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Burn injury models of care: A review of quality and cultural safety for care of Indigenous children

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Abstract

Safety and quality in the systematic management of burn care is important to ensure optimal outcomes. It is not clear if or how burn injury models of care uphold these qualities, or if they provide a space for culturally safe healthcare for Indigenous peoples, especially for children. This review is a critique of publically available models of care analysing their ability to facilitate safe, high-quality burn care for Indigenous children. Models of care were identified and mapped against cultural safety principles in healthcare, and against the National Health and Medical Research Council standard for clinical practice guidelines. An initial search and appraisal of tools was conducted to assess suitability of the tools in providing a mechanism to address quality and cultural safety. From the 53 documents found, 6 were eligible for review. Aspects of cultural safety were addressed in the models, but not explicitly, and were recorded very differently across all models. There was also limited or no cultural consultation documented in the models of care reviewed. Quality in the documents against National Health and Medical Research Council guidelines was evident; however, description or application of quality measures was inconsistent and incomplete. Gaps concerning safety and quality in the documented care pathways for Indigenous peoples' who sustain a burn injury and require burn care highlight the need for investigation and reform of current practices.

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TITLE

Burn injury models of care: *a review of quality and cultural safety for care of Indigenous children*

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ABSTRACT

Safety and quality in the systematic management of burn care is important to ensure optimal outcomes. It is not clear if or how burn injury models of care uphold these qualities, or if they provide a space for culturally safe healthcare for Indigenous peoples, especially for children. This review is a critique of publically available models of care analysing their ability to facilitate safe, high-quality burn care for Indigenous children. Models of care were identified and mapped against cultural safety principles in healthcare, and against the National Health and Medical Research Council standard for clinical practice guidelines. An initial search and appraisal of tools was conducted to assess suitability of the tools in providing a mechanism to address quality and cultural safety. From the 53 documents found, 6 were eligible for review. Aspects of cultural safety were addressed in the models, but not explicitly, and were recorded very differently across all models. There was also limited or no cultural consultation documented in the models of care reviewed. Quality in the documents against National Health and Medical Research Council guidelines was evident; however, description or application of quality measures was inconsistent and incomplete. Gaps concerning safety and quality in the documented care pathways for Indigenous peoples' who sustain a burn injury and require burn care highlight the need for investigation and reform of current practices.

HIGHLIGHTS

- Gaps exist in the current burn injury models of care for Indigenous peoples
- Burn injury models of care do not explicitly address cultural safety
- Further work is needed to develop guidelines that appropriately manage cultural safety

KEYWORDS

- Burn
- Indigenous
- Safety
- Quality
- Models

INTRODUCTION

Around the world, burn injury is a leading cause of morbidity[1], with children particularly at risk[2, 3]. People living in lower to middle income countries[1, 2, 4] and those who identify as Indigenous[4-8] are at greater risk of burn injury. Australian research has shown a greater proportion of Aboriginal than non-Aboriginal children sustain full thickness burns and burns affecting more than 20% of the total body area[9], similar to the increased incidence of burn injury for Aboriginal peoples living in non-metropolitan areas of Canada[5]. Health services continue to struggle to provide appropriate care to marginalised peoples[10] and this coupled with the over representation of burns in such populations, can challenge health systems globally to effectively resource and deliver suitable care.

Burn care is a collaborative and multidisciplinary process that, depending on burn severity, may require specialised facilities staffed by experts in burn care[11]. The specialised nature of burn care often results in hospital admission[1], frequent and sustained follow-up care and rehabilitation[12]. This specialist, multidisciplinary burn care required for good outcomes is guided by various system and service documents. One key set of documents include those relating to the clinical management of burn injury. These documents are usually discipline specific and guide health professionals in their provision and decision making regarding direct clinical care[13].

In contrast to these more clinical documents, guidance relating to overall system and service contexts for burn care is provided through burn injury models of care.

Models of care are not discipline specific nor do they have a specific clinical focus. A model of care is more of a multifaceted concept which broadly defines the way health services are enacted and delivered[14]. Models of care outline evidence-based, best practice patient care delivery through the application of a set of service principles across identified clinical streams and patient flow continuums [14]. While such principles are commonly recognised, ambiguity continues to exist regarding a strict definition of what constitutes a model of care [15]. For the purpose of this review, a model of care will be defined as an evidence informed philosophical document that provides an overarching framework for burn injury management for a given jurisdiction.

