





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## Measurement and analysis of air quality in temporary shelters on three continents (Article)

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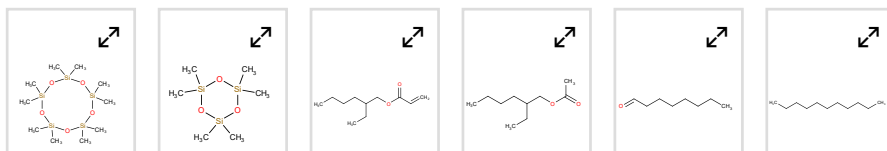
### Abstract

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Millions of displaced people are housed in shelters that generally consist of a single room, meaning that activities including cooking, sleeping and socializing all take place in the same space. Therefore, indoor air quality can be poor, resulting in estimated 20,000 displaced people dying prematurely every year. Very few studies considered the issue and all within one country. This paper describes the first comprehensive study investigating air quality in shelters by looking at Volatile Organic Compounds (VOCs), Particulate Matter (PM), and CO<sub>2</sub> in ten locations within Peru, Ethiopia, Djibouti, Jordan, Turkey and Bangladesh. It has the aim of: (i) discovering how widespread the issue is, (ii) identifying some of the causes, (iii) whether it is linked to cultural and behavioural factors, (iv) location and climate, or (v) shelters' materials or design. Results revealed very harmful levels of pollutants that are often linked to excess mortality - with total VOC concentrations as high as 102400 µg m<sup>-3</sup> and PM over 3000 µg m<sup>-3</sup>. The reasons for these concentrations were complex, multifaceted and setting-specific. However, it was an issue in both simple self-built shelters and mass-manufactured designs, and across all climates and cultures. In all cases, conditions could be greatly improved by improving airflow as windows were frequently blocked for various reasons. Therefore, airflow should be explicitly considered, whilst being cognisant of the local context; and when cooking is likely to occur indoors, chimneys must be fitted. © 2020 Elsevier Ltd

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