AUSTRALIAN INDIGENOUS REMOTE COMMUNITIES & WATER, SANITATION & HYGIENE

A scan of needs

Nina L. Hall

ABSTRACT

Indigenous people in remote locations in many countries experience lower levels of health than the general community. Health and wellbeing are influenced by access to safe drinking water, hygiene practices, and wastewater treatment. This is recognised in the United Nations' Sustainable Development Goal for water (SDG 6). However, many Indigenous communities - including in Australia, Canada and USA - experience lower quality services. As a signatory to the UN SDGs, Australia has a commitment to ensure that the access and quality of these resources is attained for all Australians - including Indigenous Australians living in remote communities. This research sought to identify the priorities of water, sanitation and hygiene within remote communities on mainland Australia. Interviews were conducted with representatives from 17 organisations providing water, sanitation and/or hygiene services to three or more communities. The results identified that drinking water supplies can be contaminated by microbes or naturally-occurring chemicals. Wastewater treatment can be poorly maintained with irregular monitoring. The hygiene-related health of residents can be negatively impacted by crowding in houses, which affects the residents' ability to maintain healthy hygiene levels of people, clothing, bedding and infrastructure. Effective responses have displayed a collaborative and systems-wide response by the various agencies responsible
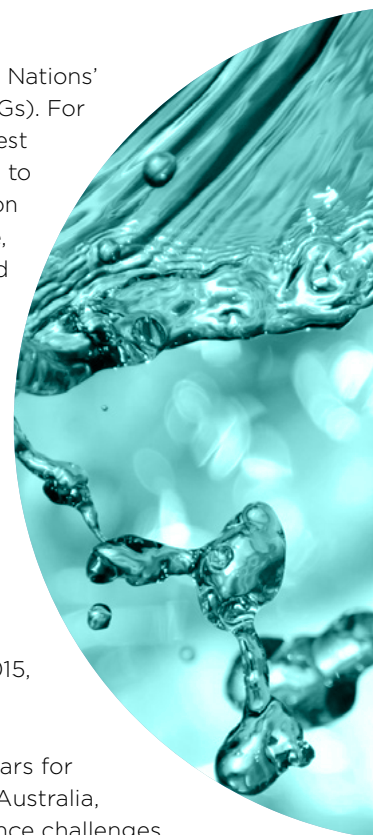
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Torres Strait Islander Peoples, health, systems approach

INTRODUCTION

Australia is a signatory to the United Nations' Sustainable Development Goals (SDGs). For the water industry, the goal of greatest relevance is SDG 6, with an ambition to 'ensure access to water and sanitation for all' by 2030 (UN 2015). Therefore, the Australian Government is obliged to address water, sanitation and hygiene (WASH)-related aspects of the SDGs within and beyond its own borders (UN 2015).

When considering the issues of water, sanitation (wastewater) and hygiene for Australians, evidence indicates that many remote Indigenous communities have less-than-adequate access – which differs considerably from rural and urban settings (AG WA 2015, Hall, Shannon et al. 2016). Although investment in and access to WASH services have improved in recent years for remote Indigenous communities in Australia, many residents continue to experience challenges with drinking water quality, adequate and continuous sanitation services, and associated health issues (Clifford, Pearson et al. 2015).

Remote Indigenous Water

In late 2016, the seventh *Overcoming Indigenous Disadvantage* review and report card identified that health outcomes for Indigenous communities – particularly those in remote and very remote locations – were compromised by a range of environmental health factors within homes and communities (SCRGSP 2016). The report concluded that improving access to clean water, functional sewerage and electricity services in the home environment were priority areas for action (SCRGSP 2016).

