

London North West Healthcare   
NHS Trust

SPECIALIST REHABILITATION FOR PATIENTS WITH COMPLEX NEEDS FOLLOWING MAJOR INJURY

NATIONAL CLINICAL AUDIT | OCTOBER 2016

NATIONAL  
CLINICAL  
AUDIT  
OCTOBER  
2016

First NCASRI Report –  
Organisation of Services  
and Analysis of Existing  
Clinical Data

Data collection period  
1 July 2015 –  
30 June 2016

Commissioned by



In association with



# Specialist rehabilitation for patients with complex needs following major injury

London North West Healthcare   
NHS Trust

This report was prepared by members of the National Clinical Audit of Specialist Rehabilitation following Major Injury (NCASRI) Project Operational Team on behalf of the Project Management Board:

- Prof Lynne Turner-Stokes (Lead Investigator)
- Miss Antoinette Edwards (TARN)
- Mrs Maralyn Woodford (TARN)
- Dr Roxana Vanderstay (King's College London)
- Dr Krystyna Walton (Clinical Lead)
- Prof Derick Wade (Clinical Lead)
- Dr Jenny Thomas (Wales)
- Dr John Etherington (Defence Medical Services)
- Dr Judith Allanson (BSRM)

#### NCASRI Project Operational Team members

- Dr Karen Hoffman (NCASRI Project Manager)
- Mr Keith Sephton (UKROC)
- Ms Heather Williams (UKROC)
- Mr Alan Bill (UKROC)
- Ms Margaret Kaminska (NCASRI Data Clerk)

#### Acknowledgements

The NCASRI Project Team and Board would like to thank the clinical and non-clinical staff who collected and submitted data to the Trauma Audit and Research Network (TARN) and UK Rehabilitation Outcomes Collaborative (UKROC) for their hard work and enthusiasm.

We are grateful to the consultants in Rehabilitation Medicine and the various clinical leads within the Major Trauma Networks who assisted with the survey of current organisation and clinical practice, and for their ongoing commitment to the project.

We would also like to thank members of the NHS England Clinical Reference Groups for Major Trauma and for Specialist Rehabilitation, and the British Society of Rehabilitation Medicine (BSRM) Trauma Working Group for helping to shape the audit project and dataset.

#### The National Clinical Audit of Specialist Rehabilitation following Major Injury (NCASRI)

The National Clinical Audit of Specialist Rehabilitation following Major Injury (NCASRI) is commissioned by the Healthcare Quality Improvement Partnership (HQIP) and led by London North West Healthcare NHS Trust, which hosts the **UK Rehabilitation Outcomes Collaborative (UKROC)**, together with its subcontracted partners:

The **Trauma Audit and Research Network (TARN)**, based at University of Manchester.

The **Cicely Saunders Institute of Palliative Care, Policy and Rehabilitation** at King's College London (KCL).

Engagement of rehabilitation specialists across England and Wales is achieved through the Trauma Rehabilitation Working Party of the **British Society of Rehabilitation Medicine (BSRM)**, and the **NHS England Clinical Reference Groups for Major Trauma and for Specialist Rehabilitation**. It is supported by active patient and public involvement including Judith Craven, Jane Pye and Norman Keen.

#### Healthcare Quality Improvement Partnership (HQIP)

The Healthcare Quality Improvement Partnership (HQIP) is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing, and National Voices. Its aim is to promote quality improvement, and in particular to increase the impact that clinical audit has on healthcare quality in England and Wales. HQIP holds the contract to manage and develop the National Clinical Audit Programme, comprising more than 30 clinical audits that cover care provided to people with a wide range of medical, surgical and mental health conditions. The programme is funded by NHS England, the Welsh Government and, with some individual audits, also funded by the Health Department of the Scottish Government, DHSSPS Northern Ireland and the Channel Islands.

[www.hqip.org.uk](http://www.hqip.org.uk)

#### Citation for this report

First report of the National Clinical Audit of Specialist Rehabilitation following Major Injury. NCASRI Project Team, Lead: Turner-Stokes L. Northwick Park Hospital. London, 2016.

#### Copyright

All rights reserved. © Healthcare Quality Improvement Partnership.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any other means, electronic, mechanical, photocopying, recording, or otherwise, without prior permission, in writing, of the copyright holders.

The authors have endeavoured to ensure that this document is as current as possible at the time it was published, but can take no responsibility for matters arising from circumstances, which may have changed, or information that may become available subsequently.

All enquiries in regard to this document should be addressed to:

The UK Rehabilitation Outcomes Collaborative  
Regional Hyper-acute Rehabilitation Unit  
Northwick Park Hospital, Watford Road  
Harrow, Middlesex  
London  
HA1 3UJ

Tel: +44-208-869-2427  
Email UKROC: [lnwh-tr.ukroc@nhs.net](mailto:lnwh-tr.ukroc@nhs.net)

Designed and typeset by Soapbox: [www.soapbox.com](http://www.soapbox.com)

Cover image: [deathtothestockphoto.com](http://deathtothestockphoto.com)

---

# Specialist rehabilitation for patients with complex needs following major injury

NCASRI – National Clinical Audit of Specialist  
Rehabilitation for Patients with Complex Needs  
following Major Injury

First report – Organisation of Services and Analysis of Existing Clinical Data  
October 2016

---

---

# CONTENTS

<b>1.</b>	Foreword	3
<b>2.</b>	Executive summary	4
<b>3.</b>	Summary and recommendations	13
<b>4.</b>	List of abbreviations and glossary of terms	16
<b>5.</b>	Introduction	19
<b>6.</b>	Background	22
<b>7.</b>	Aims and objectives of the NCASRI programme	31
<b>8.</b>	Reference standards	32
<b>9.</b>	Mapping of specialist Level 1 and 2 rehabilitation service provision	35
<b>10.</b>	Evaluation of current practice in MTCs and MTNs	41
<b>11.</b>	Analysis of existing datasets for patients included in the Trauma Audit Research Network (TARN) database	53
<b>12.</b>	Analysis of existing datasets in UKROC for trauma patients receiving specialist rehabilitation	59
<b>13.</b>	Design of the NCASRI prospective audit	77
<b>14.</b>	Appendix 1: Participants in the organisational audit, with individual MTC organisation	78
<b>15.</b>	Appendix 2: Organisational Audit: Breakdown by MTN	79
<b>16.</b>	Appendix 3: Rehabilitation Prescription – completion and transfer rates	84
<b>17.</b>	Appendix 4: UKROC data analysis – summary by provider	85
<b>18.</b>	Appendix 5: Flow chart for the prospective audit	86
<b>19.</b>	Appendix 6: Summary of recommendations in relation to audience	87
<b>20.</b>	References	89

---

# 1 FOREWORD

It is a pleasure to see this first report of the National Clinical Audit of Specialist Rehabilitation following Major Injury (NCASRI).

Specialist rehabilitation services form a critical component of the recovery pathway following major injury and relieve pressure on beds in acute services. However, in the absence of formal provision when Major Trauma Networks (MTNs) were established in 2012, it is acknowledged that specialist rehabilitation services for trauma patients lacked coordination, with large variations in provision across different parts of the country.

Numerous national guidelines and standards documents, including those from the Department of Health (DoH), NHS England (NHSE), the British Society of Rehabilitation Medicine (BSRM), the Royal College of Physicians (RCP) and the National Institute for Health and Care Excellence (NICE), have made recommendations for improving the consistency and quality of care offered to patients with complex disability, many of whom will have life-long needs for rehabilitation and support.

This is the first national clinical audit focused on access to and provision of specialist rehabilitation for patients with traumatic injuries. It marks a major step towards improving the quality of care delivered to this patient group.

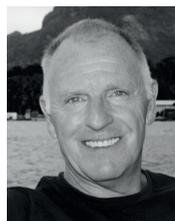
This report presents the outputs from the work in the first year of the programme. It describes the current level of provision of specialist rehabilitation within the Major Trauma Networks based on the results of a survey and on retrospective analyses of existing data – including rehabilitation data collected in the Trauma Audit and Research Network (TARN) database and the UK Rehabilitation Outcomes Collaborative (UKROC). The report explores the pathways of care and examines clinical practice – how patients that may require specialist rehabilitation are identified, where they receive that care, how long they wait and several other important criteria.

Future reports will track patients in their journey from the Major Trauma Centres (MTCs) to the specialist rehabilitation services, to find out how many patients actually receive the services for which they are referred, and if they do not, to explore the reasons why.

The audit will identify models of good practice as well as gaps in current provision to improve the quality of services and optimise the journey towards recovery for patients and their families who are living with the aftermath of major injury.



**Prof Lynne Turner-Stokes**  
President BSRM and  
Director UKROC



**Prof Chris Moran**  
National Clinical Director  
for Trauma, NHS England

---

# 2 EXECUTIVE SUMMARY

## Background

Following the NHS Clinical Advisory Group for Major Trauma (Trauma CAG) report to the Department of Health in 2010,<sup>1</sup> a series of 22 Major Trauma Networks (MTNs) were established across England to provide coordinated pathways of care for adult patients following major trauma.

The majority of patients will make a good recovery following major trauma and return home with the support of their local services. However, a small number will have complex rehabilitation needs requiring the skills and facilities of a specialist in-patient rehabilitation unit before they are ready to leave hospital. By relieving pressure on beds in acute services, these specialist rehabilitation services form a critical component of the trauma pathway, without which the MTNs cannot ensure adequate recovery for patients.

Specialist rehabilitation is provided in designated units. These are planned at either a regional level, covering a population of 1–5 million (Level 1), or at district/supra-district level, covering populations of 350,000–500,000 (Level 2). The Trauma CAG highlighted the limited capacity and fragmentation of these specialist rehabilitation services for trauma patients, noting that this was the element of the pathway in most need of development. However, the CAG did recognise that not all patients with complex disability have the potential to benefit from rehabilitation. Consultants in Rehabilitation Medicine (RM) play a critical role in assessing complex needs, planning how these will be met, and expediting their transfer to appropriate rehabilitation or longer-term care services. The CAG report<sup>1</sup> highlighted the need for RM consultants to be clinically involved in the Major Trauma Centres (MTCs) and recommended the appointment of a Director of Rehabilitation to coordinate the development of rehabilitation services across the networks.

The Trauma CAG recommended that all severely injured patients should have a Rehabilitation Prescription, which details their rehabilitation needs and recommends how these should be met after they are discharged from the acute trauma services. The British Society of Rehabilitation Medicine (BSRM) recommended a Specialist Rehabilitation Prescription (SpRP) to be completed by a consultant in RM, in order to identify patients with highly complex needs requiring referral to a specialist Level 1 or 2 in-patient rehabilitation unit. Within the SpRP, complexity of rehabilitation needs is categorised as A, B, C or D using a Patient Categorisation Tool. Category A and B patients are those with very complex rehabilitation needs who will require more intense rehabilitation and/or specialist staff skills and equipment. The SpRP also comprises three other validated tools to justify the requirement for further in-patient specialist rehabilitation. These measure the patient's impairments, dependency and care costs, and their rehabilitation resource requirements.

Despite these national recommendations, the main focus for development of the MTNs to date has been on the acute and frontline services. There is still wide variation

---

in provision for specialist rehabilitation in different parts of the country, resulting in long waits and delays in patient transfers to rehabilitation in some areas.

