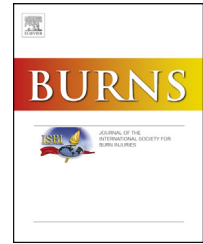


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## Review

# Fires in refugee and displaced persons settlements: The current situation and opportunities to improve fire prevention and control



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## ABSTRACT

**Introduction:** We aimed to describe the burden of fires in displaced persons settlements and identify interventions/innovations that might address gaps in current humanitarian guidelines.

**Methods:** We performed a systematic review of: (i) academic and non-academic literature databases; and (ii) guidelines from leading humanitarian agencies/initiatives regarding fire prevention/control.

**Results:** Of the 1521 records retrieved, 131 reports described settlement fires in 31 hosting countries since 1990. These incidents resulted in 487 deaths, 790 burn injuries, displacement of 382,486 individuals and destruction of 50,509 shelters. There was a 25-fold increase in the rate of settlement fires from 1990 to 2015 (0.002–0.051 per 100,000 refugees, respectively). Only 4 of the 15 leading humanitarian agencies provided recommendations about fire prevention/control strategies. Potentially useful interventions/innovations included safer stoves (e.g. solar cookers) and fire retardant shelter materials.

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*Conclusion:* The large and increasing number of fires in displaced persons settlements highlights the need to redress gaps in humanitarian fire prevention/control guidelines. The way forward includes: (i) developing consensus among aid agencies regarding fire prevention/control strategies; (ii) evaluating the impact of interventions/innovations on the burden of fires; and (iii) engaging agencies in a broader discussion about protecting camp residents from armed groups.

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## 1. Introduction

There are nearly 60 million displaced persons worldwide [1]. Ongoing conflict in the Syrian Arab Republic, Central African Republic, South Sudan and Iraq have caused a 40% increase in the number of displaced persons over the past 3 years; 14 million persons were displaced in 2014 alone [1]. The large and rapid increase in the number of displaced persons has strained humanitarian agencies' ability to plan, organize and maintain formal and informal settlements [1]. As a result, the safety of many encamped persons has become jeopardized [2]. Therefore, comprehensive, cost-effective and evidenced-based guidelines are needed to support efforts that promote the safety, health and well-being of encamped displaced populations worldwide.

Injury is one of the most common causes of death and disability among individuals in low- and middle-income countries [4–6]. Displaced persons are more vulnerable to burn injuries than their non-displaced counterparts due to living in overcrowded temporary structures, using unsafe cooking and heating appliances or open fires, inability to provide constant childhood supervision, and more predisposed to assault by domestic partners, criminals and armed groups [7–11]. Therefore, fire prevention and control initiatives are particularly important in camp settings. However, inter-agency humanitarian camp management guidelines regarding fire prevention and control are incommensurate with the risks faced by displaced persons, including those from The Sphere Project [12].

Inadequate fire guidelines are due, in part, to the lack of estimates of the burden of fire-related injuries or structure loss in humanitarian settings. Additionally, many settlements are not designed and/or equipped with contextually appropriate

fire prevention and control strategies in mind. To address these gaps, we aimed to: describe the burden of fires in humanitarian settlements using a systematic lay-literature search; report current fire prevention and control policies from leading humanitarian agencies' guidelines; and identify gaps between the guidelines and published fire prevention and control interventions and innovations in comparable settings. By doing so, the findings might highlight the burden of fires on camp health and infrastructure, as well as the need to modify humanitarian agency guidelines to include interventions and innovations that might improve fire prevention and control in camp settings.

## 2. Methods

The review consisted of three searches that aimed to describe the problem, review current standards, and identify potential interventions or innovations that might reduce the burden of fires in humanitarian settlements. Specifically, the searches consisted of:

- 1 A systematic review of fires in refugee and displaced person settlements;
- 2 A targeted review of the 15 leading humanitarian agencies fire prevention and control guidelines; and
- 3 A Systematic review of fire prevention or control interventions or innovations potentially useful for displaced person settlements.

Searches 1 and 3 were performed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [13].

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