National Burn Care Review

Committee Report

Action for Sick Children

Association of Anaesthetists of Great Britain and Ireland

Association of Burns and Reconstructive Anaesthetists

British Association for Accident and Emergency Medicine

British Association of Plastic Surgeons

British Burn Association

Changing Faces

Chartered Society of Physiotherapy

Intensive Care Society

Paediatric Intensive Care Society

Royal College of Anaesthetists

Royal College of Nursing

Royal College of Paediatrics and Child Health

Royal College of Surgeons of England

York Health Economics Consortium

Standards and Strategy for Burn Care

A REVIEW OF BURN CARE IN THE BRITISH ISLES

Contents

Foreword

The National Burn Care Review Committee (NBCRC) has approached the task of reviewing the organisation and delivery of burn injury care in the British Isles with the intention of recommending changes to improve the overall quality of the service.

It is increasingly appreciated in many areas of care, as it has been in burn care for some time, that patient centred, multi-professional working is in the patient's best interests. By involving these specialties in the discussions, it is the hope of the NBCRC that we have described an organisation that will allow the best of each specialty to be coordinated and focussed on the needs of each patient. We have described standards for the organisation of care that are practical and attainable.

Patients and relatives alike need to be confident that the NHS can provide care not only for acute injury, but for the entire process of recovery and rehabilitation. The service must also be equitable, accessible at the time of need, irrespective of location. These requirements have long been recognised by all who work in the burn care services in the British Isles.

Implementation of the series of recommendations included in this Report will require substantial re-organisation of the current burn care network. This cannot be undertaken in a short period of time. Using the robust and objective methods outlined in this Report to assess the needs of the population during the implementation phase means that over a five to seven year period following the publication of this Report the majority of the recommendations can be realised. The result will not only be of benefit for the most severely injured, but also for the whole range of burn injury cared for by the NHS today.

Throughout the two year period that the NBCRC has been considering the issues, regular communication has taken place between the Committee and various other stakeholders. Workshops at two consecutive British Burn Association meetings and other interactive meetings with healthcare managers have helped to ensure these groups have been able to make observations about the process and the evolving recommendations.

I wish to express my thanks to the members of the NBCRC and to the many NHS managers and healthcare professionals who have contributed to this work.

Ken Dunn
On behalf of the National Burn Care Review Committee

Terms of Reference

1. To consider all available national information sources relating to burn injury and;

- map the national incidence by age group and injury severity.
- detail the facilities available across the UK specifically for the care of acute phase burn injury and for post burn rehabilitation.
- consider available evidence on the outcome of treatment for burn injured patients.
- consider the appropriateness of the facility where treatment occurs, and the specialty or specialties providing that care.
- consider the views of patients regarding the service offered at present and of any future service.

2. By use of benchmarking, provide a standardised overview of the nation's burn care network.

3. To generate recommendations that might act as guidelines for the commissioning of specialised burn care services.

4. Recommend realistic changes in the provision of burn care that will move towards equity of access, efficient and effective care for all injury severity groups and all ages, both at times of normal workload and in the event of any major incident.

5. In view of such recommendations, to assess the staffing and financial implications, including the need for training or resource redistribution. Also to assess the impact on patient access to appropriate expertise.

6. To suggest methods for continued service monitoring in terms of organisation, performance and clinical outcome.

7. To suggest future studies necessary to clarify and inform the ongoing process of service evaluation and to suggest possible strategies for burn injury prevention.

The enormity of this undertaking soon became apparent. The need to condense the issues into a single standards and strategy document also became clear. This National Burn Care Review Report contains the Recommendations of the NBCRC and the Implementation process by which the NBCRC believe the standards and strategy can be achieved.

There will follow a series of world wide web-based publications covering areas that are additional to this central document. This form of publication should allow the widest dissemination and availability. Web-based publication will also allow updating of the documents as regularly as required.

- Development of Burn Care Provision in the British Isles
- Overview of the NBCR process and 1999 Burn Service Provision
- National Burn Injury Database
- Coding, Costing and Contracting
- Burn Centre/Unit Operational Policy and Design
- Burn Team: Training, Dependency and Patient Outcomes
- Service Benchmarking, Designation and Accreditation
- Clinical Management Guidelines and Care Pathways
- A Strategy for Burn Injury Prevention

Executive Summary

The need for burn care and the present state of UK services

Burn injuries are experienced by about 250,000 people in the UK each year; there are many causes such as contact with hot fluids and surfaces, flames, chemicals and electrical sources. Over 90% of these injuries are preventable. There are also rare skin conditions which cause massive burn-like wounds.

About 175,000 people visit A&E Departments with burn injuries each year and some 13,000 of them are admitted to hospital. By no means all are admitted to burns and plastic surgery units. Although there is significant geographical differences, across the UK about 30% of children and 40% of adults requiring admission to hospital are admitted to non-specialist units. Approximately 1,000 patients are admitted with severe burns requiring fluid resuscitation each year, about half of whom are children under 16 years of age.

The chances of survival following the massive trauma of a major burn have improved steadily over the last 25 years but there are still 300 deaths in hospital after burns each year in the UK. The majority of these are in the over 60 years age group, for whom the risk of death following a burn injury has remained unchanged for the last two decades in the UK, EU, and USA. The risk has decreased for similar injuries in younger age groups over the same period, particularly in children and young adults.

If patients do survive, their injuries will have serious effects on their own lives and those of their families for many years to come; the disfigurements are lifelong but can be ameliorated by high quality rehabilitation, reconstructive surgery and other therapies. With appropriate support individuals can and do learn to live life to the full again.

This Review and Report was instigated by the British Burn Association (BBA), the professional association of professionals who specialise in burn care, in light of growing evidence that the current state of UK burn care services is disorganised, fragmented, inadequate and inequitable from the patients' perspective. Although historically British burn care is rightly credited with being an innovative world leader, the quality of services has not developed in comparison with some leading services in the USA, Europe and Australia over the last two decades.

There is an urgent need for a coherent national burn care strategy with clear standards.

In 1998, the BBA therefore sought and received support from the Department of Health, related medical specialties, therapeutic professional bodies and patient support organisations for a thorough review of UK burn care arrangements.

The Committee has gathered as much evidence and opinion as possible over the last two years and now presents this Report which recommends a series of urgent and essential changes to how burn care is delivered.

The problems identified by the Review are very serious and will require concerted and sustained action by NHS planners, management and clinicians over at least the next five years. The Committee recognises that this strategic change will be a major challenge but it is confident that when the recommendations are implemented efficiently, burn care in the UK can once again be of world class quality. To aim for less would be unacceptable.

Guiding Principles

The Review Committee has considered the organisation and provision of burn services for all levels of injury severity and has made recommendations for change with several principles constantly in mind.

A. Care provision should consider the process from the time of injury through recovery and re-integration back into society; including the entire period of rehabilitation and any necessary reconstruction.

B. For any major injury, at whatever age, the skills of the full burn team are necessary to optimise survival and recovery. This must involve the simultaneous availability, on the same site and with the appropriate facilities, of expert burn nurses, burn surgeon, burn anaesthetist and burn intensivist.

C. Any recommendations made by the NBCRC need to take account of recommendations and relevant findings of other Reports published by Royal Colleges, Faculties, Specialist Societies, Department of Health and others.

D. The NBCRC recommendations should set standards for the existing service network and for any future development within that network. The NBCRC should not make decisions as to the geographical siting of such services, but rather offer a process by which suitable sites could be identified.

E. Having made recommendations there will be a need for short and medium term compromises, as a radical revision of service provision would be destabilising in the short term, given the preceding decades of no national organisational strategy.

F. Throughout the process of the NBCR, great efforts should be made to involve all professional and patient stakeholders in the process aiming to develop recommendations based on consensus.

Analysis: Key findings from research and evidence

One of the major problems confronting the Committee has been the absence of any national data on burn injury epidemiology and information about the facilities and staffing available to care for those injured. Against this background, the Committee has managed to piece together a reasonable picture of the provision, case-mix etc. across the British Isles. From this, the following summary of the major findings in the present situation emerges:

1. The way funding for burns care as a specialised service is organised needs to be changed urgently. With the introduction of NHS contracting in the early 1990s, burn services were funded only for the acute period of in-patient care. The need to staff the service for capacity, in line with the emergency nature of burns, rather than for usage has long been neglected. The costs of rehabilitation were effectively ignored. Community care provision is unsupported.

2. The current provision of burn care across the UK is enormously variable in terms of organisation, staffing, facilities and workload. This situation has arisen largely as a result of the ad hoc local organisation of services in the absence of a national strategy for burn care, and because of a failure of these services to adhere to existing NHS service standards.

3. The provision of separate acute care for adults and children after burn injury lacks coherence and planning. Most burn units are wards accommodating both adults and children with minimal, if any, segregation.

4. Although the majority of the 38 self defined ‘burns units’ provide their own high dependency care, the majority do not have the staffing levels or infrastructure required to comply with current guidelines.

5. Similarly, the 9 burns units that offer intensive care on the burns ward itself are usually catering for both adults and children, are under-staffed and unable to meet the published intensive care standards. Specialised paediatric care has been severely affected by the implementation of the paediatric intensive care report *Framework for the Future* which has reduced the number of burn units in England and Wales able to admit children with major burn injury from 17 to 6, and the number able to meet the recommendations of the *Framework for the Future* Report plus those of burn surgery best practice to 4, with 2 of these providing this level of service only after local negotiation. Two of the busiest units in the UK, are currently closed to major paediatric injury admissions.

6. Functional, aesthetic and psychological recovery and rehabilitation after burn injury continues throughout the acute phase of hospitalisation and often lasts for some years. This is particularly true in childhood burn injury as patients need to be monitored throughout all their development stages. Present facilities and staffing to provide continuing care and rehabilitation are completely inadequate or non-existent. There are no facilities for providing intensive, in-patient rehabilitation after the initial high-cost acute stage. Patients frequently have to stay in the acute care setting until they are able to function independently at home. Once discharged, patients are rarely able to receive physical or occupational therapy, pressure garment fitting and other services except at the acute unit.

7. Very few burns units provide trained psychological support of any kind for in-patients and virtually none have it available for out-patients, nor is this available for those patients just discharged. Although there are some local support groups and burn camps in existence, the lack of investment in psycho-social rehabilitation as an integral part of burn care services is a major gap in provision affecting long-term quality of life.

8. Although each hospital has a major incident plan, there is at present no nationally agreed plan for the management of a major incident involving a large number of burn injuries, whether from civilian or military source. Lessons from previous disasters have not been applied nor is there any network for disseminating information about such an incident or for collecting information about available beds.

RECOMMENDATIONS

On the basis of this analysis, the NBCRC has agreed a number of recommendations for future services to move towards care being seamlessly delivered by a network of specialised, accredited and progressive services. The Committee believes the recommendations, which can be grouped and summarised in the following way, will gain a wide and strong level of agreement within the burn care community and the health services as a whole.

1. Uniform national clinical management and referral guidelines

The traditional and much-criticised approach of using the size of skin injury (total burn surface area or TBSA) as the single criterion to guide referral should be replaced by an approach which assesses the complexity of the injury. This new approach recognises the importance of the patient's age, the injury site and mechanism plus co-existing medical problems. A new injury stratification format has been developed in consultation with relevant professionals and the NBCRC **recommend** that it should form the future basis of referral policy at all levels of health care.

Minor burn injuries are commonly assessed by a range of health care professionals. The quality of care for children and adults with burn injuries will be significantly improved by the development of clear clinical guidelines and educational programmes such as the Emergency Management of Severe Burns (EMSB) course. The same advice and guidelines must be used by the Ambulance Service and NHS Direct, and by paramedics in all the Emergency and Armed Services.

It is necessary to have agreement about what types of injury need referral to which type of burn service. As required by *Information for Health*, and as suggested by the recent experiences of the Armed Forces, consideration is being given to the role of telemedicine in referring injuries. This, and the need for a National Burn Bed Bureau, to advise as to bed availability, further necessitate the introduction of the new National Burn Injury Referral Guidelines (Appendix 2).

2. In-patient provision for burn injuries to be provided by specialists

The Committee considers that the present practice in some hospitals of admitting patients with burn injuries under the care of hospital specialties with no specific burn injury training is unacceptable. All burn injuries requiring hospitalisation should only be admitted under the care of specifically trained specialist staff.

3. A new structure of burn care services

Differing levels of injury complexity require certain types of in-patient accommodation for the provision of optimal care. Uncomplicated injuries do not need separate burn wards with high staffing levels and expensive monitoring equipment to receive high quality care. The most complex injuries on the other hand are small in number yet are currently being admitted to burn wards with very variable facilities and staffing levels, many of them falling short of current guidelines.

The Committee has considered the key elements of a burn care area (nurse and care specialisation / ward accommodation and theatre provision) and have suggested a stratification which along with new National Burn Injury Referral Guidelines describes 'who needs what'. The stratification is into Burn Facility (BF), Burn Unit (BU) and for the most complex injuries, Burn Centre (BC).

The Committee **recommends** that each stratified burn care area should be designated either paediatric or adult, never both. It is quite possible that two burn wards, one paediatric, one adult might co-exist on one hospital site. In many ways this is an efficient model, but all such accommodation must comply with the relevant NHS recommendations.

A Burn Facility equates to a surgical ward within a plastic surgery unit. There are some 60 such plastic surgery units across the British Isles.

A Burn Unit and Burn Centre are both wards created purely for the care of burn injury, each able to deal with complex injuries. The Burn Centre being equipped and staffed to provide the highest levels of care for the most severely injured, with 24 hour immediate access to a designated burn operating theatre.

Designation or reorganisation of any UK burn service will involve the identification of the best site by identifying the 'at-risk' population. If done correctly, the resulting reduction in the number of hospitals providing burn services should not significantly increase the length of journey time required for initial transfer or family visiting.

Consideration of the available information about burn injury incidence at differing levels of complexity suggests each BU or BC should be required to admit at least 50 complex injuries per year, as a minimum. The NBCRC estimate therefore that of the existing 60 BFs, a maximum of 3 would be designated to be adult BUs and a further 9 would act as BCs. For children 2 would be BUs and 6 would be BCs.

Each type of in-patient burn care area should be staffed for capacity, rather than average occupancy, by a well-trained team of professionals. A core team should consist of burn nurses, burn surgeon, burn anaesthetist and in Burn Centres, burn intensivists, supported by physical therapists, dietician, psychologist and social worker. For paediatric wards, paediatric specialists are needed plus play specialist and teacher.

4. Critical Care Provision

This is one of the most difficult areas in which to make practical, sustainable and supportable recommendations. The major issues are the skill retention of staff and bed availability.

The **recommendation** therefore is that Burn Centres provide dedicated intensive care within the confines of the Burn Centre with full intensivist support from an adjacent, preferably conjoined, Intensive Care Unit (ICU). The centralisation of complex injuries and experience gained by burns staff may be sufficient to maintain the necessary intensive care skills, but in any case, the juxtaposition of services in this way allows greater flexibility in staff rotation and team building. It also helps avoid the difficulties the excessively high occupancy rates of most ICUs cause, and would allow the prompt and reliable admission of 98% of complex burn injuries into a staffed, suitable bed.

Other models of intensive care provision may work, but only some of the time, and the principle of assuring access to the highest level of expertise, when the patient most needs it, is a goal which must not be compromised.

The provision of intensive care on a stand alone burn ward with insufficient workload to meet the recommendations of the Intensive Care Society and the Paediatric Intensive Care Society, and inadequate to maintain the skills of the staff therein, cannot be recommended as a sustainable, safe, arrangement.

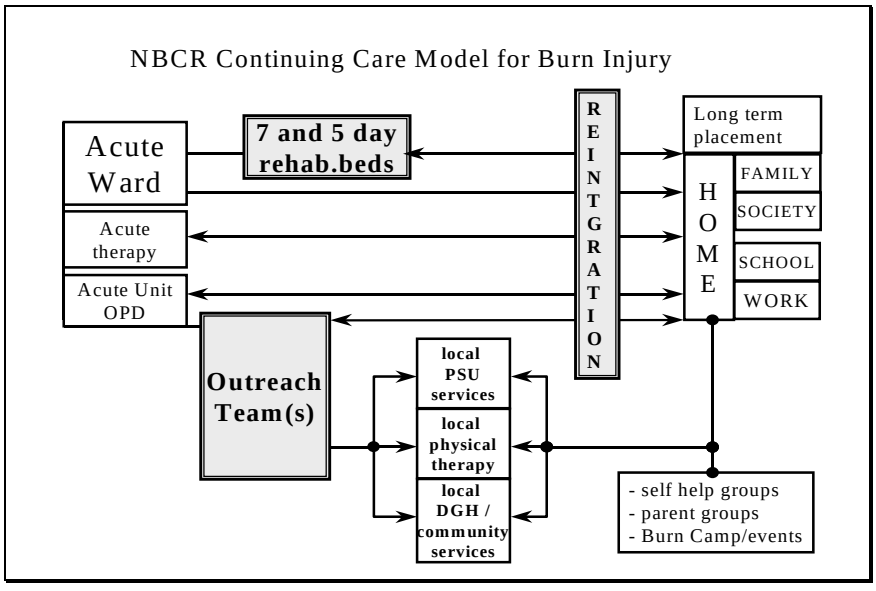
5. Continuing care of patients with burn injury as part of a burn service

To ensure that children and adults with burn injuries receive specialist functional, aesthetic and psychological rehabilitation, burn care services should plan for this from the day of admission. A continuing care model is **recommended** to provide rehabilitation services throughout acute, sub-acute, early post-discharge and community stages. In particular, three new aspects should be put in place:

- an intensive (multi-specialty) rehabilitation ward for patients with a range of traumatic injuries, including burns.

- outreach teams from each BU and BC to ensure ongoing care for patients in their own home, in spoke hospital out-patient departments, and by supporting and educating health care professionals in the Community, District General Hospitals (DGH) or Plastic Surgery Units (PSU).

- psychological rehabilitation of patient and family should be co-ordinated by the designation of a named co-ordinator in each BU and BC.



Further research is urgently required to identify how best to promote psychological adjustment after burn injury and the quantification of clinical outcomes. In addition, the Committee **recommends** that locally-based self-help groups and bum camps are actively developed with NHS supportive funding.

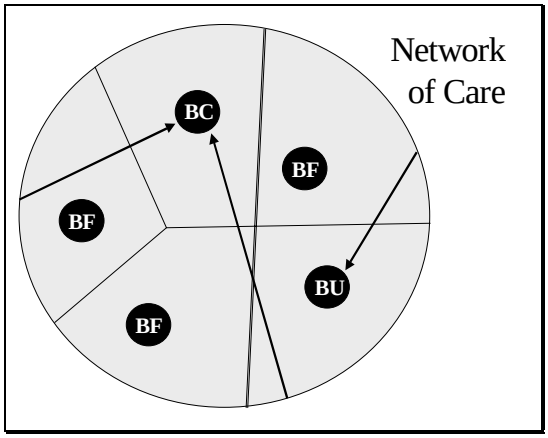
6. A network of burn injury services across the UK

The Committee envisages a network of services that can provide seamless care from the time of injury to complete recovery for all levels of injury severity.

The network envisaged can be briefly described as follows:

- For non-complex injuries, patients would be treated by GPs, Practice and District Nurses.
- For the next level of severity, patients would receive treatment at A&E Departments, from which they would be referred to higher tiers if assessment indicated a more complex injury.
- For in-patient care, BCs would be established at the centre of an 'at-risk' population receiving patients with the most complex injuries from a wide catchment area, as well as patients requiring treatment for BU and BF level injuries from smaller geographical areas. A network of BUs and BFs would support, and be supported by, the BC using outreach teams and telemedicine links via the NHSnet.

It is the intention that a Burn Centre would not only admit all complex injuries with severe skin burns from a large geographical area but less complex injuries from a smaller area around itself. Admitting more straightforward injuries from the immediately local population would help even out the peaks and troughs of workload and ensure that nursing staff in particular have a range of injury types to deal with.



Thus a Network of Care is developed by Burn Centres, Burn Units and Burn Facilities, all communicating regularly and working to provide a balance between easy access and patients having to travel for greater expertise. Placing services within the 'at risk' population will minimise how far the majority of patients have to travel to reach an appropriate level of care.

National planning should ensure that patients travel as short a distance as possible to receive the level of expertise required for their particular injury at whatever level of recovery they have reached. Analysis of data from the NHS Hospital Episode Statistics and the proposed British Isles Burn Injury Database (BIBID) will enable such planning.

The exact configuration, for a given area and population would depend on the need for burn care within that population. It is obvious that the appropriate service population for a paediatric Burn Centre may cross Regional Health Authority and even National boundaries.

7. Research and Development

Work must to be commissioned on vitally important areas of burn care in order to create the tools needed to develop the evidence base for burn care that is demonstrably lacking. Such work includes; the development of clinical management guidelines for uniform usage, the validation of a staff Dependency Scoring System for those with burn injury, clinically relevant Care Pathways and Outcome measures that will help define a high quality service. Similarly, analyses from the National Burn Injury Database will allow for the first time the creation of a Strategy for Burn Injury Prevention.

8. Improved data gathering and information analysis

Existing systems for gathering information are inadequate for the tasks of contracting and monitoring the delivery of burn care, or for the planning of future services. They are also inadequate for clinical audit, research or informing injury prevention programmes.

Optimising and making full use of the current NHS information systems is achievable with minimal additional investment by customising those coding developments already underway, such as SNOMED Clinical Terms. The available data from the NHS Hospital Episode Statistics (NHS HES) could thus be improved.

Development of a clinical specialist database for burn injury has already been done by the BBA and is called the British Isles Burn Injury Database (BIBID). This software can be implemented immediately, with Department of Health and NHSE support.