As a result of this lack of capacity within the specialist rehabilitation services, some patients with complex rehabilitation needs are currently 'repatriated' to their local district general hospitals or Trauma Units from a MTC, to wait for a specialist rehabilitation bed to become available. It is evident that many patients never actually get to those services, but we do not know why. Some patients may improve spontaneously to a level where their needs can be met by their local non-specialist rehabilitation services, but others simply 'get lost' in the system. Currently, there is no way of tracing them or understanding the reasons why they did not access rehabilitation.

The general NHS information systems collate little or no information about rehabilitation following trauma. However, there are two databases that collect data on trauma and rehabilitation:

- The Trauma Audit and Research Network (TARN) database collects patient level data on the acute care phase (including the presence of a Rehabilitation Prescription) throughout England and Wales.
- The UK Rehabilitation Outcomes Collaborative (UKROC) database collates clinical information on needs, input and outcomes for all episodes of in-patient specialist rehabilitation in England.

However, there is currently no linkage between these two databases, so there is no way of knowing whether patients who are identified as requiring specialist rehabilitation as they leave the MTCs actually receive it, and if they do, what the outcomes are.

#### **The National Clinical Audit of Specialist Rehabilitation following Major Injury (NCASRI)**

This national clinical audit was commissioned in 2015 by the Healthcare Quality Improvement Partnership (HQIP), and funded by NHS England (NHSE) and the Welsh Government in year 1, and by NHS England in years 2 and 3. It will determine the scope, provision, quality, outcomes and efficiency of specialist rehabilitation services across England to improve the quality of care for adults with complex rehabilitation needs following major trauma.

Outcomes and quality of care will be evaluated in accordance with standards and recommendations laid out in national documents from the Department of Health (2010), NHSE (2013, 2014), the British Society of Rehabilitation Medicine (BSRM) (2010, 2013, 2015) and the National Institute of Clinical Excellence (NICE) (2009).

A key component of NCASRI will be to link the national clinical databases for acute trauma (TARN) and for specialist rehabilitation (UKROC) to track patients in their journey from the MTCs to the specialist rehabilitation services.

---

NCASRI has 3 main elements:

1. An organisational audit to identify the current access and provision of specialist rehabilitation for trauma patients, including access to specialist assessment by a consultant in Rehabilitation Medicine (RM). The audit will also map the current pathways of care into and out of these services.
2. A prospective clinical audit of new patients presenting within NHS Major Trauma Centres (MTCs) and Defence Medical Services (DMS) who have complex rehabilitation needs and receive specialist rehabilitation.
3. A feasibility study for identifying the existing data flows and potential linkages to determine the pathway of care and outcomes for patients who require specialist rehabilitation on discharge from MTCs, but do not subsequently attend.

**This first NCASRI report** sets out the important background to the project, and presents the current state of service organisation. The report:

1. Identifies the current provision of specialist rehabilitation for trauma patients and maps the pathways of care into and out of these services.
2. Evaluates current practice with respect to the level of involvement of consultants in Rehabilitation Medicine (RM) and the use of Rehabilitation Prescriptions within the MTCs.
3. Describes current reporting practice to TARN and UKROC for the various process and outcome data that will be used in the subsequent elements of the audit.

## 2.1 Mapping of specialist rehabilitation services

The current provision of specialist Level 1 and 2 rehabilitation services in England for trauma patients was examined through analysis of the 'service profile' information held by UKROC for each unit regarding the configuration, capacity and casemix.

**There are currently just 1–8 specialist rehabilitation beds for adult trauma per million population**

In 2014–2015, a total of 65 adult services in England were signposted as Level 1 or 2 in-patient specialist rehabilitation units. Together, these provided approximately 994 occupied beds for specialist rehabilitation, with 195 (19%) of those being used for trauma patients. Provision varied considerably across the country, ranging from 1 to 8 beds for adult trauma patients per 1 million population.

The current capacity within in-patient specialist rehabilitation services caters for about 950 patients per year. This represents approximately 5% of the total number of adults admitted to MTCs following major trauma and registered on the TARN database.

Under-commissioning was a significant problem. In comparison with national standards, between half and two-thirds of the specialist rehabilitation units had insufficient staffing to manage a complex caseload and so diluted the casemix with less complex patients in order to meet their activity targets.

---

## 2.2 Evaluation of current practice in the Major Trauma Centres

---



**NHSE NATIONAL STANDARDS (2013)** highlight the need for:

---

- A Director of Rehabilitation to be appointed within each MTN to coordinate strategic development and delivery of rehabilitation services.
  - Consultants in Rehabilitation Medicine (RM) to be an integral part of the MTC team, with designated sessions funded by the MTNs to support the management of patients with complex rehabilitation needs.
  - A consultant in RM should be involved from an early stage in the patient's trauma pathway (within 3 calendar days) to assess patients with complex rehabilitation needs, to participate in their rehabilitation planning and to expedite onward referral. This will normally involve a consultant in RM attending the MTC or Trauma Unit (TU) at least 2–3 times per week.
- 

Rehabilitation leads for all 22 of the Major Trauma Networks that cater for adult patients were surveyed – using structured interviews based on a paper questionnaire – to evaluate current practice in relation to the above standards. Compliance to the standards varied greatly:

- Three-quarters of the MTNs (17/22) had a Director of Rehabilitation, 12 (71%) of whom were consultants in RM. Five of the 22 MTNs (23%) had no Director of Rehabilitation at all.
- All but one of the MTNs routinely referred patients to Level 1 and/or Level 2 specialist rehabilitation services. However, the provision of specialist rehabilitation is not coterminous with the MTNs (i.e. they are not planned or commissioned over the same geographical or administrative areas), and there was considerable variation in the number and range of specialist rehabilitation services accessed.
- The models for involvement of RM consultants in trauma rehabilitation varied widely across the MTNs: some consultants had paid sessions within the MTC; some consultants provided ad hoc input, funded from within the specialist rehabilitation service; and some MTNs had no consultant involvement whatsoever.
  - Seventeen (77%) of the 22 MTCs had allocated funding for RM consultant time (ranging from 1–11 sessions), while 6 (27%) had sessions funded by the rehabilitation services.
  - A total of 37 RM consultants were working within 18/22 MTCs. The number ranged from 0 to 6 across the networks, with 4/22 MTCs (18%) having no RM consultant input at all.

---

**There was only one MTC-funded session for an RM consultant across the 4 large MTNs in London**

- Recruitment was problematic. There were 5.4 whole time equivalent (WTE) vacant posts across the 22 MTNs, with the number of unfilled consultant sessions ranging from 3–30 per network.
- For those RM consultants who regularly visited the MTCs, the median number of visits was 3 per week, but ranged from 1–7 visits/week. The time they spent in the MTC ranged from 1–2 hours up to >40 hours/week (median 10 hours/week).
- As expected, RM consultants spent significantly more time in the MTCs if they had paid, designated sessions from the MTC. Where there were paid sessions, consultants visited a median of 5 times/week, compared with once a week where there were none; they also spent a median of 19 hours/week at the centres compared with just 2 hours/week where there were no paid sessions.
- Although London was the first part of the country to establish MTNs, its provision for rehabilitation input was particularly poor. Across the entirety of its 4 large networks, there was only 1 MTC-funded session for an RM consultant, and MTCs received visits either only once a week or on a purely ad hoc basis, instead of the required 2–3 times per week.
- All 22 MTCs reported that they routinely complete a Rehabilitation Prescription (RP), although the method varied: 50% complete it electronically, 36% on paper, and the remainder using a combination of the two. In one-third of the centres, the RP was either sometimes or always given to the patient, but in the remaining two-thirds it was a clinically-held tool.
- Half of the centres indicated that they used a specialist rehabilitation prescription (SpRP) for patients with complex needs, but only 2 routinely recorded all 4 of the recommended measurements within the SpRP.

#### **Strengths and weaknesses of the current provision**

- Among survey respondents, perceived strengths of the current rehabilitation provision within MTNs were:
  - Strong network engagement;
  - Commitment to the development of rehabilitation services;
  - Increasing recognition of the role of the RM consultant;
  - Trauma and Rehabilitation Coordinators were also considered invaluable in the patient pathway, where these posts existed.
- Perceived gaps were:
  - Insufficient RM consultant input in the MTCs (either due to lack of funding for designated sessions or recruitment failure);
  - Lack of capacity in the specialist rehabilitation services (especially hyper-acute rehabilitation, musculoskeletal, cognitive/behavioural, and vocational rehabilitation);
  - Fragmented pathways after the initial acute care, resulting in poor continuity of care;
  - Lack of engagement from commissioners in some parts of the country.

In addition to addressing these shortfalls in capacity, many interviewees highlighted the need for more robust data collection and data sharing across the pathway.

---

## 2.3 Current reporting practice to TARN and UKROC

### 2.3.1 The Trauma Audit and Research Network (TARN)



---

**NHSE NATIONAL STANDARDS** 2013 require that:

---

All patients with a severe Injury Severity Score (ISS)  $\geq 9$  to have a formal Rehabilitation Prescription (RP) which ideally should be patient-held, and those with complex needs to have a Specialist RP (SpRP) with formal measures of complexity to describe their needs for rehabilitation and make formal recommendations for how these should be met.

---

Data on the acute trauma patient pathway is submitted to TARN from all MTCs across England. Since the introduction of the Rehabilitation Prescription (RP) in 2012, hospitals have been able to record the presence of an RP on the TARN data collection system. Elements of the RP form part of the Best Practice Tariff (BPT) criteria for patients with an Injury Severity Score (ISS) of  $\geq 9$  treated at MTCs. Hospitals are also able to enter more extended RP information for each patient if they wish to, although the extended Rehabilitation Prescription (eRP) is not mandatory.

Data submitted to TARN by the MTCs over the three preceding years (2012–2015) were reviewed for adults ( $\geq 16$  years) with an ISS of  $\geq 9$ . The audit focused on the adult population and did not include paediatrics. The aim was to obtain a pre-audit picture of: a) reporting practice related to completion of the Rehabilitation Prescription, and b) the proportion of patients repatriated to their local services or discharged to further rehabilitation. We also examined the year-on-year trends in reporting as the services gradually developed over their first 3 years.

The pre-audit review of the TARN database found that:

- The number of patients with an ISS of  $\geq 9$  entered on to the TARN database has increased each year, to over 20,000 in 2014/15;
- The overall proportion of these patients for whom the presence of an RP was recorded has also increased year-on-year from 56% in 2012/13 to over 81% in 2014/15;
- However, even in 2014/15, there was significant variation in the RP recording rates between the MTCs, which ranged from 52% to 99%;
- Extended RP information was recorded for less than a quarter of patients, although this is not a mandatory requirement in TARN. This proportion has remained relatively stable at around 22%;
- It was not possible to examine rates of completion of the standardised tools within the Specialist Rehabilitation Prescription (SpRP) as the facility to record these within the TARN database was only introduced in 2016.

---

### 2.3.2 UK Rehabilitation Outcomes Collaborative (UKROC)

Data collated over the equivalent 3-year period for adult trauma patients ( $\geq 16$  years) within the UKROC database were analysed. As well as knowing approximately how many patients to expect for the next stages of the audit, it was important to understand how long people currently wait for assessment and transfer to specialist rehabilitation services. We also wanted to examine current reporting practice for the various process and outcome measures that will be used in the course of this audit, and to obtain baseline data on key outcomes.

