

## Explosive remnants of war: a public health threat



Every year, many people are affected by explosive remnants of war (ERW) worldwide, in both areas of active conflict and countries that have not been at war for decades. In Laos, for instance, ERW have injured or killed more than 50 000 people since the end of the Laotian Civil War in 1975.<sup>1</sup> In 2015, landmines alone caused, on average, 18 casualties a day globally.<sup>2</sup> The overarching societal implications of these devices have, to date, been largely unexplored. In *The Lancet Public Health*, Alexandra Frost and colleagues<sup>3</sup> show the wide-ranging effects of ERW on populations, with effects going far beyond direct injuries, including far-reaching and cumulative effects on livelihoods, mental health, public health, and overall security. These effects echo what we are seeing in northeast Syria, where Médecins Sans Frontières has been operating since 2013.<sup>4</sup>

Contamination of private and public spaces, including homes, fields, streets, and hospitals, impeded resumption of health-care services that were halted because of the conflict in northeast Syria.<sup>4</sup> Medical facilities were destroyed, damaged, or littered with ERW, thus limiting the population's access to functioning health services. The risks that these facilities and roads leading to them were potentially mined also hindered humanitarian assistance. As the presence of these ERW limits both the population's access to health care and the ability of medical humanitarian personnel to provide services, the effect is not only on curative health services, but also on preventive health services. These facilities are no longer able to provide routine immunisation, leading to gaps in immunisation coverage and thus to potential outbreaks of vaccine-preventable communicable diseases.<sup>5</sup>

Even after the fighting has subsided, the population is reluctant to return because of the constant threat posed by the ERW left behind. Given the low clearance capacity of deminers, villages and surrounding fields littered with ERW present an immediate threat along with the associated long-term effects on the community. A year after the town of Kobane became accessible to Médecins Sans Frontières, people still presented to health facilities with injuries sustained from victim-activated devices.<sup>4</sup> By impeding resumption of agriculture on which many households

rely before and after the conflict, persistent ERW contamination has also negatively affected economic livelihood.<sup>6</sup>

ERW pose a risk to public health, particularly to water and sanitation infrastructure. As buildings and infrastructure are damaged by ERW, so too are the sanitation structures within. Populations then face both reduced access to sanitation facilities and contamination to the environment caused by damage to previously existing sanitation systems. These effects pose a public health risk of exposure to communicable diseases.<sup>5</sup> Other environmental health concerns, which remain unknown, are the health consequences of unexploded ERW and debris as their materials degrade over time. What effect leeching of these metals and chemicals into the environment will have on long-term population health is so far unknown.<sup>7</sup>

Although the immediate effect of ERW on mental health, particularly post-traumatic stress disorder, has been studied,<sup>3</sup> the long-term effect on society in northern Syria is yet to be fully understood. Children who are exposed to violence over a period of time become desensitised to it and potentially have maladaptive behaviours towards others that can continue for extended periods of time.<sup>8</sup> In Syria, given that the conflict has been ongoing for 6 years, this effect could be extensive. Any maladaptive behaviours that have developed during the conflict could continue into adulthood, thus affecting the population for many years to come.<sup>8</sup> The unknown effects of ERW, including the unknown environmental health effects, are also of unique concern and require further study.<sup>7</sup>

Although a number of studies cited by Frost and colleagues<sup>3</sup> explore the long-term cumulative and multifactorial effects of ERW on public health, quantitative evidence of that effect is yet to be developed. To measure the effect of being exposed to ERW on individuals, studies should go beyond looking at the number of years of life lost to analysing the much broader effect on a society of living or having lived in an ERW-contaminated environment than that ascertained from just looking at the number of years of life lost. Findings from these studies should then provide an incentive to prioritise decontamination.

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