Combining the data from both systems to form a National Burn Injury Database (NBID) will provide the best national overview of any disorder or injury and be the first such overview achieved globally. The comprehensive data set available will allow all uses of the information listed above to be realised.

IMPLEMENTATION

Immediate

1. Paediatric Severe Injury and PICU

There is an urgent need for services that deal with severe paediatric injury to be designated by purchasers and supported to comply with the recommendations contained in this Report, in order to deliver an accessible, equitable, high quality service.

2. Major Incident planning

The current lack of a plan to deal with any incident that may result in high numbers of burn injuries of either children or adults, civilian or military in nature is unacceptable and must be urgently corrected.

Short Term

3. Improved clinical coding and cost of care measurement

4. Research & Development

- Clinical guideline development
- Injury Prevention
- Staff / Patient Dependency Scoring
- Clinical Pathways and Packages
- Outcome and quality of care measures

5. Service Accreditation and Monitoring

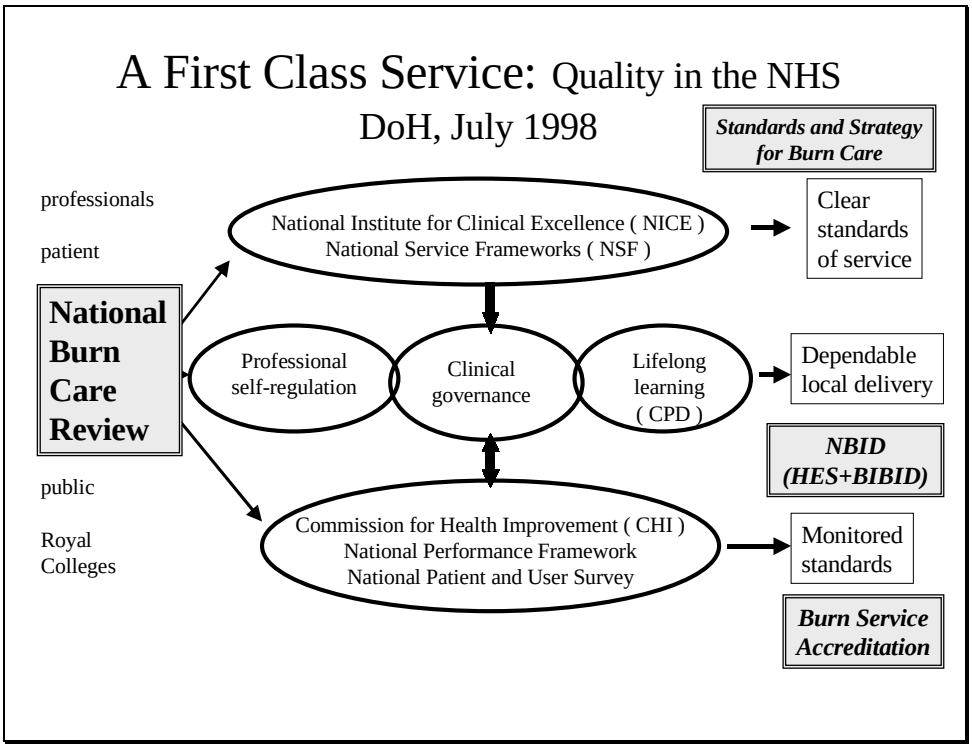
The creation of a formal process of service designation and accreditation, similar to the current US model, will allow quality improvements in the reorganised burn services to be measured against the defined standards.

Appropriate referral and location of care will be monitored by improved data collection about service provision and clinical outcome measurement by using the NHS Health Episode Statistics (HES) service and developing the British Isles Burn Injury Database (BIBID). Data from both sources will together form a uniquely powerful service monitoring and audit tool.

A nominated lead in each Department of Health will have to be appointed to co-ordinated the planning, designation and performance of the burn service networks.

6. Regional Specialised Commissioning Groups

Future commissioning arrangements will expect mandatory compliance with the standards detailed in this Report and the service accreditation programme. Commissioning agencies will also expect compliance with the national burn care information system (BIBID) as a fundamental element of Clinical Governance and to support the national IM&T strategy.



7. Implementation Timetable

Timescale	Target	*Joint responsibility with:
Immediate	develop a PICU / burns interim strategy	DH, RSCGs
	refine the HRG definitions using ICD-10 / OPCS-4	IA
	contribute to the SNOMED CT project	IA
	access and analyse detailed HES data	BBA, DH
2001 April	introduce National Referral Guidelines	BBA, RC
	create the National Burn Bed Bureau	DH, RSCGs
	commence data collection with the BIBID	Trusts, BAPS
	commence defining the service accreditation process	BBA
	define R&D agenda for Burn Services:	DH, RSCGs, BBA
	prevention	
	dependency measurement	
	care pathways	
	outcome measurement	
	commence the creation of a national burns Major Incident Plan	BBA, DH, MoD
2001 September	complete the service definition and costing for Regional Specialised Commissioning	RSCGs, BBA
	nominate single national leads for burn injury care in each DH	DH
2001 December	designation by RSCGs of Burn Centres, Units and Facilities	RSCGs, BBA
	commission the R&D agenda	DH, RSCGs, BBA
2002 April	commence Regional Specialised Commissioning of burn care services	DH, RSCGs
2003 April	analyse the NBID using combined HES and BIBID data (NBID)	BBA
	review burn service designation using the analysis from the NBID	RSCGs
	review service staffing using Care Pathways and Dependency data	RSCGs
	commence formal accreditation of designated services	BBA, BAPS

* The responsibility for ensuring these developments happen is that of the burn care community, working with employers and purchasers to provide the level of care they wish to see and can be proud of. Specific tasks will require the direct support of:

BBA	British Burn Association
IA	NHS Information Authority
DH	Department of Health
RSCG	Regional Specialised Commissioning Groups
BAPS	British Association of Plastic Surgeons
MoD	Ministry of Defence
RC	Royal Colleges, Faculties, Specialist Societies and Associations

Key Points from the Executive Summary

Burn Injury

- Burn injury has a devastating potential and requires multi-professional team working to achieve optimal results
- Overall burn injury is common, with hospital admission necessary for 25/100,000 * whole population and is commonest in children under 3 years of age, but there is marked geographical variation

Service Provision

- Current provision is ad hoc, disorganised and inequitable from the patient's perspective, particularly where critical care is needed
- Many injuries are admitted to general hospitals under the care of non-specialists
- There are too many units admitting major injuries on an occasional basis, especially paediatric injuries
- Urgent problems exist with critical care provision, especially for children with severe burn injuries
- No intensive rehabilitation beds exist to optimise functional and psychosocial recovery
- No national Major Incident plan exists for an event involving large numbers of burn injuries
- There is no detailed data available on which to base injury prevention, service planning or service audit and monitoring

Recommendations

- National, clinical management and referral guidelines be used by all, and where necessary developed
- In-patient burn injury care should only be provided by specialists trained in burn care
- Burn services require stratification and definition according to clear standards that are monitored by a burn service accreditation system
- Critical care provision for those with burn injury must be delivered in a way that provides optimal patient benefit
- Rehabilitation services be developed which integrate with the acute care service
- Clinical networks be developed across the stratified service to provide care as near the patient's home as possible, at each stage of their care
- A R&D programme be instigated to develop the tools necessary to develop the evidence base for burn care
- Better information gathering, by improving NHS systems and creating a specialty-based report and audit system
- A structured implement process and timetable outlined in the Report be used and monitored by the NBCRC over the next 5 years

Implementation

- Urgent designation and support of services to care for severe burn injuries in children
- Urgent development of a national Major Incident Plan for burn injury, civil or military, paediatric or adult
- Develop plans for rehabilitation services in both the hospital and community settings
- Commence Regional Commissioning of burn services dependant upon the participation of that service in national external audit and accreditation

* Addendum to printed version (15:100,000)

Chapter 1: Introduction

The need for a review of the burns care network across the British Isles has been discussed by members of the British Burn Association (BBA) for many years. There is a reference to this need in the 1976 minutes of the Executive Committee of the Association. However such an undertaking was hampered by the lack of any source of national data.

In April 1995, the Executive Committee of the BBA undertook to create a National Burn Care Review Committee. Invitations were sent to a number of stakeholder organisations for representation and the Committee first met in September 1998. The delay was largely due to the need to identify adequate funding. The BBA Chairman at that time, Dr Keith Judkins, was instrumental in identifying funding from the British Burn Association, the Department of Health and the British Association of Plastic Surgeons sufficient to allow the Review process to begin in 1998. In the period leading up to this, background information and reports were collected and reviewed.

The National Burn Care Review Committee (NBCRC) was charged with the task of considering burn injury care throughout the British Isles from the most minor injuries through to the most severe. In doing so, the entire period of care was to be considered; from initial acute care, through rehabilitation into the period of recovery and reconstruction. This overview is not a specialty review but rather a consideration of all the elements that go together to treat a disorder. In this respect the NBCRC believes this work is unique.

The current provision of burn care across the British Isles is enormously variable in terms of organisation, staffing, facilities and workload. This situation has largely been produced by the ad hoc local organisation of services in the absence of any described service standards [1;2]. Current provision lacks equity of access to services of uniform quality. In being an entirely emergency driven service, with no elective element to smooth out the peaks and troughs of workload, the burn services have been the victim of inconsistent support and variable staffing. As a consequence, there are profound problems of staff training and retention. In some areas this threatens the viability of the service.

The recommendations contained in this Report will need to be applied to the service carefully. It is felt that two years of service assessment and planning followed by three to five years of re-organisation is a reasonable time scale. The movement of services that require major new building work will take longer. The definition and attainment of standards within the service will however involve considerable reallocation of resources, and additional resources. However, certain aspects of the burn care service, such as paediatric care provision and rehabilitation, require urgent attention and support, both financially and politically.

The NBCRC believe that implementation of the recommendations contained in this Report, with the stratification of burn services and application of national referral guidelines will result in an optimally structured, high quality service that is patient focused, evidence based and capable of being monitored, audited and developed. Recognition of the needs of those with burn injury will be better understood by those not involved in the immediate delivery of care, as will the need for true multi-professional working. The potential value of creating managed clinical networks crossing regional and national boundaries will also be more fully appreciated.

Background

Burn care has developed most rapidly at times of conflict and war. Very significant advances in the quality of burn surgery were seen in the Second World War. At that time burn injuries involving more than one third of the body surface area were considered universally fatal, even in young men. It was not until the 1950s and 1960s that significant advance was made in the fluid resuscitation and medical treatment of burn injury when the concept of the burn team was introduced [3]. This multidisciplinary approach bore considerable fruit in terms of patient survival and much shorter length of stay in hospital [4]. This was augmented by improvements in skin grafting techniques [5].

In the 1970s and 1980s, advance was made in the treatment of massive burn injuries [6]. This was in combination with the development of intensive care techniques. These allowed the support and treatment of individuals on dedicated intensive care burn units. In the UK, development of such facilities was haphazard and unplanned and relied on the interest of the local burn care team. As a consequence, the current network of burn units has developed. Each unit having very different working practices, staffing profiles and activity levels [7].

The introduction of contracting in the early 1990s, resulted in the majority of burn services being funded only for the acute period of in-patient care. The need to staff services for capacity rather than usage, accepting the emergency based nature of the work, has long been disregarded and has led to falling staffing levels. Staffing and facilities for rehabilitation have slowly dwindled since that time such that facilities for the rehabilitation of burn injury are now at the lowest level since the inception of the NHS.

Comparison with burn care networks in Europe and North America are difficult, because of the complexity and variability of burn injury and the lack of standardised and validated methods and tools with which to make the comparison. The need for national organisation of burn care services has been recognised by several countries but the preparation of this Report is the first national organisation document for any burn care service, globally.

The NBCR Committee

In September 1998, the Committee of the National Burn Care Review first met and has, over the ensuing period, considered burn care and its provision, across the British Isles. The full Committee has met seven times but has networked widely with professionals, both clinical and non-clinical, and with patients and their representatives, to gain the broadest of understanding of the need for, and likely impact of, the recommendations.

While working within the terms of reference, a number of clinical principles and service targets have also guided the process. The importance of these have become clear during the Review process.

Principles

A. Care provision should consider the process from the time of injury through recovery and re-integration back into society; including the entire period of rehabilitation and any necessary reconstruction.

B. For any major injury, at whatever age, the skills of the full burn team are necessary to optimise survival and recovery. This must involve the simultaneous availability, on the same site and with the appropriate facilities, of expert burn nurses, burn surgeon, burn anaesthetist and burn intensivist.

C. Any recommendations made by the NBCRC need to take account of recommendations and relevant findings of other Reports published by Royal Colleges, Faculties, Specialist Societies, Department of Health and others.

D. The NBCRC recommendations should set standards for the existing service network and for any future development within that network. The NBCRC should not make decisions as to the geographical siting of such services, but rather offer a process by which suitable sites could be identified.

E. Having made recommendations there will be a need for short and medium term compromises, as a radical revision of service provision would be destabilising in the short term, given the preceding decades of no national organisational strategy.

F. Throughout the process of the NBCR, great efforts should be made to involve all professional and patient stakeholders in the process aiming to develop recommendations based on consensus.

Process

The NBCRC has overseen several processes to allow the completion of this work;

- NBCR Committee meetings
- Consideration of data from differing sources, principally;
  - NHS HES data
  - Burn Unit throughput data
- Review of literature;
  - Published reports and strategy documents
  - Peer reviewed, published work
  - On going, unpublished reviews and research
- Burn Service visits by a NBCR Researcher to 29 sites;
  - To clarify the process being followed to burns staff
  - To collect extensive data about current service provision
- National meetings;
  - Two consecutive BBA Annual meetings [8;9]
  - One meeting of all RSCG leads
- Circulation of a consensus questionnaire on referral guidelines
- Circulation of progress reports and draft Report documents

Details of the National Burn Care Review Committee members are in Appendix 1. For those unfamiliar with burn injury care, the NBCRC suggests Chapters 2 and 6 as an introduction to some of the clinical issues. This may clarify some of the reasons behind the recommendations.

Chapter 2: An Overview of Burn Injury: Nature and Management

What is burn injury?

Unlike most forms of trauma, burn injury is something the vast majority of the population can claim to have some experience of, even if in a very mild form. Almost all of us have suffered a small contact burn from a hot surface or a minor scald. As a consequence we have an understanding of the unpleasantness of such injuries. It perhaps also gives us some inclination as to the pain and suffering the involvement of a larger area of skin must generate. Indeed, in the severest forms, burn injury is felt to be the most severe form of trauma that is survivable. If survived, such an injury alters an individual's life in all aspects; their appearance, their ability to function independently in society and consequently their psychological well-being.

One of the difficulties in describing burn injury is conveying the huge variation in causation and variability of injury severity that is seen. The injury occurs in all age groups, and may range from the most trivial; such that self treatment is sufficient, through to the most severe, where the highest levels of intensive care and radical surgery are required. The very variability of this type of trauma is what attracts many clinical graduates into the specialty. Imagination and wide ranging skills are needed to tailor care to the individual.

Looking at the causes of burn injury, the vast majority are thermal injuries, the largest proportion of which are scalds, particularly in the paediatric population. There are also contact, flame and flash thermal injuries. Complex injuries are produced by chemical and electrical injuries which may involve a small area of skin but can create deeply destructive wounds and life threatening systemic effects. A burns service may also deal with large and severe sunburns in children as a subset of radiation injury, and occasional cold injury, such as frostbite. Finally there are a group of diseases, the vesiculo-bullous skin disorders, which may involve only a small area of the skin, or may affect the entire skin surface area. In the severest form these conditions may require the sufferer to be transferred to a burn service for successful management of these massive wounds.

Following thermal injury the ability of an individual to survive depends largely on two variables; the proportion of the body surface area involved (total burn surface area or TBSA) and the age of the individual. From statistical analyses, the age of the individual becomes crucial in the under one year or over 56 year age groups. Indeed, it is in the elderly population that no significant improvement in burn injury survival rates have been seen in the last twenty years, whereas survival rates in some other age groups have improved dramatically.

Other features that markedly influence survival after burn injury include; the presence of an airway injury from smoke, vapours or heat and the pre-existence of medical conditions affecting the ability of the individual to respond to trauma. Limitations in the cardiovascular and respiratory systems are particularly important. The presence of significant associated injuries such as fractures or other forms of trauma also contribute to the total trauma ‘load’ and have an effect on recovery and mortality [10].

Treatment Goals

Apart from the survival of the individual, the goal of treatment is to recover the individual to the pre-injury state and for them to return to their place in society with unaltered potential. The nature of burn injury often makes this impossible, but the goal remains. The intention is to maximise the recovery in terms of:

Form; restoring the aesthetic characteristics of the injured area as much of possible in terms of skin contour, texture and colouration.

Function; maximising the recovery of the ability to perform activities relating to home life, work and leisure. This often means working specifically to maintain the range of movement of joints and in making reconstructive surgical efforts to protect and restore vital structures.

Feeling; facilitating psychological recovery following a traumatic and destructive injury. Working to help individuals and families through the often painful and distressingly prolonged periods of treatment. For the injured, this not infrequently involves coming to terms with bereavement, following the loss of family members and friends. This aspect is more fully dealt with in Chapter 6.

Overview of the Seven Phases of Management

Rescue

At a serious incident, an individual may well be rescued by friends, relatives or the emergency services. It has been proven many times that the decisions and treatment received at the scene, particularly the quality of any first aid, often have a profound effect on mortality and morbidity.

Resuscitate

Both in Accident & Emergency Departments and latterly in hospital wards, the individual may require very little systemic support following their injury if it is small and uncomplicated, but for the larger injuries care involves the most complex forms of intensive care, involving massive fluid infusions and support for several organ systems. Most commonly support is needed for the cardio respiratory and renal systems. This is in addition to the intensive nursing care needed for the organ failure of the skin itself. Quality pain therapy is always required.

It is accepted practice that injuries involving 10% of the body surface area or over in children are likely to require formal fluid replacement as do those injuries over 15% in adults. In the elderly the threshold is more likely to be nearer 10% due to their limited physiological reserve.

Retrieve

After initial Accident & Emergency assessment the individual, particularly if a child, may require retrieval from the primary A&E site to the site of definitive care by a specific team of specialist nurses and doctors, usually intensivists. This has been shown to offer superior care for complex injuries and conditions of all types [11-14].

Resurface

All injuries to the skin need to be repaired. This can either be by wound dressings alone or some form of skin replacement.

Dressings often have to be changed frequently, involving the use of large amounts of expensive dressing materials and using many hours of nursing, PAMS and medical time. For the injured this is often painful and distressing [15-17]. This has lead to an increase in the use of general anaesthesia and sedative techniques for such dressing changes, which frequently involve showering the patient. There have also been advances in the use of regional anaesthesia and other techniques for the control of both background and procedural pain. The benefit is clear when there is a need to continue such dressings for weeks or months but the resource implications are massive.

Any injury to an individual is an insult to their physiology which responses to that injury. The worse the injury the more severe is this primary ‘insult’. The quality of the response mounted by the individual depends on their relative fitness or physiological reserve. This is obviously altered by age, physical fitness and co-existing disorders or conditions. Treatment is designed to support the individual and not allow added insults from infection etc. to deplete their physiological reserve further.

However, if in the opinion of the burn team the skin is sufficiently damaged to be unable to heal spontaneously and warrants skin grafting, this is best undertaken at the earliest opportunity following the primary injury. This is during the period the individual is responding to the primary injury and has a reduced physiological reserve. For reasons largely to do with the avoidance of infection, this approach has a proven effect in improving survival. The surgery may involve removing dead skin from very large surface areas of the body and is thus a form of secondary trauma or insult. The removal and replacement of damaged skin in this way is an emergency

operative procedure and requires the highest levels of skill from staff of many specialties if it is to be undertaken successfully [18]. It is also a major organisational undertaking.

It is not surprising therefore that admission into an intensive care environment is often necessary for extended periods. The number of days of artificial ventilation and/or multiple organ support a burns patient may require is far beyond the typical length of stay of other forms of trauma needing similar support.

The injured individual may need to return to the operating theatre on many occasions over weeks and months, at times dictated by their physiological state and the condition of the healing wounds and skin grafts. Each operative visit requires considerable orchestration of staff, resources and facilities and increasingly involves the use of temporary and permanent skin replacements such as cadaver skin from skin banks, laboratory cultured skin cells, and synthetic skin replacements. These materials and methods are expensive but improve the chances of survival for individuals with the severest forms of burn injury. These methods are also felt to reduce the degree of secondary surgical trauma and speed up healing of the wounds.

There is growing evidence that the use of temporary skin substitutes also improves the eventual recovery of individuals who have suffered injuries that will heal without skin grafting. These injuries have, in the past, often healed but left very significant scarring. Materials and techniques are being developed where these damaged areas of skin can more successfully be encouraged to heal themselves, but with less scarring and reduced need for later surgical revision [19].

Rehabilitate

This process starts on the day of admission. The involvement of the whole burn team has as its ultimate goal the return of a fully functioning individual to society with unaltered appearance, abilities and potential.

The process of rehabilitation involves support groups and many health care professionals using their skills in a variety of often inventive ways to deliver care in the most effective manner for the individual. This may involve;

Physical therapy [20];

- Gym
- Light workshop

Psychological support; for both individual and family [21-25].

Scar modulation; often using a combination of these methods [20;26].

- Massage
- Pressure garments
- Rigid and semi-rigid face mask/orthoses
- Thermoplastic orthoses
- Silicone dressing materials
- Surgical scar revision

Psychiatric support; often as a continuation of long term treatment.

