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The Inequitable Burden of Infectious Diseases Among Remote-living Aboriginal and Torres Strait Islander Australians: A Product of History

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Abstract

Insufficient and poorly maintained housing and plumbing in many remote Australian Indigenous communities in Australia results in reduced capacity to maintain personal hygiene, contributing to infectious disease inequalities. Infections from *Streptococcus pyogenes* (Strep A) and sequalae are often noted to be the result of contextual poverty; a product of over 230 years of discriminatory practice that has excluded Indigenous people from the basic human rights of healthy, maintained housing afforded to most in the nation. The solutions for eliminating diseases of inequity among Australian Indigenous population are known, their success is historically documented, and yet they are to be comprehensively implemented in the remote Indigenous communities. This paper explores how decades of inequitable policy has permeated contemporary Australian Indigenous wellbeing with specific regards to infectious disease rates; a deviation from thousands of years with limited exposure to such illnesses.

Keywords

Australian Aboriginal and Torres Strait Islander people, infectious diseases, Streptococcus pyogenes

Around the world, Indigenous communities contend with the historical effects of colonisation, including a disconnect between current ways of living and the traditional lifestyle they were disallowed upon occupation of their land. Policies such as assimilation, forced removal from Country, stolen generations of children and rapid dietary changes have placed Indigenous peoples at risk of acute ill-health and wellbeing, with downstream consequences for multiple generations. Australian history since European occupation in 1788 is no exception. Present day Australian Aboriginal and Torres Strait Islander Peoples (hereon respectfully referred to as Indigenous Peoples[1]) experience higher rates of illnesses than their non-Indigenous counterparts, and for the purposes of this discussion, infectious diseases specifically. This contrasts with what is generally accepted to be a period relatively free of many infectious diseases prior to European occupation (Campbell, 2016), a history that highlights the close interface between the disruption of all aspects of Indigenous culture through occupation of Australia and the impact that this has had on transmission of infectious diseases.

European occupation of Australia and infectious diseases

Numbering approximately 315,000 in 1788 when the First Fleet made landfall (Australian Bureau of Statistics, 2008), the Indigenous population had until then experienced relative population homeostasis and comparably fewer pathogens than other continents of the world (Henneberg et al., 2021). This is hypothesised to be a result of over 65,000 years of isolation and has been inferred by an analysis of documentary and skeletal evidence (Henneberg et al., 2021). Infectious epidemiology prior to European contact is thought to have been characterised by human and zoonotic pathogens – primarily endemic with occasional spatial and temporal

[1] In this document, Indigenous refers to both Aboriginal and/or Torres Strait Islander peoples. We recognise the strong diversity between Aboriginal and Torres Strait Islander cultures, and do not intend to diminish any identity. In the interest of truth-telling we wish to tell this story but warn readers some content in this article may be distressing to read for Indigenous people.

epidemics – introduced by trading with populations north of Australia (Cockburn, 1971). There is no evidence to suggest Indigenous populations experienced any of the diseases commonly associated with urbanised or crowded environments prior to European arrival, whereas illnesses including measles, smallpox, poliomyelitis and influenza were endemic to urbanised Europe and Asia in the 1700s (Lewis, 2014).

In the early years of occupation at Port Jackson (Sydney), European crude mortality rates ranged from 47/1,000 to 152/1,000 in the years between 1788-1792, with outbreaks of typhus and dysentery particularly devastating to the population of approximately 2,500 (Lewis, 2014; Warren, 2014). An outbreak of smallpox in 1798 left all bar one member of the European arrivals untouched due to the established practice of variolation implemented across the European occupants. However, smallpox in contrast decimated the Indigenous population in the vicinity of Sydney Cove due to lack of prior immunity or access to variolation (Warren, 2014). Debates continue today as to whether this outbreak was an act of biological warfare (Warren, 2014).

By the 1830s, the European population surpassed 50,000 people across present day New South Wales, Victoria, Western Australia, Queensland, and Tasmania. Thus, a larger pool of susceptible individuals was available to sustain infection. Resultantly, recurrent outbreaks of influenza, pertussis and measles plagued the colonies, further threatening Indigenous populations (Lewis, 2014). Such rapid urban growth occurred too quickly for sanitation measures, with poor hygiene, foodborne outbreaks, and household overcrowding fuelling transmission. The concurrent policy of assimilation forced Indigenous people further into urbanised areas and into crowded and low-quality accommodation options, increasing exposure to infectious illnesses. Indigenous populations in the north and inland protected by isolation and retaining their ways of life were less impacted by these infections.

