

## VIEWPOINT

## Managing COVID-19 in Low- and Middle-Income Countries

**Joost Hopman, MD, PhD, DTMH**

Radboudumc Center for Infectious Diseases, Department of Medical Microbiology, Radboud University Medical Center, Nijmegen, the Netherlands; and Médecins Sans Frontières, Amsterdam, the Netherlands.

**Benedetta Allegranzi, MD, DTMH**

Infection Prevention and Control Technical and Clinical Hub, Department of Integrated Health Services, World Health Organization, Geneva, Switzerland; and Institute of Global Health, University of Geneva, Geneva, Switzerland.

**Shaheen Mehtar, MBBS, MD (Lon)**

Infection Control Africa Network, Cape Town, South Africa.



Viewpoint

#### Corresponding

**Author:** Joost Hopman, MD, PhD, DTMH, Radboudumc Center for Infectious Diseases, Department of Medical Microbiology, Radboud University Medical Center, Geert Grooteplein 10, Postbus 9101, 6500 HB, Nijmegen, the Netherlands (joost.hopman@radboudumc.nl).

jama.com

**The public health response** to coronavirus disease 2019 (COVID-19) in China has illustrated that it is possible to contain COVID-19 if governments focus on tried and tested public health outbreak responses.<sup>1,2</sup> Isolation, quarantine, social distancing, and community containment measures were rapidly implemented. In China, patients with COVID-19 were immediately isolated in designated existing hospitals, and new hospitals were rapidly built to manage the increasing numbers of cases in the most affected areas. Home quarantine for contacts was initiated and large gatherings were canceled. Additionally, community containment for approximately 40 million to 60 million residents was instituted. A significant positive association between the incidence of COVID-19 cases and mortality was apparent in the Chinese response.<sup>3</sup> That is, the rapid escalation in the number of infections in China had resulted in insufficient health care resources, followed by an increase in mortality.

The association of mortality with health care resources should provide guidance for resource-limited regions on how and when to prepare for possible local outbreaks.<sup>3</sup> In addition, lessons learned from the 2003 severe acute respiratory syndrome coronavirus (SARS-CoV) outbreak geared toward strengthening of public health systems will be helpful.

#### COVID-19 Preparedness in Africa

Leaders have 2 important responsibilities in times of crisis: to solve the immediate problem and keep it from happening again.<sup>4</sup> An African task force for coronavirus preparedness and response (AFTCOR) has been established,

## The COVID-19 outbreak has again demonstrated the importance of basic infection prevention and control measures and the importance of having these minimum requirements in place.

focusing on 6 work streams: laboratory diagnosis and subtyping; surveillance, including screening at points of entry and cross-border activities; infection prevention and control in health care facilities; clinical treatment of people with severe COVID-19; risk communication; and supply chain management and stockpiles.<sup>5</sup> Should COVID-19 spread rapidly in Africa, most countries will not be able to afford large-scale diagnostics, although AFTCOR could increase this capacity to more than 40 African countries. Therefore, in the absence of testing, triage based on clinical case definition or presumptive diagnosis should be prioritized.

#### Critical Care

At the height of the Chinese COVID-19 outbreak, the number of patients that required ventilatory support out-

numbered the available intensive care unit (ICU) beds.<sup>6</sup> General beds were rapidly converted to ICU beds and general hospitals were converted to critical care hospitals; additional physicians and nurses trained in critical care medicine were transferred to the most affected area. In Africa, ICU beds and personnel trained in critical care are limited to tertiary hospitals, as assessed in the Republic of The Gambia; therefore, mortality associated with COVID-19 is likely to exceed the reported case fatality rate of 2.3%.<sup>7</sup> Furthermore, it is debatable whether low- and middle-income countries (LMICs) can fund the additional cost of critical care units from their limited health budgets.

#### Minimum Requirements for Infection Prevention and Control

Based on the World Health Organization (WHO) core components, the WHO infection prevention and control (IPC) minimum requirements are standards that should be in place at both national and health facility levels to provide minimum protection and safety to patients, health care workers, and visitors.<sup>8</sup> The minimum requirements constitute the initial starting point for building additional critical elements of the IPC core components in a stepwise manner based on the local conditions. The COVID-19 outbreak has again demonstrated the importance of basic IPC measures and the importance of having these minimum requirements in place.

The disruption of supply chains and depletion of stock (such as medical supplies and equipment) in both high- and low-resource settings has catapulted IPC core component 8 (built environment, materials, and equipment for IPC) to daily front page headlines in the popular press and social media. Panic buying and irrational use of personal protective equipment (PPE) has led to inadequate supplies of N95 respirators, and these shortages will have potentially devastating consequences for multidrug-resistant/extreme drug-resistant tuberculosis management in LMICs. To prevent shortages of essential PPE for the COVID-19 response, governments should give clear guidance on the use of PPE and act now to secure adequate supplies and stocks in case the outbreak spreads to these countries. Regional production of medical supplies should be considered for all continents to reduce the risks of shortages of PPE at crucial times.

