

# Communicable disease outbreaks

## *Surveillance and infrastructure*

**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 six-part series has mapped the fundamentals of outbreak management in Australia's public health system. The sixth and final article in this refresher series looks beyond the acute epidemic to the rationale for surveillance systems, mandatory notification and social determinants.*

Effective communicable disease surveillance relies on three pillars: reporting, analysis and advice.<sup>1</sup> Surveillance is typically a responsibility of the head office of a jurisdictional health department, although it is occasionally outsourced. Each state and territory in Australia has a list of notifiable communicable diseases. Advice based on these surveillance data is provided upwards to the respective Director-General and across to the Commonwealth Department of Health. Advice is also provided to decentralised public health teams or other stakeholders according to organisational structure and protocols. These lists of notifiable diseases are not nationally standardised, although there is a list of nationally notifiable diseases. Eligibility for inclusion on such lists varies by jurisdiction, but the conventional public health criteria usually apply, including burden of illness caused by the contagious pathogen, evidence that public health action will effectively prevent unacceptable rates of

morbidity or mortality, public concern and communicability. For example, acute post-streptococcal glomerulonephritis was added to Western Australia's notifiable diseases list only recently, although it has been notifiable for decades in the Northern Territory. Australia also adheres to the International Health Regulations issued under the constitution of the World Health Organization, by which we are an active and responsible contributor to the global public health system for alerts and response.<sup>2</sup>

Surveillance systems based on mandatory notifications from GPs, laboratories or emergency departments are designed to trigger appropriate, proportionate and evidence-based responses to communicable diseases. In the first article in this series, the need for local expertise to determine outbreaks and epidemics was described.<sup>3</sup> Additional epidemiological expertise in interpreting surveillance data is required to discern outbreaks of any specific communicable disease that are occurring in populations already burdened by endemic rates. As a result of the world's experience of COVID-19, calls have similarly begun to improve global procedures for declaring a Public Health Emergency of International Concern using surveillance data.<sup>4</sup>

Of particular relevance to GPs, 'syndromic surveillance' is a complementary approach in which early documentation and conveyance to public health authorities of prodromal or symptom patterns can prompt health advice without delay.<sup>5</sup> For example, sentinel general practices report instances of influenza-like illness to assist public health messaging and pre-emptive planning for hospital surge

capacity. Independent reviews stress-test early warning systems and whole-of-government readiness.<sup>6</sup>

Surveillance alone is not enough. Poorly distributed, unaffordable or inaccessible health systems amplify inequity for populations with higher risk factors for pathogen exposure, complications or both. Risk factors are not only individual biomedical risk factors for communicable diseases but also social determinants such as marginalisation precluding access to testing or effective prophylaxis due to financial barriers, poor nutrition or institutional racism. These are factors well beyond individual control. For example, overcrowding in remote Aboriginal and Torres Strait Islander households increases risk for communicable diseases transmitted by aerosol, droplet, fomite and faecal-oral routes. Lack of housing supply is the upstream determinant for these preventable communicable diseases.<sup>7</sup> Rather than more surveillance, structural reform and long-term health partnerships are required when inequitable rates of preventable communicable diseases persist in Aboriginal and Torres Strait Islander communities. As frontline clinicians, GPs can argue persuasively for effective upstream strategies for these and other populations affected by structural risk factors even if, as individual clinicians, they are unable to take any more direct action themselves.

Surveillance systems need to be continuously improved through post-outbreak reporting, evaluation and modelling.<sup>8</sup> This includes periodic re-appraisal of pathogen characteristics including the effective  $R_0$  once individual lifelong immunity is acquired from infection, or mass vaccination programs

deliver various degrees of herd immunity. Increasing rates of immunosuppression from lifelong medication treatments for human immunodeficiency virus, cancer or post-organ transplantation as well as natural immunosenescence in ageing patients also affect population-based communicable disease risk.<sup>9</sup>

If governments reduce their investment in critical outbreak preparedness and response infrastructure, the consequences of such decisions are not always experienced on their watch. Previous reductions in the public health workforce are implicated in Australia's largest syphilis outbreak.<sup>10</sup> It has been shown that pre-COVID-19 capacity in disease outbreak management, surveillance and coordination systems ensured a prompt COVID-19 response in Taiwan in 2020 that was otherwise lacking in other countries including New Zealand.<sup>11</sup> In the wake of the first wave of COVID-19 in Australia, the National Cabinet announced its intention to review the strategic capacity of the public health workforce.<sup>12</sup> Given their unique standpoint in the health system and direct view of the early impacts of any mismanaged communicable disease threats, it is imperative that GPs and their peak bodies be involved in this review. GPs bring their medical expertise, knowledge of communities and sustained relationships with people to any large-scale public health threat. Access to this expertise across the country is crucial for an equitable response to an outbreak.<sup>12</sup> GPs may be among the first to see the consequences of underinvestment in public health. Continuous vigilance will identify concerns about lack of readiness or underperformance early. By conveying any concerns about public health preparedness to their professional College or health department, GPs protect patients, their families and communities from future debilitating outbreaks.

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