National Burn Service Framework

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# 1 Introduction

A complex burn injury is felt to be the most severe form of survivable trauma. If survived, such an injury alters all aspects of an individual’s life: their appearance, their ability to function independently in society and consequently their psychological well-being.

The Accident Compensation Corporation (ACC) has alegal responsibility to ensure claimants are rehabilitated back to the maximum extent practicable. It is committed to ensuring that all burn services provided to claimants are comprehensive and inclusive (education, vocational, social welfare, acute, rehabilitation etc), and deal with all types of burn injury for the life-time of the injury itself. It has been acknowledged that there is a shortfall in funding for high-complex burn cases and the longer term management of burn patients.

The Regional Burn Units (RBUs), Ministry of Health (MoH) and ACC have jointly developed this framework which outlines the standards and vision for the future delivery of burn care services throughout New Zealand, in line with international best practice.

This document contains information about current practices in New Zealand, and minimum standards in terms of patient care and safety. It is the goal that the RBUs and NBC will either meet the minimum standards or give clear indications how they will achieve them within an acceptable timeframe.

The framework will address the following components of a co-ordinated national burn service:

* Standards for Patient-Centred Care
* Facility standards
* National Burn Service Network
* Disaster and mass casualty planning.

# 2 Background

In New Zealand, patients suffering from burn injuries are treated within their region at one of four Regional Burn Units (RBUs) located in Auckland, Christchurch, Hamilton and Hutt Valley. These RBUs are also the regional Plastic Surgery centres. International literature demonstrates that patient outcomes are enhanced by treatment of patients in suitably designed specialist burn facilities, particularly those having designated isolation facilities and the infrastructure to support the critically ill patient[[1]](#footnote-1). Much debate has occurred about whether patient outcomes are better in a high-volume unit it is widely accepted that high complexity cases have better outcomes in high volume units[[2]](#footnote-2).

New Zealand has remained out of step with the rest of the OECD world, and an independent audit report in 1996 reported burn injury survival rates were lower in New Zealand than in Australia[[3]](#footnote-3). At a nationally convened Major Burns Working Party involving the four RBUs in 1997 Middlemore, Christchurch and Waikato RBU’s agreed there should be a single national centre for the management of major burn cases with adequate resources to manage them (Hutt Valley RBU dissented)[[4]](#footnote-4).

Counties Manukau District Health Board (CMDHB) submitted ‘The Case for a Burn Centre’ in October 2001. The Business Case proposed a purpose-built National Burn Centre based at Middlemore Hospital with dedicated and skilled burns surgeons and a multi-disciplinary burn team providing comprehensive care for the national complex burns (defined as equal to or greater than 30% TBSA and/or burns to hands/face/genitalia, extremes of age etc). Funding for the NBC was based on the anticipated national volumes within this criteria which was approximately 7 extreme complex burns and 23 high complex burns per annum. Dr Colin Feek requested further information about the development of a burn centre and the financial implications.

There was a Ministerial announcement in July 2002 that there would be a National Burn Centre and CMDHB received Ministerial approval for the capital expenditure in April 2005[[5]](#footnote-5).

# 3 Understanding a burn injury

The burn patient has unique requirements in terms of wound management, infection control and rehabilitation which makes caring for them on a general ward unsatisfactory. For any major burn injury, at whatever age, the skills of the multidisciplinary burn team are necessary to optimise survival and recovery[[6]](#footnote-6),[[7]](#footnote-7).

International precedent has been set in the area of burn management standards by the American College of Surgeons with the certification of USA burn verified facilities. In a matched control study, patient data collected demonstrated that delayed transfer to a specialised burn centre lead to[[8]](#footnote-8):

* 25% higher incidence of infection -bacteraemia and wound sepsis
* Increased antibiotic use and increased isolation of resistant organisms
* 25% higher incidence of chest infections
* 30% increase in ventilation days
* 63% increase in hospital bed days and
* 70% more rehabilitation days

The treatment goal is to recover the individual to the pre-injury state and for them to return to their place in society with unaltered potential. The intention is to maximise recovery in terms of ***form*** (restoring aesthetic characteristics), ***function*** (recovery of ability) and ***feeling*** (psychological recover for patient and family)[[9]](#footnote-9).

# 4 Organisation and management of Burn Care Services in New Zealand

Burn care services in New Zealand are provided by primary, secondary and tertiary level healthcare providers dependent on the severity and complexity of the burn injury.