Though models of care for burn injury exist, what constitutes evidence based best practice burn care from this overall system and service perspective remains unclear. Primary research describes specific aspects of burn care, for example post-acute care and the use of

telehealth[16, 17], education and follow-up[18] and the medical management of a burn injury[19]. Apart from a national review of burn care in the British Isles there is little literature that critiques and maps *overall* burn care for any given jurisdiction; the British Isles review stresses an urgent need for a coherent national burn care strategy[20]. Overall, it is unclear if existing international, or in particular Australian burn injury models of care purporting to represent best practice, are evidence informed, or have been evaluated to assess their ability to facilitate safe and high-quality care.

Safety and quality are implicit in models of care and are equally important for consumers of care as well as for health systems, services and professionals. High quality healthcare facilitates increased effectiveness and efficiencies[21]. This is true for the clinical component of burn management in regards to increased efficiencies in Australian jurisdictions[18, 22, 23]. Internationally, governmental commissions inform safety and quality in healthcare[24-27]. In Australia, the Australian Safety and Quality Framework Health Care informs a vision for safety and quality in healthcare[28]. Frameworks such as these provide guidance and aim to achieve safety and appropriateness of healthcare in partnership with consumers[29]. Specific quality improvement documents exist for burn care[30]. How the concepts of safety and quality have been achieved, relate to or provide specific guidance to the systems and service management of Indigenous peoples with a burn injury remains unclear.

Differences in knowledge systems exist[31]. Science, a dominant global knowledge system, is in stark contrast to Indigenous knowledge systems of knowing, being and doing[32]. An important consideration where healthcare is directed at Indigenous people, is how safety may also relate to cultural competency and cultural safety. Cultural competency is the skill and capacity of healthcare professionals and systems to respond to cultural differences[33]. Cultural safety is an experiential, contextual theory developed by Maori in the New Zealand healthcare context to address the ways in which colonial practices, organisations and policy shape and negatively affect the health of Maori peoples[34]. The theory has since been adopted in other countries including Canada[35] and Australia[33], with evidence of improved healthcare outcomes [33]. Similarly, outcomes following a burn injury are associated with many factors[36-40] and extends beyond simple issues of timely access to high-quality and specialist care. Within the context of burn care and for Indigenous peoples, cultural safety or lack thereof, also contributes to health outcome. As such, it is anticipated that if a burn injury model of care is of a high-quality and provides opportunities for health services and professionals to enact care that is culturally competent, there is potential for better health outcomes for those receiving care. Effective examples of culturally competent models of burn care are poorly described in the literature.

This review aims to describe the existing Australian and international burn injury models of care that guide burn care management, particularly that of Indigenous children, and to critique and assess these models of care for their ability to facilitate safe, high-quality burn care.

METHODS

Search strategy

The search strategy included evidence syntheses and grey literature. The research focus and relevant search terms were developed iteratively in consultation with a supervisory group and refined during the literature search process. An initial search was conducted of the electronic databases: CINAHL, Scopus, Informat, and Web of Science. Keywords included: burn* AND "model of care" OR "practice guideline" OR "practice framework" OR "care standard". Additional key papers, guidelines, care standards, models of care and policy documents were sourced from health organisations and relevant associations as well as a search through reference lists and in Google Scholar. Literature was included if it reported on the system and service perspective of burn injury, with any focus on paediatrics or the care of Indigenous peoples. Because this review focuses on burn care from a systems and service perspective, literature limited to descriptions of the clinical management of burn injury were excluded, as were literature limited exclusively to adult patient care. This review reports in narrative form, a critique of documents from a wide variety of sources.

Analysis framework

In addition to the variable definitions of what constitutes a model of care, there also exists no specific tool for use to critique and appraise models of care. It is also important to acknowledge that Indigenous health knowledge cannot be verified by Western biomedical knowledge, nor can science be adequately assessed according to the tenets of Indigenous knowledge. Each is built on distinctive philosophies, methodologies and criteria[31]. The writing team consisted of Indigenous and non-Indigenous researchers: extensive discussion occurred to determine an analysis framework that interfaced the two knowledge systems. Interface research endeavours to eliminate the power imbalances and ensure equal embedding of knowledge systems. In the absence of a suitable overarching analysis framework to critique models of care and compounded by the complexities of different

knowledge systems, two tools were chosen following an appraisal of different tools: one reflecting Indigenous theory and the other for analysis of scientific aspects.

Indigenous health knowledge was considered through the cultural safety principles (Table 1) in healthcare as described by Taylor and Guerin[41]. The principles enable a critique of the documents in terms of how they consider Indigenous ways of knowing, being and doing[32]. Deductive analysis was used to assess how burn injury models of care provide or not, opportunities for healthcare professionals to enact culturally competent care.

