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ORIGINAL ARTICLE

The 5C model: A proposed continuous quality improvement framework for volunteer dental services in remote Australian Aboriginal communities

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Abstract

Objectives: Aboriginal and Torres Strait Islander communities in remote parts of Australia are some of the most underserviced communities in regard to oral health care. These communities rely on volunteer dental programmes such as the Kimberley Dental Team to fill the gaps in care, however, there are no known continuous quality improvement (CQI) frameworks to guide such organizations to ensure that they are delivering high-quality, community-centred, culturally appropriate care. This study proposes a CQI framework model for voluntary dental programmes providing care to remote Aboriginal communities.

Methods: Relevant CQI models wherein the (i) behaviour of interest was quality improvement, and (ii) the health context was volunteer services in Aboriginal communities were identified from the literature. The conceptual models were subsequently augmented using a 'best fit' framework and the existing evidence synthesized to develop a CQI framework that aims to guide volunteer dental services to develop local priorities and enhance current dental practice.

Results: A cyclical five-phase model is proposed starting with consultation and moving through the phases of data collection, consideration, collaboration and celebration.

Conclusions: This is the first proposed CQI framework for volunteer dental services working with Aboriginal communities. The framework enables volunteers to ensure that the quality of care provided is commensurate with the community needs and informed by community consultation. It is anticipated that future mixed methods research will enable formal evaluation of the 5C model and CQI strategies focusing on oral health among Aboriginal communities.

KEYWORDS
community health services, dental care, health promotion, health services, indigenous, quality improvement, volunteers

1 | INTRODUCTION

Providing adequate access to timely dental care to Aboriginal or Torres Strait Islander communities (hereafter respectfully referred to as Aboriginal as preferred by our Kimberley colleagues) is both a challenge and a national priority and there remains an urgent need to develop alternative strategies to improve the oral health of remote Aboriginal communities.[1] Oral health status has shown to decline as remoteness increases and this is compounded by factors such as reduced access to fluoridated drinking water and higher levels of food insecurity.[2] Despite this trend, 83% of the Australian dental workforce is employed in private practice and the majority (65%) working in major cities.[2] The services available to remote Aboriginal communities vary for each community and include itinerant public dental services, care though an Aboriginal Community Controlled Health Services (ACCHS) and/or ad hoc visits by external agencies such as the Royal Flying Doctor Service or visiting non-government organizations (NGOs).[2] ACCHS strive to provide holistic and culturally responsive health care and approximately two thirds of Aboriginal people access dental care through ACCHS.[2,3] However, not all ACCHS have a dedicated dental clinic and staffing along with funding constraints have limited the service provision to identified priorities such as dental care.[3] Volunteer-led services have therefore been employed as an adjunct to 'fill the gaps' and extend dental care to remote Aboriginal communities in a similar capacity to other isolated and underserved communities globally.[4]

The Kimberley region of Western Australia (WA) includes some of the most remote communities in the world with almost half of the resident population identifying as Aboriginal.[5] The WA state-run Dental Health Service is available in larger towns in the Kimberley but is supported by only 5.0 full time equivalent (FTE) dentist positions covering approximately 35000 people spread over 400000 km^2.[6] As reflected internationally, even where access to these services is available, they may be under-utilized due to culturally inappropriate styles of service delivery or feelings of mistrust and insecurity that resulting from ongoing intergenerational trauma as a result of colonization including social and cultural marginalization and loss of land.[7] Community concerns around the number of children with toothache at school and the unmet need for dental care in the East Kimberley, thus sparked the formation of the Kimberley Dental Team (KDT) a non-government, volunteer-led team in 2009. Building the relationship between the community, local school and dental volunteers was integral to this formation and laid the foundation for the KDT model. Volunteering with KDT is now an annual event where rotating teams of volunteers from across Australia, typically spend a week each in the Kimberley over a period of up to 3 months to provide dental health education and treatment to remote communities by invitation. The key tenets of the KDT model include (i) community-based oral health promotion shown, (ii) collaboration with community-controlled health services, (iii) integration with University curricula, (iv) dynamic service delivery models, and (v) strategic leadership as detailed in Table 1.