A total of 3,281 episodes were identified, of which 3,155 were admitted for rehabilitation programmes (as opposed to assessment or long-term care).

#### Process times



---

**NHSE NATIONAL STANDARDS 2014** recommend that:

---

Patients requiring specialist in-patient (Level 1 or 2) rehabilitation following trauma should be:

- Assessed within 10 days of referral;
  - Admitted within 6 weeks of being fit for transfer.
- 

Analysis found that:

**28% of specialist rehabilitation services assessed less than half of their patients within 10 days**

- Although 80% of the trauma patients who were subsequently admitted to specialist rehabilitation services were assessed within 10 days of referral, there was a long tail in the distribution, with 10% waiting over 3 weeks and 1.6% waiting over 3 months. There was also considerable variation between services with 18 of the 65 services achieving the standards for less than half of their admissions (28%).
- Compliance with the standards on waiting time for assessment was consistently low ( $\leq 50\%$ ) within the Level 1c (tertiary centres meeting cognitive/behavioural needs) services. This is due to the longer waiting times for admission to these services because of their relative scarcity: the survey highlighted that there are just 3 Level 1c services in England with a total of only 7 trauma beds between them.
- Following assessment, the mean waiting time for admission across all Level 1 and 2 units was just over 2 weeks (16 days), and 89% of patients were admitted within 6 weeks of assessment, although some were assessed before they were fit to transfer.
- The large majority of trauma patients ( $n=3,116$ ; 95%) were admitted to specialist rehabilitation within 6 weeks of being fit for transfer. However, a small minority of patients ( $n=44$ ; 1.3%) waited for more than 3 months, and some even up to a year for admission.

- 
- Although uncommon, these long waits could potentially have a serious negative impact on long-term outcomes for those patients. We know from some of our other analyses that those who wait longest tended to be the highly dependent patients (especially those with tracheostomy or highly challenging behaviours) for whom there is a particular shortage of specialist rehabilitation beds. Data from Elements 2 and 3 of this audit will help to determine the specific barriers to trauma patients accessing rehabilitation.

#### Data reporting



---

**NHSE NATIONAL STANDARDS 2014** require that:

---

- All patients admitted to specialist rehabilitation services should have their resource requirements, dependency and outcomes documented (using the standardised tools within the UKROC dataset) at the start and end of each rehabilitation programme;
  - Some measurable gain or achievement should have been recorded by discharge in at least one measure;
  - Cost-efficiency (measured in time to offset the costs of rehabilitation by savings in ongoing care) should be reported in all patients.
- 

Analysis found that:

- The large majority of specialist rehabilitation units (nearly 90%) were already compliant with standards for recording of complexity and functional gain at the start and end of each rehabilitation programme.
- The large majority (87%) of the trauma rehabilitation population also achieved some measurable gain in the course of their specialist in-patient rehabilitation programme. Lower rates of gain were seen in Level 1c (cognitive/behavioural) and hyper-acute services, but this was not unexpected. Patients with cognitive/behavioural needs are reported to change at a slower rate, and clinicians report that the standardised measures within UKROC are not always sensitive to the types of changes in these patients. Similarly, the role of hyper-acute services is usually to stabilise patients medically before transfer on to other Level 1 or 2 rehabilitation services, and many patients are reported to not make significant functional gains during this time.
- Other outcome measures may therefore be required to demonstrate the true gains derived from these services. Goal Attainment Scaling (GAS) provides the opportunity to demonstrate achievement of the intended person-centred goals for admission, even if they are not reflected in functional gain using the standardised measures in UKROC. Although all services report that they set goals, none of the Level 1c or hyper-acute services currently record GAS in UKROC, thereby missing an opportunity to demonstrate meaningful change that is important to patients.

---

**A quarter  
of specialist  
rehabilitation  
services do not  
routinely record  
cost-efficiency**

- Almost all trauma patients (98%) had a discharge destination recorded. However, only three-quarters of services routinely recorded the Northwick Park Dependency Scale (NPDS/NPCNA) – figures that are necessary for the computation of cost-efficiency. Cost-efficiency is a mandatory standard for outcome evaluation required by NHSE – and also one of the principal outcomes to be examined by the prospective audit. This shortfall will need to be addressed as part of the training and support for the prospective audit to optimise the outputs of this programme.
- Cost-efficiency data were reported for 2,185 episodes. On average, the cost of rehabilitation was balanced by savings made in the cost of ongoing care in the community within two years of discharge from rehabilitation. The time to recover rehabilitation costs for the different levels of rehabilitation ranged from just 14 months for Level 1a services to 125 months for Level 1c services. Although these figures seem lengthy, this is a relatively short time span for a young population (mean age 50 years) who may be expected to have many years of life ahead of them.

---

# 3

## SUMMARY AND RECOMMENDATIONS

---

### 3.1 Summary and recommendations for the next stage of this audit

---

In this first year of NCASRI, we expected and found wide variation across the country in both the current levels of provision of specialist rehabilitation services and the degree of integration within the Major Trauma Networks.

For those patients who actually reach the Level 1 and 2 services, the results appear quite encouraging overall. The majority were assessed and admitted within a reasonable space of time, and made measurable functional gains with evidence that specialist rehabilitation is cost-efficient and provides value for money. However, a small proportion waited for a disproportionate length of time after they were fit for transfer to rehabilitation, which may impact negatively on their outcomes. It is unclear exactly why these waits occur (except in certain areas, such as cognitive/behavioural rehabilitation, where the limited service capacity speaks for itself). In addition, this first year audit does not capture the need or complexity of patients that never reached rehabilitation services. These important issues will be addressed in the next two years of the programme (Elements 2 and 3).

---

NCASRI is unusual for a national clinical audit in that it addresses a small volume of patients with complex and highly diverse needs. The absence of ring-fenced resources and clear standards for service provision from the outset has led to a wide range of practice and diverse approaches to data collection. This poses challenges for the remainder of the audit programme.

For example, the next phase of the audit relies on the identification of patients with complex rehabilitation needs (Category A or B), which form the denominator group. A patient's need for rehabilitation cannot be reliably assessed from ISS scores, but requires an assessment by a consultant in RM and completion of a Specialist Rehabilitation Prescription (SpRP). MTCs that have little or no input from a consultant will struggle to participate in the audit, and yet these are the very services that are in most need of the improvements that are expected to be driven by NCASRI. There is clearly a risk that the results will be biased if only the better resourced networks provide data.

---

Variation in reporting is a further challenge:

- Reporting of at least the existence of a standard RP has had the financial driver of being a requirement for the Best Practice Tariff in the MTCs. Even then, the extent and mode of completion (whether computerised or on paper) still varies widely.
- Although the BSRM standards for reporting of the SpRP were published 3 years ago, they have not had the same financial drivers and so have not been taken up to the same degree.

These factors have demanded a flexible approach to the development of data collection methods and tools for Elements 2 and 3.

- Within this first year of NCASRI we have worked with stakeholders to define a manageable (and yet suitably ambitious) dataset and to gather the information required – not only to identify patients with complex needs, but to describe those needs sufficiently to understand which types of needs are least likely to be met.
- Four different platforms for submission of SpRP information for patients with complex needs were developed and agreed to accommodate all participants. We also worked individually with the MTCs to help them identify the best mode of data collection to suit their local practice.

This programme has started from a very low base in comparison with some other national clinical audits due to a lack of published data evaluating rehabilitation services for patients with serious injury. Moreover, there was great variance in adoption of standards, commissioning of services, service structure and service delivery in both rehabilitation and MTC settings. The majority of other national audits start out with much clearer and established quality standards and service structures.

Recommendations arising from this first element of the audit programme are summarised below (please find specific recommendations in Appendix 6).

### 3.2 Recommendations for service provision

**Shortfalls of specialist rehabilitation in the trauma pathway should be urgently reviewed**

- Where they have not already done so, commissioners and providers within each MTN should work together to review the capacity and pathways for specialist rehabilitation following major trauma in the light of the information provided in this audit. This should include some local action plans, based on these findings, which can be shared across their networks.
- Commissioners and service providers should explore the possibility of making more Level 1c beds available, to ensure shorter waiting times to access these services.
- MTNs that do not currently have a Director of Rehabilitation to coordinate the provision of rehabilitation services should appoint one.

- 
- The NHSE service specification for major trauma requires that a consultant in RM should attend the MTCs at least 3 times per week to review patients with complex needs for rehabilitation and to expedite their referral/transfer to the appropriate services.
  - MTNs that do not currently provide sufficient funded sessions to meet this requirement should review their funding allocations to ensure that it is met.
  - Central workforce allocations and RM training programmes should be reviewed to ensure a sustainable supply of suitably trained consultants in RM to fill these sessions.

### 3.3 Recommendations for clinical practice

- MTCs should continue to ensure that all patients with an ISS  $\geq 9$  have a Rehabilitation Prescription. The presence of RPs continues to vary between MTCs.
- All patients who have complex (Category A or B) rehabilitation needs at the point when they are ready to leave the MTC should have a Specialist Rehabilitation Prescription completed, including the four measurement tools, as recommended in the BSRM core standards:
  - The Rehabilitation Complexity Scale (RCS-ET);
  - The Patient Categorisation Tool (PCAT);
  - The Neurological Impairment Scale adapted for Trauma (NIS-Trauma);
  - The Northwick Park Dependency Scale (NPDS/NPCNA).
- Specialist rehabilitation programmes are expensive and it is important to be able to demonstrate meaningful outcomes. The NHSE service specification for specialist rehabilitation requires the recording of standardised measures within the UKROC dataset to demonstrate functional gain, reduction in dependency, and cost-efficiency for national benchmarking. Data for these measures will also be required for the next stage of this audit.
  - All providers of Level 1 and 2 services should review their outcome data reporting to ensure that they are meeting this requirement, particularly collection of Northwick Park Dependency Scores (NPDS/NPCNA) at both admission and discharge.
  - Not all patients are expected to make functional gains or changes in dependency, especially if they are admitted for the ‘disability management’ or ‘neuropalliative rehabilitation’ programmes. But in these cases, specialist rehabilitation services should at minimum report Goal Attainment Scaling (GAS) to record the achievement of the intended goals for admission.
  - UKROC will continue to explore the need to include other outcome measures, to capture the full range of outcomes and benefits to patients and their families.

