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# LANDMINES, EXPLOSIVE REMNANTS OF WAR AND PUBLIC HEALTH

Alex Frost, King's College London

# CONTENT OUTLINE

- What is Public Health?
- The Impact of Landmines and ERW
- How Does Public Health Relate to Mine Action?
- Mine action interventions
- Injury surveillance

# WHAT IS PUBLIC HEALTH?

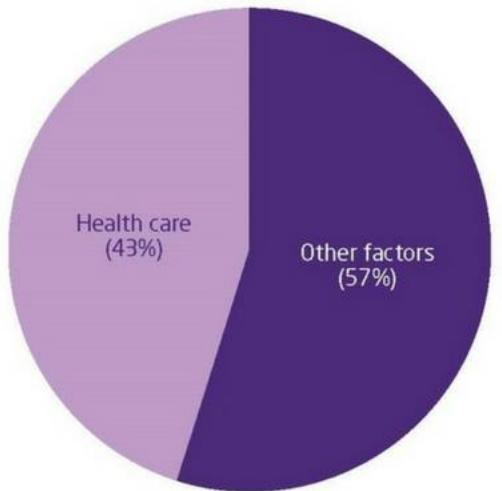
Public health refers to all organised measures to prevent disease and injury, promote health and prolong life among the population as whole.



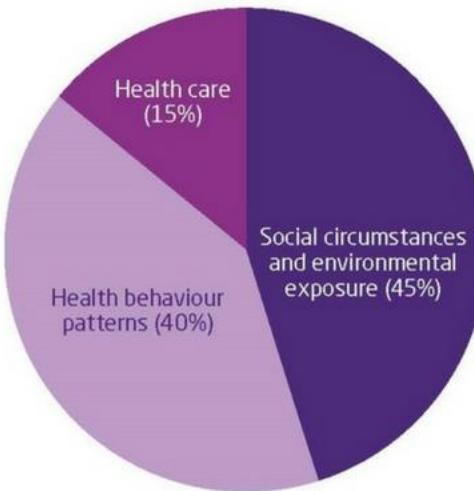
## The importance of public health

Our health is determined by our genetics, lifestyle, the health care we receive and our wider economic, physical and social environment. Although estimates vary, the wider environment has the largest impact.

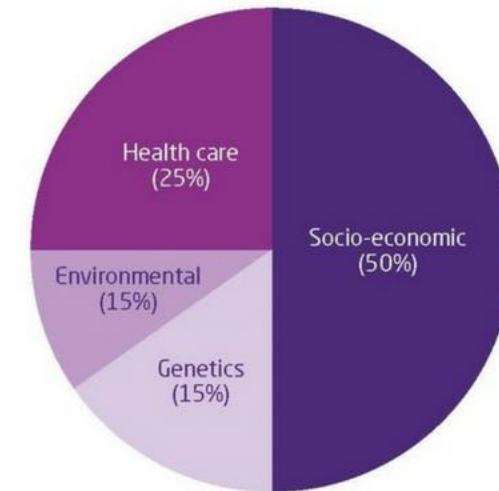
**Bunker et al (1995)**



**McGiniss et al (2002)**



**Canadian Institute of Advanced Research (2012)**



# IMPACTS OF EXPLOSIVE REMNANTS OF WAR

- Impacts of landmines, UXO and AXO on civilian populations in LMICs
- Explosive remnants of war includes landmines, UXO and AXO
- Direct and reverberating impacts
- 54 studies from 22 countries
- Evidence is context specific

## The effect of explosive remnants of war on global public health: a systematic mixed-studies review using narrative synthesis

Alexandra Frost, Peter Boyle, Philippe Autier, Colin King, Wim Zwijnenburg, David Hewitson, Richard Sullivan



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### Summary

**Background** Explosive remnants of war (ERW)—landmines, unexploded ordnance (UXO), and abandoned explosive ordnance (AXO)—have been recognised as a threat to health since the 1990s. We aimed to study the effect of ERW on global public health.

