health emergencies. The effects of conflict, climate change, large-scale natural disasters, globalisation and urbanisation, epidemics and pandemics, and emergencies of scarcity are identified from the current burden of humanitarian action as future indices of risk (Burkle 2010). In the context of change in the nature and scale of crisis, Burkle emphasises the importance of public health practice as essential for community support and protection. The premise of this assertion is based on public health being a multi-disciplinary practice, which is case- and population-focused rather than individual- and treatment-focused and establishes health as the goal of interventions.

In March 2015, Sendai hosted the UNISDR conference for disaster risk reduction. The program of presentations over four days contained 10 separate sessions devoted to emerging risk, constituting five hours of working presentations and committing nearly 20 per cent of conference time to examination of this single topic. Topic areas included rural resilience, lessons from mega disasters, global risk trends, water resource management, ecosystem management and resilience, disaster risk and poverty, epidemic and pandemic risk, economic risks of disaster risk reduction, land-use planning and disaster risk reduction, disaster and climate risk (UNISDR 2015). This array of sessions provided a broad cross-section of new and potentially evolving threats. In particular, the Global Risk Trend presentation sought to analyse the current disaster risk environment. It identified that the disaster risk environment is increasing and that many countries 'have understood and practiced disaster risk reduction as disaster management' (UNISDR 2015). The outcome of these efforts is an improvement in response capacity, and minimal impact on risk mitigation or management.

Furthermore, descriptors of risk areas within the report (i.e. poverty, employment, and environment) display strong correlation with the contemporary social determinants of health approach (Marmot *et al.* 2008).

While these findings are important in the context of identifying and improving disaster risk, risk and cause are not synonymous. The Global Risk Report (World Economic Forum 2015) provides an updated analysis of risk and factors impacting risk variance. There is opportunity to complement these efforts through further examination of current and emergent disaster cause and threat. Contextualising threat and risk analysis

can assist in appropriate investment for planning and prevention strategies.

Burkle, Martone and Greenough (2014) reviewed contemporary trends in humanitarian action and proposed that the scale and complexity of disasters is changing and that current emergency and humanitarian operational frameworks will be unable to meet future needs. The ecological, social and economic effects of climate change, extreme weather events, unsustainable urbanisation, biodiversity crisis, scarcity of resources, increasing armed conflict and lack of pandemics have been suggested as future, and likely interacting, threats to community health and wellbeing. The challenge of anticipating disasters promoted by the concept of resilience (Murray & Ebi 2012) can be achieved on the condition of being aware of their existence and root causes.

Non-traditional health threats and climate change

Burkle (2013) examined emerging disasters in the setting of climate change and highlights the disconnect between leadership and science. He provides commentary on an editorial published in *Nature* by an investment strategist. A gap in health research influence on policymakers and government leaders, as compared to the closer relationship that economists have established, is noted. Jeremy Grantham, the investment strategist and author of the editorial, calls on health professionals to be greater advocates for the health impacts of global warming. Achieving this will require health professionals and scientists to step beyond the traditional publication and conference presentations to communicate to a broader audience. Burkle notes this will invariably come with challenges and risks. In addition, Grantham proposes that these efforts need to be more realistic, more persuasive and gain better traction with government leaders (Burkle 2013). The context of this review highlights climate change as an emerging threat to health and demonstrates the need for coordinated, multi-disciplinary practice in the setting of action on disaster risk reduction. Of particular relevance is that this call is from a professional outside of health to the scientific community for action; a call that should bring into question not only what we do, but also to whom we communicate and how to achieve an effect.

The second volume of the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report examined impact adaptation and vulnerability. In particular, the human health chapter identifies future risks relative to climate change and, as in many cases of health disparity, the greater burden of impact is expected to occur in poor and vulnerable groups, exacerbating health inequalities (Field *et al.* 2014). This action is reflective of the IPCC report identifying injuries, hospitalisations and deaths due to intense heatwaves as a significant health impact category, and evidence associating poor health outcomes

associated with extreme heat exposure in the workplace (Kjellstrom, Homer & Lemke 2009).

The effect of extreme weather events is emerging in Australia (Tong *et al.* 2014). At a national level, the Australian Department for Climate Change has recognised the increasing risk to the built and natural environment posed by increasing frequency and intensity of extreme weather events. Heatwave impact on southern Australia has, in some states, shifted the responsibility of preparedness, response and recovery to emergency management sections of government. The assignment of responsibility to emergency management structure contextualises a shift in perception and application of traditional disaster definition to developing, non-traditional threats (Schipper & Pelling 2006).

Non-traditional health threats and social disruption

Urban population growth has expanded rapidly and, in many cases, in an unsustainable manner. UN-Habitat reported on the trend in urbanisation, with the majority of the global population now existing in urban spaces compared to rural living (UN-Habitat 2013). This trend is expected to continue and the consequences will be multi-faceted. Increased demand on lands in urban spaces will drive the need for resources and subsequent increased pressure on the environment through exploitation of resources or via increased emission outputs. A high proportion of this demand is in coastal regions to access ports and transport infrastructure. These same areas are also under increasing threat from weather-related events and climate change; further compounding the risk associated with unsustainable urbanisation (Burkle 2010). That and other impacts, such as increased prevalence and spread of disease in urban slums, are evident; the full effects are yet to be realised.

