Letter to the Editor: The limitation of fever in case definitions for avian influenza and SARS

Two emerging infectious diseases, namely avian influenza and severe acute respiratory syndrome (SARS), have recently brought infectious diseases to the forefront of the public eye. Case definitions for both infections from most health authorities require a fever greater than or equal to 38º C (100.4º F) before the individual can even be considered as a suspect case.

One definition of fever is as follows:

'An early morning oral temperature of 37.2º C (99º F) or an oral temperature above 37.8º C (100º F) at other times of the day.'[1]

In other words, fever varies according to time of day and anatomical site. It also varies between individuals.

Fever is one of the most common symptoms and signs of illness recognised both by health professionals and lay people. Temperature is an integral part of the 'vital observations' measured in hospitalised patients. Yet, given its diurnal and anatomical variation at so many different anatomical sites, doctors have struggled to correctly define fever.[2]

The difficulties outlined above are relevant to its role in the case definitions for avian influenza and SARS. Firstly, health authorities should specify in their case definitions at what anatomical site the temperature is taken. This is because an oral temperature of 38º C is different to 38º C measured at other sites, such as the tympanic membrane, rectum, axilla and forehead. The anatomical site for measurement of temperature in hospitals will vary between countries. While some studies provide approximate conversion factors to relate temperature at one site to another, these can be highly variable and not necessarily reliable.[1] Furthermore, in pandemic situations, case definitions will be used by lay people to monitor themselves for signs of illness, making it even more important for health authorities to clarify how to identify fever.

The diurnal variation of fever highlights the limitations of a single temperature measurement to exclude cases. This has implications for border screening, where a single normal temperature measurement should not exclude the disease in someone who otherwise meets the case definition. In fact, there were SARS patients who had a normal temperature on admission to hospital.[3]

Fever can often be identified from the history alone through descriptions such as drenching sweats, 'hot and cold' episodes, shivers and severe uncontrolled shaking (rigors). Therefore, it is pleasing to see that the Australian Government has included 'fever…. **OR** *history of fever*' in its case definition for avian influenza.[4] However, it is not clear whether 'history of fever' only refers to a numeric temperature or to symptoms consistent with fever, and if it does refer to symptoms, what are they?

This in no way should belittle the concept of a case definition—it is an important epidemiological tool, which provides an objective way of identifying cases. However, it should be remembered that defining fever as a single measurement with no anatomical reference, might lead to confusion and failure to identify cases. The inclusion in a case definition of the specific symptoms attributed to fever and fever defined according to different anatomical sites, might overcome this difficulty.

1. Mackowiak PA. Temperature regulation and the pathogenesis of fever. In: Mandell GL, Bennett JE, Dolin R, editors. *Principles and Practice of Infectious Diseases.* Philadelphia: Churchill Livingstone; 2005. p. 703–718.

2. Mackowiak PA, Wasserman SS. Physicians' perceptions regarding body temperature in health and disease. *South Med J* 1995;88:934–938.

3. Fisher DA, Lim TK, Lim YT, Singh KS, Tambyah PA. Atypical presentations of SARS. *Lancet* 2003;361:1740.

4. Australian Government Department of Health and Ageing. Guidance for recognition, investigation and infection control of SARS and Avian Influenza. Available from: http://www.health.gov.au/internet/wcms/publishing.nsf/Content/health-avian_influenza-pdf-guide-cnt.htm/$FILE/guide.pdf Accessed 22 March 2006.

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