***Most severe***

**Complexity/**

**severity of**

**Burn Injury**



***Least severe***

**Self**

**-**

**help, GPs, District nurses**

**Minor injury units**

**Emergency**

**and General**

**Surgical Departments**

**RBUs**

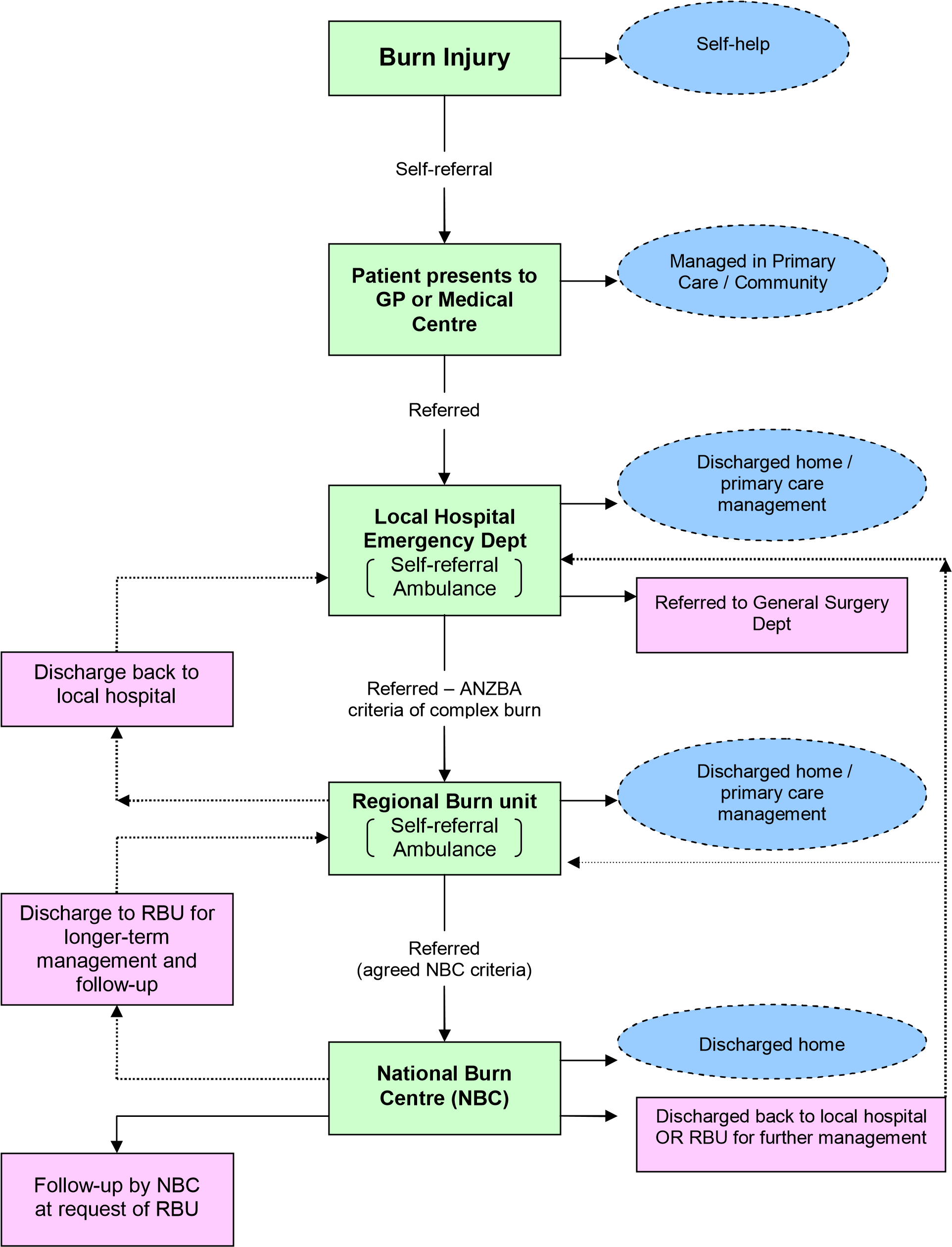
**NBC**

### 4.1 Regional Burn Units and the National Burn Centre

Collaboration is paramount for the effective and seamless delivery of burn care services; it is proposed the RBUs and the NBC will form a **National Burn Service** **Network** (refer section 19). The commitment to a network approach for the delivery of burn care services across New Zealand will ensure the equitable provision of high-quality, clinically effective services for all New Zealanders regardless of geographical location. This will be achieved through strengthening communication between units, co-ordinated clinical research, annual audits, staff education and rotations, development and the use of nationally consistent guidelines, and a shared national Burns database. Please refer to the Burn Injury Referral flow diagram (page 6) which shows the relationship between the various providers for the management of burn injuries.

The Regional Burn Units in New Zealand are located at:

* Middlemore Hospital, Auckland (co-located with the NBC)
* Waikato Hospital, Hamilton
* Hutt Hospital, Lower Hutt
* Christchurch Hospital, Christchurch



A **Regional Burn Unit** provides specialised and acute burn care treatment to burn patients within their regional catchment areas. **ANZBA referral criteria** outlines which burn patients should be referred to a RBU for specialist treatment:

* Burns greater than 10 % TBSA
* Burns of special areas – face, hands, feet, genitalia, perineum and major joints
* Full-thickness burns greater than 5% TBSA
* Electrical burns
* Chemical burns
* Burns with associated inhalation injury
* Circumferential burns of the limbs or chest
* Burns in the very young or very old
* Burns in patients with pre-existing medical disorders that could complicate management, prolong recovery or effect mortality
* Any burn patient with associated trauma
* Referral for any other reason

#### Current burn care provision in New Zealand

Burn Care is provided by Plastic Surgical teams who also deal with a multitude of other acute and elective conditions. Adult patients are admitted to general-purpose adult plastic surgery wards. Paediatric patients are either admitted to an adult plastic surgery ward or onto a combined (with other specialties) paediatric ward.

In most instances, there is limited access to the wider multi-disciplinary team eg. play specialists, psychologists. There are only two active burn support groups; these are currently at Middlemore and Waikato Hospitals.

Hutt Valley has a Level I ICU but have capacity for provision of extended care due to close communication with Wellington ICU (Level III). Hutt ICU provides tertiary level care for Burns and Maxillofacial patients. There is no access to haemodialysis but otherwise care for all patients can be initiated and provided including extended mechanical ventilation.

Following completion of treatment, patients are either discharged home for on-going management in the community or discharged back to the original referring local hospital for on-going management and rehabilitation.

### 4.2 National Burn Centre

The National Burn Centre, located at Middlemore Hospital, Auckland, will provide inpatient care for the highest level of burn injury complexity and will be staffed with burns surgeons, nursing and other health professionals with specialist training and experience in burn care. This custom-designed and world-class facility will facilitate the care of critically ill burn patients. In addition, the ability for all high-intensity rooms to cope with a ventilator dependent patient provides additional resources in the event of a mass casualty and provides important additional capacity in disaster planning.

The following criteria indicate discussion and (typically) transfer to the NBC:

#### High Complex Burns (HCBs)

* Burns > 30%TBSA
* Full thickness burn to face, hands, feet, genitalia, perineum and/or burn to respiratory tract
* Patients requiring prolonged ventilation
* Full thickness burns greater than 15% TBSA in the very young or very old
* Electrical burns – high voltage with underlying tissue damage
* Significant chemical burns

All patients that fulfil the criteria for a High Complex Burn ***should*** be discussed with the NBC but may not, necessarily be transferred if this is agreed by the RBU and the NBC staff. If there is no consultation and agreement with the NBC, additional funding will not be available to the RBU[[10]](#footnote-10).

#### Complex Burns (CBs)

Any patient who fulfils the criteria for admission to a RBU (Australian and New Zealand Burn Association (ANZBA) criteria, see above) ***may*** be discussed (at the discretion of the referring plastic surgeon) with the NBC if it is felt that the patient’s care would benefit from transfer, although transfer is not necessarily guaranteed.

The National Burn Centre will provide treatment and rehabilitation for the most severe burn patients from across the country and will continue to provide a Regional Burn Service to the Northern Region.

The NBC is on the first floor of the Adult Medical Centre, directly above the Emergency Department, adjacent to acute operating theatres, KidzFirst Children’s Hospital and the planned ICU.

There will be a total of 12 burn beds (six single isolation rooms in the NBC) with two burn isolation rooms in ICU. The Centre is designed to encompass all phases of burn treatment which integrates acute, rehabilitation, reconstructive and outpatient follow-up services into one purpose-designed facility. This includes a gymnasium, active daily living kitchen and bathroom, rehabilitation area and separate Outpatient area all within the same unit.

It has been agreed that the RBUs will be the gatekeepers for referrals to the NBC. All local hospitals in NZ will still contact their nearest RBU in the first instance to discuss referral. The RBU will refer on those patients falling within the above criteria to the NBC if required (HCBs) or desired (CBs).

Once treatment is complete at the NBC, patients will be referred for ongoing management back to the RBU. Comprehensive discharge planning will occur prior to discharge and will include agreed follow-up and rehabilitation plans. Although the RBU remains the main provider of this follow-up care for patients in their region, they may request the services of the NBC, especially for the high complex burn patients.

# 5 Communication between primary, secondary and tertiary care

Care of the burn injury patient will be provided by a number of health care professionals based in primary, secondary and tertiary services. Effective communication is essential for the co-ordinated provision of health care services required by the patient.

