MINISTRY OF HEALTH
MANATŪ HAUORA

National Health Emergency Plan:

Multiple Complex Burn Action Plan

2011

New Zealand Government

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Foreword

Health emergencies can range from the slow build-up of an infectious disease outbreak to the sudden devastation of an earthquake. Often the consequences are extreme and the likelihood is certain, but the actual timing is impossible to predict. All we can be sure of is that such events will certainly happen, that the health sector has to be ready to respond to them and that our plans need to be robust enough to last, yet flexible enough to deal with any foreseeable circumstances.

The *National Health Emergency Plan* 2008 (NHEP) shows how we in the health and disability sector would work together in a coordinated way with other government agencies to respond to disasters and emergencies.

The *National Health Emergency Plan: Multiple Complex Burn Action Plan* (the Action Plan) will provide specific guidance to the health sector in the event of a national burn emergency. It is designed to be used with the NHEP, which provides more detailed information in areas common to all disasters such as communication.

International attention to the emergency management of a burn disaster has been heightened by a number of recent events, most notably the Bali bombing in October 2002, and more recently, the response following the Black Saturday Fires of February 2009 in Victoria, Australia.

In the latter case, Australia was able to handle the entire patient load, and this became an important focus of local and national pride and unity during a period of turmoil. This Plan aims to enable New Zealand – in particular the New Zealand National Burn Service (NBS), with support from the Ministry of Health – to respond in a similar fashion to care for patients in a comparable New Zealand emergency.

The philosophy of the NBS is to provide an integrated national service to care for all burn patients within New Zealand. In the event of an emergency, the clinical load will be shared between the four regional burn units (RBUs) and the National Burn Centre (NBC) to avoid a single unit becoming overwhelmed.

The Ministry of Health acknowledges the contribution of the sector in developing this Action Plan, and the significant developments that have resulted from this work, including the establishment of skin banks; the prediction of sustainable capacity in critical areas such as intensive care and the development of teamwork. This work is an acknowledgement that any burn emergency in New Zealand will impact on a wide range of services, including ambulance and emergency care.

Charles Blanch
Director Emergency Management

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1. Introduction

New Zealand has four regional burn units (RBUs), co-located with regional plastic surgery units at Christchurch Hospital, Christchurch; Hutt Hospital, Wellington; Waikato Hospital, Hamilton and Middlemore Hospital, Auckland. The National Burn Centre (NBC), co-located with the Auckland RBU at Middlemore Hospital, opened in 2006. The four RBUs and the NBC make up the New Zealand National Burn Service (NBS). Each unit sits within a district health board (DHB) structure, which has overall responsibility for management functions, including accounting for cross boundary referrals. Each RBU is located within a hospital or regional service capable of treating trauma, with established trauma services and an intensive care unit (ICU) capable of providing ventilatory support.

The focus of this Action Plan is on managing multiple complex burns in an emergency, and in particular, the resourcing required in such an emergency. It is expected that local RBU and DHB emergency planning will be cognisant of the management of major trauma associated with burns that is likely to be required in such a situation.

Purpose of this Action Plan

This Action Plan provides specific direction to the health sector in the event of a national burn emergency. It must be read in conjunction with the *National Health Emergency Plan* 2008 (NHEP)[1], which provides overarching direction to the health sector, the Ministry of Health and the whole of government in the event of a health-related emergency. This Action Plan documents an agreed sequence of actions to be implemented in the event of a national burn emergency where injuries meet the Australia and New Zealand Burn Association's guidelines for referral to an RBU.

Appendix Five outlines the average operative time and other resources needed for given burn sizes at various stages of care. This information will enable objective estimation of when the clinical response is likely to become unsustainable with available resources. It will also facilitate estimations of the likely resource requirement for any given number of multiple (new and existing) burn patients.

This Action Plan has been developed by the RBUs and the NBC in association with DHBs and the Ministry of Health.

Activating the Multiple Complex Burn Action Plan

A national health emergency will be declared when a single RBU or the NBC is overwhelmed or is unlikely to be able to sustain the required clinical response to a burn incident due to the number and complexity of burn patients or a lack of resources. At this point, this Action Plan will be activated by the Ministry of Health in consultation with the NBS.

1 Ministry of Health. 2008. *National Health Emergency Plan*. Wellington: Ministry of Health. URL: http://www.moh.govt.nz/moh.nsf/pagesmh/8669/$File/nhep-dec08.pdf

The management of an incident involving multiple complex burn injuries will have serious immediate and ongoing implications for regional and national health services in New Zealand. In particular, there will be requirements for:

- specialist triage (see below)
- intensive care, including isolation and ventilation for prolonged periods of time
- for each patient, multiple operating theatre visits and intra-operative decisions made by clinically skilled individuals over weeks to months per patient
- prolonged and intensive use of resources.

These needs are outlined in Appendix 5. They reinforce the important point that it is burn size, rather than burn numbers, that is the major determinant in declaring a National Health Emergency and implementing this Action Plan.

2. Relationship between this Action Plan and the National Health Emergency Plan

This Action Plan is a sub-plan of the NHEP. It describes the specific response required of the NBS, DHBs and the Ministry of Health in the case of a multiple complex burn emergency.

The Ministry will activate the NHEP when local or regional responses are overwhelmed or have the potential to be overwhelmed. At this point the Ministry will also assess whether the National Health Co-ordination Centre (NHCC) needs to be activated. The role of the NHCC is to provide national coordination of the health sector in an emergency.

Coordination of a health emergency at the national level will be affected by two factors in particular:

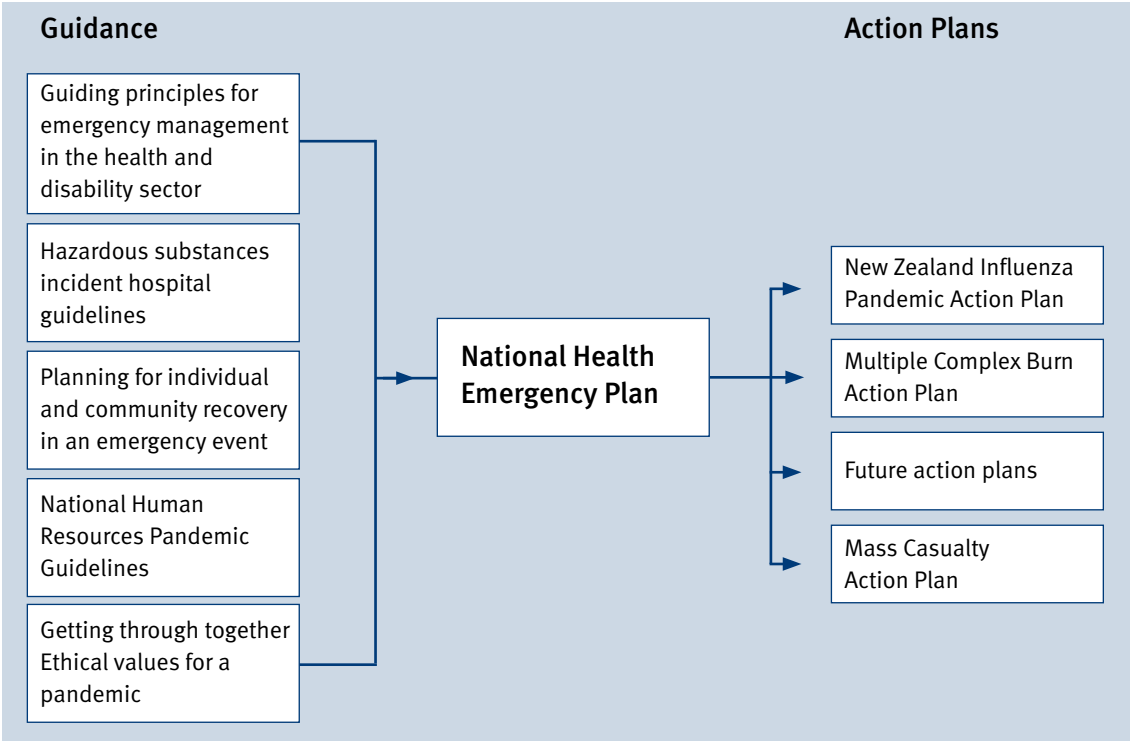
- whether the Ministry of Health is the lead government agency involved, or providing support to the lead agency
- the size and scope of the health sector and inter-agency coordination required to manage the response.

Since 2004, the Ministry's focus in this area has included publication of a series of emergency management-related documents to provide guidance in a health-related emergency. These mostly strategic documents are underpinned by specific action plans. Along with this Action Plan, the suite of guidance documents and action plans includes the following:

- *National Health Emergency Plan: Guiding Principles for Emergency Management Planning in the Health and Disability Sector* (2005)
- *National Health Emergency Plan: Hazardous Substances Incident Hospital Guidelines,* (2005)
- *Getting Through Together: Ethical values for a pandemic* (2007) (published by the National Ethics Advisory Committee)
- *National Human Resources Pandemic Guidelines* (2007)
- *National Health Emergency Plan: Planning for Individual and Community Recovery in an Emergency Event: Principles for psychosocial support* (2007)
- *National Health Emergency Plan: Influenza Pandemic Action Plan* (2008).

The relationship between these documents and the NHEP is illustrated below.