Western biomedical knowledge was critiqued through the National Health Medical Research Council (NHMRC) standards for clinical practice guidelines[43]. Given models of care require quality and safety in healthcare to be met, these guidelines (Table 2) are appropriate and can be transferred and applied to enable a critique of the models of care.

RESULTS

The search (Figure 1) resulted in six documents being identified (Table 3). Whilst not all documents were titled a 'model of care', they each meet the inclusion criteria. That is, they provided an overarching philosophical framework for burn care from a systems perspective for a specific jurisdiction. They also had the potential to guide the provision of care for Indigenous peoples and children.

Cultural safety analysis

Overview

Cultural safety was addressed in this review first to ensure the review was not privileging Western biomedical knowledge.

Table 1 – Cultural safety principles [41,42]

Principle	Definition	In-Practice
Reflexivity	reflect on practice, mutual respect	established processes for health professionals to actively reflect on practice
Dialogue	true engagement and consultation	building rapport and dialogue with family alongside consideration of kinship arrangements and decision making structures, particularly as they relate to children
Power	minimising power differentials and maintaining human dignity	including Indigenous health workers in multidisciplinary teams mechanisms to address issues of implicit bias amongst multidisciplinary team members
Decolonisation	acknowledging the key role of a colonising history in contemporary health outcomes for Aboriginal and Torres Strait Islander peoples	ensuring equity in health care to achieve equity in health outcomes
Regardful care	provide care that is regardful of culture and challenges the status quo of providing care that is regardless of culture	patient-centred care; where the context for the child and their family drives care decisions

Table 2 – NHMRC standards for clinical practice guidelines [43]

	Standards
Clinical justification	provide guidance on a clearly defined clinical problem based on an identified need
Multidisciplinary	be developed by a multidisciplinary group that includes relevant experts, end users and consumers affected by the clinical practice guideline
Conflicts	include a transparent process for declaration and management of potential conflicts of interest by each member of the guideline development group
Scientific evidence	be based on the systematic identification and synthesis of the best available scientific evidence
Recommendations	make clear and actionable recommendations in plain English for health professionals practising in an Australian healthcare setting
Navigation	be easy to navigate for end-users
Consultation	undergo a process of public consultation and independent external clinical expert review; and
Dissemination	incorporate a plan for dissemination including issues for consideration in implementation

Deductive analysis was used to assess how each of the principles introduced in Table 1 were addressed in the identified models of care (Table 4). The analysis identified marked differences between documents with respect to recording the principles of cultural safety, with both documentation of both direct and indirect guidance for healthcare professionals providing care that may/may not be experienced as culturally safe.

Principles

Only two of the documents[44, 45] addressed all five cultural safety principles and not one principle was addressed by all six documents. **Reflexivity** examples were found in four models of care[44-47] and highlighted the need for health professionals to reflect on their practice, however were not specifically focused on Indigenous or other cultural needs. Quality improvement activities were at the core of reflexivity. Almost all of the documents addressed the cultural safety principle of dialogue[44-47, 49]. '**Dialogue**' is a principle in this review that refers to health service and professional ability to partake in and enable engagement and consultation with patients and families. Concepts of dialogue in the documents related to all aspects of the burn patient care journey; prevention[46], admission[49], inpatient[44, 45, 47], discharge[44, 47, 49] and rehabilitation[44, 47].

The concept of **power** as a cultural safety principle in minimising power differentials and maintaining human dignity was identified in almost all of the models[44, 45, 47-49]. At the core of this principle, was the empowerment of patients and their family. The power relations that models of care set-up between clinicians and families, however makes true power equilibrium unlikely. Furthermore, the influence of power on healthcare interactions may make empowerment doubtful.

Almost all of the documents[44-46, 48] indirectly considered **decolonisation** by acknowledging the key role of a colonising history in contemporary health outcomes for Indigenous peoples. The models mostly described consideration of factors beyond having a purely medical focus and providing equitable care as addressing the cultural safety decolonisation principal. All documents addressed the provision of **regardful care** including the provision of holistic care[44, 45] and culturally sensitive care[47].

NHMRC standards for clinical practice guidelines analysis

Overview

Deductive analysis was used to assess how the documents met the NHMRC standards for clinical practice guidelines.