**5.1** Effective communication between all levels of care and across all specialities and professional groups will be encouraged and forms an underlying principle in the delivery of burn care for all New Zealanders throughout the continuum of their care.

**5.2** This communication will be facilitated with the use of information technology (including electronic image transfer and video-conferencing) especially when the participants are separated by geographical distance.

# 6 Management of burn care services

Burn Care Services will vary in their management structures, dependent on the configuration within their respective District Health Board. All services require a management structure to ensure that the RBU is able to provide the resources appropriate to the service level required and that it will comply with the minimum standards outlined in this document. Management will also endeavour to support the RBU and the development of the National Burn Service Network.

**Standards**

# 7 Patient Centered Care

A life-altering traumatic experience demands the involvement of all members of the multi-disciplinary team to co-ordinate their activities towards producing an optimum outcome.

Seamless care throughout the patient journey coupled with social arrangements and specific care packages on discharge will provide the greatest opportunity for the patient. Patients and families will be supported to deal with the effects of burn injuries through the promotion of family support, functional ability, provision of information and the regaining of confidence in social interaction.

Points 7.1–7.6 represent a minimum standard.

**7.1** Each patient is admitted under the care of a named consultant who shall be responsible for coordinating that patient’s care utilising the multi-disciplinary teams to its fullest extent to maximise patient outcome.

**7.2** In addition, one member of this multi-disciplinary team will provide an accessible contact point for the patient or family. This need not necessarily be the named consultant. This person (or their ‘cover’) should be easily contactable.

**7.3** The clinical care plan for each patient must involve a regular multi-disciplinary review with involvement and input from all members of the multi-disciplinary team. Whilst consideration will be made to the wishes of the family and carers, the needs and wants of the patient remains paramount.

**7.4** Burn care services must be arranged so that the patient moves from critical/acute care to rehabilitation and then to home in a systematic organised and planned manner as a result of the above meetings.

**7.5** Patients require access to acute psychological and psychiatric services. In addition, their families and staff working within the burn service should have similar access to psychological support.

**7.6** Specialist burn services may be significant distances away from the whānau/family home. Therefore travel and accommodation must be made available as required in both the acute and rehabilitative phases of burn care. Funding currently supports one family member accompanying the patient although additional support for additional members may be required. The role of the social worker in this respect is pivotal in facilitating this support. The National Burn Service Network will develop an expanded policy for travel support for relatives in conjunction with the MoH and ACC.

Point 7.7 is NOT a minimum standard.

**7.7** Ideally, patients, relatives and staff should be made aware of and have access to appropriate support groups where they can interact with other burn patients and receive peer support.

# 8 Access, Assessment and Diagnosis

Specialist burn care and associated facilities should be available to all patients irrespective of geographical location. Transfer from a local hospital to a RBU (or the NBC) will be guided by above transfer criteria and should occur without unnecessary delay.

Advice regarding the treatment of burns and possible transfer will always be available from the RBUs as is the current practice via the On-Call Plastic Surgery Registrar or Consultant.

Professionals within the RBUs who deal with acute burns should be credentialed by the National Burn Service Network and will follow national guidelines for the treatment and referral of patients (refer sections 15 & 16).

To facilitate the care of burn patients by all levels of care (primary, secondary etc.) the following is recommended as a minimum standard:

**8.1** Clear National Burn Injury Referral Guidelines will be disseminated to all primary, secondary and tertiary healthcare providers. The responsibility for designing and updating these guidelines lies with the National Burn Service Network. The responsibility for distributing these forms to all referring hospitals lies with the National Burn Service Network.

**8.2** Advice to hospitals and clinicians not credentialed to care for burns will be available via either a Plastic Surgery Registrar or Consultant based in the corresponding RBU. Advice will be available 24/7 and will continue to be available until the patient is directly under the care of the RBU or NBC.

**8.3** Advice regarding the initial assessment, management and subsequent transfer of a patient from a local hospital to either a RBU or NBC will take advantage of all available means of communication. On occasions when emergency care (eg escharotomies) needs to be performed by a non-credentialed professional, maximum use of technology to facilitate communication between the RBU professional and the bed-side carer will be utilised.

**8.4** Initial assessment, management, triage and preparation for transfer will follow established Emergency Management of Severe Burns (EMSB) principles for burn patients. The final disposition of the patient will be guided by the above criteria. Other non-burn injuries, although infrequent, need to be assessed and stabilised before onward transfer according to EMSB and Emergency Management of Severe Trauma (EMST) guidelines.

# 9 Acute Burn care

Multi-disciplinary teams will work together, across disciplines and locations, to achieve optimum decision making, treatment and outcome. Management beginning at the accident scene and during transfer to hospital will be provided in accordance with EMSB guidelines. Management in the Emergency Departments will be provided in accordance with EMSB guidelines.

Care for the acutely injured will be undertaken by appropriately credentialed professionals. Credentialing processes are currently undertaken at a hospital level by individual professional groups.

The following represents a minimum standard.

**9.1** There should be direct access to and clinical support from an appropriate ICU.

**9.2** There should be access to suitably-staffed operating theatres (surgeons, anaesthetists and nurses) to allow ‘early debridement’ of the burn. At times, this may require access to an operating theatre after hours or the weekend.

**9.3** Each RBU should have a minimum of two thermally regulated, individual rooms either in the ICU or the ward.

**9.4** Staffing numbers should be based on patient dependency and acuity rather than bed numbers alone.

**9.5** Funding should be available for the use of advanced tissue/wound healing products in the management of burn injuries within nationally agreed guidelines (to be developed across all the RBUs via the National Burn Service Network – see Section 17).

**9.6** Sufficient consultant anaesthetic time should be allocated to allow regular pain control ward rounds and provide support and assistance for major dressing changes outside of the operating theatre.

# 10 Rehabilitation and Follow-up

The ultimate goal for the multi-disciplinary burn team is to assist an individual with a burn injury to return to society with the maximum physical functioning, vocational and psychosocial well-being that their burn injury will permit. A critical part of this goal is the continuing care of patients after the acute phase of their care. Individual patients may need to return to the operating theatre on many occasions, often months or even years after the original event. Where possible and practical, this team will remain constant so that future care is planned and carried out in a co-ordinated and timely fashion.

The following represents a minimum standard.

**10.1** Intensive in-patient rehabilitation is available as part of a multidisciplinary and multispecialty service.

**10.2** All patients discharged will receive appropriate follow up for the life-time of their burn injury from the multi-disciplinary team.

**10.3** Administrative delays should be minimised such that there are no delays in admitting patients during the optimum period for any post-burn intervention. This may include further surgery, physical rehabilitation, scar management, psycho-social support or prosthetics. Service Level Agreements for burn care should include sufficient allowance to accommodate the needs of all post-burn patients for post-burn episodes of care.