Although increasing access to services is beneficial, there is a growing need to embed continuous quality improvement (CQI) into existing models of care to ensure a high quality of care is being provided. This is reflected by the National Framework for Continuous Quality Improvement in Primary Health Care for Aboriginal and Torres Strait Islander People which emphasizes the importance of CQI in planning and prioritizing improvements that are commensurate to the specific needs of Aboriginal communities.[8]

There is a plethora of research around quality improvement in Aboriginal primary health care,[9,10] however, there is little to no data around CQI in Aboriginal oral health and to date there are no documented quality assessment tools for dental programmes operating in remote Aboriginal communities. A specific framework informed by the relevant literature and the experience of existing services would facilitate more specific interventions and service developments in Aboriginal oral health. This study aims to synthesize both the existing evidence and uses the KDT as an example to construct a CQI framework that guides volunteer dental services to develop local priorities and enhance current dental practice.[11–15]

TABLE 1 Key tenets of the Kimberley Dental Team (KDT) model.

Community-based oral health promotion	'Strong Teeth for Kimberley Kids' supervised school toothbrushing programme
	School-based screening and triage by dental volunteers
Collaboration with existing health services	Partnership with community-controlled health services facilitating holistic management of patients
	Cooperative use of existing infrastructure such as fixed clinics or consulting rooms
	Dedicated KDT Aboriginal oral health officer and community liaisons
Integration with curriculum	Supervised dental student outreach placements
	Training and attracting new dental graduates into remote area dental practice
Dynamic service delivery models	Services are adaptive to community needs and demand through a multi-faceted hub and spoke model
	Mobile dental units used to increase the reach of services to remote communities
Leadership and governance	Governance framework built from community consultation
	External reference and steering committee which informs the programme and its future direction

2 | METHODS

The BeHEMoTh strategy[16] (Behaviour of interest; Health context; Exclusions; Models or Theories) was followed to identify relevant CQI models wherein the (i) behaviour of interest was quality improvement, and (ii) the health context was volunteer services in Aboriginal communities. Models not pertaining to CQI or not relevant to Aboriginal communities were excluded. Following BeHEMoTH guidelines, the literature was interrogated and theories that prioritized CQI in the context of Aboriginal health were identified.[16] An iterative process was followed involving familiarization with the literature leading to the conduct of a scoping review on CQI in Indigenous oral health.[17] Subsequently, a 'best fit' framework as described by Carroll and colleagues, was used to synthesize the available evidence in regard of its theoretical relevance.[18] This process provides a rapid and pragmatic means of synthesizing the literature to generate a model relevant to researchers and policymakers.[18] The synthesis led to the proposition of a CQI model extending the previous a priori frameworks; however, this is still informed and limited by the epistemological interpretations gained from the existing qualitative literature and the research team's experience working with Aboriginal communities in the Kimberley for over a decade.

3 | RESULTS

The Plan-Do-Study-Act (PDSA) process and more context-specific Audit and Best practice for Chronic Disease (ABCD) model were identified to be conceptual models that were most applicable to Indigenous oral health.[10,17] Interrogating the literature revealed five key themes: consultation, collection, consideration, collaboration and celebration all deemed to be integral to CQI for volunteer dental services to remote Aboriginal communities. Evidence synthesis then led to the proposed cyclical 5C framework, shown in Figure 1 with each phase detailed below.

3.1 | Phase 1: Consultation

The literature supports our own experience that community consultation and 'yarning' are strongly valued in breaking down barriers and better informing culturally secure care.[13,14,19] Multidimensional issues such as shame that impact negatively on healthcare behaviours can only be understood through a process of consultation and yarning that strongly influence subsequent strategies to improve care.[13] The CQI process must foster a culture of mutual learning and knowledge exchange through bi-directional collaboration between the community, clinicians and researchers.[20] Notably, cultural awareness alone does not lead to better health care, rather linking cultural understanding with strategic action leads to cultural security.[21] For example, the KDT Aboriginal Oral Health Officer along with local community champions are pivotal in ensuring cultural security through their role in supporting informed consent for dental procedures, overcoming barriers to care such as transport and liaising care plans with families.[22]

Community priorities should be the focus of volunteer services with planning and implementation being conducted as an equitable partnership with the community.[11] For example, the oral hygiene pamphlets used by KDT were designed in consult with the community and included artistic depictions of local landscapes and people as seen in Figure 2. This creates a sense of community ownership which is critical towards (i) directing culturally secure services, (ii) creating a lasting and sustained change in the absence of volunteer involvement, and (iii) empowering the community.

