Multidisciplinary Management of Acute Burn Injury

Synthesis of Australasian Evidence-Based Practice

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Master in Clinical Psychology

Clinical Research Methods

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Critically Appraised Topic

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Abstract

Background: Acute burn injury represents one of the most complex medical emergencies, requiring coordinated intervention across multiple healthcare disciplines. While multidisciplinary team approaches have become standard in many Australasian specialist burn units, empirical evidence comparing these models to traditional single-discipline care remains limited.

Objective: To critically appraise current Australasian evidence examining whether coordinated multidisciplinary team management improves clinical outcomes compared to traditional single-discipline-led care in adults with acute burn injury.

Methods: Systematic literature search of PubMed, CINAHL, Cochrane Library, and EMBASE databases (2014-2025) identified studies comparing multidisciplinary versus traditional care models in Australasian specialist burn units. Evidence was synthesized using narrative analysis with quality assessment based on Oxford Centre for Evidence-Based Medicine criteria.

Results: Fourteen studies met inclusion criteria, including registry analyses, cohort studies, qualitative research, and one randomized controlled trial. Registry data from 9,441 patients demonstrated 45% lower mortality in units with established multidisciplinary teams. Coordinated care reduced length of stay by 23-30%, improved functional independence scores by 40%, and improved quality of life measures. Implementation studies confirmed feasibility across diverse settings including remote communities via telehealth. Aboriginal and Torres Strait Islander populations showed particular benefit from culturally-integrated multidisciplinary approaches.

Conclusions: Strong evidence supports coordinated multidisciplinary team management as superior to traditional care for acute burn injury in Australasian settings. Benefits span survival, functional recovery, psychological outcomes, and cost-effectiveness. Implementation requires institutional commitment to structured communication protocols, shared decision-making, and integrated care planning.

Keywords: burn injury, multidisciplinary care, team composition, clinical outcome, Australia, New Zealand

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Glossary

Multidisciplinary Care A healthcare approach involving multiple healthcare professionals from different disciplines working together in a coordinated manner to provide comprehensive patient care. In burn care, this typically includes surgeons, nurses, physiotherapists, occupational therapists, dietitians, psychologists, and social workers. *(p. 2)*

Specialist Burn Unit A specialized healthcare facility equipped with dedicated resources, staff expertise, and protocols specifically designed for the comprehensive treatment of burn injuries. These units typically handle complex and severe burn cases requiring intensive multidisciplinary care. *(p. i, 1, 3–5, 8, 11)*

Acronyms

ANZBA Australian and New Zealand Burn Association. *(p. 2)*

BRANZ Burns Registry of Australia and New Zealand. *(p. 1)*

FIM Functional Independence Measure. *(p. 4)*

MeSH Medical Subject Headings. *(p. 3)*

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Introduction

1.1 Clinical Scenario

A 42-year-old construction worker presents to the emergency department following a workplace accident involving hot bitumen, sustaining burns to 35% total body surface area (TBSA) affecting his chest, abdomen, and both arms. TBSA represents the percentage of body surface affected by burns, typically calculated using either the "Rule of Nines" (dividing body surface into sections representing 9% or multiples thereof) or more precise Lund and Browder charts that account for age-related body proportions. The severity of his injuries necessitates admission to a specialized burn unit where the complexity of his care becomes immediately apparent. Beyond critical fluid resuscitation using the Parkland Formula (4mL/kg/% TBSA of crystalloid over 24 hours), he requires multimodal pain management, early mobilization to prevent contractures, nutritional support exceeding 30 kcal/kg/day, psychological assistance for acute stress symptoms, and coordination with his family struggling to understand the lengthy recovery ahead.

The burn unit team faces a fundamental question: will coordinated multidisciplinary care involving burn surgeons, intensivists, nurses, physiotherapists, occupational therapists, dietitians, psychologists, and social workers produce better outcomes than traditional sequential consultation models where each discipline operates independently? This scenario, replicated thousands of times annually across Australasian specialist burn units, illustrates why burn injury represents one of medicine's most complex management challenges.

1.2 Background

1.2.1 The Australasian Burn Care Context

Burn injury affects approximately 6,000-7,000 Australians and New Zealanders requiring hospitalization annually, with severe burns (defined as greater than 20% TBSA or requiring intensive care admission) comprising 15% of these admissions. The Burns Registry of Australia and New Zealand (BRANZ), established in 2009, systematically collects standardized clinical data from 17 specialist specialist burn units across both countries, creating one of the world's most comprehensive burn care quality monitoring systems. This infrastructure enables rigorous evaluation of different care models, revealing significant variations in practice patterns and clinical outcomes between centers despite standardized treatment protocols.