Figure 1: The New Zealand national health emergency framework (NHEP, p. 3)



National emergencies are managed by a lead agency, which may be assisted by support agencies. In a civil defence emergency, the lead agency is the Ministry of Civil Defence and Emergency Management (MCDEM). MCDEM will adhere to the arrangements in the *National Civil Defence Emergency Management Plan* to manage the adverse consequences of such an event.

A range of other government agencies may take the lead in an emergency, depending on the nature of the incident. The lead agency is determined by government, and the decision will be made in discussion with MCDEM. If an emergency primarily involves multiple burn injuries, it is likely that the Ministry of Health will be required to act as lead agency with support and advice from the NBS.

3. Principles of Multiple Complex Burn Management in New Zealand

Planning for health emergencies should:

- encompass reduction, readiness, response and recovery
- enable an appropriate response to all potential hazards
- be applicable locally, regionally and nationally
- support the protection of all health service workers, health and disability service consumers and the population at large
- support services that are best able to meet the needs of patients/clients and their communities during and after an emergency event, even when resources are limited, and ensure that special provisions are made for hard-to-reach, vulnerable communities so that emergency responses do not create or exacerbate inequalities
- adopt an all-hazards ('hazardscape') approach and consider all natural and man-made hazards cumulatively across a given area
- recognise the importance of engaging with different cultures and communities, to ensure an inclusive approach
- include an awareness of the way resources, human and other, can be used to help people from culturally and linguistically diverse communities, and overseas visitors who may be unfamiliar with New Zealand practices
- accommodate the provision of welfare to health and disability providers' staff affected by the emergency.

This Action Plan reflects the following principles agreed between burn service providers, their DHBs and the Ministry of Health.

New Zealand burn patients will be treated in New Zealand. In the event of a national health emergency being declared, the Ministry of Health will coordinate emergency management. This may include a request for international support and cooperation. Decanting patients to Australia is not an integral part of this Action Plan.

Burn patients will be treated by the people most skilled in burn management. Professionals skilled in burn management are predominantly located at the four RBUs. This has implications for the clinical staff assigned to triage a burn disaster and provide subsequent clinical care.

Requirement for local planning

RBUs and the NBC are expected to develop and document their own emergency response and recovery plans to meet the requirements of this Action Plan in conjunction with their DHBs. Planning will include managing high complex burn patients who would not normally receive ongoing treatment in the particular facility. Local planning will be coordinated with DHBs' major trauma management plans and will include documented arrangements with key service providers such as ambulance services, emergency departments and regional hospitals without a burn service.

This Action Plan assumes that effective strategies to reduce risk and ensure readiness to cope with a burn emergency are in place throughout the NBS. It provides guidance to RBUs, the NBC and all DHBs with a focus on the response and recovery phases of emergency management according to the health sector alert code system.

Planning is expected to reflect the four 'R's structure accepted for national emergency planning in New Zealand, as follows:

Reduction involves a consideration of natural or man-made risks that are significant because of the likely adverse consequences they represent for human life and property. The key factor within the reduction phase is risk mitigation.

Risk mitigation strategies start with identifing and analysing of significant natural and man-made hazards. Analysis of these hazards, using a matrix based on the associated likelihood of emergency and potential consequences, enables calculation of a value representing the level of risk involved. The risk can then be prioritised. Thereafter a risk mitigation strategy can be developed to eliminate risks where practicable and, where not, to reduce the likelihood and magnitude of their impact.

Readiness involves planning and developing operational arrangements before an emergency happens. It includes considering response and recovery. It involves equipping, training and exercising in preparedness for all emergencies identified in risk analysis. All systems need to be developed, tested and refined in readiness for response.

Response involves those actions taken immediately after recognising an emergency is taking place or is imminent, during and after an emergency. It also involves the recovery of affected communities.

Recovery includes those processes that begin after the initial impact has been stabilised and extends until normal business has been restored. The aim is the immediate, medium-term and long-term holistic regeneration of a community following an emergency. Recovery also encompasses all opportunities to learn from an emergency response in order to reduce the risks from future emergencies. Health-related agencies from a local, regional, national or all-of-government level may be involved, and economic, social or legislative issues may be considered.

Activation trigger

Health emergency plans (HEPs) are activated when usual resources are overwhelmed or have the potential to be overwhelmed in a local, regional or national health emergency. For an event to trigger activation of a HEP, it must require more than the business-as-usual emergency management.

Appendix 5, which presents data derived from cases treated at the NBC, highlights the average resource requirements for delivering care to a burn patient, based on burn size and time from injury.

If a receiving RBU is unable (or likely to be unable) to provide the appropriate sustained clinical response to a burn incident, it will advise the Ministry of Health in conjunction with the NBS, to activate this Action Plan.

The NBC is the only unit with dedicated and protected burn operating theatre access. This is currently set at 1,440 minutes per week. Other RBUs use the acute surgery list, which is shared with other theatre users caring for acute surgical cases. When the operative requirement is greater than 1440 minutes per week, the RBUs may implement the options outlined in the 'Local plan: decanting and reallocation to maximise capacity and resources' section of this Action Plan.

Sequence of response

This Action Plan expands on and modifies the framework outlined in the 2006 'Guidelines for Dealing with Disasters Involving Large Numbers of Extensive Burns', endorsed by the International Society for Burn Injuries (*Burns* 2006; 32: 933-9), so that it is compatible with the New Zealand

health system. Once this Action Pan has been activated, a sequence of events follows, as outlined below.

Initial assessment – burn assessment and triage

Burn-injured patients will normally be taken to the nearest hospital by first responders (such as an ambulance service), for assessment and treatment. In some instances, it may be beneficial to triage at the scene of the emergency. At other times, it may be beneficial to bring triage close to the scene of the emergency, or to triage life-threatening injuries, including the burn, at the closest regional trauma hospital (beyond the RBU).

In essence, a burn injury is not immediately life-threatening, and its assessment should be carried out after immediately life-threatening injuries have been stabilised and treated.

Establishing types of burn injury and referring to RBUs

Agreed referral criteria (see Appendix 2) determine which burn injuries require referral to an RBU. Each RBU has a predetermined catchment area collectively covering all of New Zealand; health providers within these regions are already familiar with the referral process.

The most severe burn injuries will be transferred from a RBU to the NBC for intense and specialised care. Due to the large resource demands of a severe burn injury (see Appendix 5), transfer to the NBC is not an automatic process. The RBUs and the NBS will use available capabilities and capacity and existing processes to manage the combined needs of existing and new burn patients.

Caring for burn patients with associated major trauma

There are established trauma guidelines on caring for major trauma patients, which prioritise treatment to address various life-threatening conditions (beginning with a focus on airway, breathing and circulation). Immediate treatment for burn patients with concomitant major trauma will be provided within a context of routine major trauma assessment, transport and treatment.

Although a burn injury remains a major threat to life, in the first 24–48 hours, so long as fluid resuscitation, emergency procedures such as escharotomies (splitting burnt skin to allow circulation to limbs and/or breathing), and wound care are performed by competent health professionals in a supportive environment under the guidance of the burn team, the patient's transfer to a RBU or the NBC need not be immediate and can instead be planned and coordinated.

Progression of care

During the course of treatment, the needs of burn patients will vary, and health providers' choices in terms of appropriate care become wider.

The **immediate** care needs of burn patients are the same as those of any other trauma patient. They can be delivered by existing first responders and established trauma centres, with support from burn teams, to ensure that there is adequate fluid resuscitation, temperature control, wound care and recognition of life- or limb-threatening constrictions requiring escharotomies.

Initial burn care (24–72 hours post-burn) is highly resource-dependent, and one focus of the NBS has been to concentrate the skills and resources required to care for patients with life-threatening burn injuries at the NBC at Middlemore Hospital. The major resource requirement during the initial

phase is operative (requiring surgeons, anaesthetists, theatre time and the ICU); allied health and nursing requirements becoming more predominant in the later stages of care. The speed of an individual patient's progress, typically measured in weeks, is highly dependent on the burn size (see Appendix 5).

Although there is a wide variation of methods of burn wound management practiced in the world, the New Zealand NBS has agreed on the principles outlined in Appendix 1. These consensus guidelines were developed not only to standardise care but also to facilitate the transfer of patients requiring ongoing treatment.

The **intermediate and rehabilitation** phase occurs once the burn wound is sufficiently closed so that the patient is no longer in a life-threatening condition. Further surgeries may be required; these can be done at the NBC, an RBU or even a hospital with plastic surgery services.

Communication

Communication between RBUs and the NBC in an emergency

Referrals to the NBC are made following an agreed process, documented in the NBS Framework, and are subject to bed availability (this includes intensive care beds), (see Appendix 3).

All burn injuries require a referral form to be completed by the referring clinician (**www.nationalburnservice.co.nz/pdf/referralform.pdf**, see also Appendix 3); this form is forwarded to and discussed with the local RBU. The process of referral follows the agreed pathway as documented in the *Guideline: Referral, Transfer and Discharge in the NBC* (**www.nationalburnservice.co.nz/pdf/referral-transfer-discharge-guideline.pdf**).

In an emergency, it is important that communication be maintained between affected RBUs, the NBC, the local affected community and the concerned wider community. Communications staff within DHBs will be responsible for communicating with the media.