Table 3 – Identified documents reviewed

Origin	Contributor/Author	Title	Date	Focus
Europe	European Burns Association[44]	European Practice Guidelines for Burn Care	Version 3 2015	Guidelines applicable for adults and/or children with a burn injury.
United Kingdom	National Network for Burn Care[45]	National Burn Care Standards	Revised January 2013	Standards cover the whole of the burn care pathway and take account of the specific needs of children and adults.
Australia	Department of Health, State of Western Australia, Injury and Trauma Health Network[46]	Burn Injury Model of Care	2009	Proposed models of care for Burn Injury for all WA burn injured patients. Adult and paediatric.
Australia	NSW Agency for Clinical Innovation[47]	NSW Statewide Burn Injury Service Model of Care	2011	The model of care has been designed to address the provision of burn care for adult and paediatric patients. Where specific requirements for burn care for paediatric patients have been identified, these have been indicated in the relevant areas of the model.
Australia	SA Health, Women's and Children's Hospital[48]	Paediatric Burns Service Guidelines	Updated 2014	The Paediatric Burns Service is responsible for inpatient and outpatient treatment of children up to 16 years of age.
Canada	The Montreal Children's Hospital[49]	The management of pediatric and adolescent burn trauma	Revised 2014	Guidelines for the management of child burn trauma.

Table 4 – Cultural safety analysis

Principle	Europe[44]	UK[45]	Australia (WA)[46]	Australia (NSW)[47]	Australia (SA)[48]	Canada[49]
<p>Reflexivity <i>reflect on practice, mutual respect</i></p>	<p>Rigorously evaluated burn services.</p>	<p>Rigorously evaluated burn services to improve efficiency, effectiveness and safety of burn care. Feedback from patients and families on quality of care and experience is required, with mechanisms to receive this feedback and a review process.</p>	<p>Rigorously evaluated provision of care.</p>	<p>Rigorously evaluated provision of care to identify unmet needs and the appropriateness of clinical practice guidelines.</p>	<p>None recorded.</p>	<p>None recorded.</p>
<p>Dialogue <i>true engagement and consultation</i></p>	<p>Family counselling sessions and family/burn team consultations are facilitated.</p> <p>Discharge and rehabilitation is patient centred.</p> <p>Discharge plan goals are agreed upon with family to meet their needs.</p> <p>Discharge information is written and verbal, including illustrations with adjustment made for cultural background.</p> <p>Healthcare professionals listen and answer questions with sensitivity to personal beliefs and</p>	<p>Families have information about their care and access to an interrupter.</p>	<p>Burn injury prevention strategies include design for remote Indigenous communities using Indigenous language and communication methods.</p>	<p>Patients and their families are central to decision making processes.</p> <p>Care plans are developed in consultation with families and reflect their needs. Family are central to the decision making process.</p> <p>Discharge and rehabilitation is patient centred.</p> <p>Rehabilitation processes consider whole patient and family unit, including community.</p>	<p>None recorded.</p>	<p>Trauma team explain processes and provide comfort.</p> <p>Discharge plan completed in consultation with the family.</p> <p>Written information available to take home.</p>

	values. Care is demonstrated to families prior to discharge.					
Power <i>minimising power differentials and maintaining human dignity</i>	Healthcare professionals activate parental coping strategies. Healthcare professional consider non-pharmacological pain interventions.	Mutually agreeable care plans are developed.	None recorded.	Healthcare professionals negotiate care, and facilitate informed decision making.	Healthcare professionals promote confidence in parental ability and psychosocial well-being of parents to ensure their optimal ability to care.	Treatment approach and plan done with family. Family is provided regular feedback and encouraged to participate in processes. Healthcare professionals prepare the family well for discharge to home.
Decolonisation <i>acknowledging the key role of a colonising history in contemporary health outcomes for Aboriginal and Torres Strait Islander peoples</i>	Full consideration of patient and caregiver factors and an awareness of the impact, complications and contraindications of various treatment modalities are made when implementing scar management regimes. When discharging, healthcare professionals take into account the family's ability to care and the situation at home.	Service and healthcare professional compliance with documented standards ensures equitable care.	Prevention strategies use local research and consult with Indigenous communities to develop Indigenous specific burn injury strategies. An Aboriginal Health Impact Statement stated to have considered the needs and interests of Aboriginal people.	None recorded.	Healthcare professionals facilitate a psychosocial assessment that includes past experiences of trauma, family dynamics, cultural and socio-economic factors, barriers to coping and family strengths and supports. Healthcare professionals support families with aspects which have been impacted by the child's injury and admission to hospital.	None recorded.
Regardful care <i>provide care that is regardful of culture and challenges the</i>	Burn care, including care plans and patient management, follows a holistic approach.	Families have access to a Patient Advisory Liaison Service or equivalent and spiritual	E-health technologies are used to alleviate distance, transport, accommodation and	Burn care meets the patient's needs. Burn care follows a	The social worker undertakes a thorough psychosocial assessment in order to	Objective of model of care to provide patient and family focused care.