**10.4** The patient should receive follow-up care, reconstructive surgery and rehabilitation in the most appropriate setting, co-ordinated in partnership with the ACC Lifetime Rehabilitation Planner. At certain times, it may be necessary for the patient to be rereferred to the NBC for follow-up treatment, rehabilitation or reconstructive surgery if deemed necessary and appropriate by the RBU. Policies will be developed outlining financial arrangements for the patient and their family during periods of readmission and re-referral to RBUs/NBC.

**10.5** Out Patient attendances for both Consultant and therapy services should continue as long as they are deemed to be necessary by the provider of care.

**10.6** Each RBU/NBC should have appropriate services in place to provide care and advice to patients in a hospital nearer to their home or in their own home, where this is considered to be the best option. This ‘outreach’ service will require additional resources including funding.

**10.7** Care is organised in such a way that patients will follow a care pathway within the National Burn Service Network.

**10.8** Essential facilities and equipment for rehabilitation will be provided and all patients will receive comprehensive information on the rehabilitation process and their individual programmes in conjunction with the ACC Case Manager and Lifetime Rehabilitation Planner.

**10.9** There should be a work / school re-integration programme available to patients, working in conjunction with social-rehabilitation assessors.

# 11 Psycho-Social Rehabilitation

Psychological adjustment of the individual and their family after surviving a burn injury takes time but the passage of time is no guarantee of success. Studies show that the best long-term adjustments are made when attention is paid to four critical factors:

* Ensuring that there are good support systems/networks in place for patients to rebuild their self-esteem and self-belief
* Enabling patients to overcome their functional limitations
* Enabling patients to be informed about surgical and other treatment, support groups, etc
* Enabling patients to acquire effective social skills to manage the reactions of the public, their school peers or employers, etc to their changed appearance

The following represent a minimum standard.

* 1. Patient care plans should include a psycho-social assessment.

* 1. Where the need is identified, patients should receive a tailored psycho-social rehabilitation programme that will be monitored on an ongoing basis.

# 12 Reintegration

The following represents a minimum standard.

The RBUs and NBC will have a comprehensive written policy and procedure for discharge and referral to:

* Other hospitals
* Social Services
* Community services
* Carers
* ACC
* Support groups

* 1. A comprehensive work / school re-entry programme will be available working in conjunction with the ACC Lifetime Rehabilitation Planner and Case Manager.

* 1. Appropriate provision of accommodation, equipment, personnel and finance will be made to meet the immediate needs of the individual to ensure safe discharge working in conjunction with ACC Case Manager.

# 13 Readmission

The following represents a minimum standard.

All patients will have the opportunity for readmission to the burn service or other facilities for scar management/release of contractures/reconstructive surgery etc.

**13.1** Working with the ACC Case Manager, policies will be developed outlining financial arrangements for the patient and their family during periods of readmission and rereferral to RBUs/NBC or other appropriate facilities.

# 14 Services for children and young people[[11]](#footnote-11)

The following represents a minimum standard.

**14.1** Consultant surgeons, anaesthetists and intensivists involved in the care of the children and young burn patient should be suitably credentialed by their respective DHBs to provide care to the paediatric population.

**14.2** As a general principle, children and young people should be admitted, wherever possible, to a paediatric ward. Where this is not possible because of the complexity of the burn injury, the child or young person should be admitted to an area in the Plastic / Burn ward which is as ‘child-friendly’ as possible. There should be designated paediatric rooms / areas within RBUs and the NBC with appropriate resources for caring for paediatric patients.

**14.3** Each child with a burn injury should have access to a comprehensive play, education and recreation programme provided by the hospital play specialists with knowledge and skills for working with children, young people and families in a burn facility.

**14.4** Arrangements should be made for all recovering patients of school age to have access to appropriate teaching so as to maintain scholastic ability.

**14.5** A community re-entry programme, which includes a school re-entry component, should be made available, arranged in conjunction with the ACC Lifetime Rehabilitation Planner and Case Manager.

**14.6** Facilities should be made available to facilitate the presence of the parent/care giver to be near the child at all times. This includes an area to sleep adjacent to the child (excluding the ICU/HDU environment) and the provision of simple meals – as is current practice in all RBUs.

**14.7** Burn care services should be arranged so that the patient and family moves from critical/acute care to rehabilitation and home in a systematic organised and planned way through the use of a paediatric care pathway and/or local burn care network.

**14.8** There should be a key worker who is responsible for establishing and developing a Burn Camp or for establishing links with an existing camp for children to learn to communicate, socialise and work together to common goals through a holiday kind of environment programme.

**Facility and Staffing standards**

# 15 Regional Burn Units - facility and staffing standards

This level of in-patient burn care is for patients with complex burn injuries. The facilities, both ward and operating theatres, must be able to provide care for patients of this acuity safely.

The following represents a minimum standard.

* An appointed consultant lead for burn care within each RBU who is responsible for research, audit, service accreditation within that RBU and acting as the National Burn Service Network liaison point (see section 17).
* As a minimum, two suitably sized single thermally controlled isolation rooms
* Designated nursing and other appropriate health professionals appropriately experienced and skilled in burn care
* Intensive care access at the appropriate level
* Secondary Hospital level support services and specialties
* Paediatric focussed designated area within the RBU.

### 15.1 Associated Services available to RBUs

The following represent a minimum standard.

* Local hospitals (ie non-RBUs) should have access to Intensive Care level of care for short periods of time prior to transferring a patient to a RBU.
* Access to a national skin bank for the provision of stored human skin from tissue donors, and a skin culture laboratory service for the growing of skin cells in culture.

Available specialities and support services include (but not limited to):

* Plastic Surgery Consultants credentialed in the care of burn patients
* Anaesthetic Consultants credentialed in the care of burn patients
* Intensive Care multidisciplinary team
* Trauma services
* General medicine and surgery
* Paediatric services
* Laboratory services
* X-ray (imaging) services
* Psychiatry and Mental health services
* Psychology services
* Occupational Therapy
* Scar management service
* Physiotherapy
* Pharmacist
* Microbiology team
* Pain team
* Dietetic advice
* Social Work service
* Hospital play specialist service
* Speech Language Therapy service

### 15.2 Staffing

**15.2.1** In each RBU one of the plastic surgery consultants will be responsible for the burn service within that RBU. They will be responsible for MDT leadership, clinical audit, research, service accreditation and representation on the National Burn Service Network.

**15.2.2** This plastic surgeon should have a sub-specialty interest in burn care and be available to provide advice to other plastic surgeons within their RBU if required.

**15.2.3** This plastic surgeon should have completed an accredited burns fellowship or have two or more years of complex (ANZBA criteria) burn care experience during the previous five years. This person should also have a current EMSB current certification and preferably be an EMSB instructor.

**15.2.4** Other plastic surgeons involved in burn care should preferably have current certification in EMSB.

**15.2.5** All members of the burn multi-disciplinary team will be encouraged to participate and complete a validated course of study in burns related care. This may include the EMSB programme.