Communication using the single-point-of-contact system (SPOC)

The single-point-of-contact (SPOC) system is a method used to provide effective 24-hours, seven-days-a-week emergency communication between DHBs, their public health units and the Ministry.

The system is an integral component of readiness and remains in place at all times. It supplements, but does not replace, normal day-to-day non-emergency communications channels and processes within the NBS and associated DHBs.

The business-as-usual communication methods used by the NBC and the NBS – an on-call clinician and a cascade system – will continue to be used in the event of an emergency response.

Local plan: decanting and reallocation to maximise capacity and resources

The high and variable resource needs associated with the care of a burn mean that multiple options are required in order to provide a graduated response that will minimise the impact on other health delivery areas.

Decanting of patients refers to the transfer of patients to make space for others. Implementation of this Action Plan may require either all or a combination of:

- transfer of burn patients at different stages of care out of the NBC to RBUs (or vice versa), to make resources available for new burn patients and/or vice versa
- transfer of non-burn patients out of the hospitals where the NBC or RBUs are located to other hospitals, including transfer of non-burn ICU patients within the New Zealand ICU network, to ensure adequate capacity in ICU beds located at RBUs and the NBC.

Reallocation involves reprioritisation of available resources. Implementation of this Action Plan may require either all or a combination of the following.

- Burn team members (such as plastic surgeons, nurses or anaesthetists) employed at RBUs or the NBC and routinely involved in burn care typically have other responsibilities within the DHB. In an emergency, these responsibilities may be deferred to others with the appropriate skills in the same DHB to allow the burn team to concentrate on delivering burn care.
- Other staff (such as plastic surgeons) normally employed at DHBs in a non-burn capacity who are capable of supporting the burn team may be redeployed to burn care.

To **increase capacity**, implementation of this Action Plan may require all or a combination of:

- increasing the frequency and number of operating lists per week dedicated to burn care (which will require reduction in other surgical services not involved in the current emergency)
- increasing the duration of theatre shifts
- increasing in-patient burn injury bed capacity
- increasing the availability of support services (including but not limited to allied health, nursing, laboratory and radiology services).

Recruiting involves calling in additional resources not normally available. Implementing this Action Plan may require all or a combination of:

- leave cancellation
- roster alteration
- part-time employees taking on full-time employment
- recruitment of professionals with appropriate skills from outside the DHB (locally, regionally, nationally or internationally).

Rostering and coordination of limited resources is vitally important given the need for sustained intervention by a small number of capable health care professionals that is likely to arise in an emergency involving burn injuries. Staff fatigue and burn-out is best managed by rotating and relieving staff in a pre-determined and controlled manner. Implementing this Action Plan may require both or a combination of the following:

- implementing the processes outlined above
- coordinating teams to provide continuous but limited periods of service (for example two weeks), to ensure that safe work hours and rest periods during the day, between shifts and between periods of service, are maintained.

4. Health Sector Roles and Responsibilities

The responses required of the stakeholder groups identified in the following table are based on emergency plans developed by DHBs locally and regionally; and more specific plans developed by the RBUs and the NBC.

Primary responsibility for the management of an emergency lies with the affected local provider, which may be the local DHB or the DHB regional group, if a regional emergency plan is activated. At each phase of an emergency, specific actions need to be taken at the local, regional and national level.

Ambulance responsibilities

Mass casualty incident (MCI) including a multiple complex burn (MCB) response

The expected sequence of events in the case of an MCI/MCB emergency is as follows:

1. An MCI with MCB occurs. (This will probably involve police in a search-and-rescue type operation and/or MCDEM in a mass evacuation.)
2. Emergency services are notified by someone telephoning 111 and identifying the appropriate emergency service. The 111 National Crisis Communications Centre (NCCC) will then transfer the call to one of the three Emergency Ambulance Communications Centres (EACCs), which are located in Auckland, Wellington and Christchurch.
3. The initial assessment of an incident occurs by the first responders at the scene using standard risk assessment processes.
4. Once an incident has been classified by an EACC, local DHBs and the Ministry of Health will be notified. Police and fire services are informed routinely by the Communications Centres. Civil Defence Emergency Management (CDEM) groups will be informed of all serious incidents.
5. Ambulance services will attend the scene and further assess the incident risk. Depending on what they assess the risks to be, they will develop an escalation and response plan.

If regional ambulance resources are overwhelmed, ambulance services will activate their NCCC, which will coordinate with the NHCC and other national emergency management structures as required. The NCCC will coordinate the ambulance response.

St John maintains the National Transport Plan for an MCI on behalf of the ambulance sector. This Plan addresses various transport options, which include road-based ambulances, rotor and fixed-wing civilian and Defence Force aircraft, and other private transport options such as trains and buses. The Transport Plan focuses on transporting the injured to the appropriate DHB/s and decanting the receiving DHB/s in order to increase their capacity.

Roles and responsibilities by heath sector alert code

Health sector alert code	Ambulance services **Principal role:** Provides first response	District Health Boards **Principal role:** Local operational management of response	Regional Burns Units **Principal role:** Regional coordination of burn management with DHBs	National Burns Centre **Principal role:** National coordination of burn management between RBUs	Ministry of Health **Principal role:** National and international coordination
Key roles and responsibilities aross all alert codes	• Communicates with health sector and other response agencies as necessary • Coordinates triage at scene of incident • Manages transport of patients • Activates local regional and national plans as necessary	• Coordinates and manages the health sector response in their own region • Provides information to the Ministry, NBC and RBUs of potential need to activate the Plan • Liaises with other agencies and emergency services at the local level • Activates local disaster plans to maximise capacity, for example, decanting of non-burn patients from the NBC or RBUs **Counties Manukau DHB (location of NBC)** • Coordinates and manages the health sector response in its region to ensure the NBC has maximum capacity by: – activating regional Memoranda of Understanding (MoUs) to decant patients from burn and ICU beds – 'ring fencing' theatre time for burn operations • Ensures that adequate supplies and equipment are available to support NBC in an extreme emergency	• Provide care for complex burn patients • Predict and monitor local service sustainable capacity • Provide a triage service • Supports non-burn hospitals/ services within the region with clinical advice and support • Communicate with: – local DHBs to assist with local /regional response to a burn emergency – NBC regarding clinical support matters including decanting and transfer of patients • Work with DHBs to implement local recovery plan	• Senior medical staff within the NBS liaise with each other to determine the appropriate clinical placement for burn patients throughout the NBS • NBS coordinator within the NBC (based at Counties Manukau DHB) provides a link between the NBC and RBUs and liaises with the Ministry regarding sustainable capacity through SPOC system • Works with Ministry to implement national recovery plan • Provides information to the Ministry and DHBs of any potential need to activate the Plan • Provides care for patients with large burns (›30% total of body surface [TBSA]) • Works with Ministry to provide clinical advice • Supports transfer of burn patients	• Coordinates health sector operational response at the national level • Provides information to NBC and RBUs and DHBs of any potential need to activate the Plan • Provides information and advice to the Minister • Provides strategic direction on health sector response • Liaises with other agencies at the national level • Liaises with international agencies • Identifies and activates appropriate national technical advisory group(s), and ensures they analyse critical data as required • Provides clinical and public health advice on control and management • Approves/directs distribution of national reserve supplies • Ensures technical advisory groups analyse critical data • Provides information to assist with response • Plans for recovery

Health sector alert code	Ambulance services **Principal role:** Provides first response	District Health Boards **Principal role:** Local operational management of response	Regional Burns Units **Principal role:** Regional coordination of burn management with DHBs	National Burn Centre **Principal role:** National coordination of burn management between RBUs	Ministry of Health **Principal role:** National and international coordination
Code White: Information	• Monitors situation • Reviews response plans • Advises staff and checks their availability • Checks equipment and supplies	**DHB closest to the incident** • Monitors situation and obtains intelligence reports and advice from ambulance services • Advises all relevant staff, services and service providers of the event and developing intelligence • Liaises with the Ministry regarding media statements • Reviews local and regional HEPs • Prepares to activate emergency plans • Liaises with other emergency management agencies within the region **Counties Manukau DHB (location of NBC)** • Liaises with NBC in preliminary planning • Prepares to decant ICU	**RBU closest to incident** • Advises appropriate staff and NBS of Code White • Reviews sustainable capacity using Appendix Five as a guide • Commences preliminary planning to increase capacity with a particular emphasis on ICU capacity • Reviews potential availability (liaising with human resources departments), of staff with burn experience • Alerts emergency equipment suppliers **Other RBUs** • Review sustainable capacity, using Appendix Five as a guide	• Reviews sustainable capacity, using Appendix Five as a guide • Commences preliminary planning to increase capacity with a particular emphasis on ICU capacity • Reviews potential availability (liaising with Counties Manukau DHB human resources department), of staff with burn experience • Investigates possibility of decanting non-burn/ plastic clinical load onto other suitably credentialed clinicians • Liaises with NBS to determine additional capacity nationally • Alerts emergency equipment suppliers • Provides clinical advice to the Ministry	• Issues Code White Alert through SPOC system • Monitors situation and continues surveillance • May activate a national incident on Emergency Management Information System (EMIS) • Advises DHB chief executives, DHB SPOC and all public health unit managers of emerging situation and potential developments • Provides media and public with information and advice • Liaises with international agencies

