

# Communicable disease outbreaks

## Contact tracing

**Jeanette E Ward**

*The role of the general practitioner (GP) as the medical expert at the centre of Australia's multidisciplinary primary healthcare system is never more acute than when populations are threatened by a communicable disease epidemic. This series is a refresher covering key concepts. This third article focuses on contact tracing, fondly known as 'shoe-leather epidemiology'.*

**FOR ANY** communicable disease, there is a highly prescribed process for tracking down those who were exposed to the pathogen while the case was contagious. This vital task of contact tracing must occur for sporadic cases as well as for multiple cases during the early course of an outbreak.

Cases rarely knowingly spread their communicable disease. Some communicable diseases are characterised by high infectivity when the case is prodromal with non-specific symptoms or even when the case is asymptomatic. Indeed, some diseases are more communicable during the incubation period than during the illness.<sup>1</sup> By contrast, severe acute respiratory syndrome (SARS) cases were found to be contagious only when symptomatic.<sup>2</sup> However, the virus itself, SARS-CoV-1, could remain on surfaces touched by the case and remain viable enough on these contaminated surfaces to infect others ('fomite transmission').<sup>3</sup>

From the moment of their diagnosis, both confirmed and suspected cases with a communicable disease will be isolated for whatever period is necessary according to the known natural history of the disease to ensure they do not expose more people

to their infective state. Depending on the communicable disease, cases may also need specific clinical treatment if the risk of poor outcomes is high, or they may need close monitoring. However, it is important to recognise that those who are next most likely to be contagious with the communicable disease (and therefore unwittingly spreading it) are close contacts exposed to a case. This is the central objective of contact tracing: namely, to identify close contacts and quarantine them so that they are also away from the public and not spreading the disease. For some diseases, a lengthy period of quarantine is required for a close contact. If any contact subsequently develops disease, they are termed a 'secondary case' and represent 'local transmission' but do not signify 'community transmission' because the link back to a known case is clear.

Sometimes contacts should be tested immediately for the specific communicable disease. Testing guidelines will advise whether such testing is best targeted only at those who are symptomatic. In specific circumstances, there are also advantages to testing asymptomatic close contacts. Such testing is done to expedite the identification of current unrecognised cases among close contacts. It is not done to exclude the disease and free contacts from their due period of quarantine. Close contacts who do not test positive are still required to quarantine. However, close contacts who do test positive have been quickly identified as 'secondary cases'. By managing them as 'cases' in their own right, their close contacts also will be immediately traced and the same process repeated. Ring after ring of contacts are

relentlessly tracked down; those who are infectious cases are immediately isolated. Those at high risk by virtue of their exposure to a case are asked to quarantine.

In public health practice, contacts for each disease are precisely defined, usually distinguishing between 'close contacts' and 'casual contacts'. Making this distinction requires detailed knowledge of the specific disease pathology, including its mode of transmission from person to person, such as droplet, fomite, faecal-oral or airborne routes. The 'virulence' of a pathogen is the proportion of people with clinical disease who become severely ill or die. Its 'pathogenicity' is the proportion of infected people who develop clinical disease. If the latest epidemiological information is required, refer to the Series of National Guidelines (SoNGs)<sup>4</sup> or contact the local public health unit.

Contact tracing for every communicable disease must happen without disclosing the identity of the case. This guarantees the confidentiality that the case deserves as a human right as part of their own interaction with the healthcare system. Their identity and their test result is known by the person and their healthcare team, all of whom are bound by codes of conduct and professional ethics. If there is any risk of stigma or threats, as might be more likely with certain diagnoses, these adverse repercussions are also avoided with strict confidentiality.

Technical knowledge of the natural history of the communicable disease and its transmission informs the types of questions asked of the case about the activities in which they have taken part, places they have visited and people they have seen for the pertinent period during which they were infectious.