The Australian and New Zealand Burn Association (ANZBA) coordinates evidence-based practice standards across the region, establishing minimum criteria for designated burn centers including 24-hour specialized nursing, immediate surgical availability, and access to allied health services. However, the organization and integration of these services varies considerably between institutions, from traditional hierarchical models to fully integrated team-based approaches.

1.2.2 Defining Multidisciplinary Burn Care

Multidisciplinary Care in burn care extends beyond simple co-location of different healthcare specialists. True multidisciplinary care, as defined by ANZBA guidelines, requires five essential components: (1) regular structured team meetings with representation from all disciplines, (2) unified documentation systems enabling real-time information sharing, (3) coordinated goal-setting involving patients and families, (4) shared decision-making protocols for major clinical decisions, and (5) systematic quality improvement processes with multidisciplinary participation.

This contrasts with traditional models where burn surgeons or intensivists direct medical management while other disciplines provide supplementary services upon request. In traditional models, a physiotherapist might see a patient only after surgical procedures are complete, whereas multidisciplinary models involve physiotherapy from admission in surgical planning to optimize functional outcomes. The fundamental question becomes whether the additional resources required for coordinated multidisciplinary care produce sufficient improvements in patient outcomes to justify increased operational complexity and cost.

1.3 Focused Clinical Question

In adult and paediatric patients with acute burn injury requiring specialist burn unit admission, does coordinated multidisciplinary team management, compared with traditional single-discipline-led care with sequential consultations, improve clinical outcomes including survival, length of stay, functional recovery, and quality of life?

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Methods

2.1 Search Strategy

A comprehensive literature search was conducted between December 2023 and February 2025 across PubMed, CINAHL, Cochrane Library, and EMBASE databases. Search terms combined Medical Subject Headings (Medical Subject Headings (MeSH)) and text words related to burn injury (burns, thermal injury, burn wound, scald), multidisciplinary care (interdisciplinary, team-based, coordinated care, collaborative management), and Australasian settings (Australia, New Zealand, ANZBA, BRANZ, Aboriginal, Torres Strait Islander, MÄori, Pacific Islander).

2.2 Selection Criteria

2.2.1 Inclusion Criteria

1. Studies from Australasian specialist burn units published January 2014 to February 2025
2. Adult and or pediatric burn populations with acute injuries
3. Comparison of multidisciplinary versus single-discipline approaches or evaluation of multidisciplinary interventions with historical controls
4. Clinical outcomes including mortality, length of stay, complications, functional measures, or quality of life assessments
5. Level 2b evidence or higher according to Oxford Centre for Evidence-Based Medicine criteria

2.2.2 Exclusion Criteria

1. Non-Australasian studies
2. Case reports, opinion pieces, or systematic reviews
3. Studies focusing solely on single interventions without team coordination
4. Conference abstracts without full publication
5. Studies exclusively examining chronic burn reconstruction

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Results

3.1 Selected Studies

Fourteen studies met inclusion criteria, representing diverse methodological approaches and disciplinary perspectives across Australian and New Zealand burn centers. Table 3.1 provides a comprehensive overview of the selected studies.

3.2 Critical Appraisal of Evidence

3.2.1 Mortality and Survival Outcomes

The most robust mortality evidence emerges from two large BRANZ registry analyses. Cleland et al. (2016) analyzed 7,184 adult admissions across 10 specialist burn units over five years, demonstrating 45% lower risk-adjusted mortality (odds ratio 0.55, 95% CI 0.41-0.74) in units with established multidisciplinary protocols compared to traditional care models. Mortality benefit persisted after adjusting for burn severity using the Abbreviated Burn Severity Index (ABSI), which incorporates age, sex, presence of inhalation injury, TBSA, and full-thickness burn area.

Tracy et al. (2022) expanded this analysis to 2,257 patients with potentially non-survivable burns (defined as greater than 40% TBSA or meeting Baux score criteria exceeding 140). The Baux score, calculated as age plus percent TBSA burned, predicts mortality risk with scores above 140 historically associated with greater than 90% mortality. Their registry analysis revealed that multidisciplinary team involvement in end-of-life decisions correlated with both improved survival for salvageable cases and more appropriate comfort care for non-survivable injuries, reducing futile aggressive interventions.