On water, while there is almost universal access to water for drinking and household use reported in remote communities across Australia, the choice of drinking water sources can often be limited and variable in terms of location, access and availability. Water supply to remote communities is impacted by economies of scale, higher delivery costs, level of demands, high maintenance costs, low cost recovery levels, and uncertainty around consumer willingness to pay for improved service levels (Browett, Pearce et al. 2012, Willis, Pearce et al. 2015). The regulatory environment for maintaining public health standards through safe drinking water provision and physical environmental protection through adequate wastewater treatment in remote communities follow those of the state or territory in which they are located (HealthInfoNet 2016). In this way, these communities are required to adhere to the same standards as urban areas, taking guidance from the Australian Drinking Water Quality Guidelines (NHMRC 2011).

On sanitation the Council of Australian Governments' Strategy on Water and Wastewater Services in Remote (including Indigenous) Communities has provided national funding since 2006 for centralised water treatment infrastructure to shift away from reliance on septic tanks (COAG 2009).

Despite the improvement of these wastewater services, there has been evidence of poor maintenance of wastewater treatment facilities. For example, a 2015 audit from Western Australia noted a high rate of remote communities had inadequate testing of wastewater systems, which potentially prolonged breakdown, leaks or overflows (AG WA 2015).

On hygiene, remote communities continue to experience hygiene-related diseases at rates higher than the wider Australian population (Foster and Dance 2012). A significant impact on healthy living practices is overcrowding. In 2014-15, 38 percent of the Indigenous adult population in remote areas and very remote areas were living in overcrowded conditions, almost three times the rate than in non-remote areas (13%) (ABS 2016). Notably, 28 percent were living in a dwelling in which one or more of the facilities for washing people, clothes and bedding, for safely removing waste, and/or for enabling the safe storage and cooking of food was not available or did not work (ABS 2016). The construction of houses has been a major focus for improving the health of remote Australian Indigenous peoples, however there has not been an associated focus on promoting health-related hygiene and behaviour change (McDonald, Bailie et al. 2008).

Given this context and the concurrent ambition within SDG6, this research conducted a scan of the WASH priorities that currently exist in Australia's remotely-located Aboriginal and Torres Strait Islander communities. The results of this scan are anticipated to inform and assist national, state and local government policymakers, water utilities, health services and other organisations that provide services into these Australian communities.

METHOD

The method had three steps: an initial literature review, qualitative interviews and analysis to verify the findings. Each step is described in more detail below.

The scope of the study was restricted to remote Indigenous communities on mainland Australia. Remote or 'very remote' area is classified according to the Accessibility/ Remoteness Index of Australia. Population data from 2011 calculated the total population in Australian remote Indigenous communities was 116,588, which represents 21 percent of the total Australian Aboriginal and Torres Strait Islander population (ABS 2012, ABS 2016). Indigenous communities are defined as permanently inhabited by a predominantly Aboriginal and Torres Strait Islander population (referred to as 'Indigenous' people in this article), and where housing or infrastructure is managed on a community basis (ABS 2007). Populations can range in communities from 100 to 6000 people.

Following an initial literature review, qualitative interviews were conducted with representatives from key organisations providing water, sanitation and/or hygiene to three or more discrete, remote communities in four states and territories of mainland Australia. The interviewing approach used open-ended questions in order to secure 'deep' and detailed accounts and perspectives, and to describe both observed issues and solutions (Fontana and Frey 2000). The focused case study approach, applied theory and strong focus on dialogue required a small sample size while delivering higher 'information power' or detail and depth (Malterud, Siersma et al. 2016). The final sample size was achieved once 'saturation' occurred and no further new information was revealed during subsequent interviews (Charmaz 2006).

The organisations were identified through the authors' and partner's professional networks and contacts. The resulting 17 interviews were with representatives from state and territory government (6), Indigenous (4), research (3), utility (2) and non-government (2) organisations. The majority were located in NT (8), and the remainder in QLD (3), SA (3), NSW (2) and nationally (1). It is acknowledged that this networking approach to respondent recruitment may create a bias in the sample. However, as this research sought to scan existing WASH priorities from those active in the area rather than to report on a representative sample, this potential bias was not anticipated to limit the study.