<p><i>status quo of providing care that is regardless of culture</i></p>	<p>Psychosocial and rehabilitative interventions provide individualised care according to patients' and family needs, with special attention to consideration of culture.</p> <p>Healthcare professionals promote strategies to keep family's everyday routine and social life.</p> <p>Transport is available from hospital to home and for follow-up visits.</p> <p>Health and rehabilitation services are available in the community.</p> <p>Social workers provide ongoing support of a family's social needs, including the facilitation of communication, coordination of resources, and financial aspects and issues of employment and relationships.</p>	<p>support.</p>	<p>cost issues for families having to travel from rural and remote areas for expert burn care.</p> <p>Burn prevention is considered, such as campfire burn, particularly for the Indigenous 0-4 year age group.</p> <p>Targeted education programmes and resources that are environmentally and culturally appropriate for rural and remote health professional, Aboriginal health workers, Aboriginal health services and Community groups must be developed</p>	<p>holistic approach, including the care plans.</p> <p>The social worker undertakes a thorough psychosocial assessment in order to review family history, cultural and socio-economic factors, risk factors, barriers to coping, as well as family strengths.</p> <p>Availability of step down or sub-acute facilities that are linked to acute services particularly for rural and remote patients that are unable to be discharged to a supported home environment local to the acute burn unit ambulatory care services is necessary.</p> <p>If a peer support program is available, it must take into account geographical location and cultural sensitivity</p>	<p>review family history, cultural and socio-economic factors, risk factors, barriers to coping, as well as family strengths.</p>	
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Table 5 – NHMRC Standards analysis

Standards	Europe[44]	UK[45]	Aus (WA)[46]	Aus (NSW)[47]	Aus (SA)[48]	Canada[49]
<p style="text-align: center;">Clinical justification</p> <p><i>provide guidance on a clearly defined clinical problem based on an identified need</i></p>	<p>Management of a burn injury is considerable and complex, delivered by a multidisciplinary team over a period of time.</p> <p>Burn injury requires specialised care, and co-ordinated care to achieve optimal health outcomes.</p>	<p>It is essential to have a set of standards that are relevant to the current health systems.</p>	<p>A model of care provides guidance to stipulated jurisdiction where burns are a major cause of injury.</p> <p>There is high incidence of burn injury in vulnerable groups, especially in young children. 0-4 years are most at risk.</p> <p>Indigenous peoples experience higher hospitalisation rates for burn related injury compared to non-Indigenous people.</p> <p>Socio-economic factors including low income, single parents, illiteracy, low maternal education, unemployment, job loss, poor living conditions, not owning a home, not having a telephone, and overcrowding all account for greater risk of burn injury.</p> <p>There is increased incidence of burn injury in rural areas compared to metropolitan areas</p>	<p>Management of a burn injury is considerable and complex, often requiring hospitalisation and extensive and continuous rehabilitation.</p> <p>Identified needs included incidence of burn injury and at risk populations.</p> <p>There is a relative high incidence of burn injury, some resulting in death, and many requiring hospitalisation; with a high proportion of young children requiring hospitalisation.</p>	<p>Management of a burn injury is considerable and complex, often requiring hospitalisation and extensive and continuous rehabilitation.</p>	<p>General references to burn injury requiring specialised services for care.</p>
Multidisciplinary	Developed by three	Developed by the	Acknowledged	Input from medical,	Listed the paediatric	Contributions and