**Methods** In this systematic mixed-studies review, we searched the Web of Science, Scopus, PubMed, and ProQuest databases, and hand searched relevant websites, for articles published between Jan 1, 1990, and Aug 31, 2015. We used keywords and Medical Subject Headings related to ERW, landmines, UXO, and AXO to locate original peer-reviewed quantitative, qualitative, or mixed-methods studies in English of the direct physical or psychological effects of ERW on direct victims of the explosive device or reverberating social and economic effects on direct victims and indirect victims (their families and the wider at-risk community). We excluded studies if more than 20% of participants were military, if they were of deminers, if they were from high-income countries, or if they were of chemical weapons. We identified no peer-reviewed studies of AXO effects, so we extended the search to include grey literature. We critically appraised study quality using a mixed methods appraisal tool. We used a narrative synthesis approach to categorise and synthesise the literature. We extracted quantitative data and calculated means and percentages.

**Findings** The initial search identified 10 226 studies, leaving 8378 (82%) after removal of duplicates, of which we reviewed 54 (26 [48%] were quantitative descriptive studies, 20 [37%] were quantitative non-randomised studies, four [7%] were mixed-methods studies, and four [7%] were grey literature). The direct psychological effects of landmines or UXO appear high. We identified comorbidity of anxiety and depression in landmine or UXO victims in four studies, more women presented with post-traumatic stress disorder than did men in two studies, and landmine or UXO victims reported a greater prevalence of post-traumatic stress disorder, anxiety, or depression than did control groups in two studies. Overall injury and mortality rates caused by landmines or UXO decreased over time across five studies and increased in one. More men were injured or killed by landmines or UXO than were women (0–30·6% of women), the mean ages of casualties ranged from 18·5 years to 38·1 years, and victims were likely to be doing an activity of economic necessity at the time of injury. The proportion of casualties of landmines or UXO younger than 18 years ranged from 22% to 55% across twelve studies. Landmine or UXO victims who had one or more limbs amputated ranged from 19·5% to 82·6%. Landmines and UXO had a negative effect on internally displaced populations and returning refugees, physical security, economic productivity, child health and educational attainment, food security, and agriculture in studies from seven countries. We could not establish the proportion of casualties caused by AXO from unplanned explosions at munitions sites, although the grey literature suggests that AXO is a substantial problem.

**Interpretation** Individually, these landmine and UXO results are not new and substantiate findings from existing research. Taken together, however, these findings provide a picture of the effect of landmines and UXO that stretches far beyond injury and mortality prevalence, making landmine and UXO clearance a more favourable option for funders. AXO effects are understudied and warrant further research.

**Funding** King's College London.

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### Introduction

The effects of explosive remnants of war (ERW), defined here as landmines (victim-activated explosive traps that target people and vehicles), unexploded ordnance (UXO; explosives that have been fired, dropped, launched, or projected during a conflict yet remain unexploded), and abandoned explosive ordnance (AXO; explosives that have not been used or have been left behind or dumped by a party in an armed conflict and are no longer under the control of the party that left them behind or dumped them), are disproportionately borne by citizens of low-income and middle-income countries (LMICs).<sup>1</sup> ERW pose a threat to people's health and human rights in more than 60 LMICs.<sup>2,3</sup> Annual casualty numbers are

# MAIN FINDINGS

- 70% of studies examined the physical effects of landmines/UXO on victims.
- Casualties were likely to be men in the economically productive age range.
- 22-55% of casualties were children.
- The psychological effects on victims appear high.
- Wide ranging negative socio-economic impacts were reported.
- No academic studies on the effects of AXO.

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# HOW DOES PUBLIC HEALTH RELATE TO MINE ACTION?

Landmines and ERW cause injury and death, they diminish the health and wellbeing of affected populations.

Mine action interventions are public health interventions.



## MINE ACTION INTERVENTIONS

- Interventions that are evidenced based and context specific.
- Appropriate for the target population.
- Impactful and cost effective.

# INJURY SURVEILLANCE

The ongoing and systematic collection, analysis, interpretation and dissemination of health information.

It can tell us about:

- the size and characteristics of a health problem
- the populations at risk
- the risk factors
- the trends.





# INJURY SURVEILLANCE AND MINE ACTION

Surveillance data was analysed in studies from Afghanistan, Bosnia, Cambodian, Chechnya, Mozambique and Nepal.

Data was collected from hospitals and clinics, from media reports, from community networks, and from existing mine action programs.

Information captured on wide range of factors including injury trends over time, who was being injured, location and type of injury, type of ordnance involved in injury, activity at time of injury.

# The importance of injury surveillance.

Broadening the scope of understanding  
beyond the physical effects of  
landmines/ERW.

Focusing on saving lives and limbs.

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Credit to Colin King for all images