**15.2.6** There should be sufficient therapists experienced in intensive and rehabilitation care needed by burn patients to comply with ANZBA standards.

**15.2.7** The Burn service should have continuous availability of appropriately credentialed and skilled anaesthetists to provide a service both within the operating theatres and also outside the operating theatres (for things such as pain rounds and to allow wound changes on the ward).

**15.2.8** Where complex cases are admitted, ICU consultants, appropriately credentialed and skilled, should be available at all times for the delivery of care to the critically ill burn patient.

# 16 National Burn Centre – Facility and Staffing standards

This level of inpatient care is for the highest level of injury complexity.

The following represents the ‘minimum standard’.

It will be a separately staffed facility with dedicated burn surgeons, nursing and other health professionals, providing the following -

* A designated stand-alone unit for paediatric and adult admissions
* Single room accommodation of adequate size with environment control and capable of monitoring a critically-ill patient
* Designated nursing and other health professionals credentialed in the treatment of burn patients, providing comprehensive, coordinated multi-disciplinary care
* Access to a dedicated burn theatre 7 days/week
* Dedicated burn anaesthetic input with nominated lead consultant
* Intensive care provided by ICU consultants or in a suitably equipped, adjacent ICU
* Consultant burn surgeon on-call roster.

### 16.1 Associated Services available to the NBC

The National Burn Centre should be sited at a major acute hospital with the following specialist services available as required. This includes but is not limited to:

* Plastic Surgery Consultants credentialed in the care of burn patients
* Anaesthetic Consultants credentialed in the care of burn patients
* Intensive Care multidisciplinary team
* Trauma services
* General medicine and surgery
* Paediatric services
* Laboratory services
* X-ray (imaging) services
* Psychiatry and Mental health services
* Psychology services
* Occupational Therapy
* Scar management service
* Physiotherapy
* Pharmacist
* Microbiology team
* Pain team
* Dietetic advice
* Social Work service
* Hospital play specialist service
* Speech Language Therapy service

Access nationally to a skin bank for the provision of stored human skin from tissue donors, and a skin culture laboratory services for the growing of skin cells in culture.

### 16.2 Staffing

The following represents a ‘minimum standard’:

**16.2.1** The NBC will be staffed to provide a sustainable 24/7 burn service, staffed by surgeons with specialist training in burns surgery. At times of fluctuating staffing levels, they will be supported by surgeons from the Department of Plastic Surgery (see Appendix Two).

**16.2.2** Surgeons to have completed a burns fellowship (as a minimum 50% of NBC surgeons) or have two or more years of burn care experience during the previous five years. All burns surgeons should have EMSB qualification and ideally to be EMSB instructors, with the lead burn surgeon preferably having current certification as an EMSB Instructor.

A designated Clinical Leader for Burns with appropriate clinical background has responsibility for the NBC service including research, audit, service accreditation and representation on the National Burn Service Network.

**16.2.3** The primary burn care team will consist of:

* Consultant anaesthetist, burn surgeon and intensivist.
* Anaesthetic, plastic surgical/burn and ICU registrar
* Nursing staff (burn unit, theatre, ICU)
* Therapists – physical and occupational
* Dietitian
* Psychologist/psychiatrist
* Social Worker
* Play Specialist

**16.2.4** All members of the burn multi-disciplinary team will be encouraged to participate and complete a validated course of study in burns related care. This may include the EMSB programme.

**16.2.5** Burn Clinical Nurse Specialists will provide care co-ordination and case management of all complex burns and will provide a 24/7 On-call Burns Nurse Roster to co-ordinate referrals and transfers.

**16.2.6** The NBC must be staffed with the capability to flex to capacity rather than average occupancy, and FTE based on patient dependency and acuity, rather than bed numbers alone.

**16.2.7** There must be sufficient therapists experienced in intensive and rehabilitation care needed by burn patients to comply with ANZBA standards[[12]](#footnote-12).

**16.2.8** The Burn service has continuous availability of ‘burn credentialed’ anaesthetists to provide acute and scheduled services both for the operating room and for on the unit. Credentialing will follow current DHB protocols.

**16.2.9** Where complex cases are admitted, appropriately credentialed ICU consultants must be available at all times for the delivery of critical care.

**16.2.10** All Intensive Care Nurses to rotate and manage burn patients in the ICU Burn Isolation rooms to maintain skills and competency.

**16.2.11** Social work and psychiatry available 7 days per week to provide acute assessment and management input.

**16.2.12** There will be an on-call burns theatre team, with a minimum of 3 full day fixed burns theatre sessions per week.

**16.2.13** One FTE Burns Fellow in a clinical, research and educational post.

**National Burn Service Network**

# 17 National Burn Service Network- Definition

The National Burn Service Network is defined as a linked group of health professionals and organisations, working in a co-ordinated manner, unconstrained by existing professional and District Health Board boundaries, to ensure equitable provision of high quality clinically effective services throughout the country.

The Regional Burn Units and National Burn Centre will form a National Burn Service Network for New Zealand. This will strengthen communication in the wider sense, between the units whilst maintaining autonomy. To ensure commitment to, and recognition of the National Burn Service Network, formal approval should be sought from the respective District Health Boards and ACC*.*

# 18 National Burn Service Network Governing principles

To ensure the success of the Network, the following core principles should be fundamental to its development:

**18.1** The Network must be a truly multi-disciplinary/multi-professional entity with representation from all the RBUs. There should be an implementation manager, a clinical leader (who is also responsible for the coordination of research and development within the Network) and clinical and nursing representation from each RBU.

**18.2** There should be an agreed structure to this network between the constituent groups to ensure that all groups have access to the other members of the network that they need, and that there are clear lines of communication and service delivery.

**18.3** The goals of the Network include improvement of the delivery and outcome of burn care across the country either via optimisation of existing services or the establishment of new ones (eg burn injury care pathways).

**18.4** There should be regular audit and review processes to ensure that these goals are being achieved.

**18.5** The Network will promote the use of consistent evidence-based guidelines within RBUs and where these are deficient, be committed to the development of them through appropriate research and development.

**18.6** All members of the Network will endeavour to participate in a shared National Burns Data Repository with Australia (ANZBA) and will ensure this is populated accordingly with burn patient data. This will provide a rich source of bench marking data for quality improvement initiatives, monitoring changes over times as interventions are introduced and the provision of large cohorts for research purposes.

**18.7** Continuing professional development will be another goal. Staff development and education is fundamental to the delivery of optimum care to the patient and their families. To this end, on-going support for approved (by consensus) programmes and support for relevant local research projects will be a fundamental role of the Network.

**18.8** The network will also facilitate the movement of staff between RBUs and the NBC as well as into local hospitals to facilitate communication and the delivery of patient care. Maximum use of available technologies to facilitate this is to be encouraged (eg video conferencing).