<p><i>be developed by a multidisciplinary group that includes relevant experts, end users and consumers affected by the clinical practice guideline</i></p>	<p>committees, had members across several different countries in Europe and comprised medical, nursing and allied health professionals.</p>	<p>Burn Care Networks for England and Wales, NHS Specialised Commissioners, Patient Representatives and the British Burn Association.</p> <p>Comments from the wider burns community by circulating the draft revised standards to the BBA membership. Although many people contributed towards these revisions the majority of the work was undertaken by an expert multidisciplinary group. Multidisciplinary team consisted of medical, nursing allied health, quality consultants, Patient Organisation Representative, burn database personnel.</p>	<p>contribution of representatives from the: WA adult and paediatric burn unit; Injury Prevention Working Group; Injury Control Council of WA; WA Drug and Alcohol Office; Kidsafe WA; WA Country Health Service South West Health Region; Royal Life Saving Society WA; and the DoHWA Population Health Division and Health Network Branch.</p>	<p>nursing and allied health clinicians involved in the care of patients with severe burn injury and burn survivors. One consumer was listed.</p>	<p>burns service multidisciplinary team; consisting of medical, nursing and allied health.</p>	<p>collaboration was with a team of multidisciplinary experts and end users.</p>
<p>Conflicts</p> <p><i>include a transparent process for declaration and management of potential conflicts of interest by each member of the guideline development group</i></p>	<p>None recorded.</p>	<p>None recorded.</p>	<p>None recorded.</p>	<p>None recorded.</p>	<p>None recorded.</p>	<p>None recorded.</p>
<p>Scientific evidence</p>	<p>No systematic process documented.</p>	<p>No systematic process documented.</p>	<p>No systematic process documented.</p>	<p>A health corporation engaged healthcare professionals,</p>	<p>No systematic process documented.</p>	<p>No systematic process documented.</p>

<i>be based on the systematic identification and synthesis of the best available scientific evidence</i>				managers and the wider community to design, promote and implement.		
Recommendations <i>make clear and actionable recommendations in plain English for health professionals practising in an Australian health care setting</i>	Provided a set of minimum level burn care requirements, and included checklists and documented the evidence for any recommendations made.	Organised into seven clear sections. Included the evidence required to achieve compliance to the standards.	12 recommendations regarding burn care from an overall jurisdictional service perspective. Recommendations for healthcare professionals were clear, in plain English with flowcharts.	Provided an initial framework outlining model, followed by clear overarching burn injury management recommendations for specific jurisdiction.	Included flowcharts, diagrams and referral documents. Clear clinical care pathways for emergency management, burn wound assessment, wound management, infection control, pain relief and physio/occupational therapy.	Included flowcharts, diagrams, protocols and discharge documents.
Navigation <i>be easy to navigate for end-users</i>	Document aligned to a literature review	Recommendations made as to how to achieve the standards from a service perspective.	Flowcharts and images.	Clear and set into easily defined areas of burn care recommendations.	Used flowcharts and images, and included referral forms and contact details.	Used flowcharts and included protocol documents for specific healthcare professions.
Consultation <i>undergo a process of public consultation and independent external clinical expert review;</i>	Invitation to all of those involved in burn care or interested people to expression their opinions.	Sought comments from the wider burns community by circulating draft revised standards to the burn association membership.	None recorded, however proposed model of care only.	Initial development was undertaken by the NSW Severe Burn Service Implementation Group. 2nd edition reviewed by the ACI Burn Injury Network (Statewide Burn Injury Service). Development of the Model of Care included input from medical, nursing and allied health clinicians involved in the care of patients with severe burn injury and burn survivors.	None recorded.	None recorded.

Dissemination <i>incorporate a plan for dissemination including issues for consideration in implementation</i>	None recorded.	None recorded.	Extensive list recorded.	None recorded.	None recorded.	None recorded.
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The analysis found the guidelines were met differently across the documents, with no one document meeting all eight. All documents contained clear and actionable recommendations for health services and healthcare professionals, however the processes used for development of the documents were mostly unrecorded.

Standards

All documents highlighted some **clinical justification** for a burn injury model of care and all provided guidance for burn injury management from injury through to rehabilitation by specialists in multidisciplinary teams. Two of the five documents[46, 47] specifically identified need for a burn injury model of care, and other needs included incidence of burn injury and at risk populations. All documents were developed by teams of **multidisciplinary** healthcare professionals, with one document listing a consumer[47]. It was not clear how the teams contributed or how the contributors were designated to this role. The NHMRC [43] calls for a declaration of **conflicts**; however, there were no declaration of potential writer conflicts in the development groups, nor documentation of management of potential conflicts by contributors in any of the reviewed documents. Furthermore, it was not clear if there was equal participation between contributors as only one of the documents[47] recorded a systematic process of development [47].

The NHMRC[43] also require models be based on the best available **scientific evidence**, however there was inconsistency between documents with respect to the references used and not all aspects of care were referenced. One document[44] highlighted a lack of rigorous evidence for some aspects of burn care and suggested clinical consensus was used to inform practice. Conversely another document[47] reported the application of evidence-based practice was essential to achieve positive patient outcomes.