The project aims and core questions were reviewed for cultural and other sensitivities by researchers with extensive experience in Australian Indigenous research. The project received ethical clearance from The University of Queensland's Human Research Ethics Committee (reference #2016001540). The questions asked to interviewees concerned their perceptions of whether the drinking water, wastewater treatment and hygiene access and services met the needs of the remote community residents. The questions were intentionally broad to enable interviewees to share their perceptions from their organisation's speciality, services and jurisdiction. Additional questions were asked based on the interviewees' responses to the core questions. This open-ended interviewing approach is common for a qualitative approach to data-gathering (Fontana and Frey 2000). Each interview lasted approximately 45 minutes. All interviews except two were conducted by telephone to limit the project costs; one was conducted by email and the other in person at the request of the participants.

The interviews were transcribed, uploaded into QSR NVivo qualitative software, and analysed using qualitative social science methods informed by grounded theory to elicit the emerging themes in a method derived from grounded theory (Hoepfl 1997, Charmaz 2006). These results were then compared against the literature review findings for comparison, validation or contrast. This 'triangulation' process involves the use of multiple information sources for verification of findings (Liamputtong and Ezzy 2005). The combined outcomes from these two sources are presented in the Discussion. Quotes from the interviewees are provided to illustrate the key themes raised, although the same topic was often raised by many interviewees. The quotes are attributed using an identity code to avoid identification of specific individuals and organisations.

RESULTS

The results of the remote Australian Indigenous community WASH priorities are presented in subsections covering water, wastewater and hygiene.

Drinking water

Drinking water supplies are at risk of both microbial contamination and chemical contamination by naturally-occurring elements in deep artesian (bore) sources - the source of drinking water for many inland communities. The microbial risk from both unmaintained infrastructure and behaviours was described as being linked to waterborne health issues:

> *It's quite chronic in cases … [because] storage tanks [are] … rarely replaced … They're going to rust, they're going to corrode … Water supplies are 100 percent a [health] problem. (Indigenous organisation representative #1).*

The chemical contaminants in water, predominantly arsenic, cadmium, nitrates, uranium and barium, tend to increase towards inland Australia, where monsoonal rains do not replenish supplies. Although these are naturally-occurring, their presence can require the installation of advanced water treatment technologies due to the health risks from excess concentration.

All interviewees mentioned a knowledge of the Australian Drinking Water Guidelines, as well as relevant state legislation and government agency requirements. These are used to direct monitoring regimes, develop local water quality management plans, and audit water utilities to achieve compliance. The monitoring data is generally publicly accessible from the organisations responsible for these supplies. The monitoring regimes are structured to trigger swift intervention if contamination is detected.

Despite these positive intentions, several interviewees raised concerns with the on-ground accuracy and frequency of water monitoring regimes. These are challenged by the remote locations, minimal staff, infrequent transport for the water samples and a lack of oversight of the staff responsible (which is often the community-based Essential Services Officer). These issues were perceived to contribute to unsafe water supplies and ill-health in community residents:

> *Even with the best and biggest communities we've got, you've got the Essential Services Officer that's taking the monthly water samples… In reality, he's probably going to take time off over Christmas and New Year. So, at best you're probably getting 10 samples. (Indigenous organisation representative #1).*

The monitoring programs are intended to provide 'safe' water to communities. However, the palatability and aesthetics of water can be poor for communities reliant on bore water:
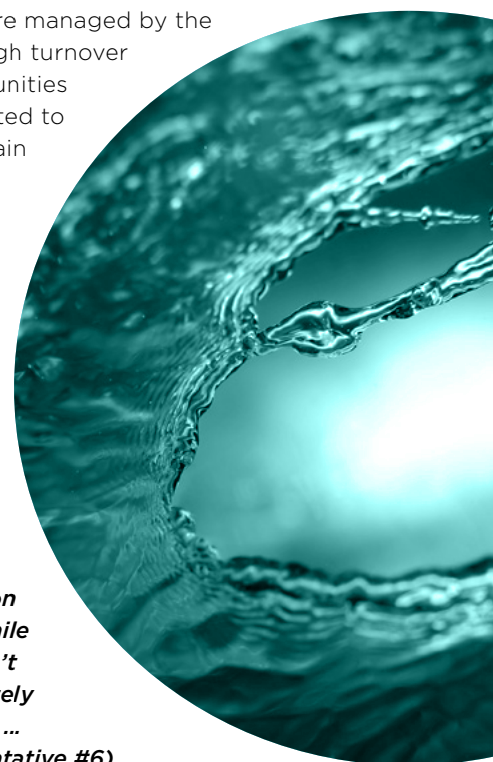
> *Hardness and total dissolved solids, … generally salinity … pH is actually slightly too low … iron, a little bit of manganese … the consequences [on the water are a lack of lather] in terms of washing, [a build-up of scale] in terms of appliances … (Water utility representative #2).*