**Consistent collection of cost-efficiency data is essential for the next stage of the audit**

---

# 4 LIST OF ABBREVIATIONS AND GLOSSARY OF TERMS

## 4.1 List of abbreviations

<b>BSRM</b>	British Society of Rehabilitation Medicine
<b>BPT</b>	Best Practice Tariff
<b>CAG</b>	Clinical Advisory Group
<b>CCG</b>	Clinical Commissioning Group
<b>CRG</b>	Clinical Reference Group
<b>CRM</b>	Consultant in Rehabilitation Medicine
<b>DoH</b>	Department of Health
<b>DMS</b>	Defence Medical Services
<b>eDCR</b>	electronic Data Collection and Reporting
<b>eRP</b>	extended Rehabilitation Prescription
<b>GAS</b>	Goal Attainment Scaling
<b>HQIP</b>	Healthcare Quality Improvement Partnership
<b>IQR</b>	Interquartile range
<b>ISS</b>	Injury Severity Score
<b>KCL</b>	King's College London
<b>MDT</b>	Multi-disciplinary Team
<b>MTC</b>	Major Trauma Centre
<b>MTN</b>	Major Trauma Network
<b>NCASRI</b>	National Clinical Audit of Specialist Rehabilitation following Major Injury
<b>NHSE</b>	NHS England
<b>NICE</b>	National Institute for Health and Care Excellence
<b>NIS-Trauma</b>	Neurological Impairment Set for Trauma
<b>NPCNA</b>	Northwick Park Care Needs Assessment

<b>NPDS</b>	Northwick Park nursing Dependency Score
<b>OBD</b>	Occupied Bed Day
<b>PCAT</b>	Patient Categorisation Tool
<b>RCP</b>	Royal College of Physicians
<b>RCS-E</b>	Rehabilitation Complexity Scale
<b>RCS-ET</b>	Rehabilitation Complexity Scale – Trauma
<b>RM</b>	Rehabilitation Medicine
<b>RP</b>	Rehabilitation Prescription
<b>RR&amp;R</b>	Recovery, Rehabilitation and Re-enablement
<b>SD</b>	Standard Deviation
<b>SpRP</b>	Specialist Rehabilitation Prescription
<b>SSNAP</b>	Sentinel Stroke National Audit Programme (SSNAP)
<b>TARN</b>	Trauma Audit and Research Network
<b>TU</b>	Trauma Unit
<b>UK FIM+FAM</b>	UK Functional Assessment Measure
<b>UKROC</b>	UK Rehabilitation Outcomes Collaborative

## 4.2 Glossary of key terms

Term	Description
<b>Clinical Advisory Group (Trauma CAG)</b>	The NHS Clinical Advisory Group that reported to the Department of Health in 2010 making recommendations for regional networks for Major Trauma.
<b>Clinical Commissioning Group (CCG)</b>	Clinically-led statutory NHS bodies responsible for the planning and commissioning of healthcare services for their local area.
<b>Clinical Reference Group (CRG)</b>	Groups that provide clinical advice to NHS England for the strategic planning and commissioning of specialised services.
<b>Consultant in Rehabilitation Medicine (RM)</b>	A consultant physician with higher specialist training and accreditation in the field of Rehabilitation Medicine.
<b>Major Trauma Centre (MTC)</b>	A specialist hospital responsible for the care of the most severely injured patients involved in major trauma. It provides 24/7 emergency access to consultant-delivered care for a wide range of specialist clinical services and expertise.
<b>Major Trauma Network (MTN)</b>	The collaboration between the providers commissioned to deliver coordinated trauma care services in a geographical area.

Term	Description
<b>Neurological Impairment Set for Trauma (NIS-Trauma)</b>	A clinical tool for recording the severity and types of impairments a patient is displaying. The NIS-Trauma is adapted specifically for use with trauma patients.
<b>NHS England (NHSE)</b>	An executive non-departmental public body of the Department of Health that oversees the budget, planning, delivery and day-to-day operation of the commissioning side of the NHS in England.
<b>Northwick Park nursing Dependency Score (NPDS)/Northwick Park Care Needs Assessment (NPCNA)</b>	A clinical tool for measuring a patient's level of dependency on care and nursing. A computerised algorithm translates the score to estimate the need for, and cost of providing, care in the community.
<b>Patient Categorisation Tool (PCAT)</b>	A clinical tool for identifying and describing a patient's complex needs for rehabilitation.
<b>Rehabilitation</b>	A process of assessment, treatment and management with ongoing evaluation, through which the individual (and their family/carers) is supported to achieve their maximum potential for physical, cognitive, social and psychological function, participation in society and quality of living.
<b>Rehabilitation Complexity Score (RCS-E)</b>	A clinical tool for measuring a patient's resource requirements in terms of nursing, therapy and medical care. The Trauma version (RCS-ET) is adapted specifically for use in acute trauma care settings.
<b>Rehabilitation Prescription (RP) (standard and basic)</b>	A document detailing a patient's rehabilitation needs and making recommendations for how these should be met after they are discharged from the acute trauma services.
<b>Specialist rehabilitation</b>	The total active care of patients with complex disabilities by a multi-professional team who have undergone recognised specialist training in rehabilitation, led or supported by a consultant trained and accredited in rehabilitation medicine.
<b>Specialist Rehabilitation Prescription (SpRP)</b>	The Rehabilitation Prescription for a patient who is identified as having highly complex needs requiring further specialist in-patient rehabilitation. It includes the Rehabilitation Prescription (RP), together with four standardised tools to record rehabilitation needs.
<b>Trauma Audit and Research Network (TARN)</b>	An organisation that provides the national clinical database for acute trauma care in England.
<b>Trauma Unit (TU)</b>	A hospital that is part of the Major Trauma Network, providing care for all except the most severe major trauma patients.
<b>UK Rehabilitation Outcomes Collaborative (UKROC)</b>	An organisation that provides the national clinical database for specialist rehabilitation services in England.

---

# 5 INTRODUCTION

Following major injury, the majority of patients will make a good recovery with the support of their local services. However, a small number will have complex rehabilitation needs requiring the skills and facilities of a specialist in-patient rehabilitation unit to make the transition from hospital to the community, and to maximise their recovery of physical, psychological and social function. By relieving pressure on beds in acute services, specialist rehabilitation services form a critical component of the trauma pathway, without which the Major Trauma Networks (MTNs) will undoubtedly fail. To date, however, the main focus of attention has been on the acute and frontline services.

The NHS Clinical Advisory Group Report on Regional Networks for Major Trauma (2013)<sup>1</sup> highlighted the limited capacity and fragmentation of specialist rehabilitation services across England, and noted that this was the area of the pathway most in need of development. The report recommended the use of a 'Rehabilitation Prescription' (RP) to identify ongoing needs and recommendations for rehabilitation after discharge from the acute trauma services. The British Society of Rehabilitation Medicine (BSRM) Core Standards for Trauma (2013) recommended a further 'Specialist Rehabilitation Prescription' (SpRP) to identify patients with complex needs requiring referral to a specialist in-patient rehabilitation unit.<sup>2</sup>

Despite this, when the Major Trauma Networks were established in 2012, the allocated funding included no formal provision for specialist rehabilitation. Some regions recognised this need and included provision within their local planning, but others did not. This has led to considerable variation in the scope and standard of provision for post-trauma rehabilitation in different parts of the country.

In accordance with the MTN policy, after definitive care has been provided at a Major Trauma Centre (MTC), patients are frequently repatriated to their local Trauma Unit to relieve pressure on acute major trauma beds. Some patients with ongoing complex rehabilitation needs may spend an extended period of time at the Trauma Unit, waiting for a bed to become available in the specialist rehabilitation services, due to limited capacity.

The UK Rehabilitation Outcomes Collaborative (UKROC) data demonstrate that some patients may never actually get to those specialist services, as they are referred and accepted but are not admitted. The reasons for non-admission are not currently recorded or collected. Some patients may improve spontaneously to a level where their needs can be met by their local general (Level 3) rehabilitation services, but others simply 'get lost' in the system, and never receive the services they need. Anecdotal evidence indicates that some complex patients are transferred to nursing homes with minimal opportunities for rehabilitation and fail to achieve their full rehabilitation potential. More work needs to be done in tracking these patients' journeys, to identify reasons for non-admission and subsequent outcomes.

---

Current NHS coding and national information systems, including the Trauma Audit and Research Network (TARN)<sup>3</sup> provide important information on acute care and crude outcomes (e.g. mortality), but little or no information about process or patient outcomes in the rehabilitation aspects of the patient pathway. UKROC<sup>4</sup> now systematically records in-patient data on needs, inputs and outcomes from all specialist rehabilitation services in England, and reports national benchmarking information on quality and outcomes. However, it currently collates de-identified data only, so that tracking of individual patients between acute care and rehabilitation services is not possible.

The National Clinical Audit of Specialist Rehabilitation following Major Injury (NCASRI)<sup>5</sup> was commissioned in 2015 by the Healthcare Quality Improvement Partnership (HQIP), and funded by NHS England (NHSE) and the Welsh Government in year 1, and by NHS England in years 2 and 3. It will determine the scope, provision, quality and efficiency of specialist rehabilitation services across England and improve the quality of care for adults with complex rehabilitation needs following major trauma. Outcomes and quality of care will be evaluated in accordance with standards and recommendations laid out in national documents from the Department of Health (DoH), NHS England (NHSE), the British Society of Rehabilitation Medicine (BSRM) and the National Institute for Health and Care Excellence (NICE). A key component of NCASRI will be to link the TARN and UKROC datasets to track patients in their journey from the MTCs to the specialist rehabilitation services.

NCASRI has 3 main elements:

1. An organisational audit to identify the current provision of specialist rehabilitation for trauma patients and to map the pathways of care into and out of these services.
2. A prospective clinical audit of new patients presenting within NHS Major Trauma Centres (MTCs) and Defence Medical Services (DMS) who have complex needs and receive specialist rehabilitation.
3. A feasibility study for identifying the pathway and outcomes for patients who require specialist rehabilitation on discharge from MTCs, but do not subsequently attend.

This first NCASRI report presents the findings from Element 1, conducted between July 2015 and June 2016. This organisational audit comprised:

- **Mapping of specialist Level 1 and 2 rehabilitation service provision**, including an evaluation of capacity and quality of specialist rehabilitation facilities against the published national standards.
- **Evaluation of current practice in MTNs and MTCs** to identify the level of involvement of consultants in Rehabilitation Medicine (RM) within the MTCs and current implementation of the Rehabilitation Prescription (RP) and the Specialist Rehabilitation Prescription (SpRP).
- **Analysis of existing data for trauma patients within TARN and UKROC** over the three preceding years to examine baseline reporting practice for the various process and outcome data to be used in the prospective audit.

This first report highlights the perceived gaps in service capacity and identifies local arrangements to address these.

---

NCASRI is unusual for a national clinical audit in that it addresses a small volume of patients with complex and highly diverse needs. The absence of ring-fenced resources and clear standards for service provision from the outset has led to a wide range of practice and diverse approaches to data collection.

A significant challenge for this audit has been to identify the dataset for Element 2 that a) is feasible to collect and b) would provide the information required. This report will outline the process we have taken to consult with stakeholders and clinicians on the ground to achieve an agreed dataset and a range of systems for data collection in the subsequent elements of the programme.

---

# 6

## BACKGROUND

### 6.1 What is Major Trauma?

In 2010, the **NHS Clinical Advisory Group for Major Trauma (Trauma CAG)** reported to the Department of Health (England), recommending the establishment of networks within each region to provide coordinated pathways of care for patients following major trauma.<sup>1</sup>

According to NHS Choices, Major Trauma means **‘multiple, serious injuries that could result in disability or death’**.

Within the scientific literature, Major Trauma is defined using the **Injury Severity Score (ISS)**,<sup>6</sup> which assigns a value to injuries in different parts of the body and totals them to give a figure representing the severity of injury. An ISS >15 is defined as **‘Major Trauma’**.

