Communicable disease outbreaks

What is a case?

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 second article focuses on case definitions, testing and early phases of a public health response.

'ACUTE MYOCARDIAL INFARCTION' is not the same as 'acute coronary syndrome', although to the uninitiated these may seem to be equivalent or close enough terms. This precision in clinical medicine is required to make decisions about treatment and prioritise outcomes. The sound practice of public health relies on a similarly highly technical vocabulary.

For every communicable disease, a 'confirmed case' has a precise definition. While diagnosing measles may seem straightforward from the classic clinical picture, public health requirements for a confirmed case are more exacting. A confirmed case of measles must satisfy 'laboratory-specific criteria' or, in the absence of these laboratory-specific criteria, a specific combination of clinical evidence and epidemiological evidence to be classified as 'confirmed'.[1] This is critical for public health surveillance and epidemiological monitoring that is the foundation for outbreak assessment as discussed in the first article.[2] For pragmatic reasons, 'suspected' cases are also a recognised public health category.

Why is this so? Let's continue the example of measles. Measles is highly infectious, as indicated by its R_0 of approximately 15.[3] While measles is not deadly (the risk of fatal subacute sclerosing panencephalitis is extremely rare),[4] more common but also serious complications from measles such as otitis media should be prevented. For certain groups of people, measles can be especially severe. Therefore, the Communicable Diseases Network of Australia (CDNA) has designated measles as a communicable disease requiring an urgent public health response.[5] Given this designation, even a suspected case of measles is sufficient to mobilise public health action. A suspected case may be brought to the attention of the public health unit on clinical symptoms alone. Action to reduce further disease transmission will be taken immediately. For example, both confirmed and suspected cases of measles will be removed from early childhood centres, schools or workplaces. However, considerable simultaneous attention will be given to obtain laboratory confirmation as quickly as possible. Where laboratory criteria must be met for epidemiological purposes for any communicable disease, your public health team will advise. Once the immediacy of the required public health action passes, there is a critical review by the public health team of each suspected case to re-classify either as a confirmed case or a 'probable' case. In a syphilis outbreak, probable cases are as precisely defined as a confirmed case so they also can be counted.

Case definitions can be highly technical and change over time. Definitions are clearly specified in the Series of National Guidelines produced by the CDNA.[6] These are regularly updated and well known to workers in the public health sector. For some communicable diseases, an 'enhanced surveillance form' must be completed to elicit data from the case essential for public health action, follow-up and surveillance.

Case definitions are especially challenging with new pathogens. Some readers based in Australia will have experienced the 'AIDS epidemic' of the 1980s. In September 1982, the Centers for Disease Control in the United States published its first case definition of what is now called acquired immunodeficiency syndrome (AIDS). It was 'a disease, at least moderately predictive of a defect in cell-mediated immunity, occurring in a person with no known cause for diminished resistance to that disease'.[7] While it seems simplistic today, it was enough to galvanise a global movement. Impeccable epidemiology, virology and clinical practice established the risk factors, modes of transmission and eventually the virus causing AIDS, soon followed by human immunodeficiency virus (HIV) laboratory tests to detect it. In Australia today, a confirmed case of newly acquired HIV only requires laboratory definitive evidence. A similar evolution of a case definition beginning with a clinical syndrome and eventually progressing to identification of the pathogen itself occurred in the sudden acute respiratory syndrome (SARS) pandemic of the early 2000s. We see this again in the evolving case definitions for COVID-19 caused by another novel coronavirus, SARS-CoV-2.

Alert GPs at the frontline of healthcare are vital for public health action. The first clinician to diagnose a patient with an acute infection consistent with measles or other infectious disease is most likely a GP. You and your GP colleagues may perceive you work in isolation from each other, but your collective impact is

significant in public health. When every GP notifies their prompt clinical suspicion or definitive diagnosis of a case of acute post-streptococcal glomerulonephritis, meningitis from *Neisseria meningitidis*, syphilis or any other communicable disease, a comprehensive public health response is enabled.

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