COVID-19: Projecting the impact in Rohingya refugee camps and beyond

Summary

Balukhali Rohingya refugee camp. Mahmud Hossain Opu/Al Jazeera

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Background

There are over 300,000 confirmed cases of COVID-19, the infection caused by the newly emerged severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), globally. Forcibly displaced populations, especially those who reside in settlements with high density, poor access to water and sanitation, and limited health services, are especially vulnerable to a serious outbreak. Bangladesh, where 27 cases of COVID-19 have been confirmed, hosts almost 1 million Rohingya refugees from Myanmar in the Cox's Bazar district. Of these, approximately 600,000 refugees are concentrated in the Kutupalong-Balukhali Expansion Site. The capacity to meet the existing health needs of this population are already limited. An outbreak of COVID-19 within this population threatens to severely disrupt an already fragile situation.

In this study, we explore three potential scenarios using current available global data on COVID-19 combined with specific characteristics of the Rohingya refugees living in Kutupalong-Balukhali Expansion Site in Cox's Bazar, Bangladesh to estimate the number of infections, hospitalizations, and deaths that might be expected in each scenario. The primary aims of these analyses are to: 1) develop a baseline expectation of the possible infection burden, speed, and hospitalization capacity needed to respond to a COVID-19 epidemic; 2) use these findings to provide some recommendations to support ongoing preparedness planning by the Bangladesh government, United Nations agencies and other actors for a COVID-19 outbreak; and 3) apply lessons from this case study to refugees and other forcibly displaced persons globally.
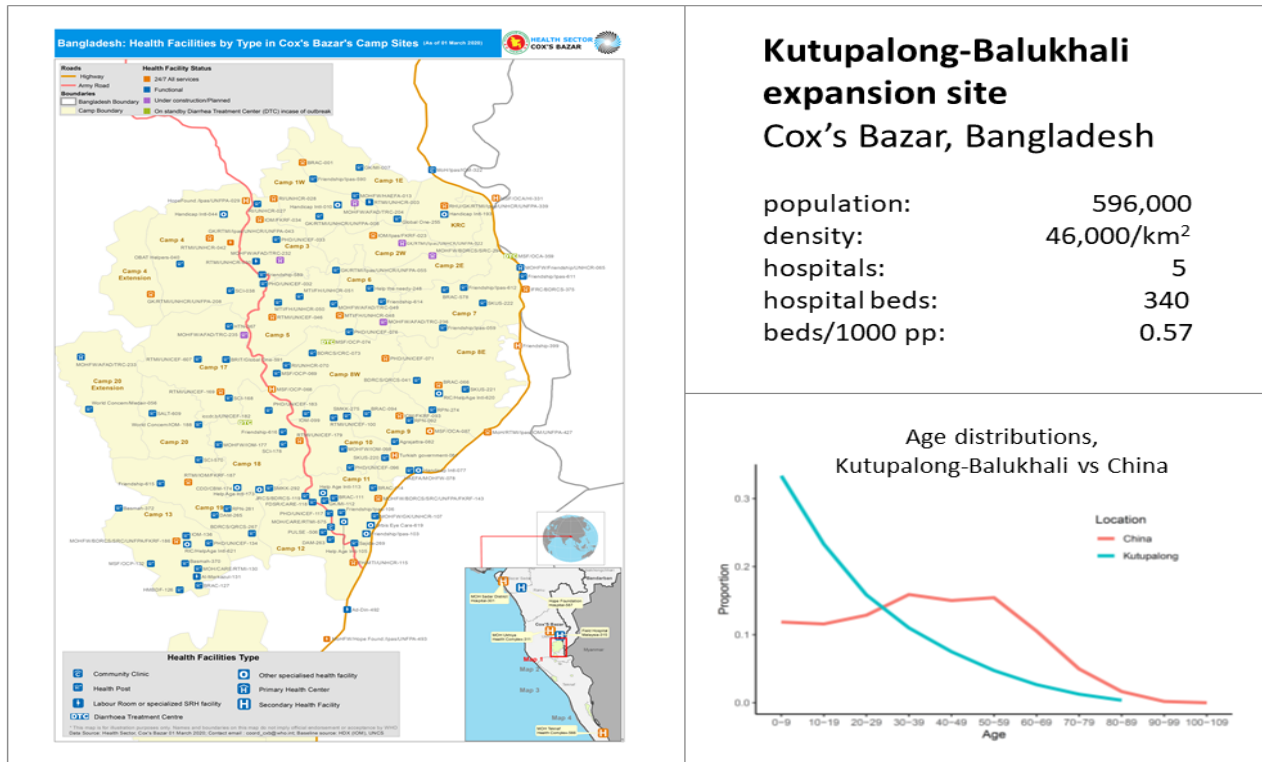
Figure 1. The Kutupalong-Balukhali Expansion Site: map (on the left); key figures (top right panel) and population age distributions in Kutupalong-Balukhali Expansion Site and China (bottom right panel).