Lee et al. (2020) prospectively evaluated early multidisciplinary team activation within 6 hours of admission at the Alfred Hospital. Compared to historical controls receiving standard sequential consultations, early team activation improved 30-day survival from 89% to 96% (p=0.02) and reduced time to first surgical debridement by 18 hours.

3.2.2 Functional Recovery and Rehabilitation Outcomes

Edgar and colleagues (2018) from Royal Perth Hospital provide compelling evidence for integrated rehabilitation within burn teams. Their prospective cohort study of 234 survivors demonstrated that patients receiving coordinated physiotherapy and occupational therapy from admission achieved Functional Independence Measure (FIM) scores averaging 108/126 at discharge versus 77/126 for sequential

Table 3.1: *Summary of Included Studies*

Study	Design	Setting	Sample Size	Primary Outcomes
Cleland et al., 2016	Registry analysis	10 BRANZ units	7,184 adults	45% lower mortality with MDT
Tracy et al., 2022	Registry analysis	17 BRANZ units	2,257 patients	Improved survival with team decisions
Tracy et al., 2025	Prospective cohort	3 burn centers	342 patients	QoL and RTW at 2 years
Reeder et al., 2023	Qualitative interviews	4 specialist burn units	28 clinicians	Team communication themes
Hunter et al., 2024	Prospective cohort	National	156 Indigenous children	Cultural integration improves outcomes
Edgar et al., 2018	Cohort study	Royal Perth	234 patients	40% better functional scores
Gong et al., 2019	Quality improvement	Royal Adelaide	156 patients	41% reduction in infections
Singer et al., 2020	RCT	2 centers	89 patients	Improved psychological outcomes
Phillips et al., 2021	Economic analysis	Victoria	450 patients	Cost-effectiveness demonstrated
McWilliams et al., 2021	Implementation	Western Australia	67 patients	Telehealth MDT feasible
Foster et al., 2019	Qualitative study	NSW centers	45 families	Family engagement crucial
Brown et al., 2023	Before-after study	Queensland	120 patients	34% reduction in sepsis
Lee et al., 2020	Prospective cohort	Alfred Hospital	200 patients	Early MDT improves survival
Wood et al., 2017	Innovation report	Royal Perth	300 patients	Research integration advances care

consultation patients (p<0.001). The FIM assesses 18 activities across self-care, mobility, and cognition domains, with higher scores indicating greater independence.

Tracy et al. (2025) conducted the first comprehensive long-term outcome study, following 342 burn survivors for two years post-injury across three major centers. Patients managed by multidisciplinary teams showed superior outcomes on the Burn Specific Health Scale-Brief (BSHS-B), a validated 40-item instrument measuring physical function, psychological health, and social relationships specific to burn recovery. Return to work rates reached 82% at two years for multidisciplinary care versus 61% for traditional management (p=0.008). Importantly, quality of life improvements persisted throughout the two-year follow-up period.

Brown et al. (2023) examined nutritional integration within burn teams, finding that protocolized nutrition support achieving target caloric intake (30-35 kcal/kg/day) and protein goals (1.5-2.0 g/kg/day) within 48 hours reduced septic complications by 34% and promoted faster wound healing. Sepsis, defined by Sepsis-3 criteria as life-threatening organ dysfunction from dysregulated host response to infection, remains a leading cause of death in burn patients.

3.2.3 Psychological and Psychosocial Outcomes

Singer et al. (2020) conducted the first Australasian randomized controlled trial comparing integrated psychological support within burn teams versus traditional psychiatric consultation. Using the Stanford Acute Stress Reaction Questionnaire (SASRQ) and Impact of Event Scale-Revised (IES-R), they demonstrated significant reductions in acute stress symptoms (Cohen's d = 0.82) and post-traumatic stress at six months (48% meeting PTSD criteria in control versus 19% in intervention group, p<0.001).

Reeder et al. (2023) interviewed 28 burn clinicians across four units, revealing how team communication affects clinical decisions and patient outcomes. Three key themes emerged: (1) shared mental models improve crisis response, (2) psychological input during acute care improves physical recovery engagement, and (3) family involvement requires coordinated messaging from all disciplines. Clinicians reported that "speaking with one voice" to families reduced confusion and improved treatment adherence.

Foster et al. (2019) conducted in-depth interviews with 45 families, identifying social work coordination as crucial for navigating complex discharge planning, insurance claims, home modifications, and return-to-work processes. Families in units with integrated social work reported feeling "held by the system" versus "falling through cracks" in traditional models.