In response to this lack of palatability, many interviewees commented that alternative drinks were preferred by both Indigenous and non-Indigenous residents in remote communities:

> *The water is quite hard … people don't want to drink it because it doesn't taste very good, so then they start substituting it for other things like soft drink or cordial or something like that … you do find, when you travel bush, all the whitefellas are drinking bottled water. (Indigenous organisation representative #2).*

Responsibility for providing both water and wastewater supplies and treatment is often provided by water utilities or other service providers to the property boundary. From there, the remote community manages the water to the house water meter, and the house-based water functions are managed by the housing provider. The high turnover in staff in remote communities around Australia was noted to limit the ability to maintain the water treatment infrastructure *in situ*:

> *You get quite a changeover of staff, so no-one gets to manage the treatment plant to the level required to bring suitable quality of water … there was one stage there where [a community] gave up on the treatment for a while because [they] couldn't get anyone appropriately qualified to manage it … (Government representative #6).*

Sanitation (wastewater)

Challenges exist in the use of reticulated wastewater treatment facilities, and in the required ongoing maintenance, staff capacity and funding. One issue raised by the majority of the interviewees was the high rate of blockages in the waste pipes from the household toilet to the treatment plant - noted as being more prevalent in remote communities than in the general community. The items that were noted to be blocking pipes included excessive amounts of toilet paper in a single flush and non-flushable items such as clothing (particularly underwear), items used for menstrual hygiene (both feminine hygiene products and alternatives, such as rags and socks), and babies' nappies. Three reasons were suggested by interviewees to explain this high rate of flushed items:

- A lack of toilet paper/lack of ability to buy toilet paper.
- A lack of waste bins in bathrooms and/or regular emptying of bins.
- Private disposal of discrete items:

'people [flush non-flushable items] while they don't have an alternative or an alternative they feel comfortable with… people don't like to hang underwear out on the line where other people can see it' (Research representative #2).

To manage blockages, some respondents described the decision to install macerators and back-up pumps as a literal 'end of the pipe' response prior to the wastewater treatment:

Macerators… can be used for dealing with these gross solids … so if you do have a pump that gets blocked by some rag, or something, [we've] got a standby pump there as well.(Water utility representative #2).

The maintenance of the installed wastewater treatment is highly dependent on the staff both in the communities and those who liaise with these on-ground officers. One response to increase local staffing capacity – and therefore to increase the sustainability of the wastewater treatment plant – has been to build the capacity of the local organisations:

Water [and] wastewater infrastructure is really expensive … $15 million pieces of infrastructure. Government, sometimes, … build and walk away and make assumptions that the Council… will … look after it, maintain it well … [There is a need for] providing practical capacity-building support …. as well as capacity-building to maintain these services through all councils, including the indigenous councils. (Government representative #2).

Hygiene and health

Interviewees described health-related hygiene issues that they had observed of concern in remote Indigenous communities. Overall, hygiene was described by interviewees in two ways: regarding the transmission of disease, and regarding the social setting in which health is impacted by hygiene status and behaviours. On disease transmission pathways, children are often the main transmitters– due to their close physical interactions. This transmission awareness was raised by interviewees with the knowledge that early, chronic infections during childhood are often linked to vulnerability to other diseases in later life:

If you have some sort of skin condition under the age of … five …, by the time you get into your mid to late … 30s or around there, you are at an increased risk of renal disease. (Indigenous organisation representative #2).