The majority of this care must be provided by the multidisciplinary burn team on a wide variety of sites:

- Burn ward
- Burn service hospital physical therapy unit
- Rehabilitation Centre catering for burns (none exist as described by the RCS/BOA [27])
- Burn service hospital outpatient department
- Peripheral hospital physical therapy unit or outpatient department
- Patient's own residence
- During children's Burn Camps
- Support groups or similar organised therapeutic event

Treatment away from the base hospital can be delivered by burn care professionals as part of an outreach service, although very few such teams exist in the British Isles. Also reintegration into the social environment of school, college or work is best dealt with by such a service [28].

Reconstruct

In both the short and long term, the nature of post burn scarring may make further surgical intervention necessary. This will most commonly involve the removal of troublesome areas of unstable, ulcerating areas of skin or skin graft, or the release of functionally important areas from contracting scar tissue. Decision making is complex and requires skilled and experienced surgical opinion. To maximise potential success means involving all the members of the original burn team, the same team who cares for the acute injuries.

Review

Lengthy follow up after complex burn injury or burn reconstruction is the norm. All developing problems are more simple to deal with if picked up early. Established or ignored problems may be resistant to all reconstruction and therapeutic efforts.

The follow up for complex injuries in children is usually into their adulthood. They might then be referred on to an adult burn service. Adults patients often return to a burn service intermittently for many years, as and when problems emerge.

Quantification of Burn Injury

When considering burn injury from the organisational point of view, one of the difficulties is attempting to quantify it. There is a lack of an agreed ‘currency’ for burn injury severity making it very difficult to define workload. There is no scoring system or simple method of grouping that might create homogenous cohorts of burn injury patients. In other words the casemix is not readily definable.

As mentioned already, the extent of skin injury is quantified in terms of the extent of the body surface area (total burn surface area; TBSA) involved in the injury, expressed as a percentage of the whole. Using this figure and the depth of skin damaged by that injury is the most commonly used method of grouping burn injury severity. However the site on the body of the skin injury is also very relevant, as are many other factors.

The overly simplistic nature of this assessment can be illustrated by considering the variability that may be seen with a 4% TBSA burn. A burn of this size on the back of a fit adult might, if a superficial burn, be treated as an outpatient safely and appropriately. If it was a deeper injury and needed skin grafting then a short length of hospital stay and minimal morbidity could be expected

A deep 4% injury to both hands is a complex reconstruction and rehabilitation problem however it makes a patient of any age entirely dependent on nursing and therapy staff. Such injuries can result in multiple finger amputation with the major morbidity this represents.

A superficial injury of this size to the face causes intense swelling, closing of the eyes, and again makes the patient highly dependent on nursing staff, from the point of view of their activities of daily living (ADL), eye care and labour-intensive wound management. In addition, the psychological support needed by a young individual with a deep facial burn is intense and prolonged. This support tends to be needed in the evening and at night when the nursing staff are the only professionals available to provide such care for someone in great need of support.

Should a 4% facial injury be associated with any risk of smoke or vapour inhalation injury, the patient would require an HDU environment with close monitoring to pick up any deterioration in airway patency. Alternatively such an injury could require airway intubation and mechanical ventilation in an ICU environment for a variable period of time, to allow airway protection and care. Such injuries carry a significant risk of death, and if survived cause significant physical and psychological sequelae. Understandably, at such times, the support offered to relatives is vital.

There are unpredictable complications of seemingly simple burn injuries of this size, that can cause sudden and rapid clinical deterioration. These cases need immediate access to an ICU environment and staff familiar with these conditions. This is particularly true with paediatric injuries.

From these scenarios the huge scope of care that can be encompassed by the simple description of a burn as '4%' can be appreciated, and why TBSA and age, although factors commonly used to group burn workload, are insufficient. In fact a full description of the severity of any burn injury very much depends on the reason one is considering it.

If predicting mortality is the prime reason for quantifying burn injury, and this is the commonest reason to do so, then there are well recognised factors that powerfully influence the outcome. These have been mentioned already. There is a complex interplay between age, TBSA, inhalation injury, existing medical conditions and associated (non burn) injuries. It is obvious that the variability of each one of these factors can produce an almost infinite variety of combinations. This, in part, is what makes the care of burn injury demanding; the constant variety of clinical problems presenting to the burn team. It is also what makes developing an accurate severity score for burn injury so difficult.

Several specific patient groups exist that present with burn injuries and complex additional needs. These include children with suspected non-accidental injury (NAI), adults with existing psychiatric or personality disorders or with drug and/or alcohol abuse problems. There are elderly patients who may present with dementia, difficult medical problems or when there is a suspicion of abuse or neglect by carers. Each of these groups have differing responses to injury and respond differently to the offer of rehabilitation and help.

Accounting for the complexities of burn care from a nursing and physical therapy point of view is very difficult. It is also difficult to quantify the psychological aspect of care. Many members of the burn team contribute to psychological care, often at the same time as they are involved in other forms of care. None more so than the burn nurse who is also responsible for social arrangements and the care package prior to discharge. To adequately represent the whole package of care calls for a new way of looking at the roles of the various members of the burn team.

Chapter 3: Acute Burn Care Provision

Community Service Provision

1. It is recognised by the NBCRC that a very substantial number of minor burn injuries are assessed and cared for in the community by a wide range of health care professionals. These include General Practitioners, Practice and District Nurses [29;30]. Extrapolation from what little work has been published in this area suggest there are 250,000 presentations of burn injury to primary care teams in the UK per year. The majority of these are treated in the community by Practice and District Nurses. Questionnaire assessment of the knowledge base and education such professional groups have access to, with regard to minor burn assessment and treatment, highlights the need for educational programmes and clear clinical guidelines to be developed [31]. Existing evidence suggests there is potential for such programmes and guidelines to greatly improve the overall quality of care burn injuries receive in the community and improve timely access to specialised services.

Hospital Service Provision: Pre-Hospital

2. In some parts of the country there are local agreements that allow severe burn injuries to be taken from the scene of injury directly to the burn unit, bypassing Accident & Emergency Departments that may be closer. These agreements recognise that prompt and accurate assessment allows resuscitation to be started early, which is in the best interests of patient recovery. However it does not allow for the possibility of associated, non-burn injuries that the burn service may be poorly equipped to deal with.

3. It is the opinion of the NBCRC that such ad hoc arrangements are not appropriate and **recommend** that unless formally agreed by clinical stakeholders, transfers from scene should be made to the nearest major A&E Department. Transfers should not be made to Minor Injury Units (MIU) or to walk-in centres. [27]. With full implementation of this Report no burn service dealing with complex burn injury should exist in a hospital without an on-site A&E Department.

Hospital Service Provision: Accident and Emergency

4. A large number of burn injuries are also dealt with by the national network of A&E Departments. Estimates suggest 175,000 acute burn injuries per year present to A&E Departments in the UK [32;33]. The majority of these injuries do not require hospital admission. Many of them are treated and followed up in A&E dressing clinics or are referred back to the community for continuing care [33;34].

5. In common with community and pre-hospital care, there is a need for clear clinical guidelines to advise staff in A&E Departments on the optimal method of management of the burn injuries they see in terms of first aid, assessment and treatment [33]. The same advice must be included in all the computer systems used by Ambulance and Fire Services and NHS Direct who advise callers about first aid following burn injury. The same guidelines must also be included in the material used to teach paramedics in all the Emergency and Armed Services. Work has begun towards the development of such guidelines [33;35]. It is **recommended** that such national guidelines be developed by the BBA and other stakeholders, and used uniformly across the NHS and in all related services.

Hospital Service Provision: Outpatient Burn Care

6. Many of the injuries referred for assessment to burn services will be most appropriately managed by an experienced outpatient service based in existing Plastic Surgery units. At present many patients with such injuries are admitted to hospital because the teams caring for them do not have the experience to be confident managing the injury any other way. One

of the many advantages from the patient's point of view of the system proposed by the NBCRC is the likelihood that many injuries will not be admitted to hospital at all. Those that do require admission can expect their care to be continued in the community as a seamless extension of in-patient care by way of these out-patient services.

7. Similar to injuries seen in A&E Departments, many injuries referred on will eventually be suitable for further management back in the community, by District and Practice nurses. Support by way of advice and review, as necessary, by the burn service outreach team or outpatient department provides optimal, seamless care for this patient group.

Hospital Service Provision: In-Patient

8. For those admitted to NHS hospitals with a primary diagnosis of burn injury, current care provision is split between self-designated Burn Units (BU), Plastic Surgery Units (PSU) and other general hospitals with no on-site staff trained in burn injury care (GH). This latter group of hospitals have in recent years admitted 43% of all emergency adult cases, and 30% of all paediatric cases.

9. An estimate of the annual burn injury workload across the British Isles is as follows:

- community treated injuries 250,000
- seen in A&E Departments 175,000
- admitted to British Isles hospitals 16,100 (100%)

- of which: 10,200 (63%)
  are admitted to Burns and Plastic Surgery Units
  adults 5,600 (57% of all adults admitted)
  and children 4,600 (70% of all children admitted)

- and: 5,900 (37%)
  are admitted to hospitals with no burns service
  adults 4100 (43% of all adults admitted)
  and children 1,800 (30% of all children admitted)

10. There is wide variation in the rates of admission to hospital with burn injury across the British Isles. Some District Health Authorities have over twice the English national average rate of admission of 15 per 100,000 population per year. Others have under half the average admission rate [36]. The possible reasons for this should be the subject of audit and research, the results of which should feed into targeted prevention programmes.

11. For those injuries felt to be sufficiently severe or difficult to manage, such that they require admission to hospital, it is the opinion of the NBCRC that the common practice of admitting burn injuries under hospital specialties that have no specific burn injury care training is unacceptable. It is **recommended** that all burn injuries, including those to the airway, requiring hospitalisation should only be admitted under the care of specialists who have received specific and recognised training in the care of burn injury, including the possible complications and common sequelae. This means admission under the care of a designated burn service.

Burn Ward Definition

12. For differing levels of injury severity, differing levels of burn ward design are required. In an effort to describe standards of care for burn injury admitted to hospital, it is necessary to stratify the in-patient burn care wards based on the following variables:

- The type of ward accommodation.
- The degree of nurse specialisation with regard to burn injury and critical care.
- The availability of an operating theatre.

13. Consideration of these variables suggests three levels of ward as being suitable for burn care. The three ward types, with increasing resources, staffing and theatre availability have been termed: Burn Facility (BF), Burn Unit (BU) and Burn Centre (BC) [37]. A Burn Facility equates to a plastic surgery unit (PSU), while a Burn Unit and Burn Centre are separate wards specifically designed, built, staffed and equipped for the care of burn injury.

Type of Ward Accommodation	Open ward	Cubicle	Thermally regulated Cubicle
Burn Ward	-	BU	BC
PSU Ward	BF	BF	-

Nurse Specialisation	Ward Level	High Dependency Level	Intensive Care Level
Burn Ward	-	BU	BC
PSU Ward	BF	BF	-

Theatre Availability	Distant (>50 metres)	Adjacent (25-50 metres)	Immediate (<25 metres)
Burn Ward	-	BU	BC
PSU Ward	BF	-	-

14. The stratification of the burn service network in this way is **recommended** by the NBCRC. Each burn care area should be nominated as a paediatric or an adult ward, never both, and should comply with the recommendations detailed in the *Welfare of Children and Young People in Hospital*, 1991 [38]. The primary need for this is the protection of the child by segregation from the adult patient population.

15. Burn wards should be designated in a hospital as near to the centre of their 'at risk' service population as possible. This means an analysis of the population to identify those sub-groups most at risk of suffering burn injuries must be made prior to the designation of any level of burn service, as outlined in the relevant section of this document. They must also be in hospitals with an A&E Department with all facilities and medical specialties associated with a District General Hospital (DGH), in addition to the burns service itself. An overview of the stratification is given below:

Burn Facility

16. This level of in-patient burn care equates to a standard plastic surgical ward for the care of non-complex burn injuries, (see Appendix 2).

- an existing plastic surgery ward, paediatric OR adult
- cubicle beds available
- nursing and other health professionals with burn care training and experience
- access to a trauma theatre
- critical care access as for any surgical patient either paediatric or adult
- plastic surgeon on-call rota
- care provided by the admitting consultant
- District General Hospital level support services and specialties
- care provision for non-complex injuries

Burn Unit

17. This level of in-patient burn care is for the moderate level of injury complexity (see Appendix 2) and offers a separately staffed, discrete ward. The facilities are up to HDU level of critical care and operating theatre access suitable for the casemix.

- designated stand-alone ward for paediatric OR adult admissions
- cubicle accommodation of adequate size
- designated burns nursing and other health professionals with training and experience
- access to operating theatre (< 50metres) with fixed burn lists each week
- intensive care access as for any surgical patient either paediatric or adult
- plastic surgeon on-call rota
- single, named consultant lead for the burn service
- District General Hospital level support services and specialties
- care provision for complex, small skin area injuries

Burn Centre

18. This level of in-patient burn care is for the highest level of injury complexity (see Appendix 2) and offers a separately staffed, geographically discrete ward. The facilities are up to ICU level of critical care and immediate operating theatre access. The detailed description is in Chapter 4.

- designated stand-alone ward for paediatric OR adult admissions
- cubicle accommodation with environment control
- designated burns nursing and other health professionals with training and experience
- immediate access to a dedicated burn theatre (< 25metres)
- dedicated burn anaesthetic input with nominated lead consultant
- intensive care provided by intensivists in the BC critical care beds OR in a suitably equipped, adjacent (<50 metres) ICU or PICU
- consultant burn surgeon on-call rota
- full range of support services and specialties
- care provision for complex, large skin area injuries

19. Implicit in stratifying the hospital accommodation for burn injury is the centralisation of the most major and complex forms of injury into a small number of Burn Centres. This is **recommended**. It is recognised that centralising complex burn injuries into numerically fewer hospitals raises the potential for longer transfers, once referred and accepted, but the use of the methods detailed in the Injury Stratification and Referral section should minimise this.

Critical Care Provision

20. A survey of the burn services has shown wide variation in the way critical care is provided for burn injury. The majority of the 38 self-designated burn units in the British Isles provide their own high dependency care (adult Level 2 [13], paediatric Level 1 [14]), but the majority do not have staffing levels that comply with the current guidelines [12;39]. Similarly the current 9 burn units offering intensive care (adult Level 3 [13], paediatric Level 2-4 [14]) on the burn ward itself are most commonly catering for both adults and children, again with staffing profiles short of that recommended [7]. An analysis of admissions also demonstrates that each of them has insufficient throughput of ICU level cases to satisfy the recommendations as they currently stand. This situation has arisen because of the lack of adherence to existing standards by hospitals and their planners through the same decades that have seen immense development in the setting of standards in the area of critical care, both adult and paediatric.

21. The major burn victim represents an individual with failure of the largest organ of the body, the skin, and needs the simultaneous input by burn surgeon, burn nurse, burn anaesthetist as well as burn intensivist. In most cases this has been achieved because burn anaesthetists, sometimes one individual, have provided the intensive care input on the burn

unit. This method of provision has become increasingly unsustainable. Recommendations clearly state burn anaesthetists and burn intensivists must work in teams. However the often suggested solution of separating the provision of critical care and care by the burn team, often into different hospitals, is patently detrimental to the care of the burn injured patient. The NBCRC rejects this suggestion as a model of service provision. The ideal situation for the care of this paediatric clinical group is in a paediatric hospital, based within a major trauma unit [27], where there is a Burn Centre offering Lead Centre level PICU care or a Lead Centre PICU with conjoined Burn Centre. For adults the same concept applies.

22. Changes in practice, recommendations from professional bodies, the Department of Health and the Royal Colleges have all had an effect on burn care provision at this level. The most profound effects have been seen following the paediatric intensive care report of 1997, *Framework for the Future* [14]. This report did not meaningfully consider paediatric burn injury care at all and implementation of the report at a national and regional level has similarly failed to adequately deal with the issue. Indeed this failure has been one of the major reasons for the NBCR and is now one of the most urgent issues in burn care.

23. Implementation of the *Framework for the Future* Report has resulted in an improvement in the overall management of severely ill children. However, of the 17 burn units in England and Wales admitting severe paediatric burn injuries in 1997, the number recognised as meeting the recommendations of the report, and thus able to continue admitting major paediatric burn injury is 6.

24. An additional 2 units have continued to admit these patients following local negotiation, but are required to transfer to other hospitals their most critically ill children (Level 3). The PICUs and hospitals receiving these critically ill children with complex injuries have no burn service and no significant experience in dealing with their various burn specific needs, in common with other general PICUs across the country who are being expected to care for such children.

25. It is the firm belief of the NBCRC that transferring critically ill children into hospitals that do not have the infrastructure to treat the burn injury means this patient group is receiving sub-optimal care.

26. Across the country, implementation of the *Framework for the Future* Report has taken place with little, if any, involvement of the burn services themselves. There has also been no development of the remaining burn services, which have been expected to take on the additional load, again without discussion, agreement or funding.

27. Some NHS Trusts have responded to this situation by ceasing to offer treatment for major paediatric burns based on a clinical governance argument. The lack of on-site PICU services up to the described standards has prompted declarations that continuing to offer such care to burn injured children was unsupportable. The hospitals involved have argued that ceasing to offer a burn service to this clinical group at all is the most practical way forward, based on the erroneous assumption that any hospital with a PICU could take over burn service provision for these children. The NBCRC deplore the failure of the involved Trusts and Health Authorities to negotiate a clinically appropriate alternative. See Appendix 4 for a summary of the situation at the end of 2000.

Critical Care Workload

28. As in previous documents dealing with critical care, and similar to the stratification of burn injury severity, there are difficulties in defining the levels of critical care needed for burn injury. The NBCRC **recommend** the method in Appendix 3. It can be expected that with adequate staffing, both in terms of numbers and training, B1 and B2 levels of care can be provided in the burn care area. The recommendations for adult intensive care [12;13] and paediatric intensive care [13;39] have similar levels of dependency described but these do not immediately translate for use in burn care. Nor do they cover the extremes of workload experienced with a major, complex burn. Caring for a major burn equates to the highest levels of critical care described in these reports, with the addition of massive wound

dressings. The standards of care otherwise detailed in these documents should be adopted for the care of the burn injury.

29. In order to provide critical care for level B3 and above, several criteria are **recommended** by the NBCRC as needing to be met. There must be;

- reliable emergency admission for 98% of referred cases audited over a rolling 3 year period
- a care area designed and specified for adults OR children, not mixed
- reliable access to all the skills needed to care for the individual and their injury
- a multidisciplinary approach, with shared care between burns and critical care teams
- access to a suitably sized, thermally regulated cubicle
- immediate access (<25metres) to a suitable operating theatre
- a workload sufficient to comply with existing standards and to maintain necessary skills

30. In attempting to define the critical care burn workload, no reliable national data exists about the current intensive care bed days needed for burn injury care. Data from the Intensive Care National Audit and Research Centre (ICNARC) or NHS Hospital Episode Statistics and specifically the Augmented Care Period (ACP) Dataset cannot yet provide useful information. Previous reports on intensive care have concentrated on the number of admissions per year as being an adequate definition of workload. This is based on average lengths of stay on an adult ICU being 3.5 days [40] and PICU 4.3 days [14]. The NBCRC believe the nature of burn injury makes it unlike other forms of disorder requiring critical care. The intensive care period for burn injuries can go on for many weeks. Indeed burn injuries have notoriously long lengths of stay on ICUs [41]. The NBCRC **recommend** the Paediatric Intensive Care Society and Intensive Care Society in conjunction with relevant burn specialists consider the evidence surrounding this issue and alter their recommendations regarding the measurement of adequate workloads to take account of the nature of burn injury.

31. It is apparent to the NBCRC that no single method of providing critical care for burn injury at these levels can be applied successfully across the variety of current burn services, even in the medium term. The NBCRC therefore **recommend** the local adoption of one of two basic models:

A. All level B3 and above care takes place in the Burn Centre if the above criteria can be satisfied. If the workload of the burns service is insufficient to allow skill retention in either the intensive care or burn teams, then circulation of nursing staff from the ICU / PICU and the Burn Centre should take place. This model is only practical if the two care areas are adjacent (<50 metres), or still better, conjoined.

B. All level B3 and above care occurs on the ICU or PICU if the above criteria can be satisfied. If the Burn Centre and the (P)ICU are not adjacent or conjoined but are, of course, in the same hospital, this may be the only suitable model. If problems with reliable access to a suitable bed are envisaged there are two alternatives: (a) ring-fencing of beds for burn service use, or (b) sufficient bed provision to have a bed occupancy of 70% [13;42] to allow reliable access.

32. Only by the careful collection of clinically relevant data over the period of implementation can the effect of these recommendations be assessed.

Chapter 4: Burn Ward Definitions

33. These definitions have more to do with the operational policy of the burn wards and treatment ethos than the design of bricks and mortar and are **recommended** by the NBCRC. High quality burn care can be provided in a variety of buildings of different design but there are common factors which must be understood and accommodated in the way the service is constructed. Greater detail of the building requirements for Burn Unit and Centre will be published in the BBA document on Burn Centre/Unit Design.

Burn Centre

Geographical site

34. This should be at or near the centre of the service 'at risk' population as assessed by epidemiological study. It should also be a site at the centre of transport systems, particularly road, air and rail for easy emergency and routine access. This should also expedite contact with important suppliers such as skin culture laboratories and skin banks. Helicopter access with no need for secondary road transfer is essential [43;44].

Host Hospital Site

35. This should ideally be equivalent to a major acute hospital (level 1) outlined in the *Better Care for the Severely Injured* document [27] page 42, so as to provide a comprehensive set of investigative and treatment facilities. This offers a system for the multispecialty care of major injury of differing types and the necessary rehabilitation facilities.