**18.9** The Network will hold, as a minimum, one meeting annually to look at the following:

* A statistical review and audit of outcomes looking at all areas of burn service delivery: pre-hospital, acute, surgical, rehabilitation.
* Review of transfers and logistics
* Guideline development and review of current guidelines
* Review of wound dressings, new products and medication
* Development of outcome indicators.[[13]](#footnote-13)

**18.10** As a minimum, there should be Consultant representation, a Lead Nurse/Manager and Allied Health representative from each RBU/NBC who will attend the annual network meetings. ACC and MoH should also provide representatives at this meeting although they would not attend the clinical audit portion of the meeting.

# 19 Education and training

**19.1** There will be a programme of continuing professional development for all staff working in the National Burn Service Network to ensure a proper understanding of, and compliance with, local, national and international guidelines, and integrated care pathways to ensure competence and a uniformly high standard of care.

**19.2** National Guidelines will be developed by the National Burn Service Network and they will be available for the education and training needed in primary and secondary care.

**19.3** The National Burn Service Network will offer an education programme to relevant health professionals that includes the treatment of minor burns and post admission care of more severely burned patients.

**19.4** All staff working in the National Burn Service Network should have access to a library service and Internet including relevant burn literature.

**19.5** All staff working in burns should have documented evidence that their continuing education programme is linked to annual appraisal/Performance Review.

**19.6** Training programmes include attendance at the Emergency Management of Severe Burns course for all medical and nursing staff.

**19.7** Attendance at international meetings is to be encouraged in order to maintain continuing professional development standards. Additional funding streams to facilitate this should be developed to augment existing funding streams.

# 20 Research and Development

**20.1** The National Burn Service Clinical Leader will also be responsible for Research and Development to co-ordinate and liaise research programmes from within the network. This role may be reviewed during the annual meeting of the National Burn Service Network and may be rotated every three years (or sooner if required). Funding for research is accessible from both MoH and ACC.

**20.2** The National Burn Service Network should have a programme of research projects in Burn Care and includes all national data so that statistically relevant data is produced.

**20.3** Programmes of research will demonstrate:

* Inter-network research
* Multi-disciplinary research
* Independent, small project research
* Involvement with academic departments.

**20.4** Clinical burn staff will have access to reports generated by the appropriate Burn Data

Registry and have the ability to request specific reports and data.

**20.5** Research outcomes should ideally result in measurable improvements to patient care.

Other desired outcomes of research include presentation at either National and International meetings, publication in peer-review journals or the award of a Higher Degree to the researcher.

**20.6** The National Burn Service Network Clinical Leader should be looking at ways of increasing academic links and the profile of Burn care, nationally and internationally.

### 21 Burn Disaster/Mass Casualty Planning

Management of mass burn casualties presents a unique challenge because of their high and **continued** demand on the resources of the treating facility (e.g. the requirement for isolation, multiple operations, long lengths of ICU stay and physiological instability of the patient).

Bed capacity at the RBUs and NBC for Intensive care, High dependency and burns ward beds have been identified and are summarised in Appendix One.

Various plans are required to meet the majority of the possible scenarios. These plans need to be in place within each RBU and the NBC and consist of the following:

**21.1** A **capacity plan** which identifies the number of burns, and at what acuities each unit can manage safely and appropriately. The capacity capabilities of each unit will be expected to fluctuate and will be dependent on resource levels (staffing – medical and nursing) and physical capabilities (beds available at required level of care) at the time of the disaster. This will be an internal plan only, and each unit should be responsible for its development. An example of the NBC capacity plan is at Appendix Two.

**21.2** The RBUs and NBC need to have a number of **contingency plans** in place for times when the RBUs and NBC are unable to accept referrals due to lack of capacity or resources. This will not be a disaster-type scenario but a plan to cover the expected fluctuations in capacity as a result of varying resource levels (ie staffing & physical).

Three plans have been identified and are attached as follows:

* RBU/NBC ICU bed required – Appendix Three
* RBU complex burn bed required – Appendix Four
* NBC high complex burn bed required – Appendix Five

**21.3** The next level of planning falls into the **burns disaster-type scenario and/or planning for mass casualties**. The Ministry of Health has developed the National Health Emergency Plan: Burns which is being finalised by end of October 2005. This plan outlines the centralised and co-ordinated processes that will need to occur at a national level when a disaster has occurred. Each DHB will have an Emergency Plan. The NBC and RBUs need to ensure that there is an agreed process for creating physical capacity and increasing medical and clinical resources in a disaster, and that these plans are included within the DHB’s Emergency Plan and dovetails into the National Health Emergency Plan: Burns.

With the establishment of the NBC with regard to the management of high complex burns, there will be a level of deskilling within the RBUs. A number of decisions will need to be made in relation to capacity planning and disaster/Mass casualty planning:

1. The level of competency for the RBUs needs to be determined with regard to the management of high complex burns where the NBC is unable to accept the referral:

i. due to capacity i

i. in a disaster situation

1. The National Burn Service Network will develop a comprehensive disaster plan for the country that manages complex burn injuries amongst the RBUs.

# 22 Appendix One ICU, HDU and Burn Ward Bed Capacity Summary

### ICU and HDU capacity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Unit** | **ICU Level** | **Currently manages both adults and paediatrics** | **How many beds can be ventilated** | **Number of isolation rooms** | **Total ICU & HDU beds** |
| **Christchurch** | III | Yes | 15 + 1 portable ventilators | 4 | 18 |
| **Hutt Valley** | I | \*Yes | 3 + 2 portable ventilators | 1 | 6 |
| **Middlemore** | III | Yes | 10 + 2 portable ventilators | 2 | 10 |
| **Waikato** | III | Yes | 14 + 5 portable ventilators | \*\*2 | 24 |
| **Totals** |  |  | **52** | **9** | **58** |

**NB - \*** **Hutt Valley has a Level I ICU but have capacity for provision of extended care due to close communication with Wellington ICU (Level III). Hutt ICU provides tertiary level care for Burns and Maxillofacial patients. There is no access to haemodialysis but otherwise care for all patients can be initiated and provided including extended mechanical ventilation. \*\* Adapted ward side room / not negative and positive pressure**

### Plastics and Burns Ward Bed Capacity

|  |  |
| --- | --- |
| **Unit** | **Total Plastic/Burns**  **Ward Bed capacity** |
| **Christchurch** | 28 |
| **Hutt Valley** | 34 |
| **Middlemore NBC** | 10 |
| **Middlemore Plastics Ward** | 29 |
| **Waikato** | 25 |
| **Totals** | **126** |

**Ward bed capacity includes the following:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Unit** | **Single**  **Rooms** | **Ventilation Capability** | **High level Monitoring** | **Burns**  **Bathrooms** | | **Christchurch** | 4 | 0 | 0 | 1 | | **Hutt Valley** | \*2 | 0 | 2 | 1 | | **Middlemore NBC** | 8 (\*6) | \*\*10 | 4 | 2 | | **Middlemore Plastics Ward** | 5 | 0 | 0 | 1 | | **Waikato** | 5 | 0 | 0 | 1 | | **Totals** | **24** | **10** | **6** | **6** | | |  | | --- | | **NB - \* Isolation rooms**  \*\* **Would require portable ventilators** | |

