

An outbreak of COVID-19 caused by a new coronavirus: what we know so far

Information on COVID-19 and its impact is being updated constantly and Australia must continue to be prepared at all levels of the health care system

Editor's note: This is an update of an article originally published in InSight+ on 27 January 2020 (<https://insightplus.mja.com.au/2020/3/the-2019-novel-coronavirus-what-do-we-know-so-far/>).

An outbreak of a novel coronavirus, now formally named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and causing coronavirus disease 2019 (COVID-19), emerged in the city of Wuhan in Hubei province in central China in December 2019. The first cases were noted as a cluster of patients with pneumonia who were all linked to a live animal market, and testing found the presence of a previously unknown coronavirus. Coronaviruses are a group of viruses that affect both animals and humans, and several (OC43, 229E, HKU1 and NL63) are a cause of the common cold.^{1,2} However, two coronaviruses have previously caused significant outbreaks associated with more severe disease: the SARS coronavirus in 2002–2003 and the Middle East respiratory syndrome coronavirus that emerged in 2012.^{1,2} Chinese authorities and researchers should be commended for their rapid sharing of viral sequences which enabled laboratories worldwide to develop diagnostic tests within weeks of discovery of the pathogen.³ An Australian laboratory subsequently isolated the virus from a clinical sample (the first to do so outside of China), and rapidly shared this virus with relevant global agencies, further aiding diagnostic, therapeutic and vaccine development efforts.

Information on the new virus and its impact is being updated constantly. We know that SARS-CoV-2 can cause severe disease, although active surveillance of contacts is required to define the milder end of the disease spectrum and to estimate the true hospitalisation and case fatality ratio. The cases reported to date suggest that most are older adults; it is currently unclear whether comorbidities reflect the age group affected or whether they are risk factors for severe disease.^{4,5}

Early studies using data before the institution of public health interventions in China suggest that SARS-CoV-2 is as transmissible as SARS coronavirus and probably more transmissible than influenza viruses.^{6,7} The timing of infectiousness relative to symptom onset is a particularly important parameter with implications for public health control. While reports suggest that asymptomatic infection and transmission may result from minimally symptomatic cases, the contribution of this to transmission is not yet known.⁸ Careful analysis of early data suggests that the mean incubation period is 6 days, with a range of up to 14 days.⁹ Reports of large outbreaks, particularly associated with hospitals and closed communities, raise the possibility of “superspreading” events, a feature of previous coronavirus outbreaks.¹⁰ The importance of infection control is also reinforced



by a report that 41% of cases in Wuhan were acquired nosocomially (including 40 health care workers and 17 patients).⁴

As at 26 February 2020, there were 23 confirmed cases of COVID-19 in Australia, across five jurisdictions. Although reported case numbers in China are slowing, large outbreaks on a cruise ship in Japan, and in South Korea, Iran and Italy are concerning and highlight our interconnected world. However, it is likely that this will change in the days or weeks ahead. Although absolute case numbers are small in Australia, the public health, political and societal ramifications have already been considerable, ranging from travel restrictions on non-Australians coming from China, the use of offshore and remote quarantine facilities, and disturbing reports of racism against members of our Asian community (<https://insightplus.mja.com.au/2020/5/coronavirus-no-place-for-racism-xenophobia/>).

For clinicians, the main considerations are the clinical management of patients with suspected novel coronavirus infection, but also systems to facilitate the identification of potential cases and to permit safe assessment and referral as appropriate. The experience with SARS and Middle East respiratory syndrome also reinforces the need for health services (both internationally and within Australia) to promptly identify patients with suspected infection and implement effective infection control measures. Based on clinical features, it can be difficult to distinguish patients with COVID-19 from those with other respiratory viral infections, including influenza. Although the original case series described fever in almost all patients,⁵ further experience has noted cases with only respiratory symptoms, and even a small proportion with gastrointestinal symptoms.⁴ This has resulted in constant changes to case definitions, initially limited to those with febrile respiratory infections from Wuhan,¹¹ but now including the full spectrum of

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1 Useful sources of official information*