Health sector alert code	Ambulance services **Principal role:** Provides first response	District Health Boards **Principal role:** Local operational management of response	Regional Burn Units **Principal role:** Regional coordination of burn management with DHB	National Burn Centre **Principal role:** National coordination of burn management between RBUs	Ministry of Health **Principal role:** National and international coordination
Code Yellow: Standby	• Continues to monitor situation • Confirms staff and their availability • Prepares equipment supplies	**DHB closest to the incident** • Prepares to activate DHB emergency operations centre (EOC) • Identifies and appoints DHB incident management team • Prepares to activate regional coordination • Advises and prepares all staff, services and service providers • Manages liaison with local agencies • Monitors local situation and liaises with the Ministry **Counties Manukau DHB (location of NBC)** • Activates regional MoUs to facilitate transfer of ICU/other patients • Facilitates transfer activities	**RBU closest to incident** • Alerts staff for standby through cascade system • Ensures emergency department/ICU and theatre are on standby • Activates emergency supply system • Completes arrangements to decant existing patients to free beds for new incoming burns • Prepares to triage patients as appropriate • Considers reallocation and recruitment of additional staff and resources **Other RBUs** • Remain on standby • Prepare to accept decanted burn patients from NBC and RBU closest to incident	• Alerts staff for standby through cascade system • Ensures emergency department/ICU and theatre are on standby • Activates emergency supply system • Completes arrangements to decant patients to free beds for incident admissions • Prepares to triage patients as appropriate • Considers reallocation and recruitment of additional staff and resources	• Issues Code Yellow Alert through SPOC • Identifies and appoints national incident management team • Activates a national incident on EMIS • Assesses whether activation of the NHCC is required, and activates if necessary • Determines and communicates strategic actions for response to the incident • Identifies national technical advisory group(s) as required • Advises the health sector via the SPOC system • Manages liaison and communications with other government agencies • Manages liaison with international agencies

Health sector alert code	Ambulance services **Principal role:** Provides first response	District Health Boards **Principal role:** Local operational management of response	Regional Burn Units **Principal role:** Regional coordination of burn management with DHB	National Burn Centre **Principal role:** National coordination of burn management between RBUs	Ministry of Health **Principal role:** National and international coordination
Code Red: Activation	• Performs scene triage • Performs initial treatment • Identifies appropriate DHB or other health provider to treat the injured • Transports patients in order of priority • Coordinates and communicates with other emergency service providers (such as fire and police) • Alerts the closest DHB • Alerts the Ministry • May activate (Ambulance) National Co-ordination Centre • May inform CDEM Groups • May implement national transport plan • May request DHBs supply expert assistance to the incident	**DHB closest to the incident** • Activates DHB EOC • Activates DHB incident management team • Manages DHB primary, secondary and public health service response • Liaises with other agencies at a district level • Provides Regional Co-ordination Centre with DHB/community intelligence • Facilitates transfer of burn patients to RBUs and NBC • Works with RBU to facilitate recovery planning **Counties Manukau DHB (location of NBC)** • Activates regional MoUs to support NBC to provide appropriate care for patients • Facilitates transfer of burn patients to and from NBC • Works with NBC to facilitate recovery planning	**RBU closest to incident** • Activates RBU emergency plan • Decants patients from RBU as appropriate • Reallocates or recruits additional staff and resources as appropriate • Receives burn patients via emergency department • Assesses and treats patients according to clinical priority • Engages in inter-clinician discussion within NBS to: – prioritise transfer of patients from RBU to RBU; and RBU to NBC – monitor patient progress and transfer to and from NBC according to clinical need (Continued on next page)	• Activates NBC emergency plan • Decants burn patients as appropriate • Reallocates clinical resources to provide necessary clinical response, as guided by Appendix 5 • Reallocates or recruits additional staff and resources as appropriate • Receives burn patients via emergency department • Assesses and treats patients according to clinical priority • Facilitates inter-clinician discussion within NBS to: – prioritise transfer of patients from RBU to RBU, and RBU to NBC – monitor patient progress and transfer to and from NBC according to clinical need (Continued on next page)	• Issues Code Red Alert; thereafter communicates via the four regional coordinators • Activates a national incident on EMIS • Coordinates health response at national level • Activates the NHCC • Activates national technical advisory group • Monitors the situation and revises and communicates strategic actions for response • Approves/directs distribution of national reserve supplies • Considers strategic recovery issues • Provides clinical and public health advice on control and management • Carries out national public information management activities • Manages liaison with other government agencies • Manages liaison with international agencies • Implements recovery planning

Health sector alert code	Ambulance services **Principal role:** Provides first response	District Health Boards **Principal role:** Local operational management of response	Regional Burn Units **Principal role:** Regional coordination of burn management with DHB	National Burn Centre **Principal role:** National coordination of burn management between RBUs	Ministry of Health **Principal role:** National and international coordination
Code Red: Activation			(Continued from previous page) **Other RBUs** • Activate RBU emergency plans as required • Decant patients as required • Receive transferred burn patients as required, transferring to RBU/ICU according to clinical need • Assess and treats patients according to clinical priority – Engage in inter-clinician discussion within NBS to prioritise of transfer patients from RBU to RBU and RBU to NBC • Monitor patient progress and transfer to and from NBC according to clinical need	(Continued from previous page) • Liaises with Ministry through SPOC on the sustainable capacity of the NBS • Plans transfer of patients within New Zealand • Commences recovery planning: – for NBC – within the NBS	

Health sector alert code	Ambulance services **Principal role:** Provides first response	District Heath Boards **Principal role:** Local operational management of response	Regional Burn Units **Principal role:** Regional coordination of burn management with DHB	National Burn Centre **Principal role:** National coordination of burn management between RBUs	Ministry of Health **Principal role:** National and international coordination
Code Green: Stand down	• Stands down (Ambulance) National Co-ordination Centre • Facilitates debriefs • Provides Ministry with information following debriefs • Reviews and updates plans	**DHB closest to incident** • Stands down DHB EOC • Stands down DHB incident management team • Focuses on recovery activities in the region • Facilitates debriefs • Provides Ministry with information following debriefs • Updates plans **Counties Manukau DHB (location of NBC)** • Reviews effectiveness of regional MoUs and systems in place to facilitate the operation of the NBC in a national burn emergency and makes appropriate changes to plan	**RBU closest to incident** • Activates RBU recovery plan • Transfers out-of-area patients back to local RBUs according to NBS criteria • Debriefs and reviews local RBU emergency plan with staff and emergency services and updates plan as necessary • Debriefs and reviews emergency management with NBS and updates plan **Other RBUs** • Activate RBU recovery plan • Transfer out-of-area patients back to local RBUs according to NBS criteria • Debrief and review of emergency management with NBS and updates plan • Debrief and review local RBU emergency plans and update as necessary	• Activates NBC recovery plan • Transfers patients back to RBUs according to NBS criteria • Debriefs and reviews the local NBC emergency plan with staff and emergency services and updates plan as necessary • Debriefs and reviews emergency management with NBS and updates plan as necessary	• Issues Code Green Alert • Advises other government and international agencies of stand down • Advises media and public • Stands down Ministry incident management team • Stands down NHCC • Focuses activities on national recovery issues within the health sector • Implements recovery plan in conjunction with other agencies • Supplies national information on recovery • Manages national debrief and evaluation of events • Reviews plans

Glossary and Abbreviations

District Health Emergency Plan (DHEP): a plan that describes the health emergency functions and capability required by the DHB, which takes an all-hazards approach and provides for both immediate events, short duration events and extended emergencies, on both small and large scales, as relevant to the DHB population. The DHEP will be built around the four Rs of emergency management: reduction, readiness, response and recovery.

Emergency Ambulance Communications Centre (EACC): a term used to describe one of three Ambulance Communications Centres located in Auckland, Wellington and Christchurch that dispatch the country's fleet of more than 600 ambulances, 250 rural doctors and nurses (under the PRIME programme), more than 40 emergency helicopters, the coastguard and other modes of response.

Emergency Operations Centre (EOC): an established facility where the response to an incident may be supported.

Health Sector Emergency Management Information System (EMIS): a web-based emergency information system that is used as the primary tool within the health sector for the management of local, regional and national emergencies. EMIS complements existing business-as-usual systems (such as EpiSurv and patient management systems).

Ministry of Civil Defence and Emergency Management (MCDEM): the Government's lead advisor in making New Zealand and its communities resilient to hazards and disasters through a risk management approach to the four Rs.

National Burn Centre (NBC): a centre that provides inpatient care for the highest level of burn injury complexity, defined as equal to or greater than 30 percent TBSA.

National Burn Service (NBS): the four regional burn units and the National Burn Centre provide an integrated national service for all burn patients within New Zealand.

(Ambulance) National Crisis Co-ordination Centre (NCCC): a national coordination centre for New Zealand ambulance services.

National Health Co-ordination Centre (NHCC): a service that provides national coordination of the health sector in an emergency. It is the main conduit for intelligence information across the health sector.

National Health Emergency Plan (NHEP): a Ministry 'umbrella' plan incorporating other health emergency-specific action plans; for example, the National Health Emergency: Multiple Complex Burn Action Plan, and the New Zealand Influenza Pandemic Action Plan. The NHEP provides guidance for the New Zealand health and disability sector for emergency management.