36. There should be full library facilities on site with internet and e-mail access in the burn care area.

Departmental Relationships

37. Within the host hospital the Burn Centre is best placed on the same level as the A&E Department to provide ready access for internal patient transfers. This is usually on the ground floor. The Burn Centre should also have a separate ambulance entrance to receive direct external referrals.

38. As described in the section on Critical Care Provision, the Burn Centre should be conjoined, or at least adjacent to the ICU if shared care is being provided.

Ward Accommodation

39. Any high care beds, that is burns care at levels B2 to B5 should be in cubicles that have environmental control of both humidity and temperature. In addition there must be an adequate air filtration and circulation system installed. Individual cubicle loading with necessary equipment to address infection control issues is essential.

40. Additional bed areas, perhaps in pairs or four bed bays can be used for level B1 patients prior to discharge or transfer to a rehabilitation service.

Operating Theatre Provision

41. There should be immediate availability (<25m) to a designated burn theatre to allow 24 hour access. This theatre should be staffed by suitably experienced staff from the burn service itself, which offers a consistent service, along with a suitably trained person available to assist the anaesthetist [45-47]. This will often be optimally arranged out of hours by an on-call system, and in working hours by normal rostering, the use of annularised hours and flexible shift working to deal with the variability of demand.

Ward Staffing

42. The NBCRC recognises that with the lack of a validated patient dependency scoring system there is little evidence for the traditionally accepted staffing levels for any high care ward in the NHS. For the purposes of describing the necessary staffing for a Burn Centre the NBCRC has considered a typical 10 bedded ward.

43. There has been no attempt to estimate the staffing needs for ward nurses at nursing grades G to D, nor to estimate the number of Health Care Support Workers (HCSW) with grades A to C. Such estimates depend entirely on the workload and dependency of the admitted casemix. The number of nurses required at grades G, F and E as ward nurses depends specifically on the critical care workload of the ward.

44. Other key posts required in a Burn Centre can be identified. These are additional to the casemix dependent staffing.

<table>
<tr><th>Staff Grade</th><th>Designation</th><th>WTE</th><th>Comments</th></tr>
<tr><td>I</td><td>Lead Nurse</td><td>1</td><td>For whole burn service</td></tr>
<tr><td>H</td><td>Clinical Nurse Specialist</td><td>1</td><td>Works office hours</td></tr>
<tr><td>G</td><td>Ward Manager</td><td>1</td><td>Works office hours</td></tr>
<tr><td>F</td><td>Audit / Research</td><td>1</td><td>Works office hours</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>G</td><td rowspan="4">Ward nurse</td><td rowspan="7">Case mix Dependent</td><td rowspan="7">Flexible shift working</td></tr>
<tr><td>F</td></tr>
<tr><td>E</td></tr>
<tr><td>D</td></tr>
<tr><td>C</td><td rowspan="3">Health Care Support Worker</td></tr>
<tr><td>B</td></tr>
<tr><td>A</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>SC2</td><td>Ward clerk</td><td>1</td><td>Works office hours</td></tr>
<tr><td>SC2</td><td>Audit Clerk</td><td>1</td><td>Works office hours</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Psychologist</td><td></td><td>1</td><td></td></tr>
<tr><td>Social Worker</td><td></td><td>1</td><td></td></tr>
<tr><td>Dietician</td><td></td><td>0.5</td><td></td></tr>
<tr><td>Play Specialist</td><td>NAHPS Senior</td><td>1</td><td>Paediatric service</td></tr>
<tr><td>Family Counsellor</td><td></td><td>0.5</td><td>Paediatric service</td></tr>
<tr><td>Infection Control</td><td></td><td>0.125</td><td></td></tr>
</table>

45. Many of the other members of the burn team need to be available but the NBCRC feel their intermittent requirement means fixed whole time equivalents (WTE) cannot be suggested.

46. Additional staff are required for outpatient care and any intensive rehabilitation beds as well as outreach teams and nurse/therapist led peripheral follow up clinics.

Physical Rehabilitation Staffing

47. Similar to the nursing estimates, key posts can be identified for a typical Burn Centre. The service activity would again increase the staffing needs above these basal levels. This would preferably be quantified by a dependency measurement tool.

Physiotherapist	**Burn Ward**	**OP Dept**	**Rehab Ward**
Clinical Specialist	0.5	0.5	0.5
Senior 1	1	0.5	0.5
Senior 2	1	0	0
junior	0.5	0.5	0.5
assistants	0.25	0.25	0.25
Occupational Therapist			
Clinical Specialist	0.25	0.25	0.25
Senior 1	0.5	0.5	0.5
Senior 2	0.5	0	0
junior	0.25	0.5	0.5
assistants	0	0.25	0.25

48. Additional staff are required for outreach teams and nurse/therapist led peripheral follow up clinics.

Medical Staff

49. Consultant surgical staff, fully trained in the management of burn injury should provide a 24 hour on call service.

50. Sufficient consultant anaesthetic time should be allocated to the service to allow regular pain control ward rounds to target background pain and specific sessions to control procedural pain during dressing changes and surgical interventions. This will commonly be at least one fixed session per day. Further information about anaesthetic staffing is documented elsewhere [48;49].

51. Intensive care consultant time dedicated to the burn patients would be provided as part of the intensive care service and reflected in the costs and contract structure of the burn service.

52. All consultant posts should comply with NHS, EU and employment conditions. One consultant should act as Burn Centre Director and take administrative responsibility for the whole service, including research, audit and service accreditation. Such a position would require allocation of part of the working week for such duties.

53. The involvement of consultant staff from other specialties would be intermittent and covered by the service level agreements negotiated by the host hospital with purchasers.

Staff Type	**Designation**	**WTE**	**Comments**
	Service Director	1	
Plastic Surgeon	Burn Surgeon	0.5 each	On call rota of 1 in 5
Anaesthetist	Burn Anaesthetist	1 - 2	Workload dependent
Intensivist	Burn Intensivist	variable	Workload dependent

54. In addition, the trainee medical staff must reflect the training needs of the specialties involved as well as the needs of the service. The post of Burn Fellow might be filled by a Specialist Registrar from Plastic Surgery, Anaesthesia or Intensive Care, as dictated by the training needs of each Specialist Advisory Committee. As a minimum the burn service would therefore need the following trainee medical staff.

Staff Type	Designation	WTE	Comments
Burn Fellow	SpR years 5 and 6	1	Shared between adult and paediatric Burn Centres
Plastic Surgeon	SpR years 1 - 4	1	On a shared on call rota
	SHO	1	On a shared on call rota

55. The day to day care of the critical care burn patients would be consultant led and delivered by the plastic surgery, anaesthesia and intensive care teams.

Research and Audit

56. Designation and accreditation of a Burn Centre will depend to a significant degree on the performance of crucial routine audits. There should be provision of complete data to the British Isles Burn Injury Database (BIBID). In addition to this external audit of burn injury there must be participation in any other audits, such as ICNARC, advocated by the Royal Colleges or by the BBA, or other specialist associations.

57. There should also be at least monthly morbidity and mortality meetings and an additional annual review of service activity and performance against national figures provided from BIBID and the National Burn Injury Database (NBID) .

58. Multi-centre research projects are recognised to be the only method by which statistically supportable conclusions can be developed for many of the most crucial questions in burn care. All Burn Centres, and each member of their staff, carry a responsibility to ensure full participation in such studies. This is not to minimise the importance of internal research projects, but is seen by the NBCRC as a vital, complementary commitment.

Burn Unit

59. The characteristics of a Burn Unit are very similar to those of the Burn Centre in terms of the geography, host site and baseline staffing. As there must be provision for care at levels B1 and B2 the casemix dependent staffing will be adjusted accordingly. The other characteristics of a Burn Unit are listed elsewhere, regarding theatre provision and ward accommodation but the commitment to a high quality, developing service through collaborative research and audit must be no different to that in the Burn Centre.

Burn Facility

60. This level of burn care service is essentially that of a Plastic Surgery Unit ward, either paediatric or adult. The need for patients with non-complex burn injuries to be cared for by fully trained staff is well catered for in such an environment. The commitment to a high quality, developing service through collaborative research and audit must be no different to that in the Burn Centre.

Chapter 5: Injury Stratification and Referral

61. Appropriate referral to differing levels of burn care requires the correct clinical assessment of the patient's needs in A&E Departments. This assessment has been formally studied and found to be inaccurate in many cases. This is understandable as the number of significant burn injuries any given Accident & Emergency trainee will see is very low. Such evidence supports the argument put forward in the Royal College of Surgeons and British Orthopaedic Association document *Better Care for the Severely Injured* [27] for the development of Consultant led trauma teams in major A&E Departments. With training, these staff would develop the necessary knowledge and expertise in burn injury assessment alongside the skills for dealing with other forms of trauma. Such skill development can be expedited by completion of an Emergency Management of Severe Burns (EMSB) course which is organised by the BBA [50].

National Burn Injury Referral Guidelines

62. The evidence also supports the creation of clear National Burn Injury Referral Guidelines. These have been developed by the NBCRC and are consensus guidelines **recommended** for immediate use (Appendix 2). The guidelines are not designed to be proscriptive or rigid, but are intended to highlight the important factors that can make a burn injury complex and suggest the need for early referral. Local service provision, geography and individual experience may modify decisions about referral of less severe injuries. The guidelines also highlight those non-burn conditions that are felt to be optimally managed by a burn service.

63. With the development of a stratified hospital-based burn care network involving Burn Centres, Units and Facilities, there will be the need to review the referral guidelines at a time judged appropriate by stakeholders and the NBCRC. This process will be lead by analysis of data from the proposed National Burn Injury Database.

Telemedicine

64. Supported by the *Information for Health* [51] and the *A&E Modernisation plans* [34] is the development of telemedicine links between A&E Departments and sources of burn injury expertise. Such links would allow advice to be given as to the appropriate treatment of any given injury. By employing these methods it is felt that the inappropriate referral and unnecessary long transfer of some less severe injuries can be minimised. It will also allow the identification of less obvious complex injuries and facilitate their early referral for definitive care.

65. At the outset, the telemedicine links need only be capable of transferring digital still images, utilising the NHSnet and suitable protocols, so as to maintain patient confidentiality [52]. It is **recommended** that telemedicine links be developed between all major A&E Departments and all major burn services in the first instance.

National Burn Bed Bureau

66. Once an assessment has been made of the injury, perhaps with the help of telemedicine links, a vacant, suitable bed must be found. Currently this can be difficult, particularly for a severely injured child. A&E personnel are at present left with the task of telephoning every burn unit, increasingly distant from themselves, in an effort to secure a bed. This wastes time and is dangerous as it delays definitive care.

67. Although a national mechanism exists for intensive care beds [13] most ICU services rely on local or regional intensive care bed information services regarding regional intensive care bed availability. Such local arrangements are not suitable for burns because of the number and position of Burn Centres and Units. However a system working in the south east of England across three regions, linking the ICU system with information about burn bed availability has worked well. However from this has come clear evidence that a burn bed bureau would need to cover the whole British Isles.

68. It is **recommended** that a National Burn Bed Bureau (NBBB) be created to keep a regularly updated tally of available Burn Centre and Burn Unit beds for the whole country, including the number of available Burn HDU and ICU beds. Should an A&E contact their local service to find no bed is available, then a single call to the NBBB will inform them of the closest, suitable vacant bed and provide them with contact details. The record kept by the NBBB would also be informed by contact with the national and various regional intensive care systems.

69. The NBBB will also be of pivotal importance in the event of a major incident involving large numbers of burn injuries.

Transport of Burn Injuries

70. There are a number of published guidelines and requirements concerning the transport of the critically ill and injured [11;12;14;43;44;53;54]. These should be used in devising local policies with the inclusion of the specific requirements of the burn injured as laid down in the Emergency Management of Severe Burns (EMSB) course [50]. Of primary importance is the need to avoid any delay in the transfer of someone with burn injury to a place of definitive care. The use of retrieval teams and/or aeromedical transfer needs to be balanced in each case.

71. It is **recommended** by the NBCRC that all complex burn injuries being referred for admission reach the burn service site within 6 hours of injury across the British Isles and within 4 hours of injury if referred from an urban site. In some areas this may only be achievable by the patient crossing regional or national boundaries. Failure to achieve these targets should be regarded as a critical incident and the reasons investigated.

Chapter 6: Psycho-social Rehabilitation

72. Psychological and social factors have an important influence throughout the entire course of a burn injury, on treatment, and the process of recovery. However, although this is widely acknowledged, there is at present no accepted format for providing psychological care for patients with burn injuries during their hospital-based treatment and subsequent reintegration into the community.

73. Evidence gathered by the NBCRC indicates that psycho-social rehabilitation has been seriously neglected in UK burn care. Very few burns units provide trained psychological support of any kind for in-patients and virtually none have it available for out-patients, nor is this support available for those patients just discharged. When psychological care is available at all the form of provision varies enormously from one service to the next. Although there are some local support groups and burn camps in existence, the lack of investment in psycho-social rehabilitation as an integral part of burn care services is a major gap in provision, affecting long-term quality of life [7;55].

74. What kind of psychological help should someone entering a burns unit reasonably expect to receive? The NBCRC has brought forward recommendations based on an understanding of the psychological and social effects of burn injuries on individuals and families as well as considering the needs of the burn care team itself.

Psycho-social needs of patients with burn injury

75. Burns are massive life-threatening traumas imposing on individuals and their families a huge and unwanted burden of extreme pain, discomfort, hospitalisation, operations, itching, pressure garments, physical limitations etc. Burn care treatment is lengthy, painful, fraught with potential setbacks, and with some uncertainty of outcome. The resulting disfigurement can be surgically ameliorated but the scars will be lifelong. For some, life after burns will be entirely successful, but, for others, life can be a difficult struggle. Cultural and religious factors can be significant in determining the outcome.

76. The psycho-social difficulties patients encounter after burns can be summarised as:

- problems in managing pain, itching and discomfort
- post-trauma problems re nightmares and flashbacks
- grief and bereavement issues which can be reflected in anger, depression etc
- functional problems of mobility/dexterity which inhibit/slow any return to work or school
- problems about surgical choices and decisions
- social interaction problems; staring/curiosity which inhibit/slow social re-integration
- social abuse; name-calling, ostracism, discrimination etc
- social support problems; family/partner/isolation etc
- problems about belief in the future after disfigurement.

77. Over the course of a year, a burn care team will encounter much higher levels of pre-existing psychological difficulties amongst their patients than are seen elsewhere in the general hospital. Alcoholism, deliberate self-harm, psychosis, behaviour patterns of relationship turmoil, impulsive risk-taking and substance abuse, and depression, are all examples. Some burn-injured patients are the victims of abuse, grievous assault or attempted murder. These matters must be accounted for in a patient's plan of care.

78. The reactions of partners and other close relatives often influence the way care is provided. They too react with high levels of distress. Fatigue and sometimes hostility towards the patient or the staff will also occasionally complicate the process of burn care.

79. It is recognised that many patients (and families) with burn injuries find the transition from acute hospitalisation to life in the community particularly challenging. Recent research confirms that patients exhibit a whole range of problems at different times in their recovery and that many of their concerns relate to wanting more information, more support and advice

and the chance to talk [22;24]. In other words, the psycho-social needs expressed are relatively straightforward issues to address, and could be tackled effectively by appropriately resourced burn care teams.

80. There is a very wide spectrum of adjustment. Adjustment takes time but the passage of time is no guarantee of success. In the UK, the evidence of several studies [22;56] suggests that a sizeable proportion of patients with burn injuries are still experiencing significant psycho-social problems 2 years and more after their accidents and are not receiving any help. Further research is needed to improve understanding of the critical risk factors, including cultural aspects.

81. Studies in the UK, North America and in other countries indicate that the best long-term, psycho-social adjustments are made where attention is paid to four critical factors:

- ensuring that family and other support systems can provide the background for patients to (re)build 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.

Delivering patient-centred health care to meet psycho-social needs

82. In order to empower patients and families to deal with the effects of burn injuries, the goal of burn care teams in relation to psycho-social rehabilitation should be to bolster these four critical adjustment factors: family support, functional ability, information, and social skills.

83. The team should aim to routinely identify what patient and family needs are at any one time and to have the flexibility, resources and programmes to be able to address them effectively. This is a patient-centred approach to health care delivery.

84. An overall strategy of psychological care is necessary that will cover both hospital and community phases of rehabilitation. Ad hoc arrangements will not succeed.

85. The broad aims of the strategy for psychological input for patients, families and the burn care team itself should include:

- to prevent, and provide help for, adverse psychological reactions to burn injury
- to ensure that in all cases the foundations are laid for the best possible psychological adjustment in the long term
- to encourage awareness and a good knowledge base about psychological care within the burn care team.

86. Without a strategy, a number of common pitfalls are often experienced:

- Burn staff are expected to manage these psychological issues themselves despite feeling that they have no time allocated to do so, inadequate information, a lack of support, and insufficient training to equip them for this.

- Psychological care singles out only those who are most profoundly disturbed rather than being understood as an element of care for every patient.

- Where outside agencies (eg: a visiting care worker) are involved in treating those patients with pre-existing psychological difficulties, care can become piecemeal with no member of the burns team being responsible for keeping track of the outside psychological help and the way this impinges on other treatments by the burn team.

- The adequacy of support and continuity of care after discharge can be compromised because specialist burn units are often a long distance from patients' homes and their

local community services and patients are not informed about support organisations and resources available to them.

Principles of good practice for delivering psychological care

87. The NBCRC **recommends** that the following principles should guide the development of burn care services to meet the psycho-social needs of patients and families.

- All Burn Centres and Units should have a named Co-ordinator of psycho-social rehabilitation

- This individual should be a permanent, core member of the multi-disciplinary burn care team guiding the rehabilitation services and activities for a patient from the moment of admission through all stages of their recovery to full functioning in the community. This post will also ensure that assessment and follow-up programmes are in place, such as for post traumatic stress disorder (PTSD) and complicating pre-morbid conditions. The Co-ordinator should also ensure that stresses and concerns of members of staff are addressed.

- The Co-ordinator should not carry out all the psycho-social rehabilitation work because this requires a whole team approach: surgeons, nurses, physical therapists, play specialists, ward cleaners, social workers, dieticians, school teachers etc all have significant roles to play. The role of the Co-ordinator should be to co-ordinate them and be responsible for planning and overseeing the whole process.

- The Co-ordinator should probably be a fully trained psychologist with a special interest in burns and disfigurement but possibly senior nurses and other burn care professionals could fulfil such posts after formal training in psycho-social issue, or play specialists in paediatric services.

- The Co-ordinator should be responsible for a strategy of psychological care which includes:

1. Screening

88. Psychological distress screening of every patient with complex burns needs to be carried out within four days of admission. This will often be complicated by, for example, the patient being ventilated or in a confused state, but the assessment is no less relevant despite these obstacles. Screening is a skilled process requiring a sound knowledge of psychological reactions in the context of burns. Continued monitoring after screening should take place at intervals dictated by the circumstances of each individual case. Where a patient is judged to be coping particularly well, there should still be a further checks at specified intervals.

2. Provision of appropriate interventions

89. The provision of psychological help should relate to the level of need. In most cases, this will involve providing information, advice and reassurance. The next level is to provide specialist psychological help from within the burns team from an identified individual who carries this responsibility and has specialist training. The third level involves a specialist professional who may not necessarily be a core member of the burns team. For example, a liaison psychiatrist for the assessment of possible psychosis. All levels should be easily accessible in the protocol for the service.

3. Integration of psychological interventions

90. The planning and monitoring of psychological care should co-ordinate the involvement of outside agencies, relay their advice to the burns team in circumstances where this cannot be given directly and ensure the updating of this aspect of the overall care plan at each case review carried out by the team.

4. Discharge preparation and follow up

91. For many who have experienced burn injuries, the most important stage in the psychological impact comes after discharge home. Continuity of contact with the burns team needs to be co-ordinated and may include links with an outreach service, outpatient appointments and/or a telephone help-line. An open access arrangement is both an asset for newly discharged patients and a reassurance for the longer term.

92. A Burn Centre or Unit should provide every patient and family with a discharge programme to support the transition from hospital to home. This should include planned contact with community agencies, and a list of recommended support groups and organisations available locally, nationally and on the world wide web support organisations such as Changing Faces.

93. In preparing patients for discharge, every patient and family should have discussed how to deal with staring and the question “what happened to you?”. This can be facilitated by providing every patient with straightforward, written advice in the form of a self-help guide [57].

94. Any burn service should also provide all patients and families with regular, preferably written, action plans of treatments including likely outcomes, timing of follow up etc. to minimise the risk that patients will be lost to follow up.

95. If necessary, and with the consent of the patient and family, a burn service should contact the patient’s school or workplace and offer suitable information and literature about burn injuries, with the additional offer of a visit from the outreach team.

5. Development and audit of psychological outcome measures

96. The evidence regarding psychological interventions is improving but there is still much to learn in terms of what works best, when, and for whom. For example, the evidence so far has been positive for the treatment of emerging psychological difficulties such as reducing stress symptoms, but negative regarding the prevention of post traumatic stress.

97. The assessment and application of evidence should be the responsibility of the Co-ordinator and the Director of the burn service. New services such as camps for children who have been burned need to be evaluated and best practice identified and disseminated across the whole UK burn care community.

6. Training

98. The Co-ordinator should provide the staff of the Burn Centre or Unit with the support which enables their further professional development to progress. Supervision of psychological work should be a routine and necessary aspect of professional practice. The arrangements for this should be explicit as part of the overall strategy of psychological care.

7. Staffing

99. The full burn care team should include a clinical psychologist, input from a psychiatrist, a specialist nurse counsellor and a similarly trained nurse/outreach worker. Additionally high quality care includes access to a specialist disfigurement psycho-social support service such as that developed at Frenchay Hospital, Bristol.