Quantifying the effect these outbreaks and epidemics had on disease rates for Indigenous people is difficult (Australian Institute of Health and Welfare, 2005). Mortality data for

this population was not included in official Australian statistics until after the 1967 Referendum, during which the Constitution was amended to allow for Indigenous people to be counted in the census (Behrendt, 2007). Estimates do suggest that where cause of death was recorded, over half of all Indigenous deaths on settlements between 1876 and 1900 were due to infectious diseases, compared to non-Indigenous estimates approximating a quarter of all-cause mortality (Cossart, 2014). Further, case-fatality rates from infectious disease were markedly higher among Indigenous people, likely due to a combination of limited immunity, inadequate access to effective treatment and poor socioeconomic conditions (Lewis, 2014). For example, while the largest recorded smallpox outbreak during the first century of colonisation (in Melbourne, 1857) recorded a case-fatality rate of approximately 25%, appraisals suggest that case-fatality rates of over 90% were observed during outbreaks of the same disease among Indigenous populations throughout Australia.

Infectious disease control in the twentieth century

The turn of the century saw the beginnings of an epidemiological transition in Australia and other industrialised nations, with reduced rates of infectious disease, increased life expectancy and growing rates of non-communicable illness (Booth et al., 2016). Three interventions – the implementation of mass immunisation programs, improved clinical care with the advent of antibiotics, and implementation of communicable disease control and surveillance – are identified as drivers of improved health and living standards in this period (Booth et al., 2016).

Arguably, it is a fourth intervention that should be viewed as the most successful: improvements in sanitation, hygiene, and living conditions. Particularly, a reduction in overcrowding of homes driven by increasing economic affluence, contraception, and smaller families. Collective public health action highlighting links between the environment and disease transmission led to the development of clean drinking water standards, food safety protocols and building codes to reduce crowding and improve homes with greater Government

responsibility (Booth et al., 2016). By the end of the 20th century, deaths from infectious diseases had fallen by 96% since 1900 and a higher standard of environmental health was observed across most metropolitan regions. However, change was not ubiquitous, equitable or universally experienced.

Current infectious disease epidemiology in Australia

Today, the Australian infectious disease burden is relatively insignificant in contrast to historical statistics, with most recent estimates indicating these diseases contribute to approximately 3.3 disability adjusted life-years (DALYs) per 1,000 population. However, this is in stark contrast to the 10.3 DALYs per 1,000 population for Indigenous peoples, who also experience 10% of the burden caused by vaccine preventable diseases despite comprising only 3% of the population (Australian Institute of Health and Welfare, 2019). Research also indicates that Indigenous children have higher primary-care presentations for infectious diseases than their non-Indigenous peers – as high as 50% in some studies (Hendrickx et al., 2018) – and experience more frequent hospital admissions, more severe disease, and heightened mortality.

One example of pathogens persisting in Australian Indigenous populations at levels on par with or above those seen in low- and middle-income countries is *Streptococcus pyogenes* (Strep A). Streptococcal sequelae including acute rheumatic fever (ARF) and rheumatic heart disease (RHD) persist among remote Australian Indigenous communities at some of the highest rates in the world while being rare among non-Indigenous people in Australia. Between 2015-2019, Indigenous peoples accounted for 95% of ARF notifications. ARF and RHD exemplify not only the inequitable burden of disease experienced by Australia's Indigenous people, but the failure of elimination efforts, environmental health improvements and raised living standards to successfully benefit this population.

The contemporary effect of a challenging environmental context

Environmental health and disease transmission exists within a socio-ecological model where personal protective behaviours may be constrained by elements outside individual control

(World Health Organization, 2021). As the most proximal aspect of the living environment, there is emphasis on the need to maintain 'Healthy Homes' to achieve good health. As previously stated, most urban and rural non-Indigenous Australians have procured the benefits of progress in socio-economic circumstances and legislation, to the point where infectious disease and sequelae perpetuated by the environment are all but eliminated through adequate plumbing, sewerage and waste removal. This differs for rural and remote, and even urban Indigenous communities who continue to contend with discriminatory practices, legislation, and policy that fails to provide the same standard of health observed across the nation.