Regional burn unit (RBU): a unit that provides specialised and acute burn care treatment to patients based on the Australian and New Zealand Burn Association (ANZBA) referral criteria.

Regional Health Emergency Plan (RHEP): a plan that sets out the proposed response of DHBs in a given region to a regional incident and establishes a generic process for the management of regional incidents, irrespective of origin. It contains task assignments, assignments of roles and responsibilities, standard forms, and other relevant guidance.

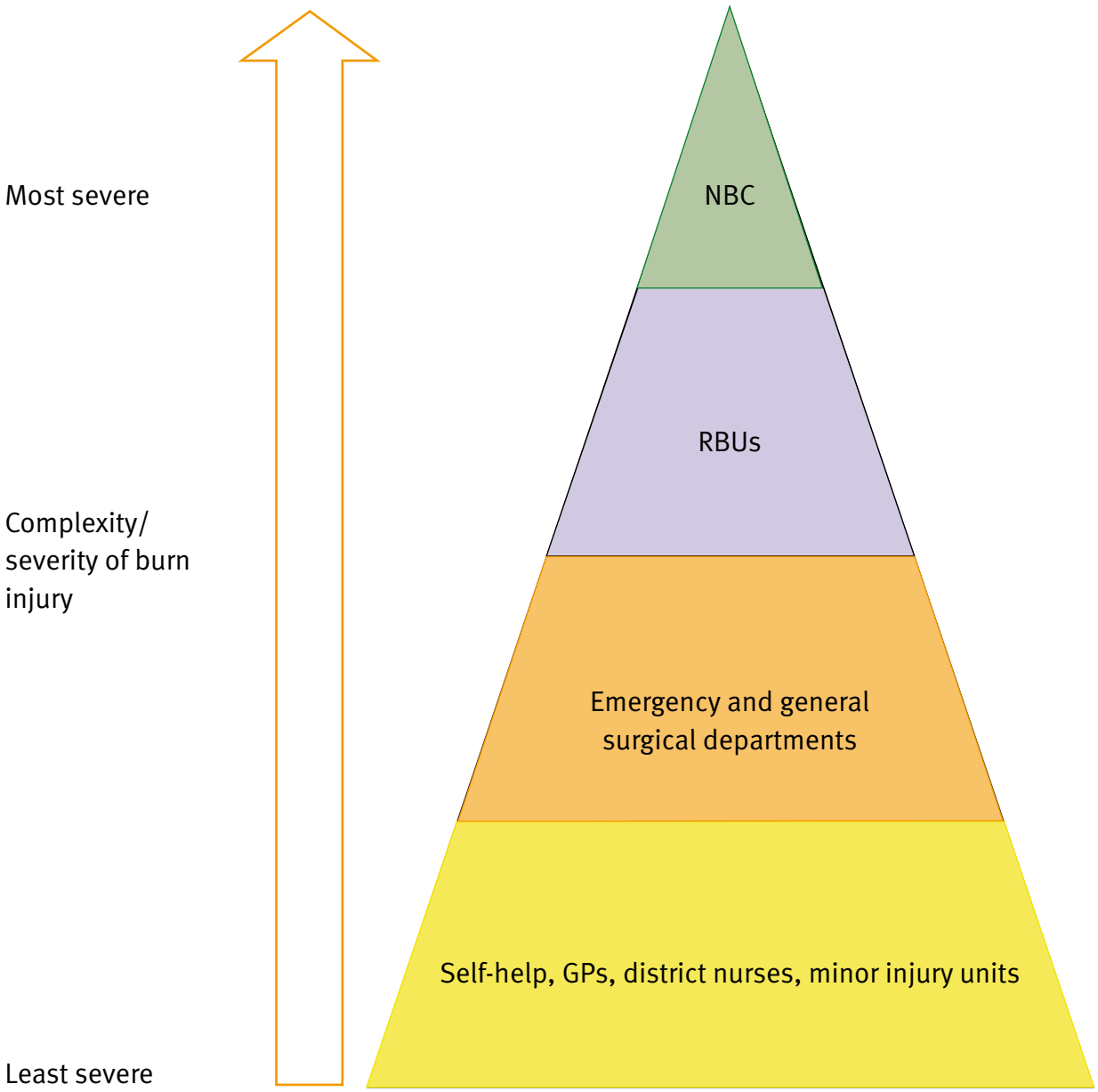
Single Point of Contact (SPOC): a system used to facilitate communications in the health sector.

Sustainable capacity: analysis of treatment data for varying levels of burn injury used to develop an interim model to predict sustainable capacity in RBUs and the NBC. Prospective data collection and analysis will provide more accurate and detailed information over time. This model and the ongoing communication system within the NBS form the basis for the safe management of people with burn injury on a day-to-day basis and in a regional or national emergency.

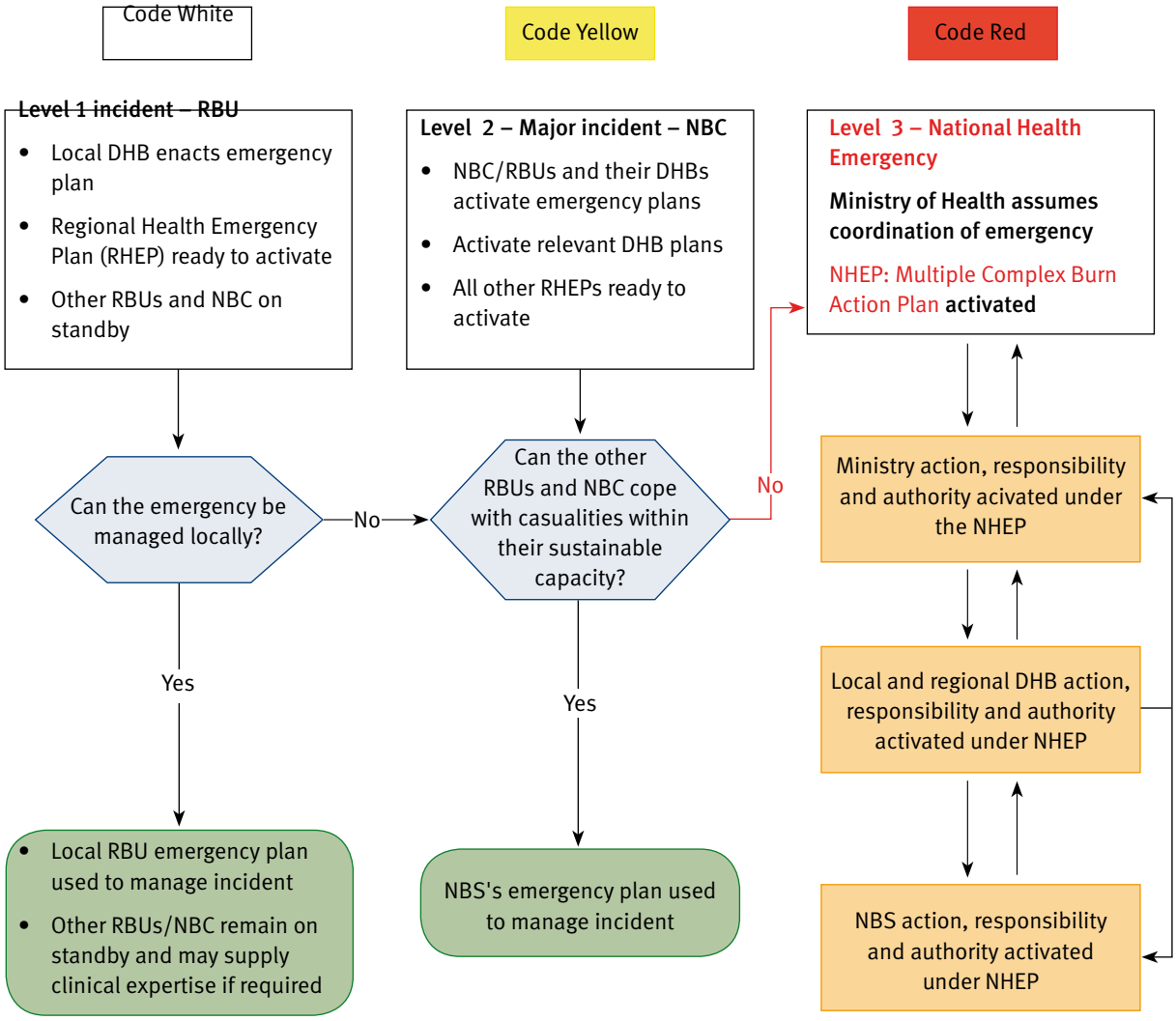
Appendix 1:
Management of Burn Care Services

1) Organisation and management of burn care services in New Zealand

Burn care services in New Zealand are provided by primary, secondary and tertiary level health care providers, according to the severity and complexity of the burn injury.