In the context of volunteer-based care to Aboriginal communities, consultation within the organization is equally as important as community consultation to identify current strengths, weaknesses, opportunities and overall strategic direction of the organization. At its core, CQI is a team process having been described as both a culture and an attitude that requires contributions from each volunteer and the synthesis of ideas from the overall volunteer team.[23] This is underlined by the National Framework which states that 'CQI is everyone's business'.[8(p10)]

3.2 | Phase 2: Collection

Good policy is driven by good data and as noted by Dyson, a methodical approach to the collection, collation, evaluation and feedback of clinical data is an essential part of sustaining good quality measures in any setting, with Aboriginal communities being no exception.[24] A recent systematic review details specific quality measures that have been described in primary dental care.[25] These have been categorized by the domains suggested by the Institute of Medicine (IoM) namely safety, effectiveness, timeliness, patient-centredness, efficiency and equity.[26] As the workforce, goals and services rendered by volunteers can vary from conventional dental models of care, additional quality measures need consideration as proposed in Table 2. Most quality measures and KPIs captured by service providers tend to be quantitative in nature, in so doing the lived experience of the patient is often overlooked. Therefore, capturing qualitative information through yarning as described in Phase 1 is equally important in informing policy and practice. The lack of qualitative data is exacerbated by the structural constraints of a working in a dental clinic that is siloed from the wider community: 'the dentists…they're afraid to speak to people that's why they wait for people to come to the hospital and open the door'.[13]

3.3 | Phase 3: Consideration

In the consideration phase, mapping the organizational workflow is critical to visually understanding the inputs, outputs, external influences and interactions that occur within a volunteer organization.

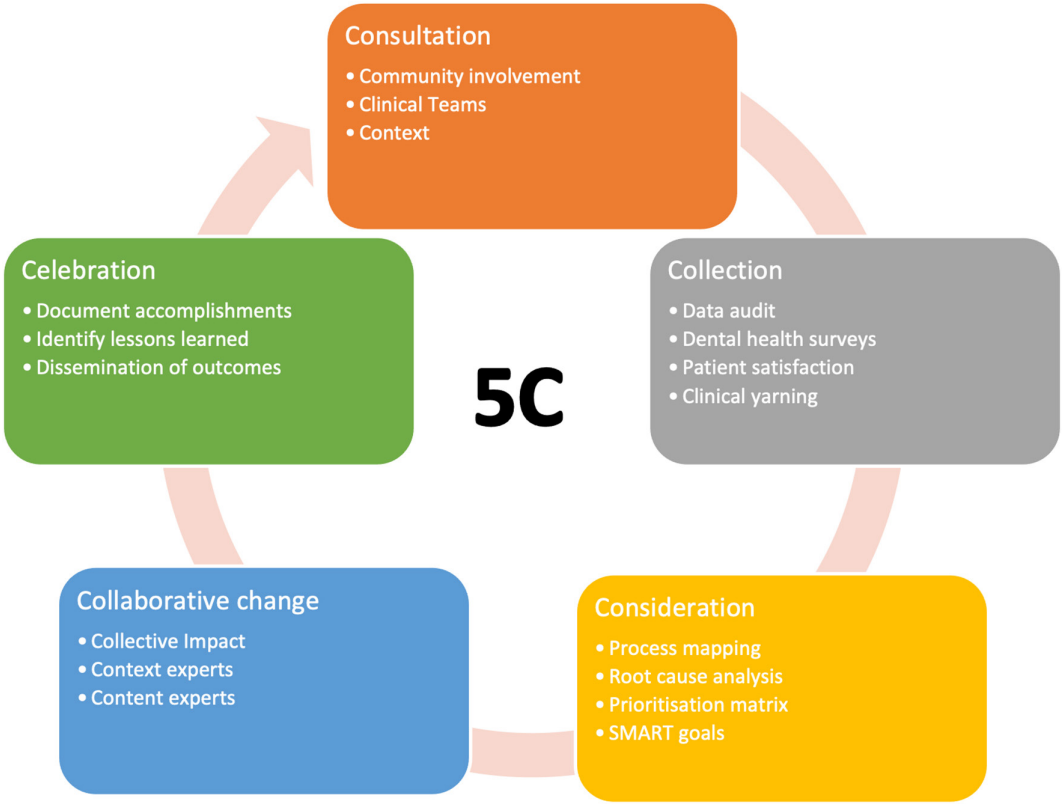

FIGURE 1 5C Continuous quality improvement model.