Special issues regarding children and teenagers

100. In addition to the above, including the references to school re-entry programmes, there are a number of points which have special relevance for children and burn care.

101. Burn injury to a child is statistically more likely to happen within the family context and with this repercussions are likely in terms of feelings of guilt and responsibility by parents. Non-injured siblings may have witnessed the event. Siblings may also be marginalised during the hospitalisation phase, being looked after by relatives rather than by their parents which may

in itself lead to difficulties, with their psychological reactions being overlooked. For these reasons, the focus of psychological attention will often need to be on the family as a whole.

102. Communicating with seriously injured children is a complex matter. It is affected, for example, by different stages of development. Their feelings, fears and other reactions can be difficult to unravel. Nevertheless effective communication is essential. For example, it is critical in achieving successful management of acute pain during treatment. Specialist expertise is needed both in communicating with the child to engender communication, within a family which is in a state of shock, and to help members of the burns team to communicate effectively with each individual child, for example regarding dressing changes.

103. Although a clear psychological need may be evident for a child, families will often resist the involvement of a psychological specialist because of the stigma many perceive. This obstacle can be side-stepped if a play specialist is a core member of the burns team and their involvement is routine.

104. As with adults, many children who are burned are the victims of assault. However, the issue of child protection is more complex and involves explicit compulsory actions and responsibilities. Specialist training and experience in these is an essential resource within the burns team.

105. Children who have visible scarring will often have to contend with teasing, name-calling and bullying. This affects self-esteem, confidence for mixing with other children, and it can lead to isolation and withdrawal. This complicates the psychological development of the child and can produce educational difficulties. Timely psychological help can prevent this.

106. In the long term, there will be transitional stages for children who have visible burn scars especially when moving to a new school where they will be faced with forming new friendships and possibly a new period of teasing. Again, timely help may alleviate such difficulties.

107. Within the burn care team, expertise should be available for providing psychological help to families in dealing with their reactions to the burn injury. Family support meetings will often be helpful but this arrangement is insufficient in itself. Formal training in methods of family therapy is needed.

108. A trained specialist such as a psychologist and/or experienced play specialist, will need to be routinely involved with each child. This will go beyond screening for specific psychological difficulties described above for adults and is necessary in every case because of the combination of concerns regarding communication, separation, preparation for surgery, monitoring pain control, the possibility of child abuse, and preparation for discharge and eventual return to school.

109. For longer periods of hospital stay arrangements will need to be organised regarding the child's education according to the individual circumstances of each case.

110. Psychological support should follow through routinely for children at the out patient stage also because of the combination of difficulties which are highly likely to emerge only after discharge.

Paediatric staffing

111. In addition to the staffing for psychological care described above for adults, a play specialist, a clinical psychologist who specialises in child and family work, a nurse from the team who has counselling training and an outreach worker are all required to meet the described needs. Involvement of a child psychiatrist may also be necessary.

112. The *Children Act* (1989) determines that these roles only be taken by professionals who are routinely involved in working with children. Such responsibilities cannot be undertaken by members of the burns team who mainly work with adults in the absence of any supervisory arrangements from a specialist in child work.

Chapter 7: Continuing Care for Burn Injury

113. Following hospital admission with a burn injury, the process of rehabilitation begins immediately. This is the case whether critical care and/or surgery is necessary or not. The process of functional, psychological and aesthetic rehabilitation continues throughout the acute phase injury and will often continue for some years. This is particularly the case with paediatric injuries which are overwhelmingly more common under the age of three years. It is often necessary to keep such children under review throughout the developmental and growth changes, including puberty, to identify any scar contraction, or psychological problems associated with growth and development as early as possible.

114. The NBCRC recognise the current inadequate provision for continuing care and rehabilitation, both in the acute phase of care and post hospital discharge. This has been identified in a number of reports looking at general rehabilitation [23;58-60], post traumatic rehabilitation provision [27] or specifically rehabilitation post burn injury [26;55;56;61].

Current Rehabilitation Provision

115. The number of burn surgeons, nurses and therapists available to carry out clinics away from the base hospital is very low, so to obtain any form of quality service the patients are currently required to travel back to the acute unit out-patient department for follow up, dressings, physical therapy and pressure garment fitting [7]. The costs of these services are rarely, if ever, included in the current contracts for burn care. This helps explain the reduction of these parts of the service, particularly over the last decade.

116. Physical therapy provision more local to the patient's home is generally non-specialist and difficult to organise. Developing functional problems are commonly picked up late and may require corrective surgery which might otherwise have been avoided. With early expert physical therapy, interventions such as surgery can often be avoided [20;26].

117. Currently very few units offer trained psychological support of any kind for in-patients and almost none can offer it to out-patients. Such help is also very rarely available through the patient's own GP at the time it is most needed, which is soon after discharge from hospital. It is recognised that this is not only a problem after burn injury [23]. As a consequence the vast majority of patients following burn injury are essentially left to their own devices to come to terms with a devastating event and injury. Many fail to do so [55;62]. The benefits psychological support can offer are well documented (see Chapter 6).

118. There are a small number of self-help groups and children's burn camps operating across the country. These are all charitably funded or self funded and usually organised by NHS burns care staff in their off duty time or holidays. These should be recognised as contributing a valuable part of continuing care and as such the NBCRC **recommend** they be actively supported, funded and developed by the NHS. As such, they should be required to audit their contribution and undertake research to identify, then disseminate, best practice.

119. Burn injury survivors are also supported by a number of charities offering advice and counselling, but these can only reach a very small proportion of those with real need [57].

Quantification of Rehabilitation Need

120. There is currently insufficient data to allow a picture of the needs of the post burn population to be made clear. In common with basic incidence information it is apparent a period of detailed data collection will be necessary before comprehensive and nationwide plans can be made. This need for good quality information is common to many areas of the burn service and is covered in Chapter 9 and the section on the British Isles Burn Injury Database.

A Continuing Care Model for Burn Injury

121. The rehabilitation needs of those surviving a burn injury are complex and must be individually tailored, taking into consideration the social, religious and racial implications of their injury, and rehabilitation. The NBCRC believe there is a generic model of continuing care that can be described which includes all the key elements necessary for the vast majority of cases. The need for every element depends very much on the workload and casemix of a given service. In some instances a selection of these elements will be suitable, while in others all the elements will need to be available so as to able to offer the care and support needed.

122. In any service caring for complex injuries there is an occasional need for long term placement of a post burn patient in whom the injury has left no chance of living an independent life. Such individuals require continuing, possibly lifelong, nursing care and non-burn specific physical therapy. This would normally be in some form of long stay facility in the community.

123. In almost all instances of major injury discharge from the high cost acute care ward is currently delayed while patients receive physical therapy to rehabilitate them to a level sufficient to allow them to function independently at home. Even for smaller injuries, should they involve functionally important anatomical areas, staying on the acute ward for physical therapy and thus delaying hospital discharge is the only means of receiving the treatment needed.

Intensive Rehabilitation Ward

124. There is a clear need for both 5 day (Monday to Friday) and 7 day rehabilitation beds separate from the acute burn ward. These beds would have a lower nursing ratio but a higher ratio of physical therapy staff. Input by a psychologist and other rehabilitation specialists would be essential [27]. Such provision would not necessarily need to be on the same site as the acute burn ward.

125. It is the belief of the NBCRC that the demand for this level of intensive rehabilitation for burn injury alone means the demand could probably be met by only two or three burn rehabilitation units across the country. This would give rise to many problems of patient and family access. Such arrangements would also perpetuate the social isolation of the burn injury survivor, heightening reintegration problems.

126. The NBCRC therefore **recommend** such intensive rehabilitation be made available as part of a multidisciplinary and multi-specialty service, treating patients from a variety of trauma and non-trauma specialties [27;58]. This arrangement provides ready access for patients and their families, increases early social contact in the post burn period with non-burns patients and promotes cross-specialty working [63;64], increasing the likelihood of best practice being identified and adopted.

127. Such a facility is more likely to be kept working all year round with an efficient ward occupancy as the rehabilitation of many forms of major trauma would even out the peaks and troughs of activity of any one specialty or incidence of any one form of traumatic injury.

128. This model not only allows early discharge from the acute burn ward but provides the appropriate nurse / therapist ratio for optimal care and preparation for earlier final discharge than is currently achieved [26]. This can be expected to improve the final outcome both functionally and psychologically. This assertion remains unproven in the NHS. It is noteworthy that no intensive rehabilitation facility remains for any form of major paediatric trauma.

129. Any patient discharged from the acute burn ward following any level of injury may need continuing support, the intensity of which is not proportional to the severity of the original injury [56]. In some instances formal reintegration back into work, school and to some extent the family itself is required. Such reintegration needs individual counselling with treatment of the patient and often family members to help them to come to terms with the injury and its consequences. Bereavement following the death of other family members in the same incident may also need to be dealt with. Much of this support can be provided by way of out-patient and outreach arrangements with the burn team.

130. To maintain care continuity and provide a seamless transition back into the community, these intensive rehabilitation services would be best placed on the same hospital site as major trauma centres [27] and the Burn Centres. The number necessary and the exact site for each can only be decided after consideration of detailed service workload data and information about patient accessibility by methods outlined in Chapter 10.

Outreach Teams

131. The outreach team concept has been of proven value and accepted in many NHS services such as renal and cystic fibrosis. It meets the need for care to be provided by an expert team, near or in the patient's abode. This method of care provision allows links to be maintained with the burn care team who can predict and respond to developing problems. The required expertise in the team includes; burn wound care, physical therapy, splint and pressure garment provision and pain management. Counselling skills within the team are essential. Teams made up of two suitably trained individuals would seem to be the most efficient. This concept is currently being tested and validated [28]. The number of teams needed for a given burn service would depend on the workload and size of catchment area.

132. Outreach teams are essential for seamless care and have four main functions during the period of social reintegration and rehabilitation:

- Enable discharges by providing support in or near the patient's home and by liaising with social, and education services.

- Educate and share skills with General Hospital based nurses and therapists and with community based nurses and rehabilitation teams.

- Act as a readily accessible expert resource for hospital and community health professionals, patients and their families.

- Avoid admissions to the burn wards by advising and supporting community teams and A&E Department staff.

133. The provision of outreach team led clinics in various locations within the burn service referral area, using General Hospital and/or Plastic Surgery Unit (Burn Facility) outpatient departments, will allow appropriate follow up to be more readily accessible to the patients and their families. Where appropriate, community rehabilitation and hospital-based services local to the patient could be educated to take on some of the work between outreach team visits. The holding of centralised records and regular debriefings will allow the recall of individual patients to the base hospital for assessment should problems prove resistant to correction by the outreach or other care teams.

Continuing Care Overview

134. Clinically this Continuing Care Model has much to commend it [26]. Managerially it is likely to prove the most cost efficient and effective in offering a high quality service. The incorporation of all the elements of the NBCR Continuing Care Model offers the post burn injury patient the care they need in as seamless a fashion as possible. It will support them in rebuilding their lives, and give them a real chance of achieving their full potential.

135. The importance of this facet of care to the burn injured patient must be recognised, even when the injury itself is graded as non-complex. Adequate provision must be made for the involvement of the appropriate specialists within the burn team from the time of the patient's admission through to final discharge from follow up by the burn service. The NBCRC therefore **recommends** that this Continuing Care Model be adopted and provided separately for paediatric and adult services.

Reconstructive Surgery

136. Regular review and feedback during rehabilitation allows the patient with burn scarring to discuss with the burn team the need for surgical scar release, resurfacing or specific reconstruction. Such decisions are difficult and may involve contributions from the whole burn team. This is not an area for the 'occasional' surgical team.

137. The NBCRC **recommend** the adoption of the practice of the burn team creating regular, preferably written, action plans of treatments, expected outcomes and the timing of interventions and follow up for the patient and family. This helps clarify complex clinical situations and minimise the patient being lost to follow up.

138. Any surgery or interventions undertaken will once again involve the whole burn team, as extensive reconstructive surgery often requires expert anaesthesia, possibly intensive care, and certainly lengthy physical therapy and further rehabilitation.

Managed Clinical Networks for Burn Injury

139. The network of burn injury services across the British Isles envisaged by the NBCRC can provide seamless care from the time of injury through to complete recovery, for all levels of injury severity. In addition, the correct placement and organisation of the network elements should ensure patients only have to travel as far as it is necessary to reach the level of expertise required for their particular problem, at whatever stage of recovery they have attained [65-67].

140. For the simplest injuries, the extensive network of General Practitioners, Practice and District Nurses can provide appropriate care for non-complex minor injuries. At the next strata of injury severity, there is the network of Accident & Emergency Departments. However, both these clinical groups may need to refer their patients on to higher levels of burn expertise. This may be for the management of acute injuries or for problems of psychological, functional or aesthetic recovery and rehabilitation. Lines of communication must be created such that this can be done rapidly. With the wide geographical coverage of the proposed burn services the most suitable method of communication would appear to be the NHSnet [51].

141. For in-patient care, the way the network would work can be envisaged by considering a theoretical population within a given circumscribed area. This population might generate sufficient complex injuries each year such that only one Burn Centre is required. It is appropriate that the Burn Centre is positioned at the centre of lines of communication and the very heart of the 'at risk' service population. This Burn Centre would admit the most severe forms of injury from the whole geographical area, but would also admit Burn Unit level injuries from a smaller geographical area. The rest of the circumscribed area would be covered by perhaps one or two other Burn Units, dictated by need.

142. The Burn Centre would also admit Burn Facility level injuries from the immediate population. Perhaps four other hospitals would be acting as Burn Facilities, including those designated as Burn Units. Thus, for the entire population of this geographical area, there may be four or five hospitals acting as Burn Facilities, spread throughout the area. The Burn Unit(s) and Centre would be acting as Burn Facilities for their own immediate populations but also admitting increasingly complex injuries from wider geographical areas.

143. When ready, patients recovering from complex injuries would be transferred back to a burn ward commensurate with their recovery and rehabilitation needs and as near their normal residence and family as possible.

144. The development of this network, with appropriate telephonic and telemedicine links, is felt by the NBCRC to offer an efficient and patient-centred care model for burn injury applicable to any geography or population. With the creation of a national network of Burn Centres, Units and Facilities, working with the A&E network and community teams. It is intended that access to the appropriate level of expertise is optimised and unnecessary travelling by the patient and their family minimised.

145. The addition of the rehabilitation elements, particularly the Outreach teams, providing outpatient care near or at the patient's residence, offers the best prospect of ensuring seamless care for those with burn injury.

Chapter 8: The Burn Team

146. Individuals suffering a burn, be it a minor or major injury, deserve to be attended by staff trained and experienced in burn care. To this end the NBCRC wish to outline the staffing needs of burn services. In doing so each major specialty in the burn team is defined and their minimum commitment to the burn service specified wherever possible.

147. The key specialties that must be available 24hrs a day for the care of a complex burn injury are the burn nurses, burn surgeon, burn anaesthetist and the burn intensivist. In many instances the role of burn intensivist is currently filled by the burn anaesthetist. Analysis of these suggests these are not sustainable arrangements.

148. Other members of the burn team must be available to advise and provide input to the balanced management of the individual. In no small part the family and friends of the injured influence that management and must be notionally included in the burn team definition. The central member of the team is the patient themselves. Their will to recover, drive and commitment influence more than anything else what the other team members advise and do.

149. Recognition of the importance of the family, and the significant distances specialist burn services may be from family homes, requires that both acute and rehabilitation burn services have accommodation available. There should also be systems be in place for travel expenses to be reimbursed over what can be long periods of time.

150. Other key members of the acute care team include (* additional for paediatric patients and many of the other team members would also be specifically paediatric, paediatric social worker etc.);

- Physical therapists: Physiotherapists and Occupational Therapists
- Health Care Support Worker
- Dietician
- Psychologist
- Social Worker
- Pain Specialist
- Play specialist *
- Teacher*

151. The burn team may receive occasional input from a wide array of NHS staff both clinical and non-clinical. The whole burn team is listed here. The concept of shared care and teamwork has been part of modern burn care for many years [3] and is a working example of the suggestions in recent reports such as *Making a Difference* [64], *Developing the NHS Workforce* [63] and the *Comprehensive Critical Care* report [13] amongst others [63;68].

152. Problems of staffing common to many areas of specialised care exist within burn services. Many of these problems are added to by the unpredictability and stress of caring for burn injury. In addition the variable day to day workload has resulted in low average bed occupancy on most burn units and given reason for successive managers to remove posts. In many areas this has resulted in burn services constantly being run close to collapse [7].

153. The burn team can include many specialties and support staff. All contribute, some daily others only occasionally, to care and recovery. This list is not intended to be exhaustive but to give an indication of the variety of inputs to care that must be co-ordinated.

	patient		
	spouse / partner		
	family		
	friends		
	relatives		
	school teacher / school friends		
Core clinical staff	burn anaesthetist		
	burn nurse		occasionally, the intensive care nurse
	burn surgeon		
	critical care nurse		very commonly, the burn nurse
	burn intensivist		very commonly, the burn anaesthetist
	burn theatre nurse		very commonly, the burn nurse
	burn physical therapist		
Other team staff	cosmetic camouflage advisor		
	counsellor		
	dietician		
	family counsellors	*	(* denotes paediatric service only)
	health care support worker		
	infection control nurse		
	maxillo-facial technician		
	occupational therapist		
	outreach team		
	pain team		
	pharmacist		
	photographer		
	respiratory physiotherapist		
	play specialist	*	
	pressure garment technician		
	limb prosthetist		
	psychologist		
	social worker		
	teacher	*	
	theatre ODA		
Administration	audit clerk		
	burn camp coordinator		
	business manager		
	outreach team coordinator		
	research and audit nurse		
	secretary		
	support group coordinator		
	ward clerk		
Clinical support	acute pain specialist		
	chronic pain specialist		
	dermatologist		
	general practitioner		
	general surgeon		
	geriatrician		
	microbiologist		
	nephrologist		
	neurologist		
	ophthalmologist		
	orthopaedic surgeon		
	paediatrician	*	
	physician		
	psychiatrist liason		
	rehabilitation specialist		
Support staff	cleaners		
	clergy		
	porters		
	translators		

154. All burn teams will also need access to specific services that on some sites are part of the burn team. These include skin culture laboratories for the growing of skin cells in culture, and skin banks for the provision of stored human skin from tissue donors. The use of these services depends on the casemix and clinical practice of each service but they are both very necessary parts of the overall network.

155. The NBCRC endorses the points raised in the recent *Comprehensive Critical Care* review [13] which in para 51 outlines the problems of critical care nursing which are common to the whole of burn team staffing. The point that competencies are more important than professional boundaries in the delivery of safe, efficient and cost-effective care is well made. The key issues listed were:

- The recruitment, training and retention of staff at all levels of the service.
- A recognition of the need to have a pool of staff with relatively high levels of competence at all levels of the service.
- A need to respond to the increasingly modular nature of training in the NHS and to remove disincentives to training from the system.
- To design training packages that enhance core skills and competencies across different professional boundaries (although a feature familiar to the burn team it is not one encapsulated in training).
- To enable all staff to take advantage of training and development opportunities at appropriate points in their careers – with concomitant benefits for the whole of the health care delivery system.
- The provision of support staff outside normal office hours to free up specialist staff for direct patient care.

156. One area where generic training is available for all burn team clinical staff is the Emergency Management of Severe Burns course [50]. This is a course designed to provide safe and effective assessment and care of a major burn injury. It follows ATLS guidelines and is intended for medical, nursing and other staff involved in this type of care. It is **recommended** by the NBCRC that all nursing and trainee medical staff of burn services undertake the course as well as senior nursing and trainee medical staff from A&E Departments regularly dealing with burn injury. It should also be a training requirement for all specialist registrars in Plastic Surgery and Trauma Team Leaders [27].

157. The co-ordinator of psycho-social rehabilitation should be responsible for ensuring that all staff receive appropriate in-service training in the effect of burns and disfigurement. This might include intensive unit-based study days, courses in counselling skills or attendance on accredited courses on the psycho-social issues arising after burn injury.

Nursing

158. Training in burn care nursing starts with the RGN or RSCN qualification. This is augmented by experience on a burn unit which the NBCRC **recommend** be at least two years before being regarded adequately experienced to be prime carer for a complex injury.

159. In England further training may include the Burns and Plastic Surgery ENB course (264), or modular adult or paediatric courses designed to replace it, the R74-77 courses. Intensive care training is via the adult ENB 100 or the paediatric ENB 415. Equivalent or similar courses exist in Ireland, Scotland and Wales.

160. A review of staff training in 18 English burn units in 1995 showed the number of trained staff in post was 418 with 30 unfilled whole time equivalent (WTE) posts. Of the staff in post 373 were RGNs and only 45 were RSCNs. Between them only 80 held the ENB 264.

161. A more detailed record of staff numbers and skills was made during the visits to each service by the Review researcher. Analysis of this data from the whole British Isles reveals the situation in 2000 is little different [7]. Of those services where staff are predominantly, or completely, concerned with looking after burn injury (16) there are 306 WTE RGNs and 51 RSCNs.

162. The number of these WTE that are in post and have a burn-relevant higher qualification, or equivalent, are tabulated here, plus the percentage of the whole this represents.

	All RGN	RGN alone	RGN +264	RGN +100	RGN +264+100
WTE	306	174	97	12	21
%	100	56.9	31.7	3.9	6.9

	All RSCN	RSCN alone	RSCN +264	RSCN +415	RSCN +264+415	RSCN +100	RSCN +415+100
WTE	51	28	16	2	3	1	1
%	100	54.9	31.4	3.9	5.9	2.0	2.0

163. Similar figures are available for those services where the nurses care for burns and a variety of other conditions on their wards. The picture is one of staff that have not been developed, either by themselves or their employer.

