



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

- 10 Cardiac Surgery Intersociety Alliance. Call for proposals to be a pilot site for CSIA supported programs. *Asian Cardiovasc Thorac Ann* 2019; **27**: 339–40.
- 11 Zilla P, Bolman RM 3rd, Boateng P, Sliwa K. A glimpse of hope: cardiac surgery in low- and middle-income countries (LMICs). *Cardiovasc Diagn Ther* 2020; **10**: 336–49.
- 12 Brainin M, Sliwa K, on behalf of the World Stroke Organization and World Heart Federation. WSO and WHF joint position statement on population-wide prevention strategies. *Lancet* 2020; **396**: 533–34.
- 13 Madhi SA, Grey G, Ismail N, et al. COVID-19 lockdown in low-to-middle-income countries: success against COVID-19 at the price of greater costs. *S Afr Med J* 2020; **1110**: 724–26.
- 14 Thienemann F, Pinto F, Grobbee DE, et al. World Heart Federation briefing on prevention: coronavirus disease 2019 (COVID-19) in low-income countries. *Global Heart* 2020; **15**: 31.
- 15 Hofman K, Madhi S. The unanticipated costs of COVID-19 to South Africa's quadruple disease burden. *S Afr Med J* 2020; **110**: 698–99.

## Leveraging the advances in HIV for COVID-19



The COVID-19 pandemic has led to accelerated research efforts globally and highlighted the importance of community engagement and leadership in the COVID-19 response. To achieve these objectives, partnerships between science, government, and affected communities are crucial, but building these rapidly presents major challenges. In the past months, we have also seen how advances in confronting the global HIV epidemic have had a positive impact on the COVID-19 response.

Accessible, rapid point-of-care diagnostics were developed to increase uptake of HIV testing and shift to a model of self-testing and community-led programmes. These technologies are allowing for rapid implementation of diagnostic capacity for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) PCR testing in low-income and middle-income countries (LMICs).<sup>1</sup> Strategies used to isolate and manufacture broadly neutralising antibodies for HIV have been applied to SARS-CoV-2 and are entering clinical trials.<sup>2</sup> Although potential SARS-CoV-2 antivirals are still only in early stage research and development, eventually, combination antivirals might have a role for treatment and prevention of COVID-19, as pioneered for HIV.<sup>3,4</sup> Novel vaccine platforms, including nucleic acid-based vaccines such as DNA and RNA and live vectors, again developed for HIV, are now in phase 2 and 3 clinical trials for COVID-19.<sup>5–7</sup>

As with HIV, COVID-19 has had a major impact on women, with higher risks of infection for women in some settings, such as health care, and a disproportionate economic impact on women as a consequence of school closures and women being primary caregivers.<sup>8</sup> Furthermore, given the high risk of infection and adverse outcomes from COVID-19 in Black and minority ethnic groups<sup>9</sup> and other vulnerable populations, the lessons of community empowerment and advocacy from HIV could help inform the response to COVID-19. Lessons learnt from scaling up antiretroviral therapy to more

than 25 million people, including those with limited access to health care, and specifically to engage women will be applicable to rolling out any potential COVID-19 vaccines and treatments. If COVID-19 vaccines are eventually deployed, there are likely to be challenges with mass vaccination programmes but empowering marginalised groups and using a human rights approach will be central to success.

The accelerated agenda of COVID-19 research will benefit the future of HIV testing, treatment, and prevention. There will be a continued expansion of the research infrastructure needed to work with both viruses, specifically high containment laboratories and animal facilities. Diagnostic, antiviral, and vaccine companies are involved in COVID-19 research, including companies that have not previously engaged in viral infectious disease.<sup>10</sup> Given the scale of testing needed in the COVID-19 pandemic, the introduction of testing capabilities in LMICs could also be used for HIV and tuberculosis.<sup>1</sup> These overlapping epidemics represent an opportunity to extend cross-disciplinary research into the integrated service delivery for HIV, tuberculosis, and COVID-19, and



aim to achieve sustained benefits of prevention and treatment.<sup>11</sup> Finally, the accelerated pathways to develop COVID-19 vaccines resulting in clinical trials of multiple candidates within months of discovery of SARS-CoV-2 should be applied to challenges such as developing an HIV vaccine.

In the short term, there have been some adverse impacts of COVID-19 on HIV research and services, as for many other diseases. Nearly all HIV clinical trials globally have halted or slowed enrolment to appropriately maximise safety for participants, and health services have seen reductions in screening, laboratory monitoring, and collections of medications, highlighting the fragility of health systems, especially in LMICs. Many HIV-focused laboratory-based research groups have moved to work on SARS-CoV-2. Finally, a decrease in resourcing for infectious diseases research, together with the economic impacts of COVID-19, could lead to less funding for HIV research and ongoing disruption of the provision of HIV and related services.<sup>12</sup>

Yet the transformative advances that are being achieved in the response to COVID-19 could be harnessed to establish strategic and strong collaborations for the HIV and COVID-19 scientific communities. The International AIDS Society (IAS) achieved this at the virtual IAS COVID-19 Conference in July, 2020. A similar format will be used in future conferences related to HIV prevention and COVID-19 vaccines, such as the HIV Research for Prevention Conference in early 2021. Incentives are also needed for the public, private, and philanthropic sectors to maintain their interest and leadership in developing solutions for infectious diseases, not only during a pandemic but also during interpandemic periods. Finally, we should ensure that the global health alliances that are currently forming in relation to COVID-19 vaccines, such as the COVID-19 Vaccine Global Access Facility, are maintained to deliver solutions to ongoing global health challenges.