As asserted by Deming 'The first step in any organization is to draw a flow diagram to show how each component depends on others. Then everyone may understand what their job is. If people do not see the process, they cannot improve it'.[27]

Several CQI tools can be used in this phase to understand the processes underpinning volunteer service delivery. In its simplest form, a process map can help visualize how the current system works and potentially how a new system should work by mapping each step of the volunteer model. For more detail, a logic model can be constructed to define the input, outputs and outcomes of the volunteer programme. To illustrate this, a logic model for the Kimberley Dental Team has been created and is shown in Figure 3. These elements were developed through an iterative process in discussion with the KDT board and external steering committee based on existing knowledge of community need, volunteer activity and interaction with community stakeholders. This logic model can be used to identify the strategies used by KDT and visualize the programme inputs, resources, activities, outputs and the anticipated outcomes at clinical, operational and executive levels.

During the consideration phase, volunteers should consider three components that build on the importance of community consultation and engagement: why an initiative seeks to work with community members; how to amplify the voice of community; and how to strengthen feedback loops within the community.[28] The responses to these questions form part of the ongoing iterative CQI process to understand what is currently working and what could be improved to strengthen the programme.

3.4 | Phase 4: Collaborative change

Once the CQI strategies have been considered it is critical that changes are not acted upon in a silo. Collaboration is key towards sustaining change in Aboriginal communities and a collective impact methodology has been shown to be successful in this regard.[29] Collective impact is a collaborative approach to addressing complex social issues, consisting of five conditions: a common agenda; continuous communication; mutually reinforcing activities; backbone support; and shared measurement.[30] Although seemingly successful, this approach has been criticized for inequity and not including the voices of community members in seeking change.[30] The 5C model addresses this by starting the CQI process with community consultation and reinforcing this involvement in the shared collection of data to ensure community ownership and empowerment within the process. During the CQI process the expression of context experts and content experts and their interaction need to be considered.[28] Furthermore, the views of community members may be different to those of the volunteers or programme leaders and a lack of meaningful connection may lead to feelings of tokenism and disrespect.[28] Therefore, in providing volunteer services to remote Aboriginal communities, the community members themselves act as the context experts and carry the lived experience. On the other hand, the clinicians, volunteer leadership team and community CEOs are likely to be content experts who have expertise on the structural and service elements at play. A collaborative approach between content and context experts allows both the community