2) Escalation pathway for the management of a multiple complex burn emergency



Appendix 2: Referrals

1) Burn referral criteria

The Australian and New Zealand Burn Association (ANZBA) recommends that patients should be referred to an RBU If they have:

- burns equal to or greater than 10 percent of TBSA
- burn in certain special areas (for example, involving the face, hands, feet, genitalia, perineum, or major joints)
- a full-thickness burn affecting more than five percent TBSA
- an electrical burn (including lightning injury)
- chemical burns
- a burn injury with an inhalation injury
- circumferential burn of the limbs or chest
- burns at the extremes of age (young children and the elderly)
- a burn injury with a pre-existing medical condition that could complicate management, prolong recovery, or affect mortality
- a burn injury with concomitant trauma (for example a fracture) in which the burn injury poses the greater immediate risk of morbidity or mortality.

Referral to the National Burn Centre

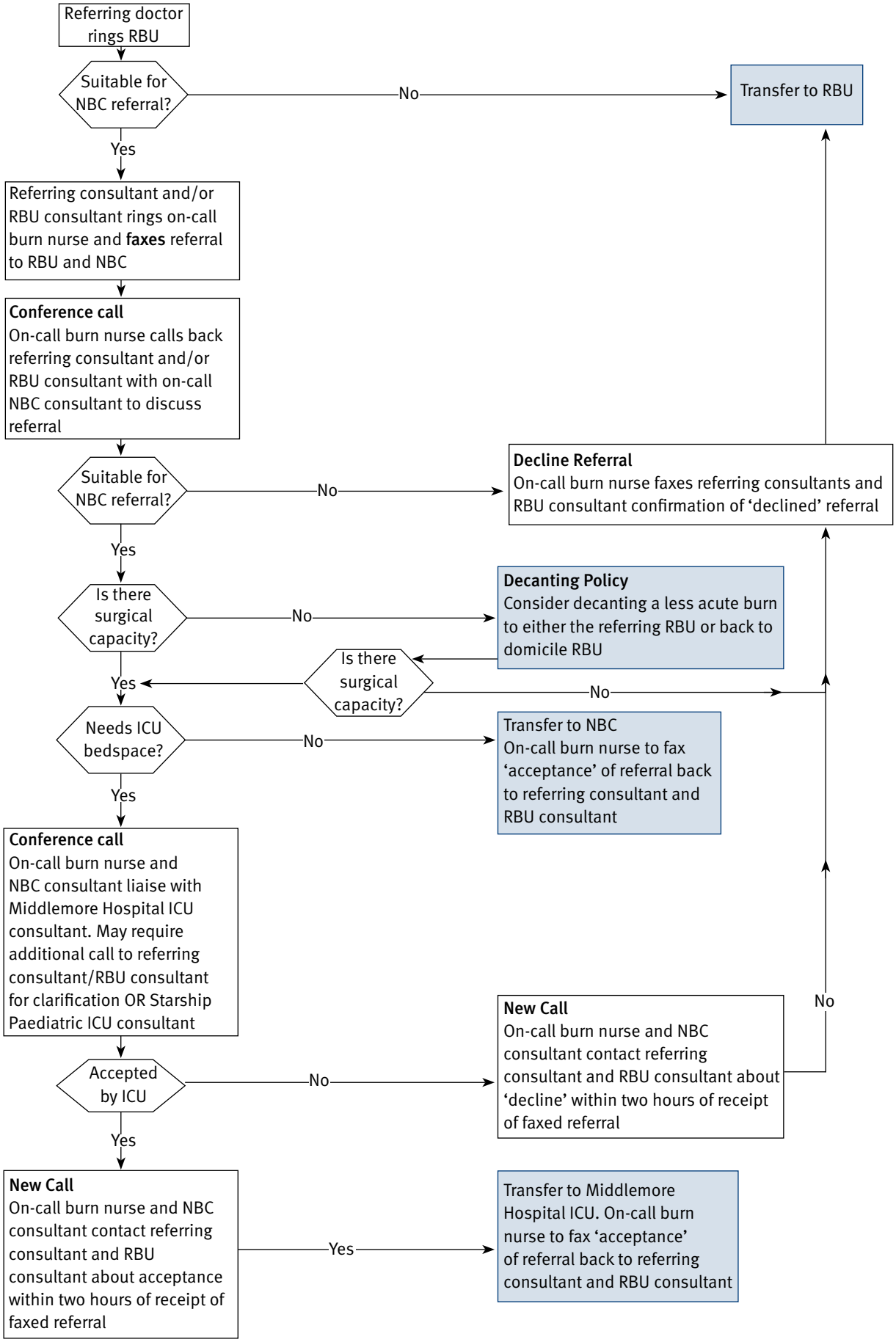
Severe burn injuries warrant consultation with, and typically transfer to, the NBC. These include:

- burns equal to or greater than 30 percent TBSA
- patients predicted to require prolonged ventilation (greater than 48 hours)
- full-thickness burns greater than 15 percent TBSA in the very young or very old
- electrical burns – caused by high voltage, with underlying tissue damage
- significant chemical burns.

Referrals to the NBC are made through the local RBU.

The NBS's website **www.nationalburnservice.co.nz** details the referral process and provides a resource for both clinicians and service users (see also Appendix 3).

2) The burn injury referral pathway



Appendix 3:
National Burn Service Referral Form

No burn patient can be transferred to the National Burn Centre or Starship without the involvement of their regional burn unit. This important step cannot be bypassed.

Burn patient arrives
- **complete trauma ABC (if required)**
- **complete first aid cooling (if not done)**

↓

- **Patient meets criteria for discussion + – transfer to a regional burn unit/ plastic surgery unit**

↓

- **Fax referral to regional burn unit and discuss case with on-call plastic surgery registrar**
- **Email photos to RBU**

Referral criteria for regional burn unit

- Burns greater than 10% total body surface area (TBSA) or 5% in a child
- Burns of special areas, eg, the face, hands, feet, genitalia, perineum, and major joints
- Full thickness burns greater than 5% TBSA
- Electrical burns (including lightning injury)
- Chemical burns
- Burn injury with inhalation injury
- Circumferential burns of the limbs or chest
- Burns at the extremes of age, ie, young children and the elderly
- Burn injury in patients with pre-existing medical disorders that could complicate management, prolong recovery or affect mortality
- Any patient with burns and concomitant trauma (eg, fractures) in which the burn injury poses the greater immediate risk of morbidity or mortality

Fax and phone referral to:	Please tick applicable box below	
Christchurch Hospital ☐ tick here	Ph: Fax:	(03) 364 0640 (please ask for on-call plastic surgery registrar) (03) 364 0456 (Department of Plastic Surgery)
Hutt Hospital ☐ tick here	Ph: Fax: Email photos:	(04) 566 6999 (please ask for on-call plastic surgery registrar) (04) 570 9239 (Plastic and Burn Ward) referrals_plastics@huttvalleydhb.org.nz
Waikato Hospital ☐ tick here	Ph: Fax:	(07) 839 8899 (please ask for on-call plastic surgery registrar) (07) 839 8725 (Plastic Surgery Booking Clerk Office)
National Burn Centre Middlemore Hospital ☐ tick here	Ph: Fax: Email photos:	(09) 276 0000 (please ask for on-call plastic surgery registrar) (09) 276 0114 021 784 057 plasticreferrals@middlemore.co.nz oncallburnsnurse@middlemore.co.nz
Fax from:		
Designation:		
Date:		
Number of pages:	3	

Initial Treating Dr: _____ Ph: _____

Designation: _____ Fax: _____

Injury Details:

Time/Date of Injury: _____ ACC 45 No. _____

Arrival Date/Time at Hospital: _____

How Accident Happened: _____

_____

_____

Burn occurred in confined space? Yes ☐ No ☐

Was there an explosion? Yes ☐ No ☐

Past Medical History: _____

_____

Daily Alcohol Intake: _____

Current Medications: _____

Allergies: Yes/No: _____

Discussed between which consultants?

RBU SMO: _____ **NBC SMO:** _____

Discussion (pls circle): Transfer to NBC RBU Other _____

Reason not transferred to NHC:

Patient label

Next of Kin or Accompanying Person: Ph: _____

_____

Initial Assessment:

Airway: _____ Breathing: _____

Circulation: _____ – *adequate supply to limbs?* Yes/ No (please circle)

Cervical injury: _____

Tetanus toxoid: *Current?* Yes / No / Don't Know (please circle)

Analgesics Given: _____

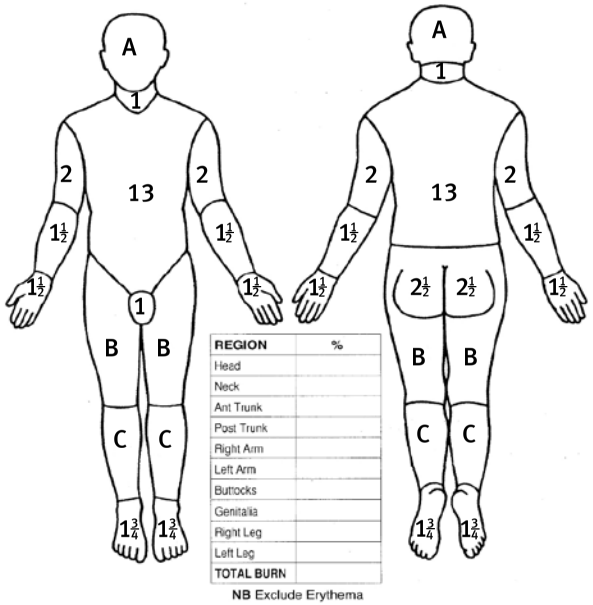
Escharotomies? Yes ☐ No ☐ *Where?* _____

_____

Transfer Checklist:

	Yes	No	n/a
Intubated			
Tetanus toxoid given			
Naso-gastric tube			
Oxygen			
Escharotomies			
Uretheral catheter			
Venous access			
Blood gases			
Urea: electrolytes, full blood count			
Urinalysis			
Jewellery removed			
Baseline data attached			
Fluid Balance Chart attached			
Burns Chart attached (Lund & Browder)			
X-rays and notes (copies) sent			

Lund and Browder Burn Chart
Areas Burned



Size of Burn (% body surface area): _____

Partial Thickness

Full Thickness

Area	Age 0	1	5	10	15	Adult
A = ½ of head	9½	8½	6½	5½	4½	3½
B = ½ of one thigh	2¾	3¼	4	4¼	4½	4¾
C = ½ of one leg	2½	2½	2¾	3	3¼	3½

Patient Weight: _____ **kg**

Fluid Replacement Guide

First 24 hours

3–4 mL x kg x % burn

- Crystalloid (eg, Plasmalyte, Lactated Ringers)
Do not include simple erythema.

