



Article title: COVID-19 & informal settlements: is Stay Home safe?

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Dear Editors,

My Co-Authors and I are pleased to submit our manuscript "COVID-19 & informal settlements: is "Stay Home" safe?" for submission in UCL open Environment.

Our manuscript is a commentary piece reflecting on the connections between housing and the current COVID pandemic in informal settlements. We discuss vulnerabilities of those in informal settlements who remain in poor quality housing during the current lockdown and its potential unintended consequences on health and well-being. We also consider the role of housing form on the inability to implement social distancing measures, and how housing makes the household more vulnerable to serve COVID-19 outcomes. We recommend immediate measures and the long-term need for adequate housing for health and well-being.

We believe our manuscript provides an important lens, not considered in commentary pieces elsewhere. This has import implications for the current COVID-19 containment measures as well as for long-term implications for adequate housing and human settlements.

We look forward to your response.

A handwritten signature in black ink, appearing to be 'EN', with a long horizontal stroke extending to the right.

Yours sincerely,
Dr Emily Nix

COVID-19 & informal settlements: is “Stay Home” safe?

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Abstract

Disproportional burden of COVID-19 and vulnerability to containment measures in informal settlements have been recognised, however, the role of poor housing conditions in propagating these remains neglected. Poor housing conditions will make it difficult to effectively implement social distancing measures. With increased time spent in cramped, dark and uncomfortable indoor environments, water and sanitation outside the home, and no outdoor space, higher exposure to existing health hazards and high levels of stress, with women and children most vulnerable, are anticipated. We reflect on these interconnections and recommend immediate measures and the long-term need for adequate housing for health and well-being.

Introduction

Preliminary evidence suggests that those in disadvantaged neighbourhoods, even in high-income countries such as the United States, will experience the largest COVID-19 health burden [1]. Informal settlements are home to some of the most disadvantaged populations globally, where residents' face overcrowding, unstable incomes, poor quality housing on vulnerable lands at high risk of climate change impacts [2]. Conditions in informal settlements are not only likely to contribute to increased COVID-19 transmission risks, due to high contact rates and limited opportunities to practice good hygiene, but infections are likely to be more profound due to co-morbidities, food insecurity and lack of adequate healthcare services [3]. Though stay homes orders are aiming to reduce COVID-19 transmission, such measures are likely to propagate income instability and increase exposure to existing housing-related health hazards in informal settlements.

Several published commentaries have discussed how to respond to COVID-19 in informal settlements. For example, Corburn and colleagues [3] provide recommendations for food and income assistance, health care services, water, sanitation and waste collection and advise drawing on existing social groups. However, they do not recognise housing deficiencies. Drawing on our field experiences across India's informal settlements, this commentary examines how housing conditions in informal settlements propagate inequalities in 1) the exposure to and 2) burden of COVID-19 and 3) unintended impacts of containment measures (Fig.1). We consider these issues and the longer-term need to consider housing on the global health and development agenda.