Australian information

- Australian Government Department of Health: <https://www.health.gov.au/health-topics/novel-coronavirus>
- Smart Traveller: <https://www.smarttraveller.gov.au/destinations/asia/china>
- Jurisdictional health department sites

International situation reports and resources

- World Health Organization: <https://www.who.int/csr/don/12-january-2020-novel-coronavirus-china/en/>
- United States Centers for Disease Control and Prevention: <https://www.cdc.gov/coronavirus/2019-ncov/index.html>
- European Centre for Disease Prevention and Control: <https://www.ecdc.europa.eu/en/coronavirus>

* Websites viewed February 2020.

illness in patients from a broader geographical area. Clinicians should refer to current information to guide testing and management (Box 1).

Nucleic acid assays for SARS-CoV-2 are available at several Australian reference laboratories and commercial tests are expected in the near future for diagnostic laboratories. Current World Health Organization advice is to test patients who meet the case definition for COVID-19, regardless of whether another respiratory virus is detected, as co-infections may occur.¹³ However, the need to maintain a low threshold of suspicion must be balanced with the capacity of laboratories to perform high throughput and timely tests.

Lessons of the past are instructive for Australia, particularly the experience in Canada with its similar federated government and comparable health care system. In 2003, an outbreak of SARS coronavirus in Toronto infected 438 people and caused 44 deaths, including many health care workers. Following this public health disaster, two important reviews were conducted: the National Advisory Committee on SARS and Public Health,¹⁴ and Ontario's SARS Commission.¹⁵ The former reinforced the need for a strong and adequately funded nationally coordinated public health and laboratory system and led to the establishment of the Public Health Agency of Canada.

The SARS Commission made detailed recommendations, including endorsing the "importance of the precautionary principle that reasonable efforts to reduce risk need not await scientific proof [which] was demonstrated over and over during SARS".¹⁵ It made recommendations regarding clear governance, preparing for the need for unexpected interventions (including the closure of three hospitals to control the outbreak), effective distribution of outbreak alerts and directives, the need for effective crisis communication, and the value of robust and timely surveillance. With the involvement of health care workers as cases, the Commission highlighted listen to frontline workers and unions and ensure a robust safety culture and effective infection control.

2 Major unresolved clinical and public health issues

Clinical

- Optimal samples for diagnostic testing (upper versus lower respiratory tract samples)
- Utility of existing and investigational antiviral agents
- Duration of infectiousness based on current nucleic acid testing, including requirement for repeat testing
- Host risk factors associated with poor clinical outcomes

Public health and control

- Sustainability of travel restrictions, and feasibility (if required) of other public health interventions, including social distancing and personal hygiene as outbreak control measures
- Quantitation of the spectrum of disease severity
- Optimal, yet pragmatic, infection control measures
- Utility of case and contact tracing in outbreak containment in low and high incidence settings

We have many more information (and misinformation) sharing tools than were available in 2003. It has been breathtaking to watch the scientific process unfold in almost real time. Rapid genomic sequencing and online databases are being used to generate and analyse primary data. Preprint servers and rapid review in traditional journals are quickly publishing research findings. Research centres and platforms are responding to rapidly collect data and evaluate interventions. Social media and traditional media platforms are disseminating public health messages and findings.

However, the fundamental structure of our public health care system remains unchanged, with the same channels of formal, sometimes protracted, communication and direction through a national network-based system of public health. It is too early to tell how this outbreak will unfold on a global scale, with many major unresolved clinical and public health issues (Box 2). In Australia, we need to continue to be prepared at all levels of the health care system, with a key tenet of this response being rapid and reliable communication. This should include advice to clinicians and patients on who should be tested, how and when testing should be performed, and how best to manage patients with suspected and confirmed infection. Australia has not been significantly challenged by the two previous zoonotic coronavirus outbreaks. However, current indications are that this new pathogen is more transmissible than previous coronaviruses. With cases reported in Australia, public health authorities, governments at all levels, researchers and clinicians, laboratories and the community need to continue to work together in a timely manner to ensure an effective response.

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