The documents all made specific **recommendations** in plain English relevant to their jurisdiction for healthcare professionals. The Canadian[49] document was available in French (a legal requirement in Canada), however no other model was offered in a different language. The end-users of these documents are the health service and healthcare professionals. For ease of **navigation**, all documents were separated into different sections either by profession or burn management stage, however overall presentation and inclusion of detail varied. Different methods of **consultation** and review were implemented in the documents. Three documents[44, 45, 47] that sought review by wider membership did not report a process for responding to feedback. Two documents[46, 48] did not specify a consultation process, although one of these was a proposed model of care and may engage a consultation process further on. The incorporation of a plan for dissemination including

issues for consideration in implementation was not recorded in any of the documents, aside from one[46]. This document was a proposed model and recorded an extensive implementation list. In a report by the Government of Western Australia[50], the burn injury model of care has reached a level of substantial implementation; meaning that most of the recommendations of the model of care have been implemented.

DISCUSSION

This review provides a unique critique of burn injury models of care with a focus on Indigenous children, from a quality and safety perspective using both Indigenous health knowledge and Western biomedical knowledge. The review is limited by the possibility that other burn injury models of care may exist but were inaccessible for the purpose of this review. Furthermore, it is acknowledged that health services and healthcare professionals are influenced by other documents that may not fit within the confines of a model of care per se, but rather sit alongside. This is especially true for profession specific guidance and related regulatory requirements. Lastly, no child specific cultural safety analysis framework was identified for use in the analysis.

Burn care can be complex and require a multidisciplinary approach over extended periods. The care of a child in the context of a family and taking into consideration growth and development heightens the complexities of burn care. The care of Indigenous peoples requires the inclusion of holistic approaches to care that sit outside of Western biomedical models. There is clear opportunity in burn care for improvement, with increased focus on patient needs[46].

Burn injury models of care are multifaceted documents that guide the way burn care is delivered in a specific jurisdiction[44-49]. It is implicit these models of care address quality and safety across all aspects, including in their development in order to facilitate such care. Culturally competent models of care consider concepts of health that extend beyond the Western biomedical health system. This guidance allows for the provision of equitable care; in contrast to care being based entirely on equality. This review demonstrated that publicly available burn injury models of care do not address all aspects of quality and safety.

Quality in models of care

The NHMRC standard for clinical practice guidelines[43] provides a framework to analyse burn injury models of care from a quality perspective; however this framework lacked consideration of culture. Overall, quality was difficult to determine due key indicators of

quality being in part or completely absent in the documents addressed by the review. There were no clear descriptions of how the synthesis of best available evidence informed the documents, making comparisons difficult. Best practice recommendations do exist[51-57], however where and how these recommendations have translated into the reviewed burn injury models of care was unclear.

The American Burn Association facilitates a verification process for burn centres detailing overall burn care systems including outcomes, infrastructure and process[58] to enhance quality. Although not US based, none of the models of care reviewed made reference to this standard, or similar accreditation type processes. Furthermore, whilst the models seemed mostly to be created by teams of specialist clinicians, for most, they did not document a process of consultation with external parties. Consultation with external parties, including consumers is important for quality and transparency and provides the opportunity for fair contribution and different knowledge perspectives to be considered. This raises the question that if models of care are mostly clinician informed, how do they incorporate evidence and do they meet the prescribed standards of quality for each given jurisdiction and/or population groups?

Safety in Models of Care

Health outcomes for Indigenous people are more likely to be enhanced when healthcare is experienced as culturally safe[33, 59]. This review demonstrated burn injury models of care address only some of the principles of cultural safety. It is anticipated that if a burn injury model of care provides opportunities for health services and healthcare professionals to enact care that is culturally competent, there would seem potential for better outcomes following a burn injury. Experiences of culturally safe burn care may help ensure improved and ultimately more economical long term outcomes for Indigenous children including through the potential for reduced loss to follow-up, increased access to rehabilitation, more efficient services and increased effectiveness. Consideration of kinship arrangements is necessary to achieve these outcomes. For example, considering beyond a western nuclear family model to a more collective community focus. In the Australian context, the Cultural Respect Framework[60] highlights relevant quality healthcare items relating to Aboriginal and Torres Strait Islander people which includes amongst many items, mechanisms to support the delivery of culturally safe healthcare. It is unclear how the Australian burn injury models of care address items in this framework. Similarly, the ability of health systems and services internationally in providing mechanisms for culturally safe burn injury management is vague.

There appeared to be limited or no cultural consultation in the models of care reviewed and in terms of their development, it is uncertain if any Indigenous people contributed or if they did, in what capacity. One model[46] reported needing to consult with Aboriginal peoples regarding the development of burn injury prevention materials and included an incomplete Aboriginal impact statement. Similarly, where the models provided an opportunity for healthcare professionals to provide care with regard to culture, directions were mostly implicit and not mandatory.