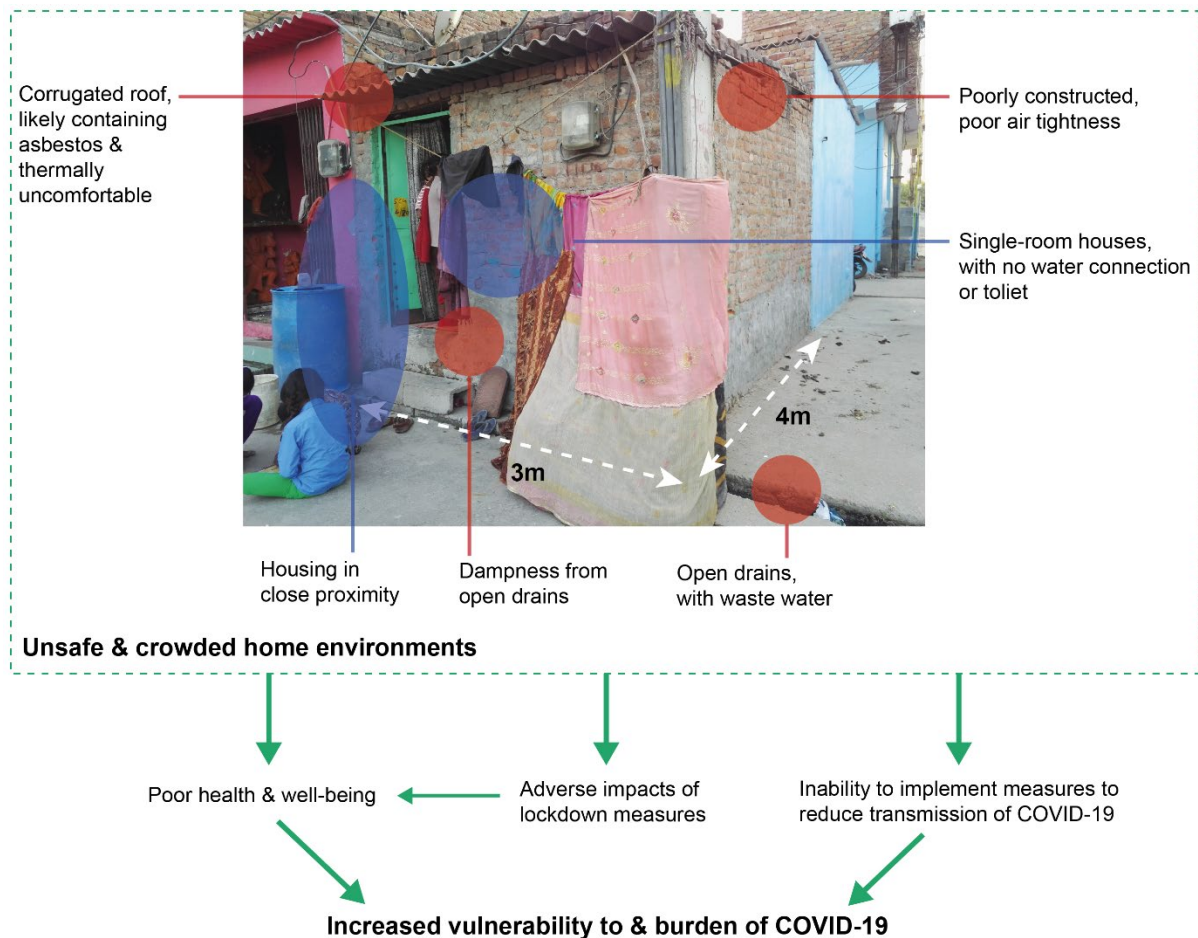


Figure 1: Connections between (non-exhaustive) unsafe and crowded homes environments and COVID-19 vulnerability and burden in informal settlements.

Housing conditions in informal settlements and impacts on health and well-being

Housing in informal settlements tends to be extremely limiting. Plots sizes are very limited, typically no more than 15m², often placed in cramped back-to-back rows with walls and entrances shared with neighbours (Fig.1). Housing is constructed incrementally, with most housing starting as single-rooms structures until households can invest in additional floors. Dwellings range from makeshift structures built from bamboo and plastic sheets to substantial structures of bricks walls and concrete roofs, with toilets incorporated where possible. These conditions result in inadequate ventilation and poor lighting levels and insufficient space for occupants, causing dwellings to become polluted and overheat, forcing residents to leave doors open or sit outside - exposing them to mosquitoes and other outdoor risks. Informal settlements generally do not have green space for exercise and well-being, have high levels of environmental pollution or are located on contaminated sites, such as nearby landfills or polluted water sources. Water and sanitation infrastructure are often at a community rather than household level, as is waste collection. Poor urban environment further contributes to the health burden through increased exposure to infections, pollutants and limited ability for healthy lifestyles.

These limiting conditions in informal settlements result in high risks of infection and injury, with children particularly vulnerable, due to malnutrition and recurrent diarrhoea resulting in stunted growth and long-term effects on cognitive development [4]. Previous research in an informal settlement in Delhi revealed how housing: was unable to provide safe indoor temperatures; had poor ventilation; experienced dampness and mould; used hazardous materials and were poorly constructed; experienced overcrowding; had poor lighting and little protection against noise; and suffered from a substantial presence of mosquitoes, pest and food infestation; and

facilities for cooking, washing and sanitation were inadequate [5]. Furthermore, this research found that housing had a significant impact on the daily practices of women, as they dealt with the hazards and limiting conditions [5]. The limiting housing and environment conditions will result in health inequalities and increased levels of chronic disease and thus lead to a higher risk of severe outcomes from COVID-19.