164. The NBCRC **recommend** that in both Burn Units and Centres 75% of their RGN and RSCN staff should be involved in, or have completed, a course of study in burns related care that has been validated by a university. For grades of staff at F and above this should be 100%. In Burn Centres the requirements of the Intensive Care Society [12;13] and Paediatric Intensive Care Society should additionally apply [39].

165. Analysis of the number of staff on the 16 burn wards reveals wide variation in workload and staffing. The range for the number of admissions over one year per Registered nurse was from 4.2 to 31.3 and the number of Registered nurses per burn bed varied from 0.69 to 2.5. It is recognised that different clinical practices and organisation have some effect on these figures but analysis of the detailed data collected during the Review researcher visits about the services does not explain the variation seen [7]. Development of Burn Care Pathways may clarify the situation but it is clear that profound differences in staffing, workload and thus care provision exist.

166. The NBCRC **endorse** the key recommendations in paragraph 55 of the *Comprehensive Critical Care* document which clearly apply to all burn nurses. These include:

- Staffing in critical care units should be based on patient dependency rather than bed numbers. Action research should be urgently commissioned to underpin the implementation of this recommendation.

- Each local health economy should produce an integrated strategy for retention and recruitment of critical care nurses by September 2000.

- A modular continuous framework of courses should be developed based on the continuum of critical care provision. This should include modules on high dependency care for all ward staff working in acute hospitals as well as an incremental programme of development towards higher levels of critical care practice. Competence based high dependency care training for ward staff should be set up: 50% by March 2002 and 100% by March 2004.

- The impact of other staff deficiencies particularly administrative, clerical, technical and cleaning staff has a major effect on all professional staff including nurses. Trusts should review staffing within critical care and ensure that there is an appropriate mix of staff to undertake the various tasks required of the service.

167. While competency based staffing is an ideal to work towards, with staffing levels dictated by patient dependency, the fact remains that there is no validated dependency scoring system in use in any UK burn service. This absence means that for the time being, more crude and traditional methods of quantifying staffing needs must be used. The NBCRC **recommend** those included as levels B1 to B5 in Appendix 3.

168. To overcome the effects of unpredictable workload it is also **recommended** that a full assessment is made of the potential value of introducing flexible work patterns and annualised hours for nursing staff. The value of on-call teams of nurses able to care for a complex major injury in the initial period after admission should also be evaluated.

Surgical

169. In almost the whole British Isles the surgical specialty that has the clinical responsibility for the care of severe burn injuries is plastic surgery. The sub-specialty of burn surgery is part of the training for the FRCS(plast) examination normally taken after year four of the Calman-style training. No other specialty has formal training and examination in the care of all aspects of the care for severe burn injury. It is the **recommendation** of the NBCRC that services designated by purchasing health organisations to care for admissions with burn injury should ensure that the surgical service is provided by an accredited plastic surgeon working with at least two other plastic surgeons [68]. Consideration must be given to the need to retain skills in dealing with children [69].

170. The NBCRC **recommend** that a Burn Unit or Centre burns and plastic surgeon should commit each week to at least one fixed session for a multidisciplinary ward round, one operative burn list and one burns out-patient clinic. This commits approximately half the fixed sessions of the working week to the care of burn injury. Most career burn surgeons will commit a greater proportion of the working week than this to the burn service.

Anaesthetic

171. Specific guidelines have been prepared on the recommended training, commitment and further education of burn anaesthetists by the Association of Burns and Reconstructive Anaesthetists (ABRA) [49] and submitted for consideration to the Royal College of Anaesthetists. These have been considered by the NBCRC and endorsed, as are the sections on anaesthetic service provision for paediatrics, trauma and critical care in the Guidelines for the Provision of Anaesthetic Services [48] and related reports from the Association of Anaesthetists of Great Britain and Ireland (AAGBI) [45-47].

Intensivist

172. The requirements for the training and further development of both adult and paediatric intensivists have been covered in a number of publications. However the NBCRC **recommend** the Intensive Care Society and Paediatric Intensive Care Society, along with the Intercollegiate Board for Training in Intensive Care Medicine, the BBA, ABRA, the RCA and AAGBI should better define recommendations about the training necessary for a burn intensivist.

Medical Staff Training

173. It is also the **recommendation** of the NBCRC that the plastic surgery and other specialist advisory committees (SAC) give urgent consideration to the establishment of burn fellowships as educational posts for trainees in years five and six of their training. This should help provide the highest level of training to those who intend to make a career as burn specialists. Such posts exist in the USA and Australia and very usefully fulfil this function. The completion of a fellowship in the care of burn injury should become a necessity for any

trainee, of whatever parent speciality, wishing to take up a post in a Burn Centre in addition to the award of the CCST.

Therapy Staff

174. Standards for the clinical training, staffing and practice of physical therapists working in burn care have recently been published [20]. The NBCRC have considered and endorsed them. Methods also exist to guide a service in assessing how many therapists are needed for a service to run efficiently [26;70]. The NBCRC **recommend** that such methods be employed until such time as a dependency tool is available with which to specifically quantify need.

Support Staff

175. Tasks performed by specialised staff could be undertaken by a variety of support staff. It is the **recommendation** of the NBCRC that work be undertaken by each burn service provider to ensure specialised staff are not burdened with tasks that keep them from direct patient care [13;63;64;71;72].

Chapter 9: Coding and Classification of Burn Injury

176. It has been appreciated for many years that certain key areas of investigation into burn injury requires the pooling and analysis of large amounts of data about all cases being seen and treated. The development of affordable technology to store and retrieve this sort of information has allowed a number of individual burn services and national or even international bodies to attempt to collect this data. The prime interest and professed intent has been to study all aspects of burn injury and work towards effective prevention programmes. Despite these efforts there is no Developing or Western country with a comprehensive picture of the national burn injury problem. Some partial coverage has been achieved in a handful of countries, and work is on going in several to fill this information vacuum.

177. In the United Kingdom, the situation has been far from ideal but the information that is available is better than that in most countries. However it is unfortunate that to gain any real perspective on the current UK burn injury problem a number of information sources have to be tapped. Each one has specific difficulties in interpretation as a result of limitations in either data quality, completeness or applicability to burn injury. Listed below are the current sources of national data and some details of the major limitations of each.

Community-based

Primary care Teams

178. There is currently no information available as to the number of burn injuries treated within the community by either the patients themselves or the primary care teams other than a few small studies [29]. Even with the eventual development of an NHS-wide network, the non-standardised method of record keeping and coding in the majority of general practices and community care teams would not make community analysis of burn injury incidence and causation viable.

Ambulance Services

179. The NBCRC understand work is underway to develop a Minimum Data Set for the collection of data about the activity of the Ambulance Services. However none currently exists and data about burn injury is unavailable.

Fire Service

180. Extensive data is collected about each incident attended by the Fire Services. Some of this data is computerised, but not all. The referral of victims and Fire Service staff to hospital is recorded but there is little useful data collected about the significance or severity of these injuries. The reporting of injury information in the Home Office reports each year has to be viewed very critically [73].

Police

181. The NBCRC understand no useful data is collected or centralised about incidents in such a way as to identify burn injury incidents or victims, even when this has resulted in severe injury, hospitalisation or death.

Coroner

182. The NBCRC understand that data is collected and centralised by the Office of National Statistics about burn injuries that have resulted in death. However such data relates only to the mode of death and has limited clinical translation.

Hospital-based

183. There are a number of levels of hospital care that have their own data collection systems and each of these have been approached to gather what information is available with regard to burn injury.

Accident and Emergency Department Minimum Data Set

184. There have been attempts to describe a Minimum Data Set for A&E Medicine but none have been accepted or nationally implemented [74]. Some of the local or regional systems that do exist contain data that does identify burn injury but none collect sufficient clinical detail to make the piecemeal analysis of these sources worthwhile.

Home and Leisure Accident Surveillance System (H&LASS)

185. This system was created by the Department of Trade & Industry in 1991 and gathers detailed information about every attendance to eighteen major Accident & Emergency Departments around the UK. The data is then computerised and analysed. Using the known target populations for each of those given Accident & Emergency Departments, extrapolations can be made to make some representation of the incidence of certain types of injury across the whole UK population. This is the first major limitation of this data, in that it is a representation, not a report, of the national picture.

186. The data does however provide a good injury causation record but only contains data about home and leisure accidents [32]. It does not contain information about injuries caused at work or in road traffic accidents. There is also very little information about the extent of injury and relatively little about the subsequent care or clinical outcomes.

UK Trauma Audit and Research Network (UK TARN)

187. Previously called the Major Trauma Outcome Study (MTOS), this system based in Salford collects data about injury admissions and deaths that attend A&E Departments around the British Isles. Currently 104 hospitals (49% of possible sites) contribute data which is computerised and analysed [75].

188. The system has not collected detailed data about burn injury. This situation is under review at present.

Burn Injury MTOS

189. This was a British Burn Association funded endeavour to collect information about burn injury victims across the UK. It became one arm of the Major Trauma Outcome Study (MTOS) and was designed to collect information, primarily from burn units, about only major burn injuries and all deaths that occurred as a consequence of burn injury. The study was initiated in the mid 1992.

190. As a consequence of the inclusion criteria, the study would not provide comprehensive data about all levels of burn injury across the UK. Also, as it was a hard copy system that required the centralisation of completed forms and subsequent computerisation, the appeal to individual burn units was low and the system was abandoned in 1994.

Intensive Care National Audit and Research Centre (ICNARC)

191. This system collects and analyses data about adult patients admitted to ICUs across the country. The system was started in 1996 and as a result has a relatively small database regarding burn injury. Currently 75% (161) ICUs in England, Wales and Northern Ireland are involved with ICNARC [41]. It will be a number of years before the coverage is adequate and the database large enough for the data to be of use in gaining a national overview about the intensive care element of burn injury treatment. It is also true that a number of units provide intensive care facilities within the burn service and none of these are part of the ICNARC system, so coverage is not likely to be ever complete unless the recommendations in the *Comprehensive Critical Care* [13] document are implemented fully.

Augmented Care Period (ACP) Dataset

192. An effort was made in 1997 to collect information about patients in the NHS needing any form of critical care including high dependency care or intensive care in NHS hospitals. The collection of a specific data set was made mandatory in all NHS hospitals [76].

193. Unfortunately the instructions for this collection where unclear about the need to include information about critical care for burn injury. Only 63% of relevant Trusts submit data at all. As a result the resulting data is grossly incomplete and of little value [13].

British Burn Association Snapshot

194. An effort was made by the British Burn Association in 1993 to get some idea of the burn injury problem across the UK. Data was collected to cover the calendar year of 1992.

195. Data was provided by 70% of burn care institutions about their admissions over the year of 1992. The data set only included; age, sex, TBSA and survival. Analysis at that time had to be extremely guarded, as there was no indication of how much burn injury was being admitted to General Hospitals and how much national capture the provided data actually represented. Subsequent comparison of this data with the NHS HES data for the same period provided a very useful indicator of the severity distribution at that time.

Hospital Episode Statistics (HES)

196. Initiated in 1989, this system is the responsibility of the NHS Information Authority. Similar systems exist in Scotland, Wales and Northern Ireland. Data is collected from all NHS hospitals who have a mandatory obligation to provide details of every admission to their institution for each financial year [77].

197. As a consequence, this database is the most comprehensive record of NHS activity and covers all types of hospitals and all forms of admission to those hospitals. The database has over 44 fields and includes in addition to basic demographic data:

- district of residence
- purchaser of care
- admitted from where?
- admitting hospital
- admitting specialty
- diagnostic code (ICD-9 and later ICD-10, x6 fields)
- operative codes (OPCS-4, x4 fields)
- method of discharge
- discharged to where?
- length of stay
- HRG code

198. From the full HES database, a subset can be created that includes all burn injury admissions by using the diagnostic ICD codes as a primary filter. As a result, data is available from the Departments of Health in England, Scotland, Wales and Northern Ireland that cover the whole UK population.

199. For the purposes of the NBCR access to a subset was negotiated and data provided that covered the years up to 1996. This was done using only the primary diagnostic field as the filter. If this field contained an ICD burn code the admission was included in the subset. This may mean a number of small injuries were missed, as when the primary reason for admission was for some other disease process, and where a subsidiary field contained a burn injury code. Inevitably these types of burn injury are likely to be minor and coincidental.

200. Within the subset provided, the secondary diagnostic codes and operative codes are available so inferences could be made as to the severity of injury where the surface area injured codes (ICD-10 T31-32) had not been used. This lack of a consistent TBSA code was the major limitation of the HES as the data does not inevitably hold information about the extent or severity of the burn injury for which the individual was admitted. It is possible

however to study the cases that required reconstructive surgery in the form of skin grafting, and use this as an indirect measure of severity.

201. As can be appreciated, the geographical distribution of the injuries across the UK as well as the age/sex distribution is available for analysis. In addition, the length of stay, mode of admission and discharge are available and from this it can be concluded whether the patient survived or not. The admitting Trust and specialty can also be studied.

202. One of the limitations of the data presented is that only the site of care, or provider, is used to identify the workload for a given health care region, not data about the patient's residence. Considerable flows across health region and even national boundaries are known to happen, particularly from North Wales and in the South East of England. No effort has been made to allow for these flows in the presented analysis.

203. The data currently available covers the financial years 89-99. The quality of the data improves over the years and has been separately analysed for this whole period [36] using Geographical Information Systems (GIS) software and sophisticated population and health boundary data. Unfortunately the initial analysis [78] did not use all the methods employed to analyse the NBCR subset in order to stratify the injury severity groups but useful conclusions could be made. It also only looked at English data.

204. The most valuable information from the latter study was that the burn injury workload in the English Trusts did not alter significantly year on year in terms of the number of admissions or in the severity groupings that were used.

205. The NBCRC **recommend** that the work using the whole 89-99 data should be repeated using the sophisticated GIS techniques but applied to data from the whole UK and employing the severity grouping methods developed for use on the NBCR data set.

206. Analysis of data from April 1999 onwards will be more informative regarding burn injury severity because changes in the rules used by clinical coders in the NHS [79] mean that from that date all admissions with burn injury had to have an ICD-10 T31-32 code attached to their record. Therefore all admission after that date can be more reliably analysed based on one of the most important indicators of injury severity.

207. Future developments in the accurate coding of burn injury variables cannot rely on the further development of the ICD or OPCS systems. These are structurally not up to the task. To convey the complexity of clinical state requires a system capable of recording degrees of severity in an hierarchical manner such as that seen in the Read Coding system versions 2 and 3 [80]. The current development of this as part of the amalgamation of the North American Systemized Nomeclature of Medicine (SNOMED-RT) and Clinical Terms Version 3 (Read Codes) as the SNOMED Clinical Terms project holds the future for burn injury coding, only so long as sufficient clinical input to the process is ensured [81].

Burn Service Snapshot 1997/98

208. As part of the NBCR process each significantly busy burn service identified from the 1992 snapshot data was asked in the Autumn of 1998 to provide data on each burn admission to their service for the financial year 1997/98. They were asked to collect and return each patient's; age, sex, TBSA, length of stay and whether they survived their injury or not.

209. Complete recovery of this data was necessary to have any understanding of the national burn injury workload because of the limitations of other data sources already detailed.

210. Unfortunately, it was not until December 2000 that complete data returns were received. Analysis of this data along with the results from the HES analysis has produced the best estimate of the British Isles burn injury workload ever achieved.

British Isles Burn Injury Database (BIBID)

211. Recognising the limitations of current information systems, the British Burn Association initiated the development of a burn injury Minimum Data Set in 1996. From this data set a

computerised data collection system was designed which was to be provided free to burn services so that they might enter information about all patients seen or admitted with burn injury. The system (BIBID) was designed to be simple in use and robust, with a particularly comprehensive system for recording burn injury causation and injury extent. Inevitably it would be some time before adequate coverage and data had been collected to make meaningful analysis possible.

212. Those burn injuries seen or admitted outside Burn & Plastic Surgery Units were not intended to be recorded on the BIBID. As such it cannot be regarded as being fully comprehensive. However the amalgamation of the results from the burn injury data set with analysis of full HES data will give the most comprehensive overview of the burn injury problem of any country, world wide.

213. Within the BIBID are fields that can be used to provide information for a number of purposes, the list is not intended to be exhaustive:

- injury causation data to inform national burn prevention programmes
- clinical data for audit and research
- service data to monitor provision and workload
- information for use in the burn service accreditation process
- accumulative analysis for national burn service planning
- quality of service and quality of care indicators

214. The latter need cannot be met by any of the high or low level indictors published to date [82;83] so the NBCRC **recommend** some of the information from the BIBID be used with other information as part of quality assurance exercises and in the service accreditation process.

215. The quality indicators that can be used as indicators of service include;

- presence of a 24 hr burn surgeon rota
- multidisciplinary care and ward rounds
- reliable ICU or PICU availability
- burn theatre availability
- a full range of rehabilitation services for in & out-patients
- education and research profile
- participation in both internal and external audit
- participation in service accreditation

216. The quality indicators that can be used as indicators of process include;

- time delay of injury to admission
- time delay until seen by a burns consultant after admission
- time from admission to first surgery
- time from injury until 90% healed
- percentage body weight loss over stay
- delay of discharge >3 days

217. The quality indicators that can be used as limited indicators of clinical outcome include;

- survival and length of stay for each age/injury complexity group
- time until return to work or full activity
- need for secondary surgery or readmission

218. Each burn service may wish to incorporate the burn injury minimum data set within BIBID into the burn service in a number of ways. They can;

- use the software provided free by the BBA as a stand alone application
- incorporate the data set into any existing hospital system under a BBA licence
- use commercial software that has already incorporated the data set under licence from the BBA

219. Similar licensing arrangements are used by ICNARC and involve minimal cost to the purchaser but ensure incorporation of the entire, updated data set and reporting requirements.

Estimate of Current Burn Care Workload

220. In order to estimate the impact of implementing the recommendations in this Report an overview of the burn injury workload is needed. Although burn injury Care Pathways are not yet developed, the use of NHS HES and burn unit data as outlined above has allowed estimates to be made. These estimates are not sufficient for service planning but are intended to give an indication of the scale of the issue.

221. Methods by which data sufficiently robust and clinically detailed can be collected is covered elsewhere in this document.

222. As also pointed out earlier, there are no reliable data about the national intensive care burn workload, either paediatric or adult.

223. The British Isles estimates of workload for 1998/99 are based purely on the simplistic variables of age, TBSA and average length of stay. These have been grouped in the following table where a non-PSU is a hospital with no Plastic Surgery Unit (PSU) on site. A Burns and Plastic Surgery Unit site is one with a self-designated Burn Unit. The workload is then broken down into the type of admission that might be expected to be admitted to a Burn Facility (BF), Unit (BU) or Centre (BC). Where classification was unclear, cases were placed in an intermediate BU/BC group.

CHILDREN	non-PSU	PSU	Burn and Plastic Surgery Units				<16yrs
Burn Ward	BF	BF	BF	BU	BU/BC	BC	Grand Total
England	1432	1528	1310	538	237	126	5171
Ireland	N/A	N/A	60	26	18	9	113
Scotland	399	127	221	128	48	19	942
Wales	43	0	161	47	11	3	265
Grand Total	1874	1655	1752	739	314	157	6491

ADULT	non-PSU	PSU	Burn and Plastic Surgery Units				>16yrs
Burn Ward	BF	BF	BF	BU	BU/BC	BC	Grand Total
England	3213	2086	1515	460	302	223	7799
Ireland	N/A	N/A	118	40	38	18	214
Scotland	721	216	199	75	40	33	1284
Wales	165	0	220	42	23	16	466
Grand Total	4099	2302	2052	617	403	290	9763

224. This breakdown can be further expanded to show the workload as new admitted cases by country and NHS health region.

CHILDREN	non-PSU	PSU	Burn and Plastic Surgery Units				<16yrs
Burn Ward	BF	BF	BF	BU	BU/BC	BC	Grand Total
Scotland	399	127	221	128	48	19	942
North East	166	118	96	35	11	3	429
North Yorkshire	131	171	9	10	26	19	366
North West	207	420	476	114	35	23	1275
Trent	153	296	254	44	23	9	779
West Midlands	154	95	76	48	42	19	434
South West	163	79	92	61	33	10	438
Wales	43	0	161	47	11	3	265
South East	237	95	47	52	10	8	449
Eastern	74	162	168	92	31	9	536
London	147	92	92	82	26	26	465
N.Ireland	N/A	N/A	11	0	8	2	21
Ireland	N/A	N/A	49	26	10	7	92
Grand Total	1874	1655	1752	739	314	157	6491

ADULT	non-PSU	PSU	Burns and Plastic Surgery Unit				>16yrs
Burn Ward	BF	BF	BF	BU	BU/BC	BC	Grand Total
Scotland	721	216	199	75	40	33	1284
North East	240	169	86	27	21	10	553
North Yorkshire	304	277	16	15	21	18	651
North West	680	342	384	79	58	38	1581
Trent	301	446	277	41	24	21	1110
West Midlands	380	121	80	42	37	27	687
South West	398	195	231	72	29	25	950
Wales	165	0	220	42	23	16	466
South East	431	255	78	41	31	25	861
Eastern	116	141	223	70	35	16	601
London	363	140	140	73	46	43	805
N.Ireland	N/A	N/A	46	0	14	4	64
Ireland	N/A	N/A	72	40	24	14	150
Grand Total	4099	2302	2052	617	403	290	9763

This map shows each country and health region plus all the plastic surgery units.