This definition, however, does not include all those who would benefit from the regionalisation of trauma care. The Trauma CAG took a more inclusive view, encompassing patients with lower ISS scores and recommending, for example, that all patients with an ISS ≥9 should have their rehabilitation needs formally considered and documented through a **Rehabilitation Prescription (RP)**.

### 6.2 Major Trauma Networks in the UK

A Major Trauma Network (MTN) is the **collaboration between the providers** commissioned to deliver coordinated trauma care services in a geographical area.

- At its heart is the **Major Trauma Centre** (or **‘Collaborative’** if there is more than one), but the Trauma Network includes *all* providers of trauma care, particularly: pre-hospital services, other hospitals receiving acute trauma admissions (e.g. **Trauma Units**), and rehabilitation services.
- Within this system, patients who suffer major injury are treated and stabilised at a **Major Trauma Centre (MTC)**.
- Patients then progress along a care pathway, the details of which vary according to their rehabilitation needs and the specification of local and regional rehabilitation services.

There are currently 27 MTCs (22 of them treating adults) established across England, each linked with a number of supporting Trauma Units (TUs). The London Major Trauma Network was launched in 2010, and networks around the rest of England went ‘live’ from April 2012.

---

Recognising the importance of early and specialist rehabilitation in managing flow and removing bottlenecks in the acute patient pathway, the Trauma CAG recommended the appointment of a consultant in RM as Director of Rehabilitation in every MTN, to support strategic development and provide clinical leadership of acute trauma rehabilitation services. This recommendation is now included in the NHS England (NHSE) Service Specification for Major Trauma.<sup>7</sup>

### 6.3 What is specialist rehabilitation?

According to the NHSE 2014 Service Specification for Specialist Rehabilitation:<sup>8</sup>

**Rehabilitation** is a process of assessment, treatment and management with ongoing evaluation, through which the individual (and their family/carers) is supported to achieve their maximum potential for physical, cognitive, social and psychological function, participation in society and quality of living. Patient goals for rehabilitation vary according to the recovery trajectory and stage of their condition.<sup>9</sup>

**Specialist rehabilitation** is the total active care of patients with complex disabilities by a multi-professional team who have undergone recognised specialist training in rehabilitation, led by a consultant trained and accredited in Rehabilitation Medicine.<sup>9</sup>

**Evidence:** There is now a substantial body of trial-based evidence and other research to support both the effectiveness and cost-effectiveness of specialist rehabilitation.<sup>10</sup> Early transfer to specialist centres and more intense rehabilitation programmes are cost-effective,<sup>11,12</sup> particularly in the small group of people who have high care costs due to very severe brain injury.<sup>13–15</sup>

Despite their longer length of stay, the cost of providing early specialist rehabilitation for patients with complex needs is rapidly offset by longer term savings in the cost of community care, making this a highly cost-efficient intervention.<sup>16</sup>

#### 6.3.1 The role of consultants in Rehabilitation Medicine (RM)

Not all patients with complex disability have the potential to gain from rehabilitation. Consultants in RM play a critical role in assessing complex needs, planning how these will be met, and expediting transfer to the most appropriate next stage of rehabilitation or long-term care for that particular individual.

In the context of trauma the **core activities of an RM consultant** include:<sup>2</sup>

- Diagnosis and medical management of conditions causing complex disability. These include musculoskeletal injuries, limb loss, brain and spinal cord injury arising from trauma itself, and also any pre-existing physical, psychological or mental health conditions.
- Anticipation and prevention of physical, psychological and social complications, based on knowledge of a condition's natural history and prognosis.
- Evaluation of a patient's potential to gain from rehabilitation and prognosis for recovery.

- 
- Defining rehabilitation needs, planning how they will be met, and directing patients to appropriate services.
  - Coordinating care and collaborating with other medical and therapy teams, as well as health and social care commissioning agencies, to negotiate individual funding for bespoke rehabilitation programmes when necessary.
  - Communicating with families to provide information, support them in distress and manage expectations.
  - Making 'best-interests' decisions on treatment and care – with the team and family – for patients who lack the mental capacity to decide for themselves.

RM consultants therefore play a vital role in the MTCs, and should be closely involved, both at a clinical level and in the planning and delivery of services across all parts of the MTNs. They are particularly involved with the specialist services for patients with complex needs, but also provide a networking role to support local non-specialist services. They provide an important resource of advice and training of staff with respect to rehabilitation needs and interventions.

## 6.4 Which patients need specialist rehabilitation?

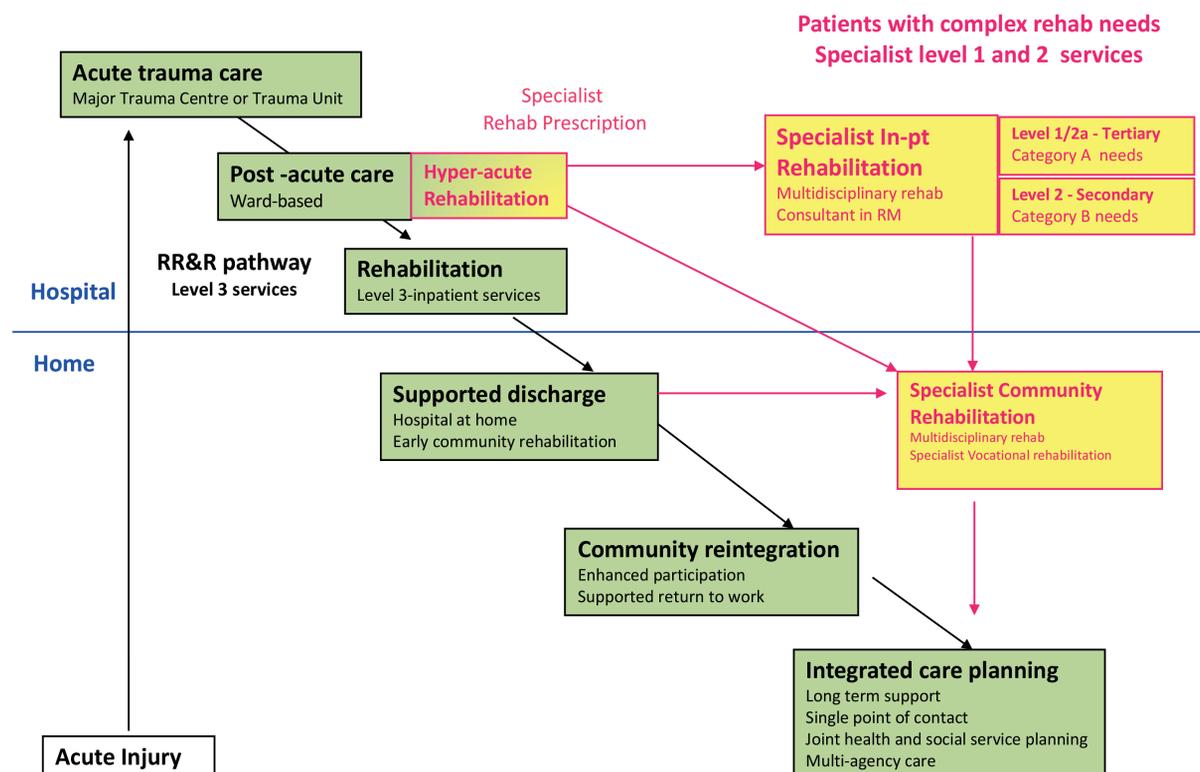
Injuries requiring rehabilitation will range from the very modest to the very severe, and not every patient will require specialist rehabilitation.

The NHSE Service Specification for Specialist Rehabilitation<sup>8</sup> defines three levels of service (1 to 3) and four categories of patient need (A to D).

- The majority of trauma patients will have an uncomplicated recovery and progress rapidly down the 'Recovery, Rehabilitation and Re-enablement' (RR&R) pathway. Their rehabilitation needs (Category C or D) can be met within their local general (Level 3) rehabilitation services (see Figure 6.1).
- Those with more complex needs (Category B) may require referral to their local specialist (Level 2) rehabilitation services for coordinated intensive rehabilitation programmes.
- A small number of patients with highly complex needs (Category A) require the specific staff expertise and facilities of tertiary specialised (Level 1) rehabilitation services.
- Level 1 services are expected to have a casemix with over 85% Category A patients. Level 2 units may have a more varied casemix of patients with Category A or B needs.
- Spinal injury units are currently not part of the NHSE service specification for specialist rehabilitation, but Level 1 and 2 services treat a proportion of patients with spinal injuries.

Further detail on the criteria for rehabilitation needs within each category can be found at [www.england.nhs.uk/wp-content/uploads/2014/04/d02-rehab-pat-high-needs-0414.pdf](http://www.england.nhs.uk/wp-content/uploads/2014/04/d02-rehab-pat-high-needs-0414.pdf).

Figure 6.1: Pathway for patients with trauma



Copyright Prof L Turner-Stokes (2012). Reproduced with permission.

## 6.5 Identifying patients with complex rehabilitation needs

By its very nature, Major Trauma results in a complex range of impairments and disabilities, which typically include a mixture of physical, cognitive, emotional, social and behavioural problems. ISS scores do not necessarily provide a good indication of rehabilitation needs.

The NHSE service specification for Major Trauma<sup>7</sup> mandates use of the **Rehabilitation Prescription (RP)** within the MTCs as a condition for payment of the Best Practice Tariff (BPT), and also requires assessment by an RM consultant within 2 to 4 working days for patients with more complex rehabilitation needs.

**All patients with Category A or B rehabilitation needs should have an SpRP**

For patients who are confirmed as still having complex (Category A or B) needs for specialist rehabilitation at discharge from the MTCs, a **Specialist Rehabilitation Prescription (SpRP)** should be drawn up by the RM consultant or their designated deputy, who will then arrange transfer to an appropriate specialist rehabilitation setting as quickly as possible.<sup>2</sup>

The British Society of Rehabilitation Medicine (BSRM) has proposed a set of core standards and data items for an SpRP, including the following measurement tools:<sup>2</sup>

- The **Patient Categorisation Tool (PCAT)**, which identifies Category A and B needs;
- The **Rehabilitation Complexity Scale (RCS-ET)**, which identifies the resource requirements to meet the individual's rehabilitation needs;

- 
- The **Neurological Impairment Set for Trauma (NIS-Trauma)** provides a measure of the severity of trauma-related impairments, against which to evaluate outcome;
  - The **Northwick Park Dependency Scale (NPDS)** – a measure of dependency that translates to an assessment of care needs and costs (the **Northwick Park Care Needs Assessment (NPCNA)**); which is used to estimate the cost-efficiency of rehabilitation.

More details about these tools are given later in this report.

The RP and SpRP present a major opportunity for data capture on the needs for, and provision of, specialist rehabilitation within the trauma networks. However, their exact nature and content are still under development, and data reporting varies widely between centres.

This audit will capture patients referred for specialist rehabilitation at the point of discharge from the MTCs, and will help to embed robust systems for identifying patients with complex needs and expediting appropriate referrals to meet their continuing needs.

## 6.6 Rehabilitation service provision in the UK

Since the reorganisation of the NHS following the Health and Social Care Act 2012, tertiary specialist rehabilitation for patients with highly complex (Category A) needs is commissioned directly by NHS England. Local specialist and general rehabilitation services are commissioned by the Clinical Commissioning Groups (CCGs).