Influence of housing conditions to COVID-19 vulnerability and unintended-impacts of containment measures

Housing conditions will significantly limit the ability to implement measures intended to reduce the transmission of COVID-19. With limited indoor-space or only a single room, there is little scope for social isolation within a household. This is an additional burden where inter-generations stay in the same house, as typical in India, posing a significant exposure risk to older people who are most vulnerable. There is often less than 2-meters between neighbouring entrances and streets are often less than 2 meters wide making it extremely difficult to maintain distance when leaving the house to collect necessary supplies and to gain access to outdoor air (Fig.1). Poor air circulation and limited ventilation due to narrow streets are likely to increase the risk of infectious disease, as found with tuberculosis [6]. Similarly, shared walls with high permeability between dwellings are unlikely to offer protection between households. This situation is further compounded by the frequent need to leave the house to access water sources and use communal toilet spaces. Moreover, with little to no income savings residents' ability to stock up food and other supplies becomes very limited, thereby forcing residents to regularly access public distribution systems or the informal labour market. As a direct result of the home environment, it is very difficult to implement measures to reduce exposure to COVID-19, and thus controlling the spread will be extremely challenging in these settlements.

There is likely to be detrimental effects on health with increased time spent inside in dark, cramped and uncomfortable environments with no or limited private outdoor space. For instance, the current lockdown coincides with India's peak summer temperatures over 45°C, with poor housing temperatures indoors are likely to be higher than the outdoor temperatures [5], and if residents are unable to access shade outdoors or cooling appliances the consequences on mortality could be catastrophic. With more occupants remaining indoors, the indoor conditions are likely to become hot and stuffy and the ability to move around and complete daily tasks more stressful and result in increased accidents. Furthermore, the risk of contracting other infectious diseases or mosquito-borne diseases (e.g. dengue), is likely to be higher with more people remaining home. During cooking, our previous observations are that children are typically found outside, however, if children remain inside they are likely to have increased exposure to indoor pollution and increased risk of burns and accidents. The small houses provide limited opportunity for productive study or work and the cramped conditions are likely to result in the feeling of suffocation and poor mental health. Women and children are most likely to be affected by these stresses, through increases in domestic violence – which has been reported globally [7]. The situation is likely to be extremely grave in households with very limited space, as women and children have no respite from abusers.

Reflections and recommendations

With widespread social distancing and stay home orders, access to adequate housing and making human settlements safe for health and well-being has never been more important. The COVID-19 pandemic is highlighting the gross inequalities and deficiencies in housing infrastructure. Poor housing conditions and urban form have significant influence not only on vulnerability to COVID-19 but also on potential exposure to COVID-19 and adverse-impacts of the lockdown measures.

Improved housing must be part of measures to reduce the burden of infectious diseases and to support containment of future disease outbreaks. Governments and organisations must start to recognise the role of housing in health inequalities and support improved housing for

all. Housing has been too often missed from the global health agenda, looked through the lens of affordability and access, and considered physically adequate when built from finished materials, with sufficient space and having access to water and sanitation [6]. While the recent WHO Housing and health guidelines [8] are a useful starting place, these must be expanded to include other risks (such as light levels, mosquito-borne diseases and pests) and be translated for use in the limiting conditions of informal settlements and be adapted to geographic and social contexts.

In the immediate term, focus needs to be given to those living in the most unsafe dwellings, remediation measures carried out or alternatives provided. Clean cooking fuel and stoves, mosquito nets and protective equipment should be provided for mitigating both existing risks and risks of COVID-19. Cooling appliances, electricity subsidies or access to cool places, such as community centres, should be provided during periods of extreme temperatures and households should not be penalised for leaving home. Support should be given to those most vulnerable to COVID-19 and the impacts of lockdown measures, for example, the elderly or women and children at risk of domestic abuse. Action plans should be developed with the local community and agencies with experience of providing support.

Small scale interventions, such as shading or screens for mosquitoes, can be easily implemented to alleviate some housing deficiencies. Housing design manuals and guidelines should be developed for high-density settings to inform improvements for ventilation, lighting, layouts and other aspects. There needs to be a move away from community-level services in informal settlements and ensure that every household has access to basic amenities at home; COVID-19 highlights the deficiencies in a settlement level approach. Capacity building programmes are vital to build awareness of health and housing and safe construction practices, appropriate materials and low-cost interventions. Such programmes could form expert community groups that can bridge between the community and government at such times of distress, acting as the frontline workers to better implement and develop effective containment measures.

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Ethical approval

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Conflict of interest declaration

There are no conflicts of interest in the preparation of this manuscript.

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