225. The movement of this workload into the configuration proposed by the NBCRC would give a breakdown by health region as follows.

CHILDREN				
Burn Ward	BF	BU	BU/BC	BC
Scotland	747	128	48	19
North East	380	35	11	3
North Yorkshire	311	10	26	19
North West	1103	114	35	23
Trent	703	44	23	9
West Midlands	325	48	42	19
South West	334	61	33	10
Wales	204	47	11	3
South East	379	52	10	8
Eastern	404	92	31	9
London	331	82	26	26
N.Ireland	N/A	N/A	8	2
Ireland	N/A	26	10	7
Grand Total	5281	739	314	157

ADULT				
Burn Ward	BF	BU	BU/BC	BC
Scotland	1136	75	40	33
North East	495	27	21	10
North Yorkshire	597	15	21	18
North West	1406	79	58	38
Trent	1024	41	24	21
West Midlands	581	42	37	27
South West	824	72	29	25
Wales	385	42	23	16
South East	764	41	31	25
Eastern	480	70	35	16
London	643	73	46	43
N.Ireland	N/A	N/A	14	4
Ireland	N/A	40	24	14
Grand Total	8453	617	403	290

226. This data emphasises the need to consider burn care provision being organised across health region and national boundaries. The workload in some areas of the country is simply too small to sustain the necessary staff skills and experience if a full range of services in each health region were retained and developed.

227. Such analysis also indicates the need for more detailed data on which to base any final network of provision. This will be provided by the National Burn Injury Database.

Chapter 10: Implementation

228. The NBCRC recognises that with decades of ad hoc service development, the recommendations in this Review Report cannot be fully implemented in a short period of time. It will be necessary for NHS Trusts, District Health Authorities (DHAs), Primary Care Groups and Trusts (PCGs and PCTs) and Regional Health Authorities, including the Regional Specialised Commissioning Groups (RSCGs), to adopt a sober approach to implementation. It must be recognised that over-rapid alteration could destabilise services. This has been seen during the implementation of the *Framework for the Future* [14] and the *Cleft Lip & Palate* recommendations [84]. The effects of the PICU Report implementation have been particularly destabilising for a number of burn services around the country. Having attempted to learn from these, and other, national implementations, the NBCRC wish to **recommend** the following process of implementation.

Overview

229. In the first instance the number of parallel processes underway in the NHS must be recognised. These include;

- The *A&E modernisation* plan [34]
- Implementation of the adult *Comprehensive Critical Care* report [13]
- Continued implementation of the *Framework for the Future* report on paediatric intensive care [14]
- Proposals for the organisation of care and rehabilitation of the severely injured [27]
- Proposals for improved provision of rehabilitation services [58]

Great efforts have been made by the NBCRC to understand and accommodate the findings and recommendations in these and other relevant reports.

230. Implementation of the recommendations in this Report depend on several processes commencing.

- Creation of the National Burn Bed Bureau (NBBB)
- Development of a National Major Burn Incident Response
- Creation of the National Burn Injury Database (NBID)
- Support for Modelling of Burn Service Provision
- Initiation of Burn Service Accreditation and Validation
- Start of Regional Specialised Commissioning of Burn Care Services
- Further development of burn injury coding [81], the cost of burn care and Health Resource Groupings (HRG)
- The undertaking of NHS funded research into:
  - The creation of a validated nurse and therapist dependency scoring method
  - The development of burn injury quality of care and outcome measures
  - The development of care pathways and packages of care for burn injury

Regional Specialised Commissioning of the Burns Services

231. The process of commissioning of burn care as a specialised service is underway. In completing and implementing this work there are risks of destabilising existing burns and plastic surgery services [85]. This is made more likely by the inaccuracy of the current HRG costing database [86;87], which fails to reflect the real cost of caring for burn injury. Using the database in the service costing phase poses a risk of burn services being seriously under funded.

232. The Chairman of the NBCRC has been involved in the Service Definition process and has used the framework of the Review to help develop the draft Service Definition document (Appendix 5).

233. The undertaking that the Commissioning process will undergo annual review is welcomed. It is the hope of the NBCRC that the implementation of the recommendations of this Review Report will empower each of the Department of Health leads plus the relevant committees of the involved PCTs, PCGs, DHAs and Regional Health Authorities to make informed decisions, and along with the providers of burn care, to develop a sustainable, equitable, high quality and seamless service [65-67].

Development of burn injury coding

234. Recording and monitoring of burn injury incidence and workload is hampered by the limitations of the current clinical coding systems used in the NHS. Both ICD-10 and OPCS-4 have severe limitations on their ability to adequately define any burn injury, particularly a complex burn, or to describe the surgery required. As a consequence, the HRG groupings developed for burn injury are similarly limited in their reliability.

235. Some improvement in the completeness of Hospital Episode Statistics (HES) coded information can be expected when data collected under revised coding rules works through the system [79]. The requirement, introduced in April 1999, that all admissions to hospital with a primary diagnosis of burn injury should have a burn surface area code (T31-32) attached to the record should improve the analysis of injury severity using HES data. It should also increase the proportion of admissions for which the relevant HRG can be attached. However these improvements do not correct the fundamental inadequacy of the ICD and OPCS systems as far a burn injury, and plastic surgery, are concerned

236. A promising but limited improvement has been seen in the draft copies of the Clinical Terms project [51;80]. It is hoped by the NBCRC that further development and refinement of the coding of burns will be seen with the amalgamation of Clinical Terms and SNOMED [81] and it is **recommended** by the NBCRC that this be guided by appropriate clinical involvement from the BBA.

Health Resource Groups and cost of care

237. In the short term there is great need for refinement of the HRGs for burn injury to reflect the recommendations of this Report and the creation of a similar group to the Intensive Care National Working Group on Costing [13]. It is **recommended** that this should be initiated by the NHS Information Authority who have in the past worked closely with the BBA. The need to update the HRG structure and correct the current information in the HRG costing database is imperative if specialised commissioning is to be soundly based [51;88].

Service Designation, Accreditation and Validation

238. During the implementation period of this Review Report, and in preparation for regional specialised commissioning, regional authorities will find it necessary to designate hospitals suitable to provide Burn Centre, Unit and Facility services for their population. It is

recommended by the NBCRC that a process of accreditation be created by the BBA and agreed with other stakeholders represented on the NBCRC, to formally assess the nominated sites as to their suitability for such designation [89;90] and develop burn service benchmarking [91]. The process for accreditation should be in place within two years of the publication of this Report and be able to respond to the requests of designating bodies (PCTs, RSCGs etc.). It is suggested the process of validation be repeated in a 3 year cycle to ensure the attainment and maintenance of the standards set out in this Report [92].

National Burn Bed Bureau

239. One of the first most readily achievable recommendations is the creation of the NBBB. With the limited number of hospitals involved, it is felt one of the four designated Intensive Care Bed Bureaux could readily act as the NBBB to offer 24 hour information. Transfer of information achieved rapidly via fax or NHSnet email will allow the NBBB to accurately inform A&E Departments requesting information about bed availability. Much of the information transmission and reception could be semi-automated.

240. The NBBB would also provide invaluable information in the event of a major incident involving large numbers of burn injuries either civilian or military, paediatric or adult.

National Major Burn Incident Response

241. At present there are no nationally agreed plans for the management of a major incident involving a large number of burn injuries. This is true whether the injuries are from a civilian or military source, paediatric or adult [93;94]. Incidents in the past have been managed in an ad hoc fashion and the lessons learned not subsequently applied [93]. There is no formal arrangement between burn units in the current network for the dissemination of information about an incident, nor a method of alerting them to a developing situation. As already noted, there is no means of recording accurately the number and site of available burn beds nor a means of allocating and distributing casualties.

242. From information gathered during this Review [95], it is likely that the entire burn care network would be filled to capacity by an incident generating 20 severe adult burns, and half that figure if the casualties were severely injured children [7]. This is not just due to the shortage of suitably equipped beds but the shortage of experienced nursing staff and the immense amount of resource needed to adequately care for a single major injury over many weeks.

243. Although each hospital has a major incident plan, if a burn service is on site it must be recognised that the burn service can become involved in a major incident many miles away, even in another country. The hospital in question must have protocols for dealing with this. Currently very few do. It is also noteworthy that most major incident plans make no allowance for the possibility that a major incident may predominantly involve child casualties, be they burn injuries or not [94].

244. Planners considering the evacuation of military casualties with burn injuries back to the UK need to appreciate the very limited capacity of the UK network for dealing with significant numbers of major injuries if such casualties are to receive optimal care. Recent plans produced by the Ministry of Defence (MoD) clearly did not take this fact into account [96;97].

245. The NBCRC **recommend** that work be commissioned to advise the NHS, MOD and the burn care network on how to best plan for any major incident involving burn injuries.

National Burn Injury Database (NBID)

246. It is part of the professional responsibilities of all clinical staff to participate in audit. This responsibility has been emphasised in numerous publications, most notably in publications from the General Medical Council [98] the NHS documents *A First Class Service* [66] and *Information for Health* [51]. The information needs for audit and service review have been further detailed in Reports from the Royal College of Surgeons of England [27;69] the Department of Health [62;65;67;82], the Royal College of Anaesthetists [48] and others [99;100].

247. The NBCRC recognises that there are also a number of facets of the national burn care network that require monitoring. These include the monitoring of burn injury incidence and causation, the monitoring of outcomes and quality of care, and the monitoring of service workload to ensure there is maintenance of expertise. As discussed elsewhere in this Report, there are significant problems in quantifying many of these variables. However the need for this monitoring is undeniable and the methods can and must be developed.

Health Episode Statistics (HES)

248. National data about all admissions is available from NHS information systems. Data for service analysis has in the past come from the HES [77]. However HES data relies on ICD coding to identify patient groups and subgroups. The limitations of the coding systems have already been mentioned, but the data is reliable in identifying many features of burn injuries admitted to hospital and as such is a valuable data source.

249. Reasonable identification of the 'at risk' populations and information such as bed days, admitting specialty and number of operative procedures have been analysed. Previous analyses have demonstrated the variation of standardised admission rates between regions and district health authorities [36;101]. Such work has also defined a method for modelling different arrangements of Burn Centres, Units and Facilities to assess the effects on access to the services by the 'at risk' population.

250. It is **recommended** that NHS data held within the NHS information systems of England, Wales, Scotland and Northern Ireland, pertaining to burn injury admissions be made available for analysis.

British Isles Burn Injury Database (BIBID)

251. Recognising the shortcomings of current coding systems and in order to fulfil the necessary audit and information requirements, the BBA has created a specialised database for the collection of burn injury data. The British Isles Burn Injury Database (BIBID) has been designed to allow the collection of data about patient demographics, injury causation and the clinical progress of each individual being seen with a burn injury. The variables that can be recorded match those in the National Burn Injury Referral Guidelines.

252. The NBCRC has reviewed the design of BIBID and have identified a number of variables that it **recommends** as indicators of the quality of care. It is recognised that many of these are indicators of process rather than true clinical outcome, but it is similarly recognised that there is no current, validated method of adequately describing burn injury clinical outcomes that could be incorporated into BIBID or any other system.

253. The ways in which burn services can make use of the BIBID design are clarified in Chapter 9. It is **recommended** by the NBCRC that all hospitals providing burn care for more than 25 in-patients per year should participate in data collection using the BIBID. These hospitals will be required to submit their data on at least an annual basis to a central point for processing and report generation. After a two year period, sufficient data will be available to give a clear overview of the temporal and geographical distribution of burn injuries of sufficient severity to require referral from A&E Departments.

254. The data from this database can be combined with that available from the NHS HES to give a combined overview of burn injury care provision in the UK. This unique and powerful

combination of data sources will form the NBID which will be the first comprehensive burn injury data source globally.

Monitoring and Modelling of Service Provision

255. With better information from the NHS HES, BIBID and thus the NBID, strategies for service development and re-organisation can be generated, based on objective information, currently unavailable. The combined data from the BIBID and NHS HES will for the first time map the national need for burn care services. The severity of injury will be known as will the clinical course and outcome. National audit of this clinical group will be possible for the first time.

256. As the majority of burn injuries happen at, or close to, the home the residence postcode in the HES data set will allow the site of the majority of injuries to be identified. With this identification of the 'at risk' population, and the generation of a map reference from the site of injury postcode GIS software [36] can be used to then map the areas of high and low injury incidence for any age or injury severity group.

257. From such analysis the distance or ease of access to existing services can be calculated and the data can be used to model the effect of any planned service alteration. This form of analysis would of course be combined with a non-financial option appraisal of existing and proposed services. The NBCRC **recommend** the use, as a template, of the method developed and employed by the Expert Advisory Group when considering the re-siting of the Mount Vernon Burns and Plastic Surgery Unit in north London (Appendix 6).

Research and Development

258. There are fundamental gaps in the evidence base of burn injury care. Although enormous improvements have been seen in the survival of major injuries in children and adults, this has not been the case for the elderly [102]. In burn survival terms there has been no reported improvement for those over the age of 60 for the last 20 years. The clinical advances that have occurred have generally not been the subject of a randomised control trial (RCT). Almost invariably they have been reports from a single unit making an alteration to their usual practice and observing for change over time.

259. A review of the evidence base [103] showed that of the 57 burn care related RCTs found in the literature, 62% were trials of various dressings. The other clinical RCTs were almost all about some aspect of acute care, rarely measuring outcomes other than survival or length of stay in hospital. A report from the European Burn Research Registry [104] from 1997 also showed that the research underway at the time was predominantly concerned with acute injury care and the basic science of wound healing.

260. There is no published work on the effect of differing service organisation models on burn care. Similarly there are no national organisational documents or reports available from any western country.

261. In order to develop a meaningful evidence base for burn injury it is clear that some of the basic tools are missing. There are no objective, validated methods of defining skin burn depth, degree of airway injury (from smoke or vapour), or accurate extent of skin area injured by a burn. These clinical tools, necessary for acute injury assessment are matched by an absence of a tool to measure the dependency of an individual with regard to nurse, therapist and medical intervention and the absence of tools to quantify the outcome, from a patient's perspective, following care.

262. It is the **recommendation** of the NBCRC that research be commissioned into the questions of nurse and therapist dependency scoring and the development of burn injury outcome measures. From this research it is expected that a more complete set of quality indicators can be described than those already defined within Chapter 9. These can subsequently be used as part of the service monitoring package.

Prevention

263. The basis of any injury prevention programme is information, to first understand the incidence and cause of the target injury and who is most at risk, and then to monitor the incidence of the problem as the programme is applied to the target population. Validation of a given prevention technique, be it information leaflets, advertising, altered equipment design or legislation, can only come from such information gathering. The best design allows comparison of the injury incidence between the target population and a control population that has not been exposed to the prevention method.

264. In the global literature, there are a tiny number of such studies relating to burn injury [30;105-107]. From these studies no clear methods for effective burn prevention emerge but there are indications of what does not work. It is clear however that the costs of burn injury to society are huge [108].

265. In the UK several government agencies and charities have an interest in burn injury prevention. Each of them have specific prevention agenda based on the age of the injured, injury causation, safety of devices etc. There is little evidence of 'joined up thinking' in burn injury prevention [109] however. Each year considerable sums of money are spent by these organisations based on questionable data or no data at all. None of them have sufficient data collection methods in place to inform whether the expenditure has resulted in any benefit.

266. The only group with an overview of the whole burn injury problem, for all injury causes, all age groups and for the entire British Isles is the BBA. For this the reason the development of the information systems outlined in this report will in time allow the BBA to inform the creation of monitored prevention programmes to identify those prevention methods that work and help stop wasting money on those that do not.

Dependency Model

267. As a matter of some urgency, research should be commissioned to produce a validated nurse and therapist dependency scoring system relevant to burn injury. The NBCRC endorses the recommendations in *Comprehensive Critical Care* [13] which suggests that staffing numbers should not be calculated by fixed staff to bed ratios dictated by the designation of the bed as HDU, ICU etc, rather the patient dependency is reason enough to dictate staffing levels.

268. It is obviously desirable that the needs of the patient dictate the number and skill level of the staff on the ward. However some means of assessing the dependency of patients is needed for such a system to work. No validated system exists for use in burn injury. Unfortunately systems designed for standard critical care, such as the System Of Patient Related Activity (SOPRA), do not directly reflect the dependency of patients with burn injury. Any system used must cover all aspects of burn nursing throughout a patients in-patient stay. These aspects include dependency brought about by; the need for physiological monitoring, wound dressings, other procedures, the degree of immobilisation of the patient and the psychological support needed by both the patient and their relatives. Such a system must also reflect the changing dependency of the patient, which in burn care can be very rapid, often altering profoundly from day to day or nursing shift to shift.

269. The number and type of physical therapy staff needed to care for a patient with burns similarly changes a great deal during the course of their recovery. There is a clear need for a dependency scoring system to quantify physical therapy input [26;70] and for assessing the psychological needs of each patient [23;56].

Burn Injury Outcome Measures

270. When considering burns, only the length of hospital stay and survival are available as clinical outcome measures from NHS data sources. There are few process outcome measures either, although some can be inferred such as; was the individual admitted under the care of a burns and plastic surgeon etc?

271. There is a clear need for the development of patient centred clinical outcome measures. These outcome measures must be validated and describe the functional, aesthetic and psychological outcomes following burn injury of all levels of severity. Without them, monitoring of the effects of organisational change is incomplete and research into more successful interventions is jeopardised if survival is the only measure. The quality of the life saved is central to the question.

272. Within the design of BIBID there are measures of the process of care that will act as proxies for quality of clinical outcome until such time as clinical outcome measures have been developed and validated. They can then be incorporated into the BIBID.

Burn Injury Care Pathways

273. To appreciate the impact of the proposed model of care on the NHS, the translation of the national burn care workload into a small number of clinically meaningful pathways would be valuable. The ideal would be for the geographical distribution of this workload, based on accurate data and translated into the pathways, to be available.

274. This was one of the laudable goals of the HRG project [51]. Unfortunately this has proved impossible as the complex interaction of the key clinical variables cannot be recorded or reflected by coding systems currently in use. This difficulty is detailed in Chapter 9. To correct this within NHS information systems cannot be achieved by modernisation of the ICD and OPCS coding systems but by the further development of the Clinical Terms Project and the amalgamation of it with the North American SNOMED coding system [81]. However this will only be of long term value if there is sufficient clinical input to the creation of the codes describing burn injury and care.

275. Alternatively the development of meaningful burn care pathways can be achieved using clinical data collected in a uniform manner across the British Isles.

276. The NBCRC **recommend** the commissioning of work to help refine the NHS coding system and develop the BIBID so both data sources can be utilised to create Burn Injury Care Pathways. The potential value of having both sources of data are outlined in the section on the National Burn Injury Database.

Future Role for the NBCR Committee

277. The recommendations that have been made, and the timetable outlined above, places the responsibility for implementation on a number of NHS departments and the BBA. In reality the success of such implementation lies in the collaborative involvement and agreement of many professional bodies, the majority of which are represented on the NBCRC.

278. Each Department of Health should nominate a lead by September 2001, to represent them and their burn services on the NBCRC.

279. The NBCRC **recommend** therefore that the process continues to be monitored and co-ordinated by the NBCRC until such time as the measures detailed in this Report are in place. This is achievable before April 2008.

Timetable for change

Timescale	Target	*Joint responsibility with:
Immediate	develop a PICU / burns interim strategy	DH, RSCGs
	refine the HRG definitions using ICD-10 / OPCS-4	IA
	contribute to the SNOMED CT project	IA
	access and analyse detailed HES data	BBA, DH
2001 April	introduce National Referral Guidelines	BBA, RC
	create the National Burn Bed Bureau	DH, RSCGs
	commence data collection with the BIBID	Trusts, BAPS
	commence defining the service accreditation process	BBA
	define R&D agenda for Burn Services:	DH, RSCGs, BBA
	prevention	
	dependency measurement	
	care pathways	
	outcome measurement	
	commence the creation of a national burns Major Incident Plan	BBA, DH, MoD
2001 September	complete the service definition and costing for Regional Specialised Commissioning	RSCGs, BBA
	nominate single national leads for burn injury care in each DH	DH
2001 December	designation by RSCGs of Burn Centres, Units and Facilities	RSCGs, BBA
	commission the R&D agenda	DH, RSCGs, BBA
2002 April	commence Regional Specialised Commissioning of burn care services	DH, RSCGs
2003 April	analyse the NBID using combined HES and BIBID data (NBID)	BBA
	review burn service designation using the analysis from the NBID	RSCGs
	review service staffing using Care Pathways and Dependency data	RSCGs
	commence formal accreditation of designated services	BBA, BAPS

* The responsibility for ensuring these developments happen is that of the burn care community, working with employers and purchasers to provide the level of care they wish to see and can be proud of. Specific tasks will require the direct support of:

BBA	British Burn Association
IA	NHS Information Authority
DH	Department of Health
RSCG	Regional Specialised Commissioning Groups
BAPS	British Association of Plastic Surgeons
MoD	Ministry of Defence
RC	Royal Colleges, Faculties, Specialist Societies and Association

Appendix 1: NBCR Committee membership and acknowledgements

The National Burn Care Review Committee

Ken Dunn	(Chairman)	Consultant Burns and Plastic Surgeon, Manchester British Burn Association
Peg Belson		Paediatric Patient Representative Action for Sick Children
Jenny Collings		Clinical Specialist Physiotherapist in Burns, Salisbury Chartered Society of Physiotherapy and Rehabilitation Professions Allied to Medicine
Paul Cussons		Consultant Burns and Plastic Surgeon, Northwood British Association of Plastic Surgeons
Bill Dickson		Consultant Burns and Plastic Surgeon, Swansea Royal College of Surgeons of England (Trauma Committee)
Anne Fowler		Burns Clinical Nurse Specialist, Northwood Royal College of Nursing
Michael Marsh		Consultant Paediatric Intensivist, Southampton Paediatric Intensive Care Society
Michael McCabe		Consultant of A&E Medicine, Swansea British Association for Accident and Emergency Medicine
Peter Nightingale		Consultant in Anaesthesia and Intensive Care, Manchester Intensive Care Society
James Partridge		Adult Patient Representative Executive Director, Changing Faces
Michael Place		Health Economist York Health Economics Consortium
Joan Robson		Consultant in Paediatric A&E Medicine, Liverpool Royal College of Paediatrics and Child Health
Michael Steyn		Consultant Burns Anaesthetist, Chelmsford Association of Burns and Reconstructive Anaesthetists (ABRA) on behalf of the Royal College of Anaesthetists and the Association of Anaesthetists of Great Britain and Ireland

Observers

Valerie Day (Sept'98-Jan'00)	Senior Medical Officer Department of Health of England
Mike McGovern (Jan'00-Feb'01)	Senior Medical Officer Department of Health of England
Geoffrey Carroll	Regional Specialised Commissioning Group (Eastern Region)
Leigh Griffin	Regional Specialised Commissioning Group (NorthWest Region)

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Douglas Murray	Consultant Plastic Surgeon, Stourbridge
Rory O'Conor	Consultant Clinical Epidemiologist, Dewsbury
Judith O'Shaughnessy	Head Occupational Therapist, Wakefield
Judith Palmer	Head Occupational Therapist, Plymouth
Alan Phipps	Consultant Burns and Plastic Surgeon, Wakefield
Alison Roe	Specialist Physiotherapist in Burns, Manchester
Pat Ryan	Burns Charge Nurse, East Grinstead
Nicola Rumsey	Health Psychologist, University of the West of England, Bristol
Chris Walker	Consultant Burns and Plastic Surgeon, Chelmsford
Stuart B Watson	Consultant Burns and Plastic Surgeon, Glasgow

Standards and Strategy for Burn Care was complied on behalf of the NBCR Committee by Ken Dunn.