#### Influence of Climate and Seasons

Most cases of COVID-19 linked with local transmission have been identified in countries located in the northern hemisphere, which are in the winter "flu" season. Similarly, the SARS-CoV global outbreak in February 2003 did not affect Africa or South America on a large

scale, suggesting that respiratory viruses spread more effectively in the winter and, therefore, the southern hemisphere will be affected later in the year, if at all. Climate-specific cultural differences (living more outdoors than indoors), the effect of UV light on the survival of the virus on surfaces, immunological differences of the population (innate immunity), preexposure with coronaviruses, or the higher temperatures could all have contributed. To date, all identified cases of COVID-19 in Africa originated from Europe and not from China.

### Refugees and Conflict Zones

According to estimates from the United Nations High Commissioner for Refugees (UNHCR), the United Nations refugee agency, there are more than 41 million internally displaced people and 25 million displaced refugees globally, many of whom are living in LMICs. Large-scale refugee camps are situated in countries at risk for COVID-19, and these countries have limited resources to increase preparedness measures. Known comorbidities for COVID-19, such as cardiovascular disease, diabetes, chronic respiratory disease, hypertension, and cancer, are often not properly controlled under these conditions. Health care systems in these camps are weak and access to health care facilities is limited<sup>9</sup>; thus, COVID-19 could have catastrophic consequences in these camps. Managing noncommunicable diseases and reducing the risk factors for COVID-19 in refugee camps is feasible, as was shown in a model of care for diabetes and hypertension by Médecins Sans Frontières in a Shatila refugee camp.<sup>10</sup> Furthermore, triage and the implementation of minimum

WHO IPC requirements should be initiated as part of COVID-19 preparedness in the existing health care facilities.

### Media Partnerships

The West African (2014-2016) and Democratic Republic of the Congo (2019-2020) Ebola responses have demonstrated the negative effect of media resulting in suspicion of IPC measures and stigmatizing of patients. Both are crucial factors in public health responses. Social media can, and should, support public health responses both in preparedness and controlling the outbreak by teaming up with government in providing consistent, simple, and clear messages. It is evident how quickly both positive and negative messaging can influence the public. For example, images of spraying the environment with disinfectants should not be published to prevent misinformation. Correct, short, and motivational messages for communities are pivotal to support the acceptance and support of COVID-19-specific IPC measures and quarantine legislation. In countries in which culturally appropriate messages, such as daily briefings, are delivered to the public, simple health messaging has greatly improved the confidence of the public in the government efforts to curtail the spread of this virus.

### Conclusions

China has illustrated that the COVID-19 pandemic can be limited when public health outbreak response strategies and tactics are implemented early. In LMICs, IPC programs must be strengthened by ensuring that at least minimum requirements for IPC<sup>8</sup> are in place as soon as possible, and media partnerships should be created to prevent societal fear.

#### ARTICLE INFORMATION

**Published Online:** March 16, 2020.  
doi:10.1001/jama.2020.4169

**Conflict of Interest Disclosures:** None reported.

**Disclaimer:** The opinions expressed herein reflect the collective views of the coauthors and do not necessarily represent the official position of Radboud University Medical Center, Médecins Sans Frontières, Infection Control Africa Network, or the World Health Organization. The World Health Organization takes no responsibility for the information provided or the views expressed in this article.

#### REFERENCES

1. Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. *JAMA*. Published online February 24, 2020. doi:10.1001/jama.2020.2648
2. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19). World Health Organization; 2020. <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>
3. Ji Y, Ma Z, Peppelenbosch MP, Pan Q. Potential association between COVID-19 mortality and health-care resource availability. *Lancet Glob Health*. Published online February 25, 2020. doi:10.1016/S2214-109X(20)30068-1
4. Gates B. Responding to Covid-19: a once-in-a-century pandemic? *N Engl J Med*. Published online February 20, 2020. doi:10.1056/NEJMp2003762
5. Nkengasong JN, Mankoula W. Looming threat of COVID-19 infection in Africa: act collectively, and fast. *Lancet*. Published online February 27, 2020. doi:10.1016/S0140-6736(20)30464-5
6. Xie J, Tong Z, Guan X, Du B, Qiu H, Slutsky AS. Critical care crisis and some recommendations during the COVID-19 epidemic in China. *Intensive Care Med*. Published online March 2, 2020. doi:10.1007/s00134-020-05979-7
7. Touray S, Sanyang B, Zandrow G, et al. An assessment of critical care capacity in the Gambia. *J Crit Care*. 2018;47:245-253. doi:10.1016/j.jcrc.2018.07.022
8. Minimum requirements for infection prevention and control (IPC) programmes. World Health Organization website. Accessed March 12, 2020. <https://www.who.int/infection-prevention/publications/core-components/en/>
9. Roberts B, Patel P, McKee M. Noncommunicable diseases and post-conflict countries. *Bull World Health Organ*. 2012;90(1):2. doi:10.2471/BLT.11.098863
10. Kayali M, Moussally K, Lakis C, et al. Treating Syrian refugees with diabetes and hypertension in Shatila refugee camp, Lebanon: Médecins Sans Frontières model of care and treatment outcomes. *Confl Health*. 2019;13:12. doi:10.1186/s13031-019-0191-3