A list of putative contacts or locations is then compiled. Contact tracing rarely comprises a single phone call, and it is tailored to the disease. Contacts will usually have questions to be answered and anxieties to be alleviated. Two examples illustrate the purpose and process. Contact tracing in a case of measles must urgently identify those who have been exposed to a case while the case was infectious, assess their susceptibility to infection and implement post-exposure prophylaxis.<sup>5</sup> Cases are considered to be infectious from 24 hours prior to the onset of their prodromal symptoms until four days after the onset of their measles rash.<sup>5</sup> As measles is primarily airborne, contact tracing requires painstaking investigation to identify household contacts, waiting areas, work settings and, in the setting of a child case, children in the school or childcare centre. This is called ‘shoe-leather epidemiology’, referring to the past practice of public health officers wearing out their shoe leather from their walking from setting to setting.

Contact tracing for a case of invasive meningococcal disease is also urgent. Here, public health focuses on the subset of ‘higher-risk’ contacts who require clearance antibiotics or vaccination. The period of interest is exposure to the case from seven days prior to the onset of the case’s symptoms to the time the case has completed 24 hours of their own antibiotic treatment.<sup>6</sup> Transmission occurs by respiratory droplets from the upper respiratory tract.<sup>6</sup> Higher-risk contacts of a confirmed meningococcal case – such as family household, or those who kissed or had sexual relations with the case – represent not only an exposed network but similarly a carrier network. The purpose of clearance antibiotics prescribed for contacts through this intensive contact tracing is to eliminate *Neisseria meningitidis* promptly from any carrier within this contact network, reducing the risk of further transmission of what is putatively a more virulent strain.<sup>6</sup>

Depending on the arrangements in the state or territory, GPs may be required to trace contacts of a case with a notifiable communicable disease. In remote parts

of Australia, primary healthcare staff typically take responsibility for contact tracing in conjunction with an authorised public health officer located in a distant regional centre. A large outbreak might see public health teams arrive to support effective contact tracing. All notifiable diseases require thorough contact tracing to prevent further morbidity in the population.

*First published online 17 June 2020.*

#### Author

Jeanette E Ward MBBS, MHPEd, PhD, FAFPHM, FACHSM, FAICD, Adjunct Professor, Nulungu Research Institute, WA. jeanette.ward@nd.edu.au  
Competing interests: None.

Provenance and peer review: Commissioned, peer reviewed.

Citation: Ward JE. Communicable disease outbreaks: Contact tracing. *Aust J Gen Pract* 2020;49 Suppl 26. doi: 10.31128/AJGP-COVID-26.

#### References

1. Hawker J, Begg N, Blair I, Reintjes R, Weinberg J, Ekdahl K. Communicable disease control and health protection handbook. 3rd edn. West Sussex, UK: Wiley-Blackwell, 2012; p. 6.
2. Centers for Disease Control and Prevention. Frequently asked questions about SARS. Atlanta, GA: CDC, 2005. Available at [www.cdc.gov/sars/about/faq.html](http://www.cdc.gov/sars/about/faq.html) [Accessed 9 June 2020].
3. World Health Organization. Consensus document on the epidemiology of severe acute respiratory syndrome (SARS). Geneva: WHO, 2003. Available at [www.who.int/csr/sars/en/WHOconsensus.pdf?ua=1](http://www.who.int/csr/sars/en/WHOconsensus.pdf?ua=1) [Accessed 9 June 2020].
4. Department of Health. Series of National Guidelines (SoNGs). Canberra, ACT: DoH, 2020. Available at [www1.health.gov.au/internet/main/publishing.nsf/Content/cdnasongs.htm](http://www1.health.gov.au/internet/main/publishing.nsf/Content/cdnasongs.htm) [Accessed 4 June 2020].
5. Department of Health. Measles: CDNA national guidelines for public health units. Canberra, ACT: DoH, 2019. Available at [www1.health.gov.au/internet/main/publishing.nsf/Content/cdna-song-measles.htm](http://www1.health.gov.au/internet/main/publishing.nsf/Content/cdna-song-measles.htm) [Accessed 9 June 2020].
6. Department of Health. Invasive meningococcal disease: CDNA national guidelines for public health units. Canberra, ACT: DoH, 2017. Available at [www1.health.gov.au/internet/main/publishing.nsf/Content/cdna-song-IMD.htm](http://www1.health.gov.au/internet/main/publishing.nsf/Content/cdna-song-IMD.htm) [Accessed 9 June 2020].