**Hyper-acute specialist rehabilitation services.** Development of the MTNs has instigated a new category of ‘Hyper-acute rehabilitation’ unit.<sup>2</sup> These units are sited within acute care settings. They take patients at a very early stage in the rehabilitation pathway, when they still have unstable medical and surgical needs requiring continued active support from the trauma, neuroscience or acute medical services. These units are still undergoing development and a variety of service models for hyper-acute rehabilitation exist in different parts of the country.

**Tertiary ‘specialised’ rehabilitation services\* (Level 1)** are high-cost/low-volume services, which provide for patients with highly complex rehabilitation needs that are beyond the scope of their local and district specialist services. These are normally provided in coordinated service networks planned over a regional population of between 1 and 5 million, through NHSE specialised commissioning arrangements. These services are sub-divided into:

- **Level 1a:** for patients with high physical dependency;
- **Level 1b:** for patients with mixed dependency;
- **Level 1c:** for mainly mobile patients with cognitive/behavioural disabilities.

**Local (district) specialist rehabilitation services (Level 2)** are typically planned over a district-level population of 350,000 to 500,000, and are led or supported by a consultant trained and accredited in Rehabilitation Medicine (RM), working both in hospital and in the community setting. The specialist multi-disciplinary rehabilitation team provides advice and support for local general rehabilitation teams. These are **Level 2b** services. As some parts

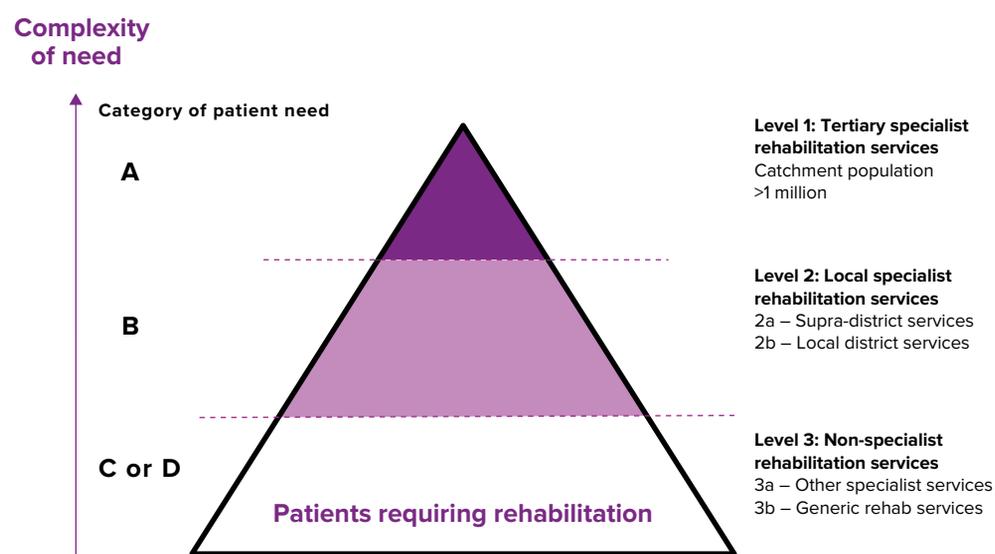
\* Previously known as ‘Complex specialised rehabilitation services’ in the National Definition Set, version 2.

of England have no access to tertiary specialised rehabilitation services, local specialist rehabilitation services have extended their reach in some areas to support a **supra-district** catchment of 750,000 to 1 million people, and take a higher proportion (at least 50%) of patients with very complex needs. These are **Level 2a** services.

Within each locality, **local non-specialist (Level 3) rehabilitation** teams provide general multi-professional rehabilitation and therapy support for a range of conditions within the context of acute services, intermediate care or community services. These are **Level 3b** services. In addition, local services which ‘specialise’ in certain conditions and include a significant component of rehabilitation (for example, stroke or care of the elderly) may act as a local source of expertise, even though they do not meet the criteria for designation as a ‘specialist rehabilitation service’. These are **Level 3a** services.

These developments have led to a 5-tier system, as shown in Figure 6.2. **The focus of this audit is on patients requiring hyper-acute and Level 1 and 2 specialist rehabilitation services only.**

**Figure 6.2: Different levels of specialisation in rehabilitation service provision in England**



## 6.7 National clinical databases for Major Trauma and Specialist Rehabilitation

### 6.7.1 The Trauma Audit and Research Network (TARN)

The Trauma Audit and Research Network (TARN) is the National Clinical Audit for trauma care across England, Wales and the Republic of Ireland. It provides a statistical base to support clinical audit, to aid the development of trauma services and to inform the research agenda.

---

Established in 1989, TARN's key role is to deliver a high-quality service that supports clinicians in driving improvements in trauma care. It holds the largest trauma database in Europe, with over 500,000 cases, including 47,000 children, and is self-funded through annual hospital subscription fees.

NHS Trusts, commissioners, regulatory bodies, NHS England and the Department of Health rely on TARN's national clinical trauma audit data. TARN offers the means to monitor care and outcomes by:

- Providing a robust data collection system that can adapt to and reflect changes in service delivery;
- Delivering casemix-adjusted analysis to report on comparative outcomes;
- Reporting of key standards and recommendations to support improvements in care and in the commissioning of trauma care services.

These are delivered through three themed clinical reports, the Major Trauma Dashboard, and national reports.

Data submitted to TARN relates primarily to the acute care pathway from incident to hospital discharge, and is entered into the secure web-based **electronic data collection and reporting system (eDCR)** by hospitals.

Since the introduction of the Rehabilitation Prescription, hospitals have been able to record a presence of an RP. In 2013, completion of the response to four mandatory RP questions on the TARN data collection system became part of the criteria for payment using the Best Practice Tariff in Major Trauma Centres.<sup>7</sup> These four mandatory questions are:

- **Presence of a Rehabilitation Prescription? If yes:**
- Does the patient have physical rehabilitation needs?
- Does the patient have cognitive or psychological needs?
- Does the patient have psychosocial needs?

In addition to the mandatory RP, fields for an extended Rehabilitation Prescription (eRP) are also available on TARN for MTCs that wish to use the eDCR to collate more detailed information. The eRP is not mandatory, and it should be noted that it is different from the SpRP. The eRP includes descriptive information about impairments, functional limitations and psychosocial issues, as well as recommendations for rehabilitation, but does not include the formal measurement tools included in the SpRP.

---

### 6.7.2 The UK Rehabilitation Outcomes Collaborative (UKROC)

The UK Rehabilitation Outcomes Collaborative (UKROC) provides the national clinical database for specialist rehabilitation services in England. It was established in 2010 through an National Institute for Health Research programme grant for applied research (2008–2015).<sup>17</sup> It is based at Northwick Park Hospital in London and overseen by the BSRM.

UKROC systematically collates patient level data for all case episodes admitted for in-patient specialist rehabilitation in England; the database now contains over 30,000 recorded episodes. The dataset comprises socio-demographic and process data (e.g. waiting times, discharge destination), as well as clinical information on:

- the complexity of rehabilitation **needs**;
- the **inputs** provided to meet those needs;
- **outcomes**, including functional gain and cost-efficiency.

Key measurement tools within the UKROC dataset relevant to this audit are summarised in Table 6.1.

Since July 2015, UKROC has been directly commissioned by NHSE to provide the commissioning dataset for specialist rehabilitation services. Registration and submission of the full UKROC dataset is a commissioning requirement for designation, and for eligibility for payment as a Level 1 or 2 specialist rehabilitation service.

From a commissioning perspective, UKROC performs key functions:

- It collates information on service characteristics (staffing levels, caseload complexity and catchment population) to ‘signpost’ services for designation at the appropriate service level;
- It provides monthly activity reports for contracting and commissioning purposes;
- It also provides quarterly benchmarking reports on quality and outcomes, including response times for assessment and admission, functional gain and cost-efficiency; The figures for each specialist rehabilitation unit are compared to average figures for providers within the same service level.

This national clinical audit will build on the programme of work initiated through UKROC to provide insights into cost-effective models of care for patients with complex disabilities following major trauma.

To date, UKROC has collated only de-identified data, which precludes the tracking of individual patients. NCASRI will extend the scope and purpose of the UKROC programme to encompass rehabilitation for patients with complex needs following Major Trauma by **developing the database into a registry**. Permissions are being sought to **collect identifiable data** (NHS number and date of birth). Data linkage will be created with TARN to provide information in an identifiable form that enables tracking of individual patients longitudinally through the care pathway.

**Table 6.1: Key measurement tools within the UKROC dataset**

Tool	Structure	Purpose
<b>Needs for rehabilitation</b>		
Patient Categorisation Tool (PCAT)	Checklist and ordinal measure Total score range 17–50	Records the types of need a patient may have that lead to a requirement for treatment in a specialist rehabilitation unit (Category A or B needs).
Neurological Impairment Set for Trauma (NIS-Trauma) <sup>18, 2</sup>	Checklist and ordinal measure Total score range 0–113	Records the severity of neurological and other trauma-related impairments, against which to evaluate outcome.
<b>Inputs</b>		
Rehabilitation Complexity Scale (RCS-E) <sup>19, 20</sup>	Ordinal measure Total score range depends on version	Records the resource requirements to meet the patient's needs for medical support, basic care and nursing, therapy and equipment.
Northwick Park Dependency Score (NPDS) <sup>21–23</sup>	Ordinal measure Total score range 0–100	Records basic care and nursing dependency. Translates by a computerised algorithm within the UKROC software to the Northwick Park Care Needs Assessment (NPCNA).
Northwick Park Care Needs Assessment (NPCNA) <sup>22</sup>	Interval scale of estimated care hours and costs	Provides a timetable of care needs and estimates the cost of care per week in the community.
<b>Outcomes</b>		
UK Functional Assessment Measure (UK FIM+FAM) <sup>24, 25</sup>	Ordinal measure Total score range 30–210	A global measure of disability comprising 16 items addressing physical function (FIM+FAM motor) and 14 addressing cognitive, communicative and psychosocial function (FIM+FAM cognitive).
Cost-efficiency	The time taken to offset the cost of rehabilitation by the resulting savings in the cost of ongoing care in the community.  This is calculated from 'mean episode cost of rehabilitation' divided by 'mean reduction in weekly cost of care' between admission and discharge, as estimated by the NPCNA.	

Full details, including electronic versions of the tools, may be found on the UKROC website [www.csi.kcl.ac.uk/ukroc.html](http://www.csi.kcl.ac.uk/ukroc.html).

---

# 7 AIMS AND OBJECTIVES OF THE NCASRI PROGRAMME

## 7.1 Overarching aim

NCASRI aims to provide a national comparative audit of access to and organisation, quality, outcomes and efficiency of specialist rehabilitation services provided for adults with complex needs following major injury in the English NHS and the Defence Medical Services.

The audit is designed to drive:

- Improved and equitable access to specialist rehabilitation services for eligible patients;
- Improved physical and psychological recovery, and the reduction of long-term disability and dependency following specialist rehabilitation.

Return to employment is usually not a feasible option for the group of patients with severe complex disability that forms the target population for this audit. Therefore, we will also use other methods to record and compare the cost-efficiency of rehabilitation services, such as the reduction of care needs, and the time taken for the cost of the rehabilitation programme to be offset by estimated savings in the cost of ongoing care in the community.