Methods

To explore the potential impact of the introduction of SARS-CoV-2 virus on the Rohingya refugees in the Kutupalong-Balukhali Expansion Site, we used a stochastic disease transmission model with parameters derived from the literature. Given the high degree of uncertainty about this emerging disease, we considered three scenarios with different assumptions about the transmission potential of SARS-CoV-2 at this site. We used a stochastic Susceptible Exposed Infectious Recovered (SEIR) model to simulate transmission in this population. We simulated epidemics under three potential scenarios with different values of the basic reproductive number, R_0 : 1) a **low transmission scenario** based on transmission levels in many of the Chinese provinces with elevated isolation and control practices and an R_0 similar to influenza (R_0=1.5-2.0)[1]; 2) a **moderate transmission scenario** that mirrors estimates in early stages of the outbreak in Wuhan, China (R_0=2.0-3.0)[2]; and, 3) a **high transmission scenario** where we assume that R_0 is increased by a factor of 1.65 (R_0=3.3-5.0) compared to estimates from open community settings, as was observed during the 2017 diphtheria outbreak.[3] The R_0 in each of these scenarios falls within the 95% confidence interval of the current range of estimates for COVID-19.[4] We assumed an Erlang distributed serial interval (time between the onset of symptoms in infector-infectee pairs) with a mean of 6 days (standard deviation = 4.2).[5]

We estimated the number of infections, hospitalizations, deaths, and health care needs that might be expected. To account for population-specific severity, we estimated an age-adjusted proportion of infections that we might expect to develop into severe disease.

Results

Even in a low transmission scenario, a large-scale outbreak was highly likely after a single introduction of the virus into the camp, with 65% of the simulations leading to an outbreak of at least 1,000 infections and increasing to 82% and 93% in moderate and high transmission scenarios, respectively. On average, in the first 30 days of the outbreak following a single introduction, we expect between 119 and 504 infections in the low and high transmission scenarios, respectively; and between 424,798 and 591,349 in 12 months. Hospitalization needs exceeded the existing bed capacity after 58-139 days (depending on the scenario). Given the relatively young age distribution in Kutupalong-Balukhali camps, we estimate that the proportion of infections that lead to severe disease and hospitalization could be approximately half of what we estimate for China (3.6% vs 6.6%). However, even in the low transmission scenario, we project that there could be 1,515 (1,285-1,773) deaths at 12 months, rising to 2,109 (95% CI, 1,699-2,571) with the high scenario.

Table: Cumulative infections, hospitalizations, intensive care unit admissions, and deaths at 1, 3, and 12 months following successful introduction of simulations where an outbreak occurs.

Transm-ission Scenario	1 month				3 months				12 months			
	Infections	Hospital-izations	Intensive Care Unit	Deaths	Infections	Hospital-izations	Intensive Care Unit	Deaths	Infections	Hospital-izations	Intensive Care Unit	Deaths
Low (R_0=1.5-2.0)	119 (105-134)	3 (2-4)	0 (0-1)	0 (0-0)	3,014 (153-13,692)	84 (3-364)	16 (0-69)	3 (0-15)	424,798 (382,725-476,302)	15,150 (13,014-17,551)	3,721 (3,198-4,317)	1,515 (1,285-1,773)
Moderate (R_0=2.0-3.0)	168 (101-391)	4 (0-11)	1 (0-3)	0 (0-1)	99,359 (975-419,741)	2,775 (20-13,442)	526 (4-2,737)	92 (0-567)	543,637 (498,627-570,995)	19,424 (16,529-22,659)	4,775 (4,040-5,585)	1,945 (1,637-2,287)
High (R_0=3.3-5.0)	504 (107-2070)	9 (1-38)	1 (0-5)	0 (0-1)	547,083 (289,130-595,983)	18,931 (7,184-24,990)	4,469 (1,182-6,101)	1,498 (137-2,412)	591,349 (582,107-596,832)	21,099 (17,166-25,534)	5,193 (4,246-6,325)	2,109 (1,699-2,571)
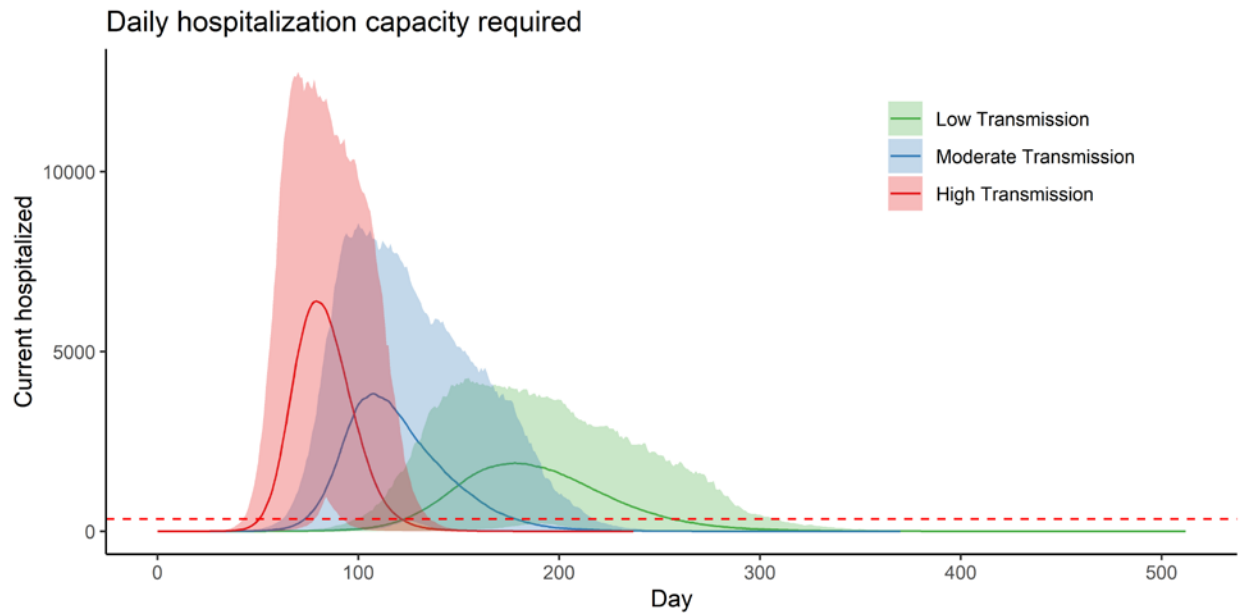
Figure 2. Hospitalization capacity requirements for an outbreak of SARS-CoV-2 in the Kutupalong-Balukhali camps, under three transmission scenarios: low transmission (R_0 =1.5-2.0), moderate transmission (R_0=2.0-3.0), and high transmission (R_0=3.3-5.0). The dashed red line represents the 340-bed surge capacity currently believed to exist in the population.