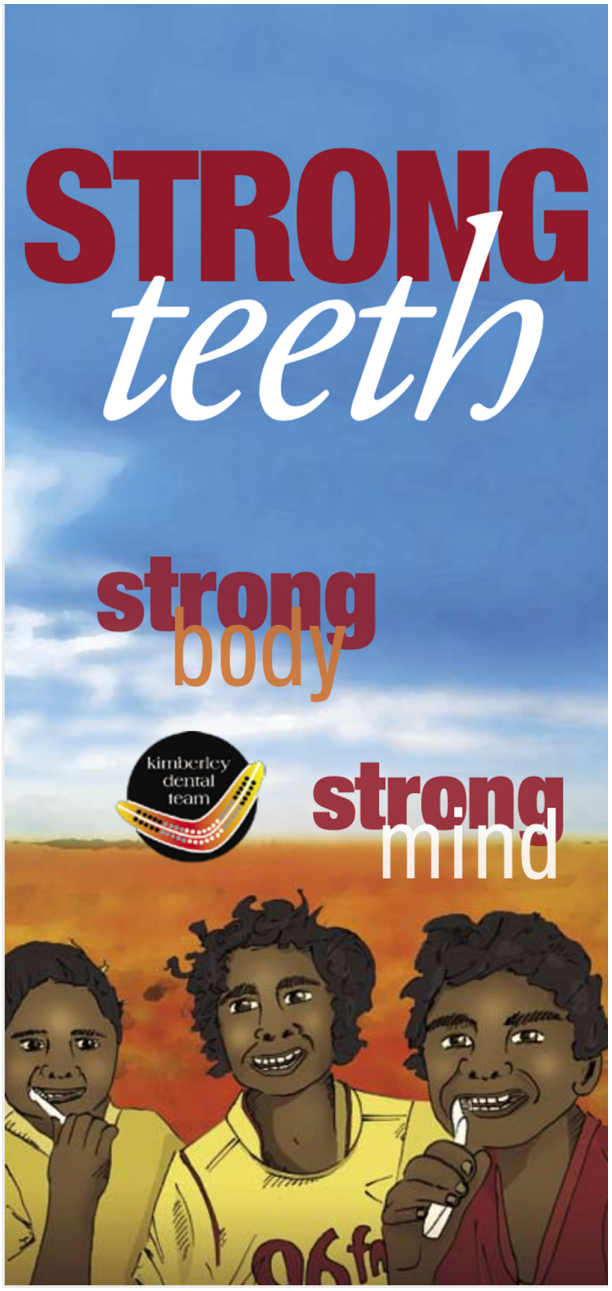

FIGURE 2 Community-led design of oral health material.

voice to be heard while leveraging the drive and resources provided by the volunteers.

Evidently, the need for a community-driven approach is central to achieving a sustained outcome among Aboriginal communities. Nevertheless, some CQI strategies may be internally governed such as the dentist to nurse ratio or makeup of a volunteer team.

3.5 | Phase 5: Celebration

The culture, commitment and enthusiastic spirit within volunteer organizations makes them unique to the rest of the workforce. However, this spirit is not infinite and the motivational drivers behind volunteering vary from altruism to self-satisfaction.[4,15] Nevertheless, once a CQI initiative has been implemented and evaluated it can often go unnoticed because the improvement is not acknowledged or celebrated both by the organization or the wider community. Thus, the first step in celebration is to document accomplishments and identify the lessons learnt from the CQI process, these can be in the form of team newsletters, social media posts or updating website content. Further to this, recognition of achievement is a powerful tool that can strengthen volunteer engagement, increase satisfaction and boost motivation and community confidence.[31,32] This is a critical step towards creating a culture of continuous improvement and is often overlooked in health care. Conventionally, celebration is thought of as a dedicated event or festival but in the context of CQI, celebration should be more about an emotional and meaningful connection with the change created. Re-engaging with those consulted in Phase 1 to disseminate and discuss the outcomes achieved is therefore a valuable experience. This inevitably lends itself to community engagement and acknowledging the impact of CQI together and thereby restarting the 5C cycle.

TABLE 2 Potential quality of care measures for volunteer-led dental teams.

Structural	Use of Mobile Dental Units[a]
	Dentist: Nurse ratio[b]
	Hub and Spoke model[a]
	Fly in fly out services[a]
	Payment structure[a]
	Education-service integration[a]
	Specialist-led services[b]
Process	Length of volunteer visits[a]
	Volunteer recruitment strategies[a]
	Provision of specialist services[a]
	School-based education sessions[a]
	Types and frequency of clinical services provided[b]
	Number of communities visited[a]
	Time spent by volunteers on clinical activity[a]
Outcome	Patient satisfaction[b]
	Oral health related quality of life changes[a]
	Reduction in surgical procedures[b]
	Rate of repeat volunteers[a]
	Ratio of untreated to treated carious lesions[a]
	Plaque scores[a]
	Emergency vs routine procedures[b]
	Rate of complications[b]

[a]Proposed measures adopting to the dental volunteering in the context of remote Aboriginal communities.
[b]Adapted from Byrne et al.[25]

4 | DISCUSSION

Oral health interventions targeting Aboriginal communities have all too often failed to create an lasting impact.[11] One of the underlying reasons for this is the implementation of top-down approaches