## 7.2 Specific objectives

1. To enable these improvements through the provision of high-quality data that compares providers of healthcare.
2. To achieve and maintain close alignment with the relevant national standards and clinical guidelines, as published by the DoH, the BSRM and NICE.
3. To link data at the individual patient level to TARN, UKROC and other relevant national datasets to maximise impact and reduce data entry burden.
4. To consider and plan from the outset other linkage activity which might in the future facilitate extension of the audit further along the patient care pathway.
5. To consider and plan how the audit's reports and other outputs will be used to stimulate change, both locally and nationally.

# 8

## REFERENCE STANDARDS

Reference standards and indicators are drawn from the following national clinical guidelines and standards documents:

- The National Service Framework for Long-term Conditions (NSF for LTC) (2005).<sup>26</sup>
- NICE Guidelines for Rehabilitation after Critical Illness in Adults (2009).<sup>27</sup>
- BSRM Standards for Rehabilitation Services, Mapped on to the NSF for Long-term Neurological Conditions (2009) (C).<sup>28</sup>
- BSRM Specialist Neuro-rehabilitation Services: Providing for Patients with Complex Rehabilitation Needs (2010, updated 2015) (D).<sup>29</sup>
- BSRM Core Standards for Rehabilitation following Major Trauma (2013) (E).<sup>2</sup>
- The NHS Clinical Advisory Group Report on Regional Networks for Major Trauma (2010) (F).<sup>1</sup>
- The Department of Health Specialised Services National Definition Set (2009) (G).<sup>30</sup>
- NHSE Service Specification (standard contract) D15 for Major Trauma (all ages) (2014) (H).<sup>7</sup>
- NHSE Service Specification (standard contract) D02 for Specialist Rehabilitation for Patients with Highly Complex Needs (all ages) (2013) (I).<sup>8</sup>

### 8.1 Key standards for patients with complex needs following major trauma

Structure and organisation	Element	Source
<p>RM consultants should be closely involved both at a clinical level and in the planning and delivery of all Major Trauma Networks to support and direct rehabilitation for patients with complex needs.</p> <ul style="list-style-type: none"> <li>• Within each Major Trauma Centre (MTC), an identified RM consultant (or consultants) should be an integral part of the MTC Team.</li> <li>• An RM consultant should attend the MTC or TU at least 2–3 times per week; this should be written into their job plan.</li> <li>• At an operational level, key roles for the RM consultant should include rounds of multi-disciplinary wards and team-based planning meetings.</li> </ul>	1	Survey

1 Process within the MTC		Element	Source
1.1	All patients with ISS scores of $\geq 9$ should have a Rehabilitation Prescription (RP).	2	TARN
1.2	Rehabilitation planning (including the commencement of the RP) should start within 48 hours of admission.	2	TARN
1.3	A consultant in RM should be involved from an early stage in the patient's trauma pathway (within 3 calendar days) to assess patients with complex rehabilitation needs, to participate in their rehabilitation planning, and to expedite onward referral. This will normally involve a consultant in RM attending the MTC or TU at least 2–3 times per week.	1	SURVEY
1.4	Patients thought likely to have complex rehabilitation needs requiring specialist in-patient rehabilitation should have the following completed by the MTC team: <ul style="list-style-type: none"> <li>Rehabilitation Complexity Score (RCS-E);</li> <li>Checklist of complex needs.</li> </ul>	2	TARN
1.5	If the checklist suggests the patient is likely to have Category A or B needs, they should be reviewed by a consultant in RM or their designated deputy.	2	TARN
1.6	The consultant in RM (or designated deputy) should complete: <ul style="list-style-type: none"> <li>The PCAT tool – to confirm Category A or B needs.</li> </ul> <p>If Category A or B needs are confirmed, a Specialist Rehabilitation Prescription (SpRP) should be completed before discharge from the MTC, including:</p> <ul style="list-style-type: none"> <li>The Northwick Park nursing Dependency Scale (NPDS);</li> <li>The Neurological Impairment Set – Trauma (NIS-Trauma);</li> <li>Details of referral to one or more named Level 1/2 service;</li> <li>Discharge destination.</li> </ul>	2  2	TARN/ UKROC  TARN/ UKROC

2 Assessment and transfer to Level 1/2 service		Element	Source
2.1	Following referral, the patients should be assessed by the Level 1/2 service within 10 days.	2	UKROC*
2.2	A consultant in RM (or their designated deputy) should complete a Patient Categorisation Tool (PCAT) to confirm that the patient has complex (Category A or B) needs for rehabilitation.	2	UKROC
2.3	If accepted in principle, but the patient is not yet fit for transfer, they may be placed on an inactive waiting list pending further review. Serial recordings of the RCS-ET Medical score may help to determine the 'R-point', at which the patient is Ready for transfer and placed on the active waiting list.	2	TARN
2.4	Patients identified as requiring Level 1/2 in-patient rehabilitation should be transferred to specialist in-patient rehabilitation within six weeks of being fit for transfer.	2	UKROC

\* UKROC currently only collects these data for patients actually admitted to a Level 1 or 2 service.

3 Specialist Level 1 and 2 in-patient rehabilitation services		Element	Source
3.1	All Level 1 and 2 services should be led by a consultant in RM and/or neuropsychiatry, depending on caseload.	1	Service profiles
3.2	All Level 1 and 2 services should meet at least the minimum standards for safe and effective staffing levels as laid down in the BSRM standards.	1	Service profiles
3.3	All Level 1 and 2 services should be registered with UKROC and contribute the first full UKROC dataset for every patient enrolled under the NHSE-commissioned rehabilitation programme.	1	Service profiles
3.4	Assessment of function and rehabilitation needs should be documented within 10 days of admission and within the last 7 days before discharge, including RCS-E, NPDS and UK FIM+FAM.	2	UKROC
3.5	By discharge, all patients should have achieved some measurable gain or goal achievement, as measured by UK FIM+FAM, NPDS or GAS T-score (or other approved measure), or the reason for no gain is recorded. Discharge destination should also be recorded.	2	UKROC
3.6	Cost-efficiency data* should be reported in all episodes. Excluding patients who remain in prolonged disorders of consciousness at discharge, cost-efficiency for trauma patients should be within two standard deviations of the mean within each service group for 85% of patients. The reasons for any outlying services should have been explored and reported.	2	UKROC

\* Measured in the time to offset the costs of rehabilitation by savings in ongoing care, as estimated by the Northwick Park Dependency Score (NPDS/NPCNA) – see Table 6.1.

Within this report, the following colour codes, similar to those used in the Sentinel Stroke National Audit Programme (SSNAP),<sup>31</sup> will be used in tables to report the percentage of episodes meeting the standards:

Colour code	<65%	65–74%	75–79%	80–89%	90–100%
	<65%	65–74%	75–79%	80–89%	90–100%

---

# 9

## MAPPING OF SPECIALIST LEVEL 1 AND 2 REHABILITATION SERVICE PROVISION

UKROC is responsible for signposting specialist rehabilitation services for designation at the different levels of specialisation. Signposting is reviewed annually by examination of the service profile and the caseload complexity for each service in relation to the standards published by the BSRM<sup>29</sup> and the average figures for other services within the group. It is normally published in September/October, in time for the following year's contracting round.

Updated service profiles (detailing characteristics such as staffing levels within each discipline, bed capacity and other facilities) are requested annually, and caseload complexity is extracted from analysis of the RCS-E and PCAT scores submitted to UKROC in the monthly activity data from each provider over the preceding year.

In order to map the current Level 1 and 2 service provision, data were extracted from the service profiles for all registered specialist rehabilitation providers in 2014–2015 (the latest figures available).

Extracted service profiles included:

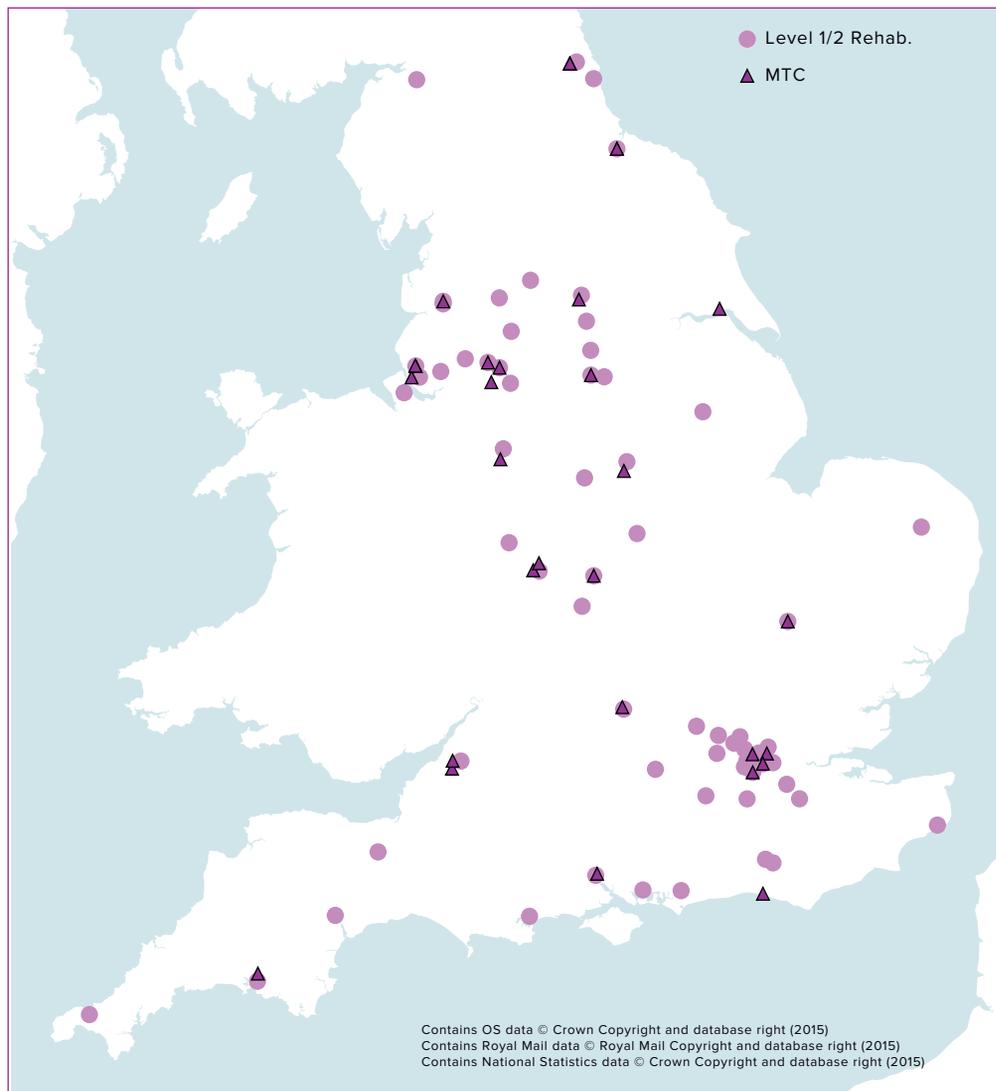
- The number and geographic distribution of all Level 1 and 2 specialist in-patient rehabilitation services in England;
- The total capacity (occupied beds) and the proportion of activity for trauma patients within each level of service;
- The provision of specialist rehabilitation beds per million population in each of the NHSE commissioning areas – and the proportion of that capacity currently used for trauma patients.