International solidarity and collaboration have been the hallmarks of the HIV response globally. We will need even more widespread collaborative efforts to end the COVID-19 pandemic. Concerns about access to potential COVID-19 vaccines and therapeutics are highly relevant for LMICs and for vulnerable populations globally.<sup>13</sup> Arguably, the most important lesson of the HIV response is that no country could go it alone in bringing this deadly virus to its current state of a chronic

treatable condition. We need to heed this lesson to avoid nationalistic responses that jeopardise global access to solutions and cannot succeed against a global pandemic.

JHM reports that his institution had received funding to conduct clinical trials from Gilead Sciences, ViiV Healthcare, Merck Sharp & Dohme Australia. JFH reports personal fees paid to her institution from Gilead Sciences, ViiV Healthcare, and Merck Sharp & Dohme Australia. SRL reports grants from the National Health and Medical Research Council of Australia, the National Institutes of Health; American Foundation for AIDS Research, Gilead Sciences, Merck, ViiV, Leidos, the Wellcome Trust, Australian Centre for HIV and Hepatitis Virology Research, Melbourne HIV Cure Consortium, Department of Health and Human Services, and the Medical Research Future Fund. AK, L-GB, and CB declare no competing interests.

**James H McMahon, Jennifer F Hoy, Adeeba Kamarulzaman, Linda-Gail Bekker, Chris Beyrer, \*Sharon R Lewin**  
sharon.lewin@unimelb.edu.au

Department of Infectious Diseases, Alfred Hospital and Monash University, Melbourne, VIC, Australia (JHM, JFH, SRL); Department of Infectious Diseases, Monash Medical Centre, Melbourne, VIC, Australia (JHM); Department of Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia (AK); The Desmond Tutu HIV Centre, University of Cape Town, Cape Town, South Africa (L-GB); Center for Public Health and Human Rights, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA (CB); The Peter Doherty Institute for Infection and Immunity, The University of Melbourne and Royal Melbourne Hospital, Melbourne, VIC, Australia (SRL); and Victorian Infectious Diseases Service, Royal Melbourne Hospital at the Peter Doherty Institute for Infection and Immunity, Melbourne, 3000 VIC, Australia (SRL)

- Loeffelholz MJ, Alland D, Butler-Wu SM, et al. Multicenter evaluation of the Cepheid Xpert Xpress SARS-CoV-2 test. *J Clin Microbiol* 2020; **128**: 104426.
- Yang X, Yu Y, Xu J, et al. Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. *Lancet Respir Med* 2020; **8**: 475–81.
- Beigel JH, Tomashek KM, Dodd LE, et al. Remdesivir for the treatment of Covid-19—preliminary report. *N Engl J Med* 2020; published online May 22. <https://doi.org/10.1056/NEJMoa2007764>.
- Boulware DR, Pullen MF, Bangdiwala AS, et al. A randomized trial of hydroxychloroquine as postexposure prophylaxis for Covid-19. *N Engl J Med* 2020; **383**: 517–25.
- Graham BS. Rapid COVID-19 vaccine development. *Science* 2020; **368**: 945–46.
- Folegatti PM, Ewer KJ, Aley PK, et al. Safety and immunogenicity of the ChAdOx1 nCoV-19 vaccine against SARS-CoV-2: a preliminary report of a phase 1/2, single-blind, randomised controlled trial. *Lancet* 2020; **396**: 467–78.
- Jackson LA, Anderson EJ, Roupael NG, et al. An mRNA vaccine against SARS-CoV-2—preliminary report. *N Engl J Med* 2020; published online July 14. <https://doi.org/10.1056/NEJMoa2022483>.
- Wenham C, Smith J, Morgan R, et al. COVID-19: the gendered impacts of the outbreak. *Lancet* 2020; **395**: 846–48.
- Williamson EJ, Walker AJ, Bhaskaran K, et al. OpenSAFELY: factors associated with COVID-19 death in 17 million patients. *Nature* 2020; **584**: 430–36.
- Baum A, Fulton BO, Wloga E, et al. Antibody cocktail to SARS-CoV-2 spike protein prevents rapid mutational escape seen with individual antibodies. *Science* 2020; published online June 15. <https://doi.org/10.1126/science.abd0831>.
- Bekker LG, Alleyne G, Baral S, et al. Advancing global health and strengthening the HIV response in the era of the Sustainable Development Goals: the International AIDS Society–Lancet Commission. *Lancet* 2018; **392**: 312–58.
- Jewell BL, Mudimu E, Stover J, et al. Potential effects of disruption to HIV programmes in sub-Saharan Africa caused by COVID-19: results from multiple mathematical models. *Lancet HIV* 2020; **7**: e629–40.
- Yamey G, Schäferhoff M, Hatchett R, Pate M, Zhao F, Kennedy McDade K. Ensuring global access to COVID-19 vaccines. *Lancet* 2020; **395**: 1405–06.

For HIV Research for Prevention  
see [www.hivr4p.org](http://www.hivr4p.org)