Using disaster definitions and descriptors applied by UNISDR (UNISDR 2009), the impact of illegal drug use and trafficking represents a contemporary, societal disaster. The impact of drug trade and usage on society is rapidly increasing. In 2012, the Australian Institute of Criminology reported Oceania as having the highest global usage and trade of methamphetamine, also known as 'ice' (Schloenhardt 2007). In Indonesia, President Joko Widodo has stated that 'Indonesia is in a state of emergency with regard to drug use' (Times 2014). The emerging impact of methamphetamines in Victoria has been labelled a crisis and led to the establishment of a workforce appointed by the incumbent government in response to a parliamentary report. The Victorian Police have publicly stated that 'we can't simply arrest our way out of this crisis. We need to get to the heart of the problem and listen to the experts who see the effects of this tragedy every single day.' The importance of revealing the underlying causes of these invisible crises are exemplified in recent studies by Case and Deaton. These authors recently revealed a disproportionate upward trend in mortality rates due to drug overdose, alcohol and suicide among white male US Americans,

calling them 'deaths of despair' (Case & Deaton 2017). Determinants associated with this trend were economic distress and high unemployment in working class populations without university education. Importantly, as in the case of drought, these social disasters unfold progressively. In America this trend emerged in the late 20th century with the move of manufacturing centres to Asia and increased as these population groups were impacted by the Global Financial Crisis of 2008. The same crisis had public health impacts in many European countries (Stuckler *et al.* 2011). Emerging research is now able to demonstrate the connection between a political decision, such as austerity measures, and the connection to health deterioration (Robertson 2011).

Additionally, like many commonly recognised disasters, this impact extends across borders and countries in a globalising world, and disproportionately affects vulnerable groups within communities. While addiction has previously been identified as a causal factor of poor health, it is not construed as a risk factor within emergency management paradigms, and, as a consequence, the capacity to operationalise either addiction programs or trafficking action is limited, if not non-existent. The recognition of the complexity of illicit drug impact should be heeded as a call to collaborative action across professions to engage in action. Public health practice has a unique and valuable skillset to offer, and should be engaged by leadership in this field, particularly in understanding the social environment favouring drug use and addiction.

Domestic violence has been reported as the cause of one death per week of women in Australia (Chan & Payne 2013) and one in three women have experienced violence since 15 years of age (Cox 2015). The magnitude and impact of these events meets conceptual definition of a diffuse disaster as a primary event. Recent national and state inquiries have resulted in the adoption of targeted strategies to address this national imperative. Many of the proposed strategies reflect attributes of a public health and disaster risk reduction approach.

While there is not a single agreed definition of domestic violence in Australia, Parkinson and Zara (2013) referred to domestic violence as a 'hidden disaster' in their research that identified an increase in domestic violence post-Australia's Black Saturday bushfires. In this context the impact of domestic violence could be considered a secondary event associated with the recovery phase following the initial event. Domestic violence is also included as a 'chronic stressor' in the Resilience Strategy, auspiced by the Rockefeller Foundation's 100 Resilient Cities program. Akin to many disasters the long term impact on health attributable to domestic violence is poorly understood and underpins a need to examine emergency management frameworks to address awareness and action on domestic violence as both a primary and secondary disaster event.

Discussion

Considerations for action and public health interconnectedness with emergency management

Non-traditional health threats are difficult to define, as definitions of disaster vary and are contextual to need and to governmental purpose to apply disaster definitions for the application and enabling of support services. However, research institutions may apply definitions for data gathering purposes. The Centre for Research and Epidemiology of Disasters defines a disaster as 10 or more people deceased and/or greater than 100 injured and/or declaration by the country of a state of emergency and/or an appeal for international assistance (Guha-Sapir *et al.* 2012). Non-traditional threats are not easily recognisable as disasters by emergency managers yet, when compared to currently accepted types of disasters, the impact on individuals is as significant, if not more so. A comprehensive approach to reduce disaster risk was mandated in the United Nations *Sendai Framework for Disaster Risk Reduction*, whose declaration was 'to enhance efforts to strengthen disaster risk reduction and to reduce disaster losses of lives and assets from disasters worldwide' (Glantz 2015). A comprehensive approach requires a deeper understanding of the drivers of disaster risk and challenges traditional norms of hazard and vulnerability assessment.