The extent to which Level 1 and 2 services currently meet the standards for caseload complexity and staffing levels was also examined.

## 9.1 Number and geographic distribution of Level 1 and 2 services

In 2014–2015, a total of 65 services in England were signposted as Level 1 or 2 in-patient specialist rehabilitation units. Figure 9.1 shows their geographic distribution in relation to the MTCs.

**Figure 9.1: Geographic distribution of the Major Trauma Centres and Level 1 and 2 specialist in-patient rehabilitation services**



## 9.2 Capacity

Table 9.1 shows the total bed capacity and approximate proportion of trauma admissions within each level of service.

**Table 9.1: Total capacity and proportion of trauma patients in 2014–2015**

Service level	No. of units	Total OBDs* 2014–2015	No. of beds**	% admissions for trauma	No. of trauma beds
Hyper-acute	3	8,281	23	7%	2
1a	7	56,740	155	19%	30
1b	6	38,062	104	33%	34
1c	3	8,681	24	29%	7
2a	13	95,820	263	17%	45
2b	33	155,161	425	18%	77
<b>Total</b>	<b>65</b>	<b>362,745</b>	<b>994</b>	<b>Overall 19.5%</b>	<b>195</b>

\* OBDs = Occupied bed days.

\*\* The number of occupied beds was calculated as OBD/365, rounded to whole numbers.

In 2014–2015, there were approximately 994 occupied beds for specialist rehabilitation in England. Across all services, 19.4% of admissions were for trauma cases, giving a total of about 195 beds used for trauma patients. However, it is not known what proportion of these were actually admitted from the Major Trauma Centres or Trauma Units.

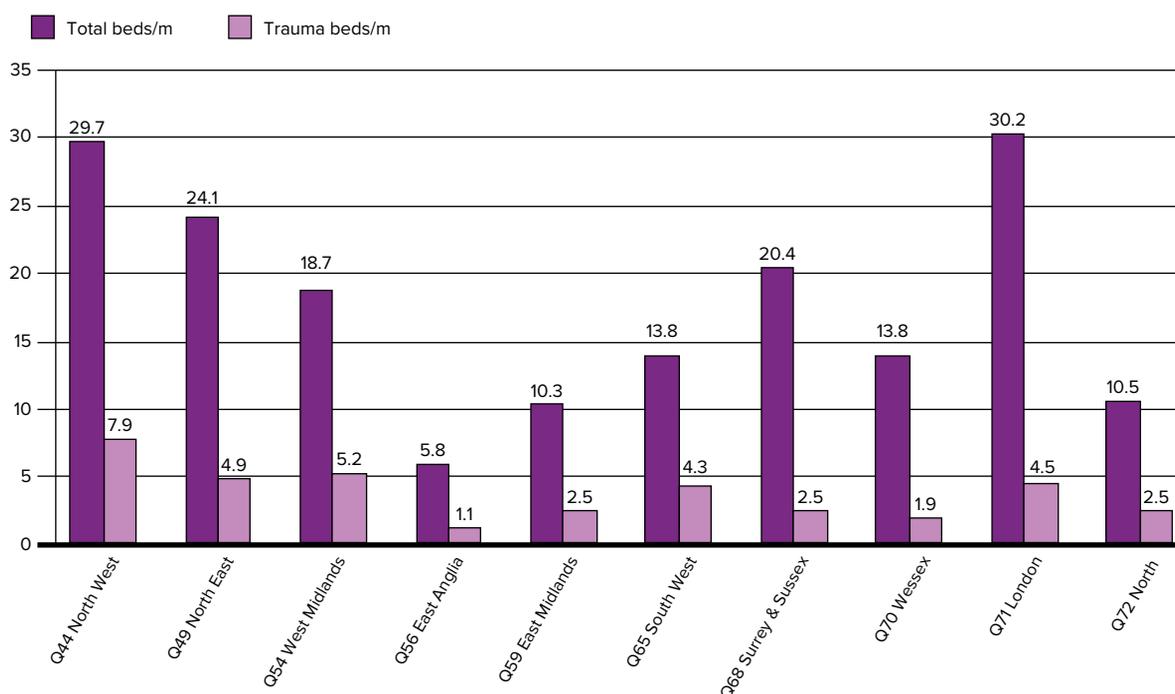
**About 5% of cases treated in MTCs subsequently receive specialist rehabilitation**

With the average length of stay approximately 75 days (see below), each bed accommodates about 5 admissions per year, so that this total provision allows for 950 admissions to specialist rehabilitation per year for trauma patients.

In the same period, TARN recorded a total of approximately 20,000 cases of Major Trauma admitted to MTCs across England (see below). Therefore, about 5% of these patients received Level 1 or 2 specialist in-patient rehabilitation. It is not yet known how accurately this proportion reflects the total need for specialist rehabilitation in the Major Trauma population. However, this is a question that this audit will address in Elements 2 and 3.

Figure 9.2 shows the geographic variation in bed provision per million population across the different NHSE commissioning areas. Provision for specialist in-patient rehabilitation ranged from under 6 to over 30 beds per million population, and provision for trauma patients ranged from 1 to 8 beds per million.

**Figure 9.2: Total Level 1 and 2 beds for specialist and trauma rehabilitation per million population**



It should be noted, however, that these figures do not take account of out-of-area commissioning, for which there may be good reasons. For example, commissioners for the Home Counties surrounding London have historically commissioned tertiary services within the London area for reasons of better accessibility by public transport, as it is often easier to travel into the city than to travel 'across country' within a region.

The same may occur to some extent in other large metropolitan areas such as Manchester. So the apparently higher levels of provision in these areas may disappear if calculated on the wider population being served, as opposed to the population figures for the area itself.

### 9.3 BSRM standards

The BSRM standards for specialist neuro-rehabilitation services for patients with complex rehabilitation needs<sup>29</sup> sets out standards for caseload complexity within the various levels of service. It also provides standards for recommended staffing levels to meet the needs of this casemix, as summarised in Table 9.2.

Caseload complexity may be reflected either by the proportion of patients admitted with Category A needs (as defined by a PCAT score of  $\geq 30$ ), or by the proportion of patients with Rehabilitation Complexity Scores (RCS-E) of  $>11$  at any one time. This cross-sectional RCS-E data accounts for the fact that some patients may improve (i.e. become less dependent and resource intensive) more quickly than others during a rehabilitation programme.

**Table 9.2: The BSRM standards for staffing and complexity within the different levels of specialisation**

	Hyper-acute	Level 1a	Level 1b	Level 2a	Level 2b
<b>Staffing Whole Time Equivalents (WTE)</b>					
Medical	6.0–7.0	4.5–5.5	3.5–4.0	3.5–4.0	3–3.5
Nursing	45–60	40–45	35–40	35–40	35–40
Therapy	18.0–21.5	19–23	17.5–21.5	16–19	13–16.5
<b>Caseload complexity</b>					
% Category A needs*	≥85%	≥85%	≥85%	50–80%	30–50%
% RCS-E** >11	≥70%	≥70%	≥70%	50–70%	30–50%

\* Category A needs defined as a Patient Categorisation Tool (PCAT) score ≥30.

\*\* RCS-E = total Rehabilitation Complexity Score versions 12 or 13.

Separate data do not currently exist for staffing provision specifically for trauma patients within the specialist rehabilitation services. However, the UKROC data on service capacity, staffing levels and patient complexity profiles provide some evidence of the units' ability to meet the needs of their caseload.

Because this is an analysis of baseline data, we present aggregated data by service level, rather than individual service data. Table 9.3 summarises the percentage of services meeting the above standards.

**Table 9.3: Staffing levels and caseload complexity: The percentage of centres that meet the BSRM standards**

	Hyper-acute N=3 units	Level 1a N=7 units	Level 1b N=6 units	Level 2a N=13 units	Level 2b N=33 units
<b>Staffing</b>					
Medical	3 (100%)	2 (26%)	5 (83%)	8 (61%)	22 (66%)
Nursing	3 (100%)	3 (43%)	4 (66%)	9 (69%)	21 (64%)
Therapy	3 (100%)	4 (57%)	6 (100%)	9 (69%)	25 (76%)
<b>Caseload complexity</b>					
% Category A needs	2 (67%)	3 (43%)	3 (50%)	4 (31%)	16 (48%)
Missing data*	1 at 89%	1 at 69%	0	3 at >75%	5 at >75%
%RCS-E >11	2 (67%)	7 (100%)	6 (100%)	11 (85%)	32 (97%)

\* A small number of units were excluded from the analysis of % Category A needs because they had the majority of PCAT scores missing (for example, one hyper-acute unit was missing 89% of its PCAT scores).

## 9.4 Interpretation and conclusions

The data show that the majority of Level 1 and 2 services report a cross-sectional caseload complexity (RCS-E) in line with the standards. However, only about two-thirds of the units have the staffing to manage this caseload – and among Level 1a services, which are particularly short on medical and nursing staff, less than half have adequate staffing.

The data demonstrate that, in order to manage their caseload but still meet activity targets, most of the Level 1 and 2a units still admit a significant proportion of non-category A patients, whose needs could probably be met in other services. This is not surprising, as it is known that many Level 1 and 2 services are commissioned at reimbursement rates that fall well short of meeting service costs.<sup>16</sup>

This analysis of service profile and activity data has highlighted substantial variation in the provision of trauma beds across the country. This variation is unlikely to be accounted for by differences in either population or trauma rates, but may be explained by differences in commissioning and referrals. The findings suggest that, where this has not happened already, commissioners and providers should work together to undertake a detailed assessment of needs and capacity of specialist rehabilitation services for trauma patients within their service network.

---

# 10 EVALUATION OF CURRENT PRACTICE IN MTCs AND MTNS

A survey of current practice against published standards was completed in all Major Trauma Networks in England and one hospital in Wales. Established MTCs and MTNs do not currently exist in Wales. It was thus not appropriate to map and compare all services in Wales as these would look very different to those established in England.

The specific aims were to determine:

1. The level of involvement of consultants in RM within the Major Trauma Network (MTN) and Major Trauma Centre (MTC);
2. How MTNs are structured, in terms of number of MTCs, Trauma Units and pathways to access Level 1 and 2 rehabilitation units and availability of on-site rehabilitation beds;
3. Current practice within MTCs, including the use of Rehabilitation Prescriptions (RPs), Specialist Rehabilitation Prescriptions (SpRPs), data collection, and reporting methods;
4. Any perceived gaps in services or capacity, and local innovations to address these.

## 10.1 Survey methods

A customised questionnaire was developed, based on the reference standards listed in Section 8. The questionnaire can be found in electronic Appendix 1.1.

A named lead consultant in RM (or their designated deputy) was identified for each of the 22 Major Trauma Centres or Collaboratives treating adults in England. Contact details were obtained from the BSRM Trauma Special Interest Group (SIG) or the MTN contact lists.

The questionnaire was completed through structured interviews, conducted either face-to-face or by telephone. The interviewee received an electronic copy of the questionnaire prior to the interview and the data and information were confirmed and elaborated on further during the interview.

As rehabilitation services and MTNs are not