Another emphasis of cultural safety is on the healthcare interaction. While burn injury models of care provide guidance to health services and healthcare professionals from which to enact burn care, the delivery of care and subsequently the healthcare interaction is dependent on the individual. It is the individual health professional's level of empathy and capacity for reflective practice in providing healthcare that is or is not experienced as culturally safe[34]. These qualities contribute to health professionals' understanding of the process of culture, identity and wellbeing and includes reflexivity whereby the health professional acknowledges how power imbalances or relationships contribute to culturally unsafe practice[61]. Therefore, although cultural safety is conceptualised in the healthcare interaction, it is vital that cultural safety principles be manifest in health system and service documents, which in this instance are the burn injury models of care. It is the combination of the ability of burn injury models of care to facilitate safe, high-quality care and the individual health professionals' implementation of that guidance that is a true measure of cultural safety. In addition to the lack of cultural safety in the burn injury models of care reviewed how these prescriptions of care are enacted by healthcare professionals for each jurisdiction has not been explored. As a result, it remains unclear if Indigenous children are receiving safe, high quality burn care from a system, service or individual level.

It is well documented that Indigenous peoples' and those living in rural and remote areas experience burn injury at a higher rate than people living in metropolitan areas[6, 62]. This review also recognised that burn injury models of care provide guidance for the burn care of Indigenous children residing in rural and remote geographical locations without adequate consideration of the availability of healthcare and other services in these communities. Patient assisted transport schemes were addressed in the models and do provide support to those families who experience difficulties related to geographical isolation. These schemes do not address an Indigenous person's connection to country and family, and it is unclear in the models whether or how services might be accessed closer to home in order to minimise the need for travel. Providing services in regional and remote areas can be expensive,

however there is likely to be a significant impact on health and wellbeing when multiple family members are away from home for extended periods of time.

What should a burn injury model of care include?

This review highlighted gaps related to safety and quality in the current burn injury models of care that inform healthcare provided to Indigenous children. The development of a model of care needs consultation with key stakeholders and consumers of care. Furthermore, incorporation of all health knowledge resources and the combination of clinical and cultural aspects is imperative as being culturally secure is critical for Indigenous children's wellbeing. Milroy's[63] dimensions of holistic health: physical, psychological, social, spiritual and cultural could provide the basis for a model of care and has culture as the centre of health as per current National Aboriginal and Torres Strait Islander Health Plan[64]. A focus on 'patient-centred care that is respectful of, and responsive to the preferences, needs and values of consumers' will help facilitate high quality and culturally safe models of burn care[65].

How do we develop a safe, high quality model of care for Indigenous children? The development of a model of care needs consultation with key stakeholders and consumers of care. Cultural safety needs to be reflected and clearly articulated in the documents that guide burn care. To enable such a purposeful approach to cultural safety, expectations of cultural safety need to be embedded in policy, health systems and at service levels. To facilitate the development of such guidance, an accurate account of what guides the burn care delivered in tertiary paediatric burn units across Australia is needed; along with how this guidance is implemented. Durie's principles of research at the interface of knowledge systems[31] are well aligned to the development of a safe, high quality burn injury model of care. These principles include: mutual respect, with recognition of the validity of each system of knowledge; shared benefits, where Indigenous communities share in the benefits; human dignity with cultural and spiritual beliefs and practices reinforced; and discovery where innovation and exploration using Indigenous methodologies and scientific methods work together.

With a safe, high quality burn injury model of care, implemented by cultural competent healthcare professionals, there is the opportunity for equitable health outcomes. There is the chance that a child's readmission to hospital for infection will not occur and a surgeon's skin graft will more likely be successful. Along with these better health outcomes, the effectiveness and efficiency of burn care may be enhanced, and benefits to health system may be achieved.

CONCLUSION

This review has highlighted gaps concerning safety and quality in documented care pathways for Indigenous peoples' who sustain a burn injury and require burn care, and highlights the need for the investigation of current practices in burn units who treat Aboriginal and Torres Strait Islander children. Some, but not all, aspects of cultural competence were addressed in the models. The question still remains, is cultural safety facilitated or mitigated by the application of the guidance? An investigation of current health system and service and practices in the burn units across Australia will provide the basis for the development of a national burn injury model of care that is informed on the premise of mutual respect, shared benefits, human dignity and discovery.

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