

## Humanitarian disaster for Rohingya refugees: impending natural hazards and worsening public health crises



The Rohingya people are the world's largest stateless population.<sup>1</sup> Violence towards the Rohingya in Myanmar from late August, 2017, caused the mass displacement<sup>2</sup> of 655 000 people from Rakhine State of Myanmar to the southeastern hilly region of Bangladesh, resulting in what UNOCHA describes as the "fastest growing refugee crisis in the world".<sup>3</sup> The majority are residing in overcrowded temporary shelters, with Cox's Bazar and Bandarban hosting one of the densest concentrations of refugees; there are 954 500 people in total at the time of writing.<sup>4</sup> Existing challenges in addressing poor access to health services, acute food shortages, and scarce shelter are compounding growing public health needs.<sup>5</sup> The likelihood of a public health emergency from infectious diseases is high in this vulnerable population, with already very low vaccination coverage, high prevalence of malnutrition,<sup>6</sup> and poor sanitation and water conditions. Vaccine-preventable diseases such as measles, polio, and tetanus are on the increase and diphtheria has recently re-emerged. As of Feb 14, 2018, there were 5710 suspected diphtheria cases and 35 deaths.<sup>7</sup>

Against this background exists the further challenge of the approaching monsoon season, which runs from May to September. The refugee camps are highly susceptible to rainfall-triggered landslides, flash flooding, and cyclones.<sup>8</sup> At their worst, cyclones can cause high mortality; for example, cyclone Nargis in the Bay of Bengal in 2008 killed an estimated 138 300 people.<sup>9</sup> The risk to the refugee population is high, as the camps are in predominantly low-lying areas vulnerable to flash flooding; the surrounding mud hillsides have been indiscriminately cut back to create rudimentary terraces for temporary shelters with no regard to the landslide hazard; and large areas of forest in the hills have been cut down to build makeshift shelters, further increasing the risk of landslides. The flooding will increase the risk of waterborne diseases and the landslides will cut road communications when transportation into the camps is already difficult. The overcrowded makeshift huts with poor sanitation and water supply, in the absence of multi-hazard alert systems and evacuation shelters, are also likely to contribute to an increase in disease incidence and demand on existing health-care facilities.

Disaster risk reduction (DRR) measures are essential to reduce the likely mortality and morbidity. DRR addresses prevailing levels of vulnerability and formulates measures to prevent, mitigate, and prepare for disasters. Essential DRR activities include an urgent need to conduct a rapid multi-hazard risk mapping of the refugee camps and surrounding areas, with identification of evacuation routes and a safe zone during emergencies. An effective landslide and flash-flooding early warning system for the refugees and host communities should be developed, and hill-cutting and cutting down of the forests should be prevented, with the generation of a risk-sensitive land-use plan. The essential infrastructure needs to be examined for structural resilience in relation to health-care, education, services, and relief facilities. Alongside this, adequate training needs to be provided for community volunteers and risk information disseminated amongst the refugees.

No disaster is natural. Vulnerability—a complex blending of social, economic, physical, cultural, environmental, and institutional aspects at local or community scale—is considered the primary component of DRR.<sup>10</sup> In this context, any decision to put the Rohingya refugees in greater risk has the potential to increase disaster vulnerability and the consequent effects on societal wellbeing. For example, two long-term solutions to the Rohingya crisis have been proposed. One is the return of refugees to Myanmar following governmental agreement with Bangladesh; however, this prospect seems remote. The second is to move refugees to an uninhabited low-lying island (Bhashan Char) off the coast of Bangladesh, but without adequate cyclone shelters or evacuation procedures and livelihood opportunities, this will probably lead to high mortality.

It is apparent that any environmental hazard in the region would profoundly affect the humanitarian response and would pose grave challenges to sufficient provision for health needs. An effective public health emergency response that integrates DRR with assessment of the immediate health needs, mortality and morbidity surveillance, and the implications of the destruction of the health, water, and sanitation infrastructure is essential. The Government of

Bangladesh plus the Inter-Sector Coordination Group, led by the International Organization for Migration, have a responsibility to act to prevent a worsening public health crisis in the region, as a result of natural hazards. By developing and strengthening the DRR components of the humanitarian response to the Rohingya refugee crisis, the severity of a disaster from a natural hazard can be mitigated and preventable life loss minimised.

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- 1 UNHCR. "This is our home". Stateless minorities and their search for citizenship. November, 2017. <http://www.unhcr.org/ibelong/stateless-minorities/> (accessed March 15, 2018).
- 2 The Office of the United Nations High Commissioner for Human Rights (OHCHR). Myanmar Rohingya abuses may be crimes against humanity, UN rights experts warn. 2017. <http://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=22196&LangID=E> (accessed March 15, 2018).
- 3 UNOCHA. Rohingya refugee crisis. <https://www.unocha.org/rohingya-refugee-crisis> (accessed Jan 8, 2018).
- 4 The office of the United Nations High Commissioner for Refugees (UNHCR). Operational update: Bangladesh (27 December 2017–7 January 2018). 2018. <https://data2.unhcr.org/en/documents/download/61561> (accessed Jan 15, 2018).
- 5 Pocock N, Mahmood S, Zimmerman C, Orcutt M. Imminent health crises among the Rohingya people of Myanmar. *BMJ* 2017; **359**: j5210.
- 6 UN Children's Report. Malnutrition rates among Rohingya refugee children in Bangladesh appear to be at least double earlier estimates. 2017. <https://reliefweb.int/report/bangladesh/malnutrition-rates-among-rohingya-refugee-children-bangladesh-appear-be-least> (accessed March 15, 2018).
- 7 Bangladesh Humanitarian Situation Report No. 23 (Rohingya influx), UNICEF Report from 18 February. 2018. <https://reliefweb.int/report/bangladesh/bangladesh-humanitarian-situation-report-no23-rohingya-influx-18-february-2018> (accessed Feb 21, 2018).
- 8 Ahmed B. Landslide susceptibility modelling applying user-defined weighting and data-driven statistical techniques in Cox's Bazar Municipality, Bangladesh. *Nat Hazards* 2015; **79**: 1707–37.
- 9 The International Federation of Red Cross and Red Crescent Societies (IFRC). 2011 Myanmar: Cyclone Nargis 2008 facts and figures. 2011. <http://www.ifrc.org/en/news-and-media/news-stories/asia-pacific/myanmar/myanmar-cyclone-nargis-2008-facts-and-figures/> (accessed Jan 15, 2018).
- 10 Wisner B, Blaikie P, Cannon T, Davis I. At risk: natural hazards, people's vulnerability and disasters. Oxon: Routledge, 2004.