

Editorial

Tropical health and infection control research directions

Anne Gardner RN, PhD

Tropical Health Research Unit for Nursing and Midwifery Practice, James Cook University and Townsville Health Service District, Townsville, Qld 4814, Australia. Email: anne.gardner@jcu.edu.au

This editorial, with its focus on tropical health, provides a great opportunity to raise the profile of some regional and rural issues that impinge directly or indirectly on our ability to provide best practice infection control in the tropics. Tropical northern Australia (~40% of the Australian continent) is comprised entirely of areas categorised as regional, rural or remote by the Australian Bureau of Statistics.¹ In addition, tropical Australia is geographically close to other countries with similar climates that are facing enormous infection control challenges of their own. This geographical proximity provides wonderful opportunities for international research collaboration on infection control. This editorial is confined to Australian issues and briefly discusses the international implications.

Some of the particular issues affecting healthcare provision in the tropics include extremes of climate, isolated localities, rural healthcare practice and workforce issues, professional isolation, the decreased level of access to healthcare for people living in rural and remote areas, the often higher levels of chronic disease, tropical diseases specific to local areas and the disproportionately high rates of ill health in Aboriginal and Torres Strait Islander peoples.

Many Australians think of tropical health and medicine as entities that only affect a distant minority and have a rather 'exotic' flavour. Tropical medicine as a discipline is primarily focussed on illness, conventionally taking a narrower view of the determinants of disease. In the healthcare literature, there is some exploration of the concept of tropical health (encompassing both prevention and management) as it relates to remote health service delivery, sustainable health in developing countries and international health, but little is written about tropical health as a concept applied more broadly to include less remote tropical environments. This omission has the effect of rendering less visible many infection control problems that arise in northern Queensland, the Northern Territory and the top half of Western Australia.

The tropical Australian environment provides a home to many microorganisms that give rise to infection control problems and infectious diseases that are not found at all or are only rarely found

in the southern parts of Australia. Vector-borne diseases such as Ross River fever (causative agent is an alphavirus, the Ross River virus), Dengue fever (causative agents are flaviviruses including serotypes DEN 1, 2, 3 and 4) and Barmah Forest fever (causative agent is an alphavirus, the Barmah Forest virus) are all mosquito-borne infections endemic in parts of northern Australia. Malaria (another mosquito-borne disease caused by protozoan parasites of the *Plasmodium sp.*) also occurs in northern Australia as an imported disease. It arises in travellers from overseas due to the close proximity of tropical Australia to countries where such diseases are endemic. Malaria is of particular public health importance because the mosquito vectors are present in Australia, making Australia receptive to re-introduction of the parasite.²

There are many bacterial infections that occur more frequently in tropical Australia due to localised social and environmental factors. Examples include Q fever (*Coxiella burnetii*), which has a relatively high incidence due to the higher ratios of farm workers in regional and rural Australia, and melioidosis (*Burkholderia pseudomallei*), which is a very serious disease, the bacterium occurring in the soil in parts of the Northern Territory and north Queensland. Other important bacterial infections that occur Australia-wide but are found frequently in the tropics, with a particularly high incidence in Aboriginal and Torres Strait Islander groups, include acute rheumatic fever and rheumatic heart disease (*Streptococcus pyogenes*), staphylococcal disease (*Staphylococcus sp.*, including community-acquired methicillin-resistant *Staphylococcus aureus*) and pneumococcal disease (*Streptococcus pneumoniae*).³

Helminthic infestations have substantial but often difficult to measure effects.⁴ These infestations are common worldwide in tropical regions where warmth and moisture, if combined with poor sanitation, makes their transmission easy and so they are often related to poor living conditions.³ In Australia, while tricuriasis or whipworm (causative agent is *Trichuris trichirua*) is on the decline, especially in Australian cities, both tricuriasis and strongyloidiasis (causative agent is *Strongyloides stercoralis*) are common in parts of the tropics, notably in rural and remote Aboriginal communities.⁵

These are just some of the diseases that confront healthcare professionals working in tropical parts of Australia. Infection control and public health strategies are of paramount importance in the prevention and management of many of these diseases. While it can be argued that more fundamental research is always needed, for many of these diseases it is also true that we now have sufficient evidence to improve practice. Mosquito-borne viruses and protozoa (described above) are limited through vector control programs, but the levels of some bacterial infections and helminthic infestations in the Australian tropics remain very problematic despite the good evidence available for prevention and control. Why is this?

As in other areas of healthcare practice, there are many barriers that interfere with the implementation of evidence in the tropics. Some barriers are very complex and have their origins in the social determinants of health.⁶ In particular, it is not possible to do justice here to the multifaceted problems surrounding the delivery of effective and appropriate healthcare for Aboriginal and Torres Strait Islander populations. Some barriers are related to geography and climate. The great distances from metropolitan and even regional centres affect patient access to healthcare; disruption to immunisation schedules and missed follow-up visits are two examples. These distances also reduce the potential for face-to-face collegial contact between health professionals and can curtail education and training opportunities. In very remote areas, there is limited and unreliable internet, telephone or videoconference linkage, which affects both workers and clients. The vagaries of intense weather patterns (such as cyclones and tropical storms with consequent heavy rain and flooding) cause further isolation in tropical regions at certain times of the year.

The body of knowledge about barriers and facilitators of research utilisation and the implementation of evidence into practice is now being applied to infection control practices worldwide. Programs for improvement in hand hygiene are an excellent example.⁷ *Healthcare Infection* encourages discussion of the challenges that surround understanding and applying evidence at the local level (e.g. Bennett *et al.*⁸ and Bellard-Smith *et al.*⁹). In the current edition of the journal, Edmiston *et al.*¹⁰ highlight the range of strategies being tested in response to knowledge about the complexities of surgical-site infection risk. The authors also emphasise the need for interdisciplinary teamwork and 'collegial effort to develop appropriate, effective and scientifically sound interventional strategies',¹⁰ an approach that applies to prevention and control of

many infections found in tropical Australia. Moreover, the diverse geographical, climatic and social conditions found in tropical Australia provide rich opportunities for international multisite collaborations to develop and test infection control related interventions.

In conclusion, for many infectious diseases in the tropics, there is a strong laboratory science and clinical medicine research program. The challenge that *Healthcare Infection* has taken up, with its broad multidisciplinary readership, is to foster debate and support publication of a diverse range of research topics and methods grounded in infection control knowledge. Tropical infection control issues serve as useful exemplars of the need to consider the local context. As an Australasian-based publication, *Healthcare Infection* is well positioned to be a leader in presenting tropical health research, the utilisation of that research and its integration into tropical healthcare practice.

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