Trachoma eye infection is one such disease that is transmitted by infected individuals through contact. It can occur in homes and schools, mostly passed through children, but is rarely found outside remote desert communities:

Australia is the only developed country that has trachoma, and trachoma is mostly in Indigenous communities. (NGO representative #1).

Housing featured in a range of health-related hygiene comments from interviewees. Population growth in remote Indigenous communities has resulted in many communities having a high number of people living in each house. This was described by all interviewees, including:

[In some communities] you're looking often at housing situations where you've got upwards of 20 plus people in a three-bedroom home. [One community] used to have 148 houses for about … 3000 people. So, you're averaging about 18 people per house. (Indigenous organisation representative #1).

Hygiene difficulties from overcrowding included the cost of washing supplies, when used by a large number of the house's residents. This is a challenge in addition to the cultural expectations of sharing assets among family members. Such high populations per house can affect the ability of the toilet and washing facilities to function where overused:

> *The thing is, what are you going to do if you've got 20 or 30 people? The house would need two, three, four toilets– otherwise things are going to start to break down and eventually they do. (Government representative #4).*

These reflections on infrastructure are referred to as 'health hardware' needs - mainly water-based, in-home infrastructure that enables the washing of people and clothes, and improves the ability to prepare food - all of which were described over twenty years ago (Pholeros, Rainow et al. 1993). The interviewees provided a range of responses that reflected their understanding of the direct link between functioning health hardware and the hygiene and health of the community residents:

> *If you want to improve [social] outcomes for people, they need to be able to have a shower, have a good workable toilet, and wash their clothes … [in] all the public housing, there are no washing machines …. it's really important for [hygiene, so] a lot of services just go around washing people's blankets. (Indigenous organisation representative #2).*

The interviewees described the current status of health hardware in the houses of remote communities where they worked. They described the hardware as being absent or insufficient, damaged by bore water, of low quality, or poorly maintained, such as:

> *The major issue is poor construction and maintenance of housing … Very quickly, … pipes get blocked, … washing machines stop working. So, basically things like the capacity to wash kids, wash bedding and so on, gets impacted on really quickly. (Research representative #1).*

Many residents were described by interviewees as waiting significant lengths of time for repairs to their health hardware, with this lack of repair identified as being the responsibility of specific agencies that owned and managed the houses. Several programs have been established that repair health hardware in homes, and/or repair washing machines.

DISCUSSION

The key WASH findings are displayed in Table 1. These have strong similarities to those presented by Healthabitat several decades ago (Pholeros, Rainow et al. 1993), indicating a significant lack of progress.

Table 1. Key WASH challenges
Drinking water
Microbial contamination
Chemical contamination (naturally-occurring)
Infrequent monitoring
Bore water unpalatable and unaesthetic
High staff turnover
Sanitation
High rate of toilet blockages
Lack of local staff in-community
Hygiene
Transmission of infectious disease (e.g. trachoma)
Crowding in homes
Health hardware malfunctioning/disrepair

The results identified that a number of the determinants of health influence each other. This suggests that the management approach to improve health needs to address these interactions. Figure 1 seeks to clarify these interactions and support a holistic perspective for managing WASH to improve health outcomes in remote Indigenous communities. Healthy behaviours in the home are influenced overwhelmingly by the layer regarding household size – and the impacts from overcrowding. In turn, the functionality of the heath hardware influences whether the house's residents can routinely perform these desirable health behaviours. Surrounding the inner layers is the availability of water and wastewater services to the community. These four interlinked levels of WASH services operate in the context of two important foundations: a strong desire to live on traditional country in these remote settings, and the persistent traumatic legacy of colonisation.