Discussion

Rohingya Refugees in Kutupalong-Balukhali Expansion Site

While COVID-19 planning between the government of Bangladesh and international organizations is currently ongoing, such an epidemic in a refugee setting with high population density, poor baseline health status, limited ability to isolate infected individuals, and inadequate capacity to surge health infrastructure and workforce remains a major challenge. Similar issues exist for the national population in Cox's Bazar, given Bangladesh's limitations in adequately responding to such an epidemic for their own population. A significant amount of medical infrastructure and health capacity will be needed to respond to a COVID-19 outbreak in the camps, yet outside support will be difficult to find during a pandemic. Task shifting among existing health personnel and repurposing of other professionals such as teachers will need to be undertaken, requiring enhanced training. Isolation of suspected cases will be difficult given the limited number of hospital beds and available land in the site. Novel and untested isolation strategies of the elderly and medically vulnerable persons in the site may need to be considered. The use of facemasks among those most at risk could be considered. Diversion of limited health resources from existing health services to the epidemic response may cause an increase in mortality due to disease that could normally be treated by the health system. Realistic and detailed planning scenarios should be finalized and shared widely with partners.

Implications for Refugees Globally

The challenges discussed in this particular setting are not unique to Bangladesh or the Rohingya. Rather, they expose more fundamental issues of how to plan and respond to refugees and internally displaced persons (IDPs) living in high density camps and out-of-camp settings globally. During exceptional times, it is not unreasonable for governments to take extraordinary measures to protect their citizens. Therefore, while difficult for governments to state openly at this point, it is likely that most countries will restrict access to their hospitals to nationals only, particularly when there are large numbers of refugees in the same geographical area. This leaves refugees and other non-nationals, such as undocumented migrants, in an extremely precarious position. While there is no simple recommendation to address this serious issue, it is important to acknowledge the likelihood that host countries' hospitals will be closed to refugees in most camp-like settings, and consequently, clear and detailed COVID-19 plans that explicitly state how existing programs will be adapted according to their context need to be developed and shared immediately. Such adaptive programming will be an iterative process, as these are exceptional circumstances, and we will all have to learn by trying different approaches and then document the results. A portal should be established by the United Nations High Commissioner for Refugees and the global health cluster, led by the World Health Organization, to document how such adaptive programs for refugees and IDPs are being undertaken in different contexts. Finally, refugees face discrimination and are often falsely accused of spreading disease. We are concerned that the COVID-19 pandemic, while completely unrelated to being a refugee, could be used as an excuse to take retribution against refugees, as well as other vulnerable groups such as IDPs and undocumented migrants. Such discriminatory actions would not only be morally wrong, it would jeopardize the effectiveness of containment and mitigation measures, as pandemics require planning and responses that do not discriminate by nationality and protect the health of the global population.

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