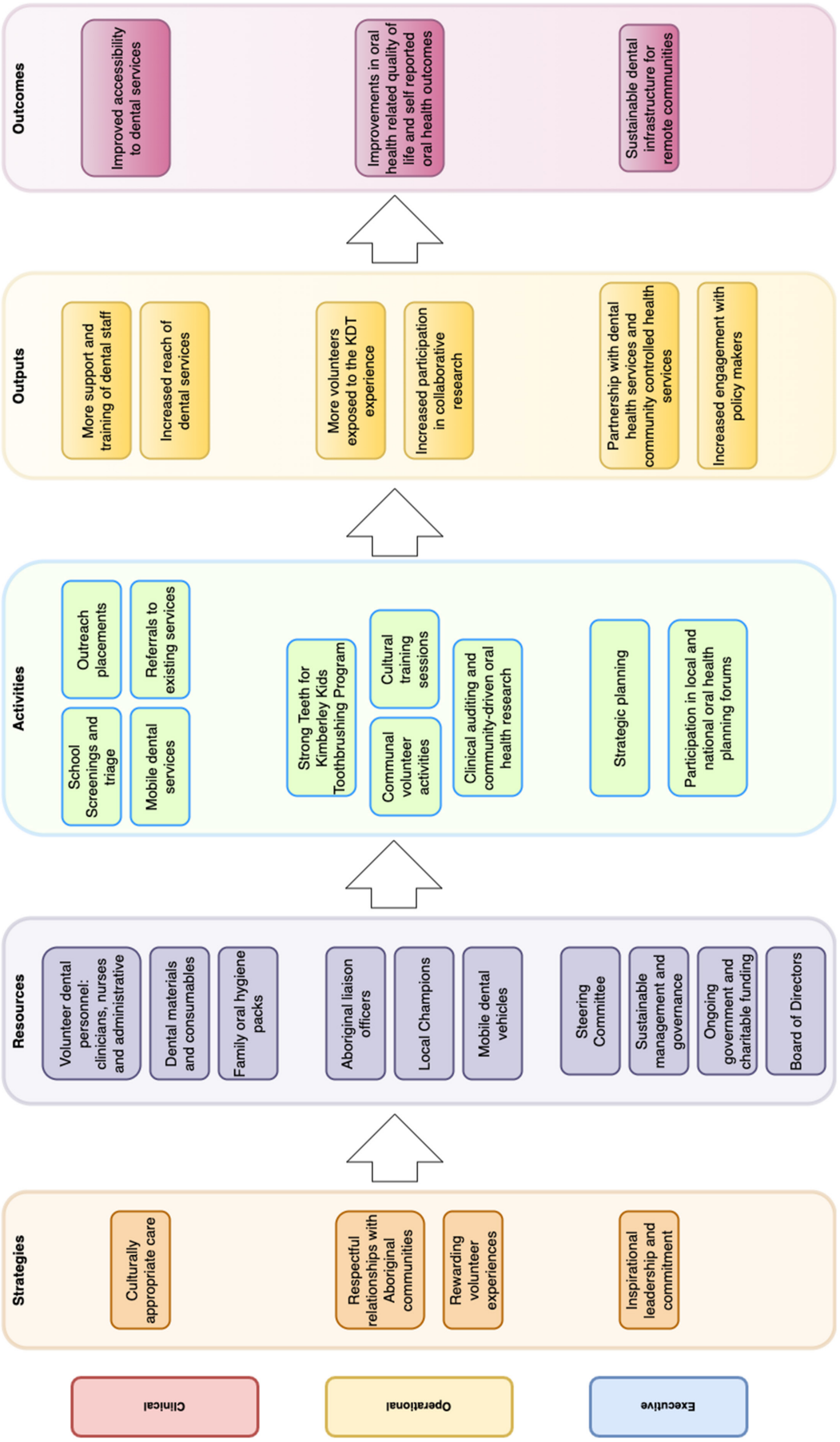

FIGURE 3 Logic model of the Kimberley Dental Team programme showing the inputs, activities and anticipated outcomes at executive, operational and clinical levels.

applied through a colonial lens without adequate community and stakeholder involvement.[13,33] A simple concept such as recommending daily toothbrushing may seem easy and effective to implement but this relies on clean running water, appropriate storage, a mirror, and access to toothbrushes and fluoridated toothpaste. Assumptions of resource availability, which are appropriate in a metropolitan setting, are not always translatable into remote Aboriginal communities where issues such as housing, poverty and education may significantly impact on healthcare behaviours.[33] Phase 1 of the 5C model, consultation, involving the community's Elders and members of the community is thus vital in building trust, acceptance, understanding and respect. During consultation, it is also critical to consider kinship networks without assuming that there is only one spokesperson for a community, as this responsibility may be distributed across multiple kinship groups.[34]These members have gained recognition as custodians of knowledge and lore, and yarning can often identify local priorities.[35] In the case of the Kimberley for example, the regularity and predictability of a service was perceived to be more important than the organization or clinicians that ran the service.[13]

Volunteer dental organizations are uniquely positioned when compared to conventional dental services. They are typically developed with altruistic intentions to fill gaps in current services and are based on the leadership of a small group of individuals. The treatments provided are largely symptomatic focusing on relief of pain and constrained by intermittent volunteer visits.[4] Furthermore, the available funding and volunteer commitment also limits the nature and extent of volunteer services.[13] Volunteer organizations, therefore, must balance the advantages and disadvantages of the workload posed by initiating CQI strategies, collecting additional data and undertaking subsequent outcome evaluation. Nevertheless, good-quality data are central to the CQI process and subsequent evaluation.