Appendix 2: National Burn Injury Referral Guidelines

It has been traditional to use the size of skin injury following a burn injury as the single criterion to guide referral. This approach has often been criticised as overly simplistic. Consideration of other important factors has proved difficult as quantification of these is unclear or impossible.

It has been recognised that practical clarification is needed and the British Burn Association by way of the Committee of the National Burn Care Review wish to propose the following guidance. Such guidance is not to be viewed as rigid instruction but used to help highlight some of the important features of burn injury that are known to predict a complex clinical course. It is proposed that burn injuries be referred to appropriate burn care hospitals based on the injury complexity for assessment and management.

COMPLEX A burn injury is more likely to be complex if associated with the following criteria:

Age	under 5yrs or over 60yrs
Site involvement *(with dermal or full thickness loss)*	face or hands or perineum or feet or any flexure particularly the neck or axilla or any circumferential dermal or full thickness burn of the limbs, torso or neck
Inhalation injury	any significant such injury, excluding pure carbon monoxide poisoning
Mechanism of injury	chemical injury (>5% TBSA) exposure to ionizing radiation injury high pressure steam injury high tension electrical injury hydrofluoric acid injury (>1% TBSA) suspicion of non-accidental burn injury; adult or paediatric

A **complex** burn injury is also suggested by one involving:

Size of skin injury *(with dermal or full thickness loss)*	paediatric (under 16yrs old) >5% TBSA or adult (16yrs or over) >10% TBSA

A burn injury may also be deemed **complex** if it occurs alongside:

Existing conditions eg	cardiac limitation &/or MI within 5yrs respiratory limitation of exercise diabetes pregnancy immuno-suppression for any reason hepatic impairment; cirrhosis
Associated injuries	crush injuries fractures head injury penetrating injuries

Associated injuries, such as those listed, complicate any burn injury and may make it complex. However the range of presenting problems must be carefully considered and the most compelling injury dealt with first, according to clinical need. This may, in some circumstances, delay any referral for the burn injury to be dealt with. In such instances advice as regards burn management should always be sought.

A **complex non-burn** would include:

Inhalation injury	any significant such injury with no cutaneous burn, excluding pure carbon monoxide poisoning
Vesicullobullous disorders eg	any over 5% TBSA epidermolysis bullosa staphylococcal scalded skin syndrome (Ritter's) Stevens-Johnson syndrome toxic epidermal necrolysis (Lyell's)

*All injuries deemed to be **complex** need referral to the local Burn Centre or Burn Unit.*

The criteria listed above put the patient at risk of a complex injury. While some are absolute others such as age <5 or >60 years, co-existing medical problems, associated head injury, fractures, burns to the face, hand feet are open to interpretation if the burn is not more than 5% TBSA and has no area of deep burn. Under these circumstances the burn may be treated locally in an A&E Department provided it is reviewed within 24 hours by an experienced A&E clinician, and referred to the burns service if there is doubt about the extent or severity of the injury. A&E Departments are advised to discuss these type of cases with their local burns service on initial presentation, if there is any uncertainty about the nature, severity or the significance of each of the criteria.

NON-COMPLEX All burn injuries felt not to be complex may be referred for assessment and admission according to the skin surface area involved.

Size of skin injury	paediatric (under 16yrs old) 2% to 5% TBSA if dermal or any smaller injury if full thickness loss. adult (16yrs or over) 5% to 10% TBSA if dermal or any smaller injury if full thickness loss.

*All **non-complex** injuries referrals should be made to a local Plastic Surgery Unit (Burn Facility).*

Other injuries, not meeting the criteria laid out above, are often suitable for care in an A&E Department or in the community.

NON-ACUTE REFERRALS Injuries that may require referral from A&E, GP, Practice Nurse or District Nurse in the post acute phase include:

Wound healing	any wound unhealed at 14 days post injury
Complications	any significant infection, septic episode or suggestion of a Toxic Shock-like illness
Rehabilitation	Any healed wound where the scarring suggests there will be: a significant aesthetic impact &/or psychological disturbance the need to consider skin camouflage a significant functional limitation the need to consider pressure therapy or other forms of scar modification the need to consider surgical reconstruction

In the opinion of the National Burn Care Review Committee and the British Burn Association, there is no justification for injuries requiring hospital admission to be dealt with outside this system.

British Burn Association
published date: February, 2001 *review date: 1st March, 2003*

Appendix 3: Nursing Levels for Monitoring Patients with Burn Injury

These guidelines relate only to staffing for patient monitoring. Procedures such as dressings may require far higher nurse to patient ratios for variable parts of a day. There is no direct correlation between these descriptions and the type of burn service the patient will be accommodated by.

ref[13]		ref[14]				
CCC Level	Ratio trained staff/patient	PICS Level	Ratio trained staff/patient	Burn Level	Ratio trained staff/patient	
0	Not defined	**0**	Not defined	**B1**	0.25 to 1	**Surgical ward**
1	Not defined			Standard level monitoring *~ recovering and pre-discharge burn cases*		
2	Not defined	**1**	0.5 to 1	**B2**	0.5 to 1	**High dependency**
				Close monitoring and observation but not requiring assistance from 'life support' machines. Examples include the recently extubated patient; the patient undergoing close observation with ECG pulse oximetry, receiving IV fluids or TPN. *~ routine non-complex injury but needing fluid resuscitation* *~ immediate recovery from minor / moderate surgery*		
3	Not defined	**2**	1 to 1	**B3**	1 to 1	**Intensive care**
				The patient requiring continuous observations who is usually intubated and ventilated. Also the unstable patient, for example some cases of upper airway obstruction requiring nebulised medication. The recently extubated patient. In addition the dependency of B2 patients increases to B3 if the patient is nursed in a cubicle. *~ facial burns and/or suspected inhalation* *~ acute complex injury with moderate TBSA, needing fluid resuscitation* *~ immediate recovery from major surgery*		
3	Not defined	**3**	1.5 to 1	**B4**	1.5 to 1	**Additional Intensive care**
				The patient requiring intensive supervision at all times, who needs additional complex therapeutic procedures and nursing. For example, the unstable ventilated patient on vasoactive drugs and inotropic support or with multiple organ failure. In addition the dependency of B3 patients increases to B4 if the patient is nursed in a cubicle. *~ complex resuscitation case in post acute phase +/- ventilation*		
3	Not defined	**4**	2 to 1	**B5**	2 to 1	**Complex Intensive care**
				Patients requiring the most intensive interventions, such as unstable or B4 patients managed in a cubicle, and patients undergoing renal replacement therapy. *~ acute complex injury with large TBSA, needing resuscitation +/- ventilation* *~ extra corporeal circulation to control hyperpyrexia*		

Appendix 4: Paediatric Severe Burn Care Provision

This table details the sites accepting major paediatric injuries prior to 1997 (+ signs indicate higher numbers of admissions). It then details the current provision of services on those sites, felt to be essential for the care of children generally and those essential for the care of children with severely burn injuries.

Burn and Plastic Surgery Units and PICUs	Accepting major paediatric burns prior to 1997?	Current Provision, 2000					
		Designated Burn Unit	Consultant Burn Surgeon 24hr on call?	Paediatrics on same site 24 hr?	Lead PICU on the same site?	Burns & PICU provided on same site?	Experienced burns team on site 24hr?
Manchester Children's	Y++	Y	Y	Y	Y	Y	Y
Chelmsford (St Andrew's)	Y++	Y	Y			Y to Level 2	Y
Birmingham Selly Oak	Y++	Y					Y
Leicester	Y			Y	Y	Y	
Liverpool (Alder Hey)	Y			Y	Y	Y	
Edinburgh Children's	Y			Y	Y	Y	Y
Glasgow Children's	Y++			Y	Y	Y	
Newcastle Children's	Y	?		Y	Y	Y	Y
Dublin Children's	Y			Y	Y	Y	Y
Belfast Children's	Y			Y	Y	Y	
Bristol (Frenchay)	Y			Y		Y to Level 2	Y
Nottingham	Y			Y	Y		
Sheffield	Y			Y	Y		
Wakefield	Y+	Y		Y			Y
Aberdeen Children's	Y			Y			
Aylesbury	Y			Y			Y
Salisbury	Y	Y		Y			Y
Plymouth	Y			Y			
East Grinstead	Y	Y					Y
Swansea	Y	Y					Y
Chelsea & Westminster	Y+	Y		Y			Y
Mount Vernon	Y	Y					Y
Cork		?		Y			Y
Birmingham Children's				Y	Y		
Bristol Children's				Y	Y		
Cambridge				Y	Y		
Leeds				Y	Y		
Lond Guy's				Y	Y		
Stoke-on-Trent				Y	Y		
London St. George's				Y	Y		
London Sick Child (GOS)				Y	Y		

The following table details some of the current arrangements in place, and some of the requirements placed on these services.

Burn and Plastic Surgery Units and PICUs	Accepting major paediatric burns prior to 1997?	Comments in January 2001 re major paediatric burns
Manchester Children's	Y++	3 surgeons (closed to majors 13/12/00)
Chelmsford (St Andrew's)	Y++	4 surgeons, export level 3 to GOS (no burn unit)
Birmingham Selly Oak	Y++	3 surgeons, was exporting to Manchester or Bristol (closed to majors 1/4/99)
Leicester	Y	no formal paed Burn Unit or regular experience of major injury
Liverpool Children's	Y	one surgeon, no on-call burn staff
Edinburgh Children's	Y	one surgeon
Glasgow Children's	Y+	one paed general/burn surgeon
Newcastle Children's	Y	one surgeon
Dublin Children's	Y	one surgeon
Belfast Children's	Y	no current burn surgeon
Bristol (Frenchay)	Y	one surgeon, exporting level 3 to central Bristol (no burn unit)
Nottingham	Y	always exported to PICU hospital with no burn unit
Sheffield	Y	always exported to PICU hospital with no burn unit
Wakefield	Y+	arrangements with Leeds PICU (no burn unit) for level 2 and 3
Aberdeen Children's	Y	exporting
Aylesbury	Y	exporting
Salisbury	Y	exporting to general adult ICU
Plymouth	Y	exporting to Frenchay
East Grinstead	Y	export level 3 to Guy's / King's (no burn unit)
Swansea	Y	nearest PICU is Cardiff
Chelsea & Westminster	Y	exporting to Brompton (no burn unit)
Mount Vernon	Y	exporting to Chelsmford
Cork		?
Birmingham Children's		new burn unit build, open 2002?
Bristol Children's		taking level 3 from Frenchay, no burn unit or staff
Cambridge		no major burns
Leeds		no major burns
Lond Guy's		no burn unit or staff
Stoke-on-Trent		no major burns
London St.George's		one surgeon, taking some S.London major paed burns, no burn unit, have some burn staff
London Sick Child (GOS)		taking all N. London level 3, no burn unit or staff

Appendix 5: Definition of Specialised Burn Services

Draft document, 21st January 2001.

1. General Definition of the Service

The factors which define a burn injury that requires a specialised service are included in the National Burn Injury Referral Guidelines (Appendix 2). In general terms the definition is based on; the size of the injury, the depth of skin injury, the anatomical site and the presence of co-existing conditions. The care for such patients may be provided on an in-patient or out-patient basis depending on progression and recovery. The element of care most required by the individual may be surgical but may as likely be nursing or physical therapy. In some cases the major need is for specialised psychological or social worker involvement. With a complex injury the whole burn team are involved throughout the acute care period and with reintegration into society, continuing care and rehabilitation. This latter period may continue with the same team for some years, especially for children, and involve multiple outpatient interventions and several admission to hospital for reconstructive surgery.

The current definition of specialised burn care must therefore include all injuries referred to burn services based on the National Burn Injury Referral Guidelines, and include the whole process of care from injury to final discharge.

2. Rationale for the service being on the specialised commissioning list

The current clinical coding systems have no clear link to the National Burn Injury Referral Guidelines and thus to complex burn injury. Therefore, the identification of specialised burns care needs to be defined as any injury sufficiently severe as to require referral to a recognised burn service, (please see section 4 for details on this).

3. Links to other services on the specialised commissioning list

For adult patients there are no commonly used clinical links. For paediatric patients there is a link with paediatric intensive care facilities and occasionally to paediatric nephrology.

4. Approach to identifying activity in information systems

There is no readily available way of identifying specialised burns activity from the non specialised element using NHS information systems. Operative OPCS codes are of no value and ICD codes are of limited use as there is no means of describing the severity of an injury as this is often dependent on the precise anatomical site and depth of injury. The existing ICD 10 codes can give some indication of the most severe, large surface area skin burns (T31 and T32), but these alone do not define the whole of the specialised burn population.

ICD-10
T20 – T32
T58
T59

The most recent HRG groupings make best use of the information available but are not sophisticated enough to accomplish an adequate definition of specialised burns. If anything they merely exaggerate the inadequacies of the ICD and OPCS coding systems.

HRG
J13 – J28

Therefore it is **recommended** that a new specialist code be created for use in the MAINSPEF field of the Hospital Episode Statistics (HES) definitions for the sole purpose of describing patients being seen referred with a primary diagnosis of burn injury. This code will be used instead of the current plastic surgery code (160) and be used to cover all aspects of care; be it the acute admission, rehabilitation and/or out-patient treatment and follow up. It will also be used to cover all therapies, be they delivered in a base hospital, or as part of a managed clinical

network in a distant hospital or community based clinic, or by an outreach service. The code will be used for any treatment or consultation required as a result of the individual having suffered a burn injury. The code will cover all clinical care events, whether they are delivered by medical, nursing or PAMS clinical staff. This activity will all be defined as specialised.

5. Detailed description of specialised activity

See section 4.

6. Recommended units of activity / currency measurement

Work is on-going to describe care pathways in burns. With the variability of burn injury, the wide population age range involved, plus the variety of ways in which various forms of therapy can be delivered, a comprehensive set of care pathways cannot be defined in the near future.

The areas of care which must be included are as follows:

- *Augmented Care Period (ACP) Dataset*

The collection of ACP data is mandatory in the NHS and can provide information about HDU and ICU care requirements and bed days attributed to burn injury.

- *Acute Burn Ward bed days*

Involving care by the whole burn team.

- *Rehabilitation Unit bed days*

Involving care by the whole burn team.

- *Out-patient attendances for therapy or follow up*

This may include base hospital, peripheral clinic or outreach provision;

  - the first emergency referral assessment at the base hospital
  - subsequent out-patient nursing care via any of the burn clinics
  - physical therapy sessions
  - pressure garment provision
  - psychological treatment
  - maxillofacial technician clinic for rigid mask or splint provision
  - camouflage service
  - and another therapies necessary following burn injury

- *Reconstructive surgery FCEs*

Based on bed days and HRGs.

The apparent separation of these elements of care is artificial. The key to successful specialised burn care is the involvement of the whole burn team with each patient. Certain members of the team may be more involved with direct care at certain times but multidisciplinary team working provides optimal care.

7. Elements of service / guidance for costing

• Out-patient care	as above
• In-patient care	Intensive care High dependency care Burn ward Plastic surgery ward Rehabilitation Unit for 5 and 7 day admission
• Rehabilitation Unit	Day attendance
• Outreach	Re-integration at school, work etc Home visits Satellite burn clinics

- Reconstructive Surgery as above
- Patient/parent support groups and Children's Burn Camp

The current HRG costing database does not include any element of care other than the acute care period. Even so the costs attributed to acute care are grossly inaccurate. To more accurately reflect the cost of the burn service the methods used must be radically revised.

8. Issues to be noted regarding this service / definition

The current network of hospitals providing burn care services is very heterogeneous. Most of the severe and complex injuries are treated in dedicated burn units, but a significant amount of smaller, but complex burn injuries, are admitted to plastic surgery units. An additional, large number of burn injuries are admitted to hospitals where there are no specialist services designed to deal with this type of injury.

Admitted burns per year	Children <16years	Adults >16years
Burn Units and Plastic Surgery Units	4600	5600
General hospitals with no defined burn service	1800	4100

There are very wide geographical variations in the incidence of burn injury in the UK most of which can be attributed to socio-economic factors. This rate (/100,000 whole pop.) is in some DHAs more than two standard deviations above the mean.

All the hospitals in the British Isles that have any form of defined burn care provision are clinically led by plastic surgeons. There is only one exception where a paediatric general surgeon is the clinical lead.

In the North and North-West of the British Isles, the majority of children's burns services are within paediatric hospitals. In the mid portion of the country and in the South and East, burn care is almost invariably provided on mixed adult and paediatric burn wards. This not infrequently includes the provision of intensive care for children's burn injury. As a result the situation does not lend itself to the inclusion of children's burn services into Paediatric Specialised Commissioning. It is more appropriate to consider specialised burn services for adults and children as a single entity.

9. National Standards, guidelines and protocols.

The National Burn Care Review has considered burn services in the British Isles from September 1998 to December 2000. The Review has set standards for service organisation and includes recommendations for the stratification of burn care services and a process for implementation of the recommendations. The Review process also provides for the first time National Burn Injury Referral Guidelines. The guidelines are clinically based but do not readily translate into any existing coding system.

The full Report can be found on the British Association of Plastic Surgeon's web site at www.baps.co.uk and is downloadable as an Acrobat (.pdf) file.

Appendix 6: Non-financial Option Appraisal Criteria

This template is **recommended** for use by a joint clinical and managerial team when appraising options for the development or placement of a Burn Unit or Burn Centre. These issues have to be considered in conjunction with the specific requirements of these types of Burn Ward. Each appraising committee may wish to use different weightings or add criteria to define the benefits each option offers.

1. Quality of clinical care (weighting = 2) * (appropriate to designation)

- Trainee plastic surgeons, anaesthetists and intensivists available * on site 24 hours a day
- Critical mass of activity to sustain junior staff rota of 1 in 5 minimum
- Sufficient activity levels to maintain the expertise and further training of the whole team, including clinicians, nurses and therapists
- Dedicated and staffed 24 hour emergency operating theatres
- Intensive Care Unit facilities for adults or children in geographical proximity to the Burn Centre/Unit
- Presence of essential supporting services by locating on a DGH site as a minimum *
- Paediatric clinical services in accordance with current guidelines
- Availability of as many as possible of the other specialties with which plastic and burns surgeons collaborate in the care of burns, including; renal medicine, care of the elderly, psychiatry, general surgery, orthopaedics etc.

2. Research and development (weighting = 1)

- Meets the essential service factors necessary for audit, research and development for siting of teaching and research
- Meets the essential academic factors for teaching and research

3. Quality of physical environment and infrastructure (weighting = 1.5)

- Good quality environment which is pleasant for patients, staff and visitors
- Appropriate facilities for adults, parents and children in accordance with current guidelines
- Functionality and specification consistent with requirements of the burns service

4. Staff, training and professional development (weighting = 2)

- Appropriate levels of experienced staff, and low vacancy levels and staff turnover
- Capacity to recruit, retain, train and develop medical, nursing, therapy and clinical support staff
- Meets Royal College Accreditation criteria
- Meets requirements for junior doctors hours and the European Work Time Directive

5. Ability to develop services in the future (weighting = 1)

- Sufficient flexibility to meet changes in demand and supply, technology, clinical practice and guidelines
- Sufficient capacity to accommodate short, medium and long term activity levels

6. Access (weighting = 1.5)

- Accessibility for emergency cases
- Good access for patients by public and private transport, particularly for those undergoing rehabilitation and follow up treatment
- Access for visitors and staff by public and private transport

7. Ease of implementation (weighting = 1)

- Extent to which the option fits in with local and national service strategies
- How soon the transfer of service could realistically be implemented for interim and longer term options as appropriate
- Inter-dependence on other service developments requiring approval
- Enables the change process to be managed effectively while maintaining existing services to patients and carers

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