# 23 Appendix Two Capacity plan for Burns SMOs

\*This capacity plan will be included in a formal audit within 6 months of operation.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **No. of**  **SMOs**  @ 0.5 FTE | **Burns Complexity** | **Options for clinical management** |
| **A** | One | • 1-2 patients greater than 30% TBSA at one time | * Burn surgeon remains on Plastic Surgery call, but formal redistribution of ‘other’ acutes including minor burns to Plastics teams if required. * Priority is given to the >30% TBSA on the dedicated burns list. Assuming that cancelling elective burn cases does not free enough operating time, lower acuity burns are treated on the acute list. * Designated ‘second’ surgeon to cover burn theatre on the days the 0.5 FTE burn surgeon is unavailable. This ‘second’ surgeon should ideally not be the On-Call plastic surgeon. * Daily review of the burn patients will at times need to be done by other Consultant Plastic Surgeons when the 0.5FTE Burn Surgeon is unavailable. |
| **B** | Two | * 2-3 patients greater than 30% TBSA at one time * 4-5 if staggered admissions | As above plus:   * Assumes three full-day dedicated burn theatre lists. * If required, additional acute burn theatre lists will be either covered by the Acute On-Call plastic surgeon OR by the Burn Surgeons IF their other commitments are covered by the Department of Plastic Surgery. |
| **C** | Three | * 3-4 patients greater than 30% TBSA at once * 3-4 patients greater than 30% TBSA at once | As above plus:    • *In the interim, ICU capacity may be the limiting factor.* |

|  |  |  |  |
| --- | --- | --- | --- |
|  | **No. of**  **SMOs**  **@ 0.5 FTE** | **Burns Complexity** | **Options for clinical management** |
| **C** (cont) |  | • 5+ if staggered admissions | * Existing Burns theatre sessions would need to be increased from three days to four full-days per week, and there may be a requirement for additional theatre sessions. * If required, a Consultant Plastic Surgeon would need to be available to allow the concurrent running of two burn theatres (one dedicated burn theatre and one acute plastic surgery theatre). To support the Plastic Surgeon, he or she will require the assistance of a trainee registrar or fellow. |
| **D** | Four | • 4-5 patients greater than 30% TBSA at once | * Access to four full-day theatre lists with the option of a fifth-full day burn operating list to be covered from within the group of Burn Surgeons. * Additional concurrent theatre lists (if required) will also be covered from within the group of Burn Surgeons. * Burn surgeons remain on Plastic Surgery call, but formal redistribution of ‘other’ acutes including minor burns to Plastics teams if required. * Priority is given to the >30% TBSA on the dedicated burns list. If necessary, lower acuity burns are treated on the acute list and not on the dedicated burn list. |
| **E** | Five | • 6-7 patients greater than 30% TBSA at once | As above plus:  • *The impact of this on the whole system will require ‘crisis management meeting’ between GM of Surgical Services, Clinical Director of Surgical Services and relevant HODs.* |
| **F** |  | • 7+ patients greater than 30% TBSA at once | • Irrespective of the number of Burn Surgeons available, the National Burn Service Disaster Management Plan needs to be activated (to be finalised). |

# 24 Appendix Three Contingency Planning – RBU/NBC Burn ICU bed required

Burn injury referral requires

ICU bed at NBC / RBU

**No ICU capacity**

ICU reviews patients due for discharge to other wards

ICU reviews elective ops

arranged and cancels, if

appropriate

ICU identifies non-burn

patients to transfer to

nearest ICU

Onward refer patient to

nearest suitable

RBU with Burn

ICU capacity

# 25 Appendix Four Regional Burn bed required

RBU complex burn

injury referral – ward

bed required

**No capacity on**

**burns / plastics**

**ward**

Review patients for

early discharge

home

Review patients for

transfer to other

wards

Contact nearest

RBU and onward

refer

# 26 Appendix Five NBC high complex burn referral – NBC bed required

|  |  |
| --- | --- |
| NBC High Complex Burn Referral | |
|  |  |

Transfer lower

complexity burns to

RBU’s

Request RBU manages

patient until capacity is

available

**Unable to manage**

**patient**

NBSN explores all

options for care of

patient including

possible transfer

overseas

Review patients for early

discharge

**No Capacity**

Review patients to

transfer to Plastics and

other wards

# 27 Appendix Six Framework Approval Group

|  |  |  |
| --- | --- | --- |
| **Name** | **Role** | **Organisation** |
| Carolyn Braddock | Clinical Manager | Hutt Valley DHB |
| Chris Adams | Consultant Plastic Surgeon | Hutt Valley DHB |
| Chris Goudie | Adult Burn CNS | Counties Manukau DHB |
| Chris McEwan | Consultant Plastic Surgeon | Waikato DHB |
| Dana Ralph-Smith | National Burn Service Coordinator | Counties Manukau DHB |
| Janet Hanvey | Manager Surgical Services | Waikato DHB |
| Richard Wong She | Consultant Plastic Surgeon | Counties Manukau DHB |
| Rory Matthews | Programme Manager | ACC Healthwise |
| Stewart Sinclair | Consultant Plastic Surgeon | Canterbury DHB |

# 28 Appendix Seven Contributions from:

|  |  |  |
| --- | --- | --- |
| **Name** | **Role** | **Organisation** |
| Alar Treial | Team Leader, DHB Funding and Performance Directorate | Ministry of Health |
| Carol Bolton | Kidz First Play & Recreation Service | Counties Manukau DHB |
| Catherine Smith | Social Worker | Counties Manukau DHB |
| Chris Fleming | General Manager, Surgical and Ambulatory Care Services | Counties Manukau DHB |
| Craig Harrington | Occupational Therapist | Waikato DHB |
| David Rankin | General Manager | ACC Healthwise |
| David Geddis | Chief Medical Advisor | Ministry of Health |
| Debbie Murray | Paediatric CNS | Counties Manukau DHB |
| Frances James | Burn adult Psychologist | Counties Manukau DHB |
| Gary Duncan | Consultant Plastic Surgeon | Hutt Valley DHB |
| Jane Widdowson | CNE | Waikato DHB |
| Jim Armstrong | Consultant Plastic Surgeon | Hutt Valley DHB |
| June James | Charge Nurse | Counties Manukau DHB |
| Kate Middlemiss | Burn Service Establishment Manager | Counties Manukau DHB |
| Lynley Gardner | Operations Manager, Surgical Services | Waikato DHB |
| Lynne Walker | Clinical Nurse Leader, RBU | Waikato DHB |
| Mary Leighton | Programme Manager | ACC Healthwise |
| Rachel Binning | Senior Advisor, DHB Funding and Performance Directorate | Ministry of Health |
| Sharon Minchington | Clinical Charge Nurse, RBU | Canterbury DHB |
| Stephen Mills | Consultant Plastic Surgeon | Counties Manukau DHB |
| Stuart Francis | Management Consultant | Francis Consulting |
| Swee Tan | Consultant Plastic Surgeon | Hutt Valley DHB |
| Tracey Perrett | Occupational Therapist | Counties Manukau DHB |