Ranson (1993), a forensic pathologist in Melbourne, coined the term 'The Diffuse Disaster Syndrome'. Ranson suggests that 'what separates the diffuse disaster from the mass disaster is its temporal and spatial distribution with deaths and injuries taking place as isolated events that are not easily recognised as being related. As an example, large droughts in the Horn of Africa causing famine and death are more visible than smaller, long-term droughts but are still responsible for many deaths. In a slow-onset, invisible crisis like this, deaths will not be temporally or spatially aggregated and thus difficult to attribute to the drought. It is only by bringing cases together that the impact of such deaths on community can be fully appreciated and the resources needed to research the mechanisms that result in these deaths be appropriately addressed (Ranson 1992). On this basis, road trauma, workplace death and injury, child abuse, domestic violence, youth suicide, opiate and 'ice' epidemics could be structured as 'diffuse disasters'. They could be approached and studied through a public health lens, an approach that has seen the national road toll reduced dramatically since the 1970s. One implication is that national and international disaster databases (e.g. CRED, Australian Disaster Information) would need to capture new fields. At present, an examination of both these databases suggests that data variables to capture and to examine disasters are not adequate. The 2015 Monash Disaster Resilience Initiative Forum on this theme strongly supported the proposal that these non-traditional events would benefit from examination

through a disaster risk reduction lens. A strategy of resilience-thinking and analysis would provide greater focus on the study on the long-term health consequences of disasters.

As new threats emerge and causal factors are identified, emergency management practice will require evolution beyond traditional response-based frameworks. An increasingly connected world requires collective action to address complex problems that arise. Public health practice, as an evidence-based means of enquiry and action, can provide a solid foundation for future practitioners (Keim 2008). Epidemiology is a fundamental toolbox to systematically investigate the underlying (sometimes distal) drivers of these societal or diffuse disasters, not just vulnerable groups and their age or sex.

Increasing connectedness across nations has led to the emergence of global public health practice. As boundaries between nations and continents decrease, variations in health threats are evolving as common concerns and require commitments in global health to address them (Labonté & Schrecker 2007).

Governments face complex challenges in the face of changing disaster profiles. Demands to maintain constituent support can shift political objectives from long-term structural solutions to more popular short-term agendas. Contributing to this is that many of the factors are often outside a single government's control. Economic and environmental change, regional population shifts, and climate-related events affecting regional security have domestic consequences. Solutions to these require collaborative efforts for enduring success and require sound, strategic leadership to engage societal support (Clark 2012). Delays in achieving this will make impacts more severe and mitigation more costly (World Bank 2013).

Schipper and Pelling (2006) previously examined interconnectedness across broad policy areas of disaster risk, climate change and international development. Specifically, they note that the divide between these disciplines requires bridging to ensure that projects to address needs are complementary, not conflicting (Schipper & Pelling 2006). Recommendations are provided for improved interaction and integration between these communities of practice to reduce overlap, and provide uniformity in language and methods (Schipper & Pelling 2006).

Further action in 2015 included the conclusion of the Millennium Development Goal project and the initiation of the Sustainable Development Goals as their successor. The opportunity to achieve action on causal factors of health is inextricably linked to disaster vulnerability and sustainable development (United Nations 2014). Helen Clark, former New Zealand Prime Minister and United Nations Development Program Administrator, has highlighted the interconnectedness of resilience and sustainable development. Significantly, Clark identifies resilience-based activity with developmental programs as not only a responsible course of action, but one that is practicable, delivers the greatest output and aligns sustainable development-based activity

with aims described within strategic disaster risk reduction policy. This proposal draws practitioners together towards common goals and emphasises the need for comprehensive analysis of need and long-term commitment to reduce vulnerability (Clark 2012). A global public health agenda linking these initiatives is imperative to ensure optimum results are delivered from future projects. The scientific community may support these initiatives by identifying drivers and outcome indicators common to sustainable development, resilience and disaster risk reduction.

At a pragmatic level, the public health consequences of the Hazelwood mine fire in Victoria (Victorian Government 2014) and the 2017 'thunderstorm asthma' event in Victoria, which resulted in a reported nine deaths, an 8500 patient surge in ambulance and emergency department attendances over one evening, and a broadcast of public health alerts (Guest 2016) suggests a priority in re-examining these non-traditional events through a new, but complementary, lens.

Conclusion

Broader examination of emerging disasters and non-traditional health threats is fundamental to understanding the health of communities and the vulnerabilities within them (Keleher & MacDougall 2009, Marmot, *et al.* 2005) particularly in a rapidly changing and globalising world. Once exposed, the effects of disaster on vulnerable groups can be magnified, resulting in marginalisation and increased suffering. Vulnerability arises from social, cultural, health and environmental interactions (Lindsay 2003); as such no single agency is equipped to adequately respond to identified needs and a multi-disciplinary approach is required. Further examination of emerging disasters and non-traditional health threats is warranted. However, the challenge for the emergency management discipline is to examine this in more depth and re-evaluate contemporary practice (Paul & Raisa 2012). Research and case study analysis of specific non-traditional disasters and emerging threats in Australian emergency management is recommended and will provide opportunity to redefine risk and develop a dialogue for future practice.

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