This Figure is presented with examples of effective contributions that have enhanced the WASH status at each of these layers: some government programs are continuing to fund long-term and well-maintained water and wastewater treatment services; other government programs are providing health hardware repairs and upgrades in communities.
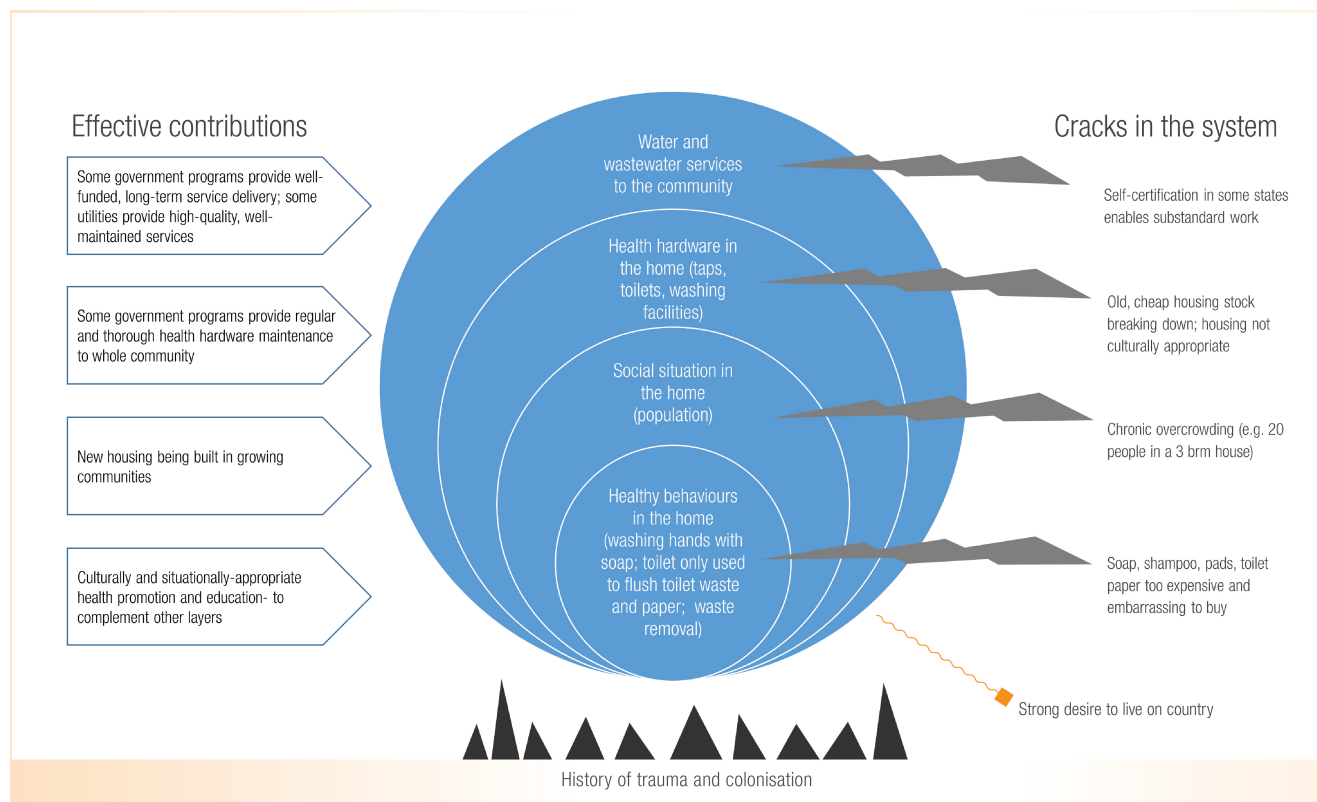
Effective contributions

Some government programs provide well-funded, long-term service delivery; some utilities provide high-quality, well-maintained services

Some government programs provide regular and thorough health hardware maintenance to whole community

New housing being built in growing communities

Culturally and situationally-appropriate health promotion and education- to complement other layers

Water and wastewater services to the community

Health hardware in the home (taps, toilets, washing facilities)

Social situation in the home (population)