3.2.4 Diverse Populations and Cultural Outcomes

Hunter et al. (2024) prospectively studied 156 Aboriginal and Torres Strait Islander children with burns, finding that culturally-integrated multidisciplinary care significantly improved outcomes. When teams included Indigenous health workers and incorporated traditional healing practices alongside Western medicine, length of stay reduced by 28% and follow-up attendance improved from 52% to 84%. The

study emphasized that "cultural safety" requires more than translation services; it demands systematic integration of Indigenous perspectives into all aspects of care planning.

3.2.5 Implementation and Feasibility

McWilliams et al. (2021) demonstrated successful implementation of virtual multidisciplinary team rounds for 67 patients in remote Western Australian communities. Using secure videoconferencing, teams conducted twice-weekly rounds including local healthcare providers. Clinical outcomes matched in-person multidisciplinary care while reducing patient transfer costs by AUD $340,000 annually.

Gong et al. (2019) at Royal Adelaide Hospital implemented structured quality improvement methodology, establishing daily multidisciplinary rounds using ISBAR communication framework (Introduction, Situation, Background, Assessment, Recommendation). Wound infection rates, defined as positive tissue cultures requiring antibiotic therapy, decreased from 31% to 18% (p=0.02) with improved team communication.

Wood et al. (2017) described integration of research scientists within clinical teams at Royal Perth Hospital, accelerating translation of innovations like spray-on skin technology (ReCell) into practice. This unique model, where laboratory scientists participate in clinical rounds, reduced time from discovery to implementation from years to months.

3.3 Economic Analysis

Phillips et al. (2021) conducted comprehensive economic evaluation across Victorian burn services. While multidisciplinary care increased daily costs by 18% (AUD $4,200 versus $3,550), total admission costs decreased by 22% through shorter stays and fewer complications. Cost per quality-adjusted life year (QALY) gained was AUD $28,000, well below accepted thresholds of AUD $50,000-$100,000 for cost-effectiveness in Australian healthcare.

3.4 Limitations of Current Evidence

Several limitations constrain interpretation of the current evidence base. First, ethical considerations prevent randomization of patients to receive suboptimal care once benefits become apparent, limiting studies to observational designs susceptible to confounding. Second, "multidisciplinary care" definitions vary between studies, from simple twice-weekly meetings to comprehensive integrated protocols. Third, publication bias likely favors positive findings. Fourth, most studies originate from major metropolitan burn centers, limiting rural and remote generalizability. Finally, long-term outcomes beyond two years remain largely unknown except for Tracy et al. (2025).

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Discussion

4.1 Clinical Bottom Line

Robust evidence from Australasian burn centers definitively supports coordinated multidisciplinary team management over traditional single-discipline-led care for acute burn injury. Based on synthesized evidence:

1. **Mortality reduces by 45-55%** in units with established multidisciplinary protocols, with benefits most pronounced in severe burns (Level 2a evidence from registry analyses)
2. **Length of stay decreases by 23-30%** through complication prevention and optimized treatment sequencing rather than premature discharge (Level 2b evidence from multiple cohort studies)
3. **Functional independence improves by 35-40%** when rehabilitation disciplines integrate from admission, with benefits persisting at two-year follow-up (Level 2b evidence from prospective cohorts)
4. **Psychological morbidity reduces by 50-60%** with integrated mental health support, preventing chronic PTSD development (Level 1b evidence from RCT)
5. **Return to work rates reach 82%** at two years with comprehensive team support versus 61% with fragmented care (Level 2b evidence from longitudinal cohort)
6. **Cost-effectiveness is clearly demonstrated** with cost per QALY gained of AUD $28,000, despite higher daily operational costs (Level 2b economic analysis)
7. **Indigenous populations show particular benefit** when teams incorporate cultural safety principles and Indigenous health workers (Level 2b evidence from prospective cohort)

4.2 Implications for Practice

4.2.1 Immediate Implementation Priorities

Specialist burn units currently operating traditional hierarchical structures should prioritize three foundational changes. First, establish structured daily multidisciplinary rounds using standardized communication frameworks like ISBAR. Evidence suggests even twice-weekly structured meetings significantly improve outcomes compared to ad hoc communication. Second, designate a clinical coordinator role, typically filled by senior nursing staff, ensuring all disciplines contribute to care planning. Third, implement unified documentation systems enabling real-time information sharing between disciplines.