Give approximately half in first 8 hours from time of burn, half in next 16 hours

For children add maintenance fluids – use Dextrose Saline:

Up to 10kg:	4 mL/kg/hr
+ from 10–20kg:	2mL/kg/hr
+ each kg >20kg:	1 mL/kg/hr

NB: This formula is a guideline only and does not replace clinical judgement. ADJUSTMENT WILL be necessary to maintain urine output.

Wound Management

Please consult with regional burn unit for advice prior to applying any wound care product.

Monitoring

Urine output Adults: 0.5 mL/kg/hr
Children: 1 mL/kg/hr

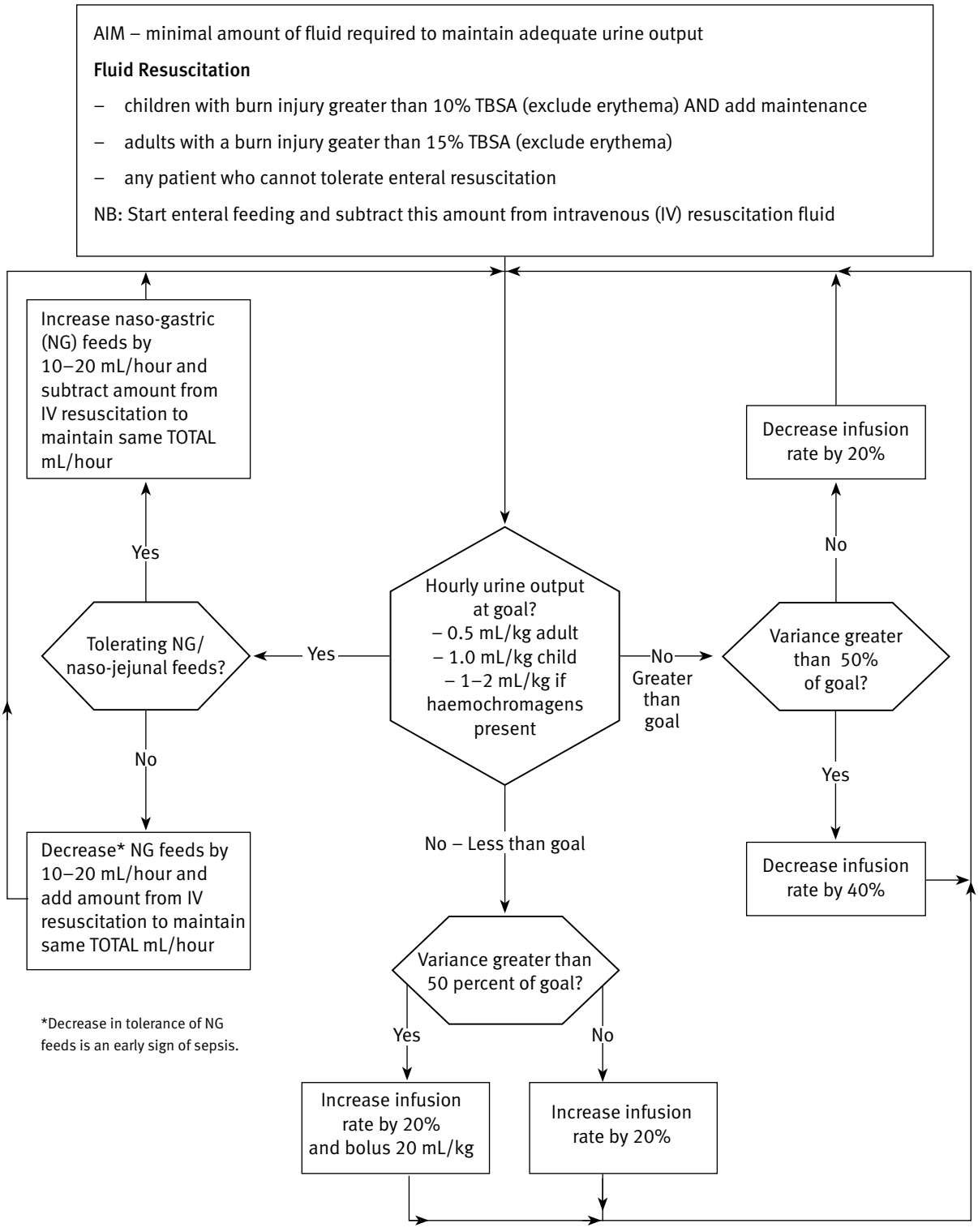
(haemoglobinuria / myoglobinuria → 1–2 mL/kg/hr)

NB: This formula is a guideline only and does not replace clinical judgement. Adjustment may be necessary to maintain urine output.

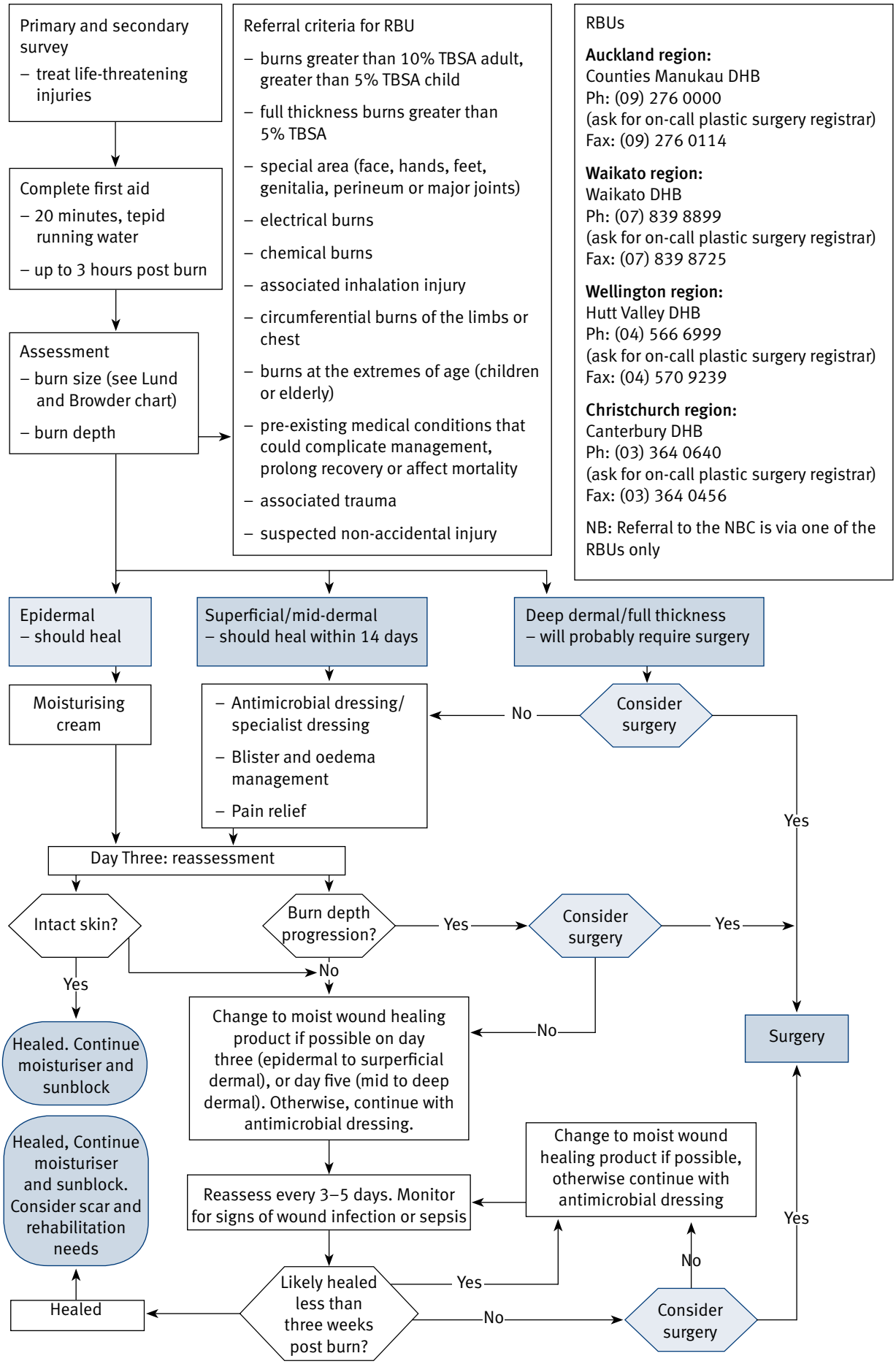
Time (hourly)	Rate fluid in/hr	Urine out/hr