Healthy behaviours in the home (washing hands with soap; toilet only used to flush toilet waste and paper; waste removal)

Cracks in the system

Self-certification in some states enables substandard work

Old, cheap housing stock breaking down; housing not culturally appropriate

Chronic overcrowding (e.g. 20 people in a 3 brm house)

Soap, shampoo, pads, toilet paper too expensive and embarrassing to buy

Strong desire to live on country

History of trauma and colonisation

Figure 1. Proposed approach to consider the integrated layers of water, sanitation and hygiene in remote Indigenous communities

To reduce the prevalence of overcrowding, new housing is being built in communities that are at capacity populations. At the central layer of the Figure, health promotion efforts to increase hygiene-related healthy behaviours have been introduced.

'Cracks in the system' that affect WASH status at each of these layers are also included in this Figure. At the water and wastewater service layer, self-certification in some jurisdictions can enable substandard work. At the layer of health hardware, existing homes can be old, poorly-maintained and/or have cheap infrastructure that does not function; hygiene-related whitegoods such as washing machines may not function. At the house population level, overcrowding appears to be chronic in many communities, with regular mentions of up to 20 people in a three-bedroom home. At the central layer of healthy behaviours, the cost, access and availability of items such as soap, toilet paper and feminine hygiene products often remains prohibitive. The importance of taking this systems approach to understanding the interlinkages between each of these four layers was described by an interviewee:

[It's about] being respectful and having some

knowledge about what the issues are that people face … being gentle around why it's hard to have toilet paper and soap in your house all the time. It's not about blaming people; it's about finding a way and prioritising what's the most important thing to do and again helping with access to that. (Indigenous organisation representative #3).

CONCLUSIONS

This scan of water, sanitation and hygiene status in remote Indigenous communities was undertaken within the context of implementing the United Nations' SDGs - particularly SDG 6. It identified areas requiring priority attention in terms of drinking water, sanitation and hygiene in the remote communities of many states and territories.

This small study did have limitations, and further research is recommended to expand the number of participants and consider service delivery in specific contexts.

Some final key observations that summarise the need and pathway to best deliver these WASH services in remote Australian Indigenous communities were provided by the interviewees:

- Address and action the 'familiar story' of poor water, sanitation and hygiene standards in remote communities: *'This is not new stuff. You know, you can look back and do some research for decades and what I'm telling you today is what was being said 20 years ago, so it's not like any of this is new' (NGO representative #1).*
- Raise expectations for WASH services in remote communities: *'What you find is, non-indigenous people who go out to communities quickly lower their expectations to what's the prevailing norm. … You're in Australia … so the benchmark … is an urban [clinic] in Darwin or Sydney' (Research representative #2).*
- Take time to create the right partnerships: *'To make something like this work, it takes some years to listen and to see what's happened, and to survey the conditions … [bring together] all the interested government agencies and all levels of government …to develop a course of action [to] address the need' (Government representative #1).*
- Enable hygiene-related health behaviours through providing appropriate infrastructure and funding: *'[Hygiene] is to do with people's behaviour, but it's also to do with the infrastructure that's provided before behaviour sets in. You need to be careful about where the blame goes' (Research representative #3).*

The Australian water industry, in collaboration with the other service providers and policymakers, may consider this systems approach as they seek to build collaborative, long-term, high-impact improvements in remote Indigenous communities – and thus respond to the UN Sustainable Development Goal 6 of ensuring water and sanitation (and hygiene) for all.

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Dr Nina Lansbury Hall is a researcher on environmental health within The University of Queensland's School of Public Health. She conducts research and teaching on responses to complex issues around the sustainable and integrated development, including management and use of water and energy resources with social, environmental and economic considerations. This includes communicating water, renewable energy and health-relevant research findings into policy outcomes with stakeholders, which covers research on community engagement, behaviour change and policy analysis. Her current research at UQ examines the implementation challenges and opportunities for the UN Sustainable Development Goals; and sustainable provision and evaluation of water, sanitation and hygiene in development.

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