A significant emphasis has traditionally been placed on measuring outcomes as part of evaluation. For this to be achieved, additional data need to be captured by volunteer organizations beyond routine clinical records. Examples include disease level indicators such as changes in Decayed, Missing and Filled Teeth (DMFT) and community index of periodontal treatment needs (CPITN) over time with increased patient satisfaction and reduced plaque scores often used as measures of success. However, this additional data collection can place undue burden on volunteer teams and rely on patient follow-up while being more prone to bias than structural or process measures. Therefore, to assist implementation, incorporating data collection and analysis into care as seen in the ABCD model, which uses annual cycles of assessment and feedback in the form of clinical audits and a web-based data entry and reporting system may ease the burden on volunteer teams.

4.1 | Strengths and limitations

This study proposes a CQI framework for volunteer dental services working with remote Aboriginal communities. The framework was constructed using evidence synthesis augmenting existing theoretical models such as PDSA with the existing literature and the research team's own experience working with Kimberley communities. Although many elements of the 5C model have been used to good effect by organizations, including KDT, the model itself remains to be formally tested. Nevertheless, it has been constructed in a way that enables translation beyond Kimberley communities. Furthermore, CQI is still an emerging field in dentistry. A recent systematic review suggests that few quality measures used in dentistry have undergone validity or reliability testing.[25] Patient satisfaction surveys for example, are widely used but do not reflect the values and priorities of Aboriginal communities.[36] Similarly, further research is required to develop quality of care measures in dentistry related to cultural security. Although the best-fit framework synthesis as used in this study is pragmatic and evidence-based, using a wider literature base and gaining the views of a range of external stakeholders will be important in proving the legitimacy and external validity of the synthesis. There is a pressing need for culturally appropriate CQI derivatives, and it is anticipated that adoption and testing of the 5C model will support the development of quality metrics that are reflective of the unique cultural and environmental context of remote Aboriginal communities.

4.2 | Position of the team

The research team has a diverse range of backgrounds. All authors have substantial experience in Aboriginal research and two authors have direct experience with the Kimberley Dental Team (JP, RL). The team comprise Aboriginal (RL) and non-Aboriginal authors (JP, BN, AD, SN, EK, LSS). RL's input as a community navigator for the East Kimberley region and the chair of the Jungarni-Jutiya Indigenous Corporation is important in informing this work. Team experience, along with our previous qualitative research[13,14] ensures that the lived experiences, needs and voice of the Aboriginal community are incorporated into the overall 5C framework and are at the forefront of CQI.

5 | CONCLUSION

Volunteer dental services represent a unique segment of the workforce; typically they provide high levels of clinical productivity, work in difficult and challenging environments and are passionate about improving outcomes being driven by altruistic ideals.[15] However, the short periods spent in communities combined with desire to deliver maximum productivity may present a disconnect between volunteer ambition and community need. This proposed CQI framework therefore enables volunteers to ensure that the quality of care provided is commensurate with the community needs and informed by community consultation. Embedding CQI into service delivery also encourages providers to continuously question, consult and strive towards improving services rather than simply providing more of the same. The 5C CQI framework pools together current evidence and experience to guide volunteer dental service delivery in remote Aboriginal communities. It is

anticipated that future mixed methods research will enable formal evaluation of the 5C model and CQI strategies focusing on oral health among Aboriginal communities.

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CONFLICT OF INTEREST STATEMENT

Dr Jilen Patel is a director of the Kimberley Dental Team (KDT) Board. This is an unpaid and voluntary position, nevertheless any reporting bias has been mitigated by using external authors and investigators who do not have any involvement with KDT. Furthermore, a variety of data sources have been used to present the material in this study which has been the subject of external review.

DATA AVAILABILITY STATEMENT

The data that support this study has been previously published, no new data sets were created from this study.

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