Appendix 4:
Suggested Pathways of Burn Care

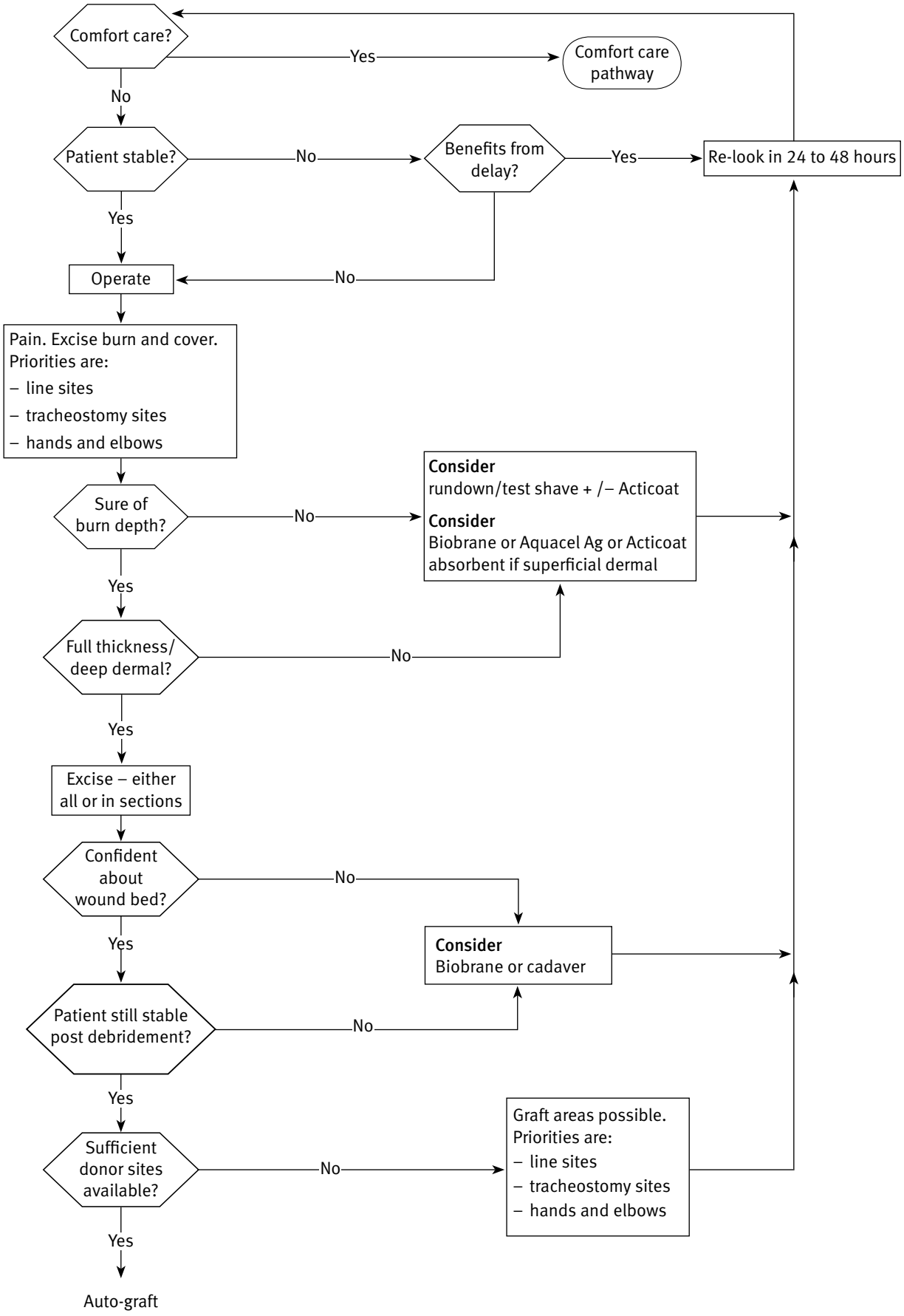
1) Fluid resuscitation pathway



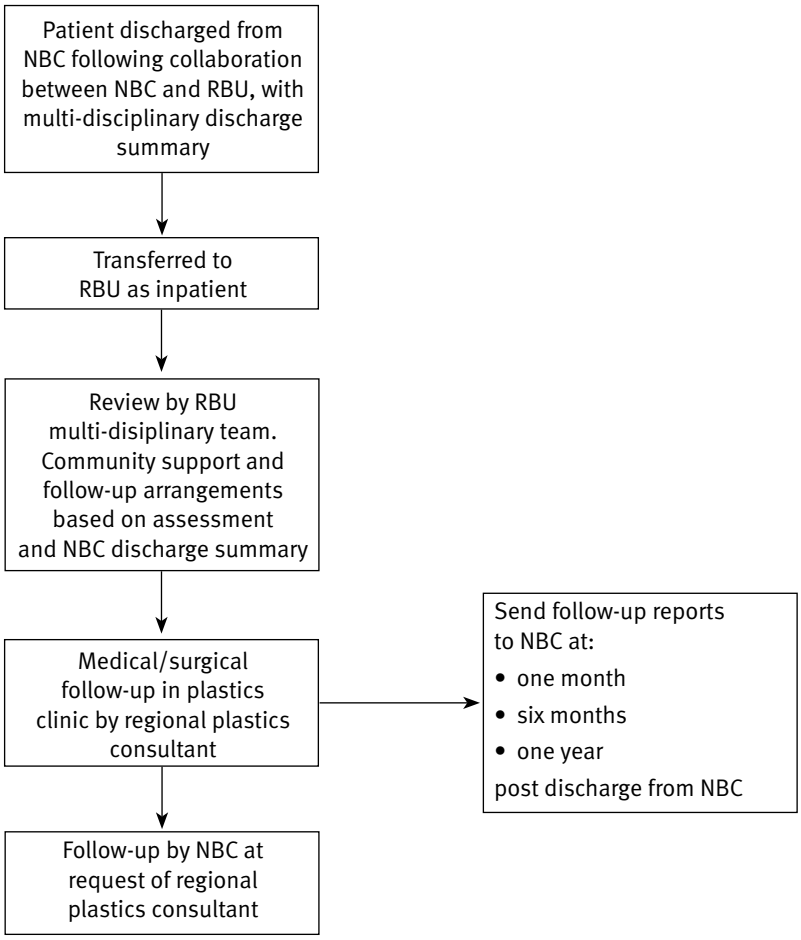
2) Burn wound management pathway



3) Surgical burn care pathway



4) Pathway for follow-up of patients discharged from National Burn Centre



Appendix 5:
Burn Care Requirements

TBSA size		Week 1	Week 2	Week 3	Week 4
0–9%	Theatre time (minutes):	139.34	14.42	5.06	1.67
	Number of theatre visits:	1.32	0.18	0.04	0.03
	Nursing time (hours):	8.14	3.36	1.02	0.47
	Physical therapy (PT) time (minutes):	41	24	8	2
	Occupational therapy (OT) time (minutes):	33	19	6	1
10–19%	Theatre time (minutes):	111.12	34.78	5.94	5.25
	Number of theatre visits:	2.08	0.35	0.08	0.09
	Nursing time (hours):	30	13	5	2
	PT time (minutes):	46	26	17	8
	OT time (minutes):	58	49	32	17
20–29%	Theatre time (minutes):	282.88	114.8	47.3	13.19
	Number of theatre visits:	1.73	0.88	0.42	0.2
	Nursing time (hours):	110	56	30	17
	PT time (minutes):	248	208	200	145
	OT time (minutes):	80	98	80	65
30–39%	Theatre time (minutes):	400.47	295.2	193.33	54.33
	Number of theatre visits:	2.4	1.86	1.54	0.86
	Nursing time (hours):	146	103	74	62
	PT time (minutes):	316	347	288	218
	OT therapy time (minutes):	118	81	138	102
40–49%	Theatre time (minutes):	640.25	425.42	303.5	155.92
	Number of theatre visits:	3.17	2.58	2	1.34
	Nursing time (hours):	179	171	109	77
	PT time (minutes):	268	310	305	278
	OT time (minutes):	106	155	126	103
50–59%	Theatre time (minutes):	808.4	429	276.6	154.8
	Number of theatre visits:	2.8	2	1.8	1
	Nursing time (hours):	176	180	97	94
	PT time (minutes):	357	367	432	335
	OT time (minutes):	165	160	183	181
›60%	Theatre time (minutes):	861.42	371.83	302	252.92
	Number of theatre visits:	3.16	2.33	2	1.75
	Nursing time (hours):	144	105	67	61
	PT time (minutes):	232	229	235	193
	OT time (minutes):	98	95	81	89

Note: Figures are per patient.