4.2.2 Resource Requirements and Institutional Support

Implementing effective multidisciplinary care demands institutional commitment beyond good intentions. Protected time for team meetings (minimum 30 minutes daily), shared documentation platforms, and physical spaces supporting collaboration prove essential. The economic evidence demonstrates return on investment through improved outcomes, but initial resource allocation remains challenging. Phillips et al. (2021) calculated that a 20-bed burn unit requires 2.0 additional full-time equivalent positions across disciplines to support comprehensive multidisciplinary care.

4.2.3 Training and Culture Change

Transitioning from hierarchical medical culture to collaborative practice requires systematic training in team communication, shared decision-making, and constructive conflict resolution. ANZBA's competency framework provides structure, but local implementation must address specific institutional cultures. Reeder et al. (2023) emphasized that "flattening hierarchies" proves particularly challenging in surgical specialties with strong traditional authority structures.

4.2.4 Special Considerations for Rural and Remote Settings

McWilliams et al. (2021) demonstrated that geographic isolation need not preclude multidisciplinary care. Virtual team rounds, visiting specialist programs, and partnerships with metropolitan centers can extend coordinated care to remote communities. Investment in reliable telecommunications infrastructure and training for local healthcare providers proves essential.

4.3 Future Directions

4.3.1 Research Priorities

Critical knowledge gaps require addressing through targeted research. Optimal team composition for different burn severities remains undefined. Implementation science methodologies could reveal how to transform traditional units into high-functioning teams. Long-term outcomes beyond two years require systematic investigation. Indigenous and culturally diverse populations need specific attention given higher burn incidence and unique care requirements. The role of emerging disciplines like burn navigators and peer support specialists warrants evaluation.

4.3.2 Policy and System-Level Changes

Evidence supports policy mandating minimum multidisciplinary team standards for designated burn centers. BRANZ quality indicators should incorporate validated team function measures alongside traditional clinical metrics. Funding models must recognize coordination costs while capturing down-

stream savings. Medical and nursing education should include multidisciplinary burn care competencies. Accreditation standards should require demonstrated team function, not merely discipline availability.

4.4 Study Limitations

This critically appraised topic has several limitations. The search was restricted to Australasian studies, potentially missing relevant international evidence. The heterogeneity of multidisciplinary care definitions across studies limits direct comparison. Publication bias may favor positive findings about team-based care. Finally, the focus on specialist burn centers may limit applicability to smaller or rural facilities with different resource constraints.

5

Conclusion

The synthesis of contemporary Australasian evidence definitively establishes that coordinated multidisciplinary team management produces superior outcomes compared to traditional single-discipline-led care for acute burn injury. The construction worker in our opening scenario would experience not merely better survival odds but demonstrably improved functional recovery, reduced psychological morbidity, and greater likelihood of returning to meaningful work through coordinated team care.

This evidence transforms multidisciplinary burn management from aspirational ideal to essential standard of care. The 17 specialized specialist burn units across Australia and New Zealand increasingly recognize that no single discipline possesses all expertise necessary for optimal burn outcomes. When burn surgeons, nurses, therapists, psychologists, social workers, and other specialists truly collaborate through structured protocols, shared decision-making, and unified goals, patient outcomes improve across every measured domain.

The challenge now lies not in proving multidisciplinary care's value but in systematic implementation across diverse settings while maintaining the compassion and humanity that must accompany technical excellence. Aboriginal and Torres Strait Islander populations particularly benefit when teams incorporate cultural perspectives alongside clinical protocols. Rural communities can access coordinated care through innovative telehealth models. The evidence clearly illuminates the path forward; Australasian burn services must now walk it together, ensuring that every burn patient, regardless of location or background, receives the coordinated team care that optimizes their recovery journey.

The implications extend beyond burn care to other complex medical conditions requiring integrated expertise. As healthcare becomes increasingly specialized, the coordination challenge intensifies. The success of multidisciplinary burn care provides a blueprint for team-based approaches in trauma, critical care, rehabilitation, and chronic disease management.

For the 42-year-old construction worker and the thousands like him who will face burn injury in coming years, this evidence offers hope. Not just for survival, but for recovery that restores function, preserves dignity, and returns them to meaningful lives. In an era of technological advances and specialized treatments, perhaps the most powerful intervention remains the coordinated effort of disciplines working together toward a common goal—the best possible outcome for every patient.

The evidence is clear. The implementation challenge remains. The opportunity to transform burn care—and healthcare more broadly—awaits those committed to collaborative excellence in patient care.

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