Poor housing conditions can facilitate infectious disease transmission where sanitation, ventilation and water access are inadequate or absent (Torzillo & Kerr, 1997). Bailie et al. (2010) found a strong association between respiratory infection and overall functioning of the home (OR 3.0, 95% CI 1.36-6.63) as well as skin infection and home temperature and presence of pests/vermin (Bailie et al., 2010). With regards to Strep A, Coffey et al. (2018) showed that living in a crowded house increases the likelihood of Strep A infection between 1.7 and 2.8-fold, with household crowding and lower socio-economic status noted as significant variables (Coffey et al., 2018). Considering approximately 40% of remote-dwelling Indigenous people live in crowded houses due to an under-investment in sufficient housing stock (Department of the Prime Minister and Cabinet, 2017), these data are compelling.

The link between inadequate housing and Strep A infections is clear and primordial preventative efforts are seen as the most beneficial. This includes investment in homes and maintenance to ensure they sustain health appropriately. As noted in the RHD Endgame Strategy, it is estimated that 5,500 new homes are required in remote Indigenous communities, at a cost of $2.7 billion AUD (2020), to reduce household crowding by 20-30% (Department of the Prime Minister and Cabinet, 2017). However, tensions persist following the expiry of the Remote Housing Strategy as States and Territories battle with the Federal Government over

ownership and funding responsibilities (Wyber et al., 2020). Until adequate legislation and action is prioritised at both state and federal levels, this problem may persist.

The choice to live on Country should not be to the detriment of health (United Nations General Assembly, 2007). Ironically, it has taken a nascent infectious disease to adequately shine a light on this issue. The threat of COVID-19 for all Australians has identified the need for homes that allow for isolation/quarantining and social distancing to reduce transmission – not just for the benefit of those within the homes but that of the overall community. In Wilcannia, remote New South Wales, where 60% of the 800 residents are Indigenous, camper vans were provided as temporary accommodation for close contacts when the virus rapidly spread in community (Mercer, 2021). Advocates in the Kimberley region of WA have also drawn attention to the lack of suitable accommodation for those testing positive to COVID-19 as the virus entered the area in early 2022, with reports of some cases being forced to isolate in dwellings co-occupied by fifteen others (Hayes, 2022). As Kimberley Aboriginal Medical Service (KAMS) CEO Vicki O'Donnell stated, "*the ability to isolate is a privilege"* presently not extended to by many living in Kimberley homes (Hayes, 2022). Compare this response to that of preventing Strep A infection and RHD – also perpetuated by overcrowding in homes, poor maintenance, and inadequate investment in primordial prevention – and it becomes clear that swift action will always occur for a national threat ubiquitously affecting Indigenous and non-Indigenous people alike, overlooked when the burden is disproportionately impacting the minority population.

The situation posed by COVID-19 also highlights exceptional work of Indigenous communities and groups in responding to a health crisis. Aboriginal Community Controlled Health Organisation' (ACCHOs) around the nation reflect a strength of Indigenous Australian people in responding to '*the inability of mainstream health services to effectively engage Aboriginal communities with their services*' (National Aboriginal Community Controlled Health Organisation, 2022) and since the establishment of the first ACCHO in Redfern in 1971 have

worked to deliver holistic, comprehensive, and culturally appropriate health care to the community (National Aboriginal Community Controlled Health Organisation, 2022). Throughout the pandemic, ACCHOs aimed to deliver scientifically valid, evidence-based and culturally translated COVID-19 prevention messages and supported communities (Finlay & Wenitong, 2020) whilst supporting prevention efforts and providing guidance to communities about self-closure well before Federal and State policies were enacted (Donohue & McDowall, 2021). While there is clearly ample self-determination and leadership across these sectors, no change can be realised without adequate and appropriate distribution of resources applicable to the prevention of all infectious diseases.

Conclusion

Reducing the burden of infectious disease among Indigenous Australian communities is a matter of equity. With the example of Strep A, achieving parity in wellbeing requires an investment in aspects of society beyond health. However, as history shows, repeated discriminatory practices have disallowed this achievement, and the known solutions continue to be ignored. Eliminating RHD among the Australian Indigenous population for example will require a greater dependence on the strengths of Indigenous leadership. The inequitable burden of infectious diseases among remote-living Aboriginal and Torres Strait Islander Australians will not be rectified without partnership and cooperation with the ACCHO sector, communities and Indigenous leaders, and these practices should be valued at the highest priority.

Declarations

Ethics approval and consent to participate, consent for publication and availability of data and materials.

N/A

Competing interests

The authors declare that they have no competing interests.

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