# 29 Appendix Eight Glossary of Terms

|  |
| --- |
| **Burn Definitions**  **Non Complex Burns (NCBs)**  Non complex burn injuries do not fulfil the following criteria below for complex burns and are covered by standard Ministry funding and ACC accident related funding. In most circumstances they will present and are successfully managed in primary care, in local Emergency Departments or General Surgical departments.  **Complex Burns (CBs**)[[14]](#footnote-14)  The following criteria are endorsed by the Australian & New Zealand Burn Association in assessing whether burns require treatment in a specialised burns unit (ANZBA 2004):   * burns greater than 10 % total body surface (TBSA) * burns of special areas – face, hands, feet, genitalia, perineum and major joints * full-thickness burns greater than 5% TBSA * electrical burns * chemical burns * burns with associated inhalation injury * circumferential burns of the limbs or chest * burns in the very young or very old * burns in patients with pre-existing medical disorders that could complicate management, prolong recovery or effect mortality; * any burn patient with associated trauma   **High Complex Burns (HCBs)**   * Burns > 30%TBSA * Full thickness burn to face, hands, feet, genitalia, perineum and/or burn to respiratory tract * Patients requiring prolonged ventilation * Full thickness burns greater than 15% TBSA in the very young or very old * Electrical burns – high voltage with underlying tissue damage * Significant chemical burns   **Extreme Complex Burns (ECB’s)**   * Patients on high mechanical ventilation for > 20 days. * Patients with an extraordinary length of stay defined as > 50 days. |
| **National Burn Centre (NBC)**  Provides inpatient care for the highest level of burn injury complexity defined as burns >30% total body surface area (TBSA). |
| **Regional Burn Unit (RBU)**  Provides specialised and acute burn care treatment to patients based on the Australian and New Zealand Burn Association (ANZBA) referral criteria. |
| **Australia and New Zealand Burn Association (ANZBA)**  The principal object of this association is to encourage higher standards of both burn injury prevention and burn patient care through research and education. ANZBA is administered by |
| a Board comprised of members representative of each Australian state and New Zealand. The board members for each state and New Zealand are the designated branch representatives for those areas. Each state or dominion is able to form a branch committee comprised of members of the association. These committees may choose to undertake activities in relation to burn care and prevention under the auspices of ANZBA. |
| **Emergency Management of Severe Burns (EMSB)**  A one day intensive course on the emergency management (first response) of severe burns. |
| **National Burn Service Network (NBSN)**  This group consists of representatives from each RBU, the NBC, ACC and the Ministry of Health and is responsible for implementation of the National Burn Service Framework, identifying gaps in the Framework, and developing policies, procedures and guidelines to standardise best practice in Burn Service provision. This group will meet minimally on an annual basis to discuss business and clinical audit activities. The Clinical Leader of the NBSN will be accountable to this group, and the National Burn Service Coordinator will support this group. |

# 30 Appendix Nine Outcome indicators in burn care

There are scant scientific findings to support the majority of processes in burn care[[15]](#footnote-15).

Literature review by the NZ Guidelines group (2003) failed to provide any outcome measures.

The British Burn Association has no outcome measures for burn care[[16]](#footnote-16).

The outcome measures at present are those of process rather than rationale for practice, and as such do not necessarily represent evidence-based practice.

International comparisons are not necessarily valid as care is resource dependent.

Survival is measured in terms of LD50; size of burn required to produce death in 50% of patients.

There are functional outcome indices, but these relate to long-term patient goals and as such would not necessarily come under the remit of Burn Units/Centres[[17]](#footnote-17).

Scar quality and psychosocial indices have been mooted as better outcome indices[[18]](#footnote-18).

Outcome indices need to be developed, but the following are suggested as a starting point:

* LA/LD50
* Length of hospital stay
* Mechanical ventilation days
* Infection rates

Key Performance Indicators should also be developed and the following again, are suggested as a starting point:

* All burns admitted are seen by a consultant within 12 hours of admission (dependent upon existing co-morbidities).
* A surgical plan is devised within 24 hours of admission
* All patients are reviewed by a consultant on a daily basis
* The total care of a patient is reviewed at least weekly.

1. Core Business Standards to Support the Activation of AUSBURNPLAN (Australia) Draft [↑](#footnote-ref-1)
2. National Burn Centre Review for the Ministry of Health, (Perth Review), April 2004 [↑](#footnote-ref-2)
3. Buchanan Report, August 1995 [↑](#footnote-ref-3)
4. Minutes of Major Burns Services Meeting, 16 May 1997 [↑](#footnote-ref-4)
5. Hon Annette King, Minister of Health, letter dated 27th April 2005 [↑](#footnote-ref-5)
6. Demling, 1995 [↑](#footnote-ref-6)
7. Herndon, 2002 [↑](#footnote-ref-7)
8. Sheridan et al, 1999 [↑](#footnote-ref-8)
9. British National Burn Care Review 2000 [↑](#footnote-ref-9)
10. Additional revenue is accessible via ACC for funding of extreme and HCB’s. This is accessible by RBU’s only if discussion and agreement has taken place between the NBC and RBU, and the details recorded – (per Guideline: Referral, Transfer & Discharge in the National Burn Centre). [↑](#footnote-ref-10)
11. NZ Handbook Health and Disability Sector Standards ( Children and Young People) Audit Workbook. SNZ HB 8134.4.2004

    [↑](#footnote-ref-11)
12. www.anzba.org.au – publications - Occupational Therapy and Physiotherapy – Principles and guidelines for burns patient management

    [↑](#footnote-ref-12)
13. Appendix Nine, Draft Outcome indicators in burn care [↑](#footnote-ref-13)
14. [www.anzba.org.au](http://www.anzba.org.au/) – Home page – Referral Criteria to a burns unit [↑](#footnote-ref-14)
15. Helvig EI, Upright J, Bartleson BJ, Kagan RJ. Development of burn outcomes and quality indicators. A project of the ABA committee on organisation and delivery of burn care. J Burn Care Rehab 1995;16:208-211 [↑](#footnote-ref-15)
16. The National Burn Care Review. British Burn Care Association et al., 2001 [↑](#footnote-ref-16)
17. Staley M, Richard R, Warden GD, Miller SF, Shuster DB. Functional outcomes in patients with burn injury. J Burn Care Rehab 1996;17:362-368 [↑](#footnote-ref-17)
18. Wood FM. Quality assurance in burn patient care: the James Laing memorial essay 1994 Burns 1995;21:563-568 [↑](#footnote-ref-18)