

# What is the link between housing, crowding, infections and high rates of kidney disease in a remote Aboriginal town?

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## Manuscript

Connection to traditional lands ('Country') and the associated maintenance of culture and spirituality are inextricably linked with the well-being of Australian Aboriginal Peoples, their families and their communities.<sup>1</sup> However, Country can be located remotely and remoteness is noted as an indicator of poorer health outcomes.<sup>2</sup> The incidence of chronic kidney disease (CKD) is higher in remote-living Aboriginal populations than in the general population and limits life quality and length.<sup>3</sup> Repeated skin infections of group A streptococcal (GAS) disease can contribute to CKD.<sup>4</sup> This research gathers contemporary data to consider whether additional housing and regular repair and maintenance by housing authorities can reduce GAS infection and subsequent CKD.

This research explored data and literature regarding skin infections involving GAS disease to understand how transmission may be affected by housing conditions and in turn contribute to lowering rates of CKD in remote Aboriginal communities. Diagnoses data from a remote Central Australian clinic were analysed for the period of January 2017 to May 2019.<sup>5</sup> Data were from Anyinginyi Health Aboriginal Corporation, an Aboriginal community-controlled health service clinic based in the remote town of Tennant Creek in the Northern Territory. A total of 2,210 patients attended the Anyinginyi clinic during this period.<sup>5</sup>

The prevalence of advanced stage CKD (stage 4 and 5; CKD) in the Aboriginal population of the remote Barkly region in the Northern Territory is much higher than that in Aboriginal peoples nationally (2.1% vs. 1.4%) and seven times higher than in the non-Aboriginal population nationally (2.1% vs. 0.3%).<sup>3,5</sup>

Post-streptococcal glomerulonephritis can contribute to CKD development, although with a significant lag time.<sup>4</sup> Post-

streptococcal glomerulonephritis in turn is linked to repeated GAS infection, particularly in children, especially through skin infections.<sup>4,6</sup> In the Barkly region, skin infections, including GAS-related disease such as impetigo, were the most common presentation of infection.<sup>5</sup>

Historically, the long-term consequences of GAS infections were common in non-Indigenous, urban and capital city settings.<sup>7</sup> This suggests that the current GAS infection rates in the Barkly population are due to factors other than ethnicity, remoteness or climate.<sup>8</sup> Instead, GAS skin infections may be related to hygiene and to crowded living conditions.<sup>9</sup> Remoteness may factor into the latter with high demand for limited housing stock and long waiting times for repairs.<sup>10</sup>

The conditions to prevent GAS transmission and infection require housing to be well maintained and managed with functioning 'health hardware' infrastructure such as hot water systems, toilets and washing machines and sufficient to avoid the necessity of crowding.<sup>9</sup> Such prevention aligns with the 'refreshed' of Australia's 2019 Closing the Gap agenda focused on Indigenous Peoples' equity.<sup>11</sup>

Further research is required on GAS transmission in the home and the efficacy of environmental health initiatives to benefit the short- and long-term health and well-being of Barkly residents. Reducing GAS infection may not only reduce CKD but also other related diseases, including acute rheumatic fever and rheumatic heart disease.<sup>4</sup> Such research is being commenced in partnership with the Barkly's Anyinginyi Health Aboriginal Corporation and other remote community organisations within an National Health and Medical Research Council Synergy-funded project involving the authors and Telethon Kids Institute, entitled 'Stopping acute rheumatic fever infections to strengthen health'.<sup>12</sup>

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## Data sharing

Anyinginyi clinical data were provided under ethical consent by the clinic and with clearance from the University of Queensland's Human Research Ethics Committee. The conditions of provision prevent sharing of the data (approval reference 2018001773).

## Conflict of interest

Ms Barb Shaw was the Chief Executive Officer of Anyinginyi Health during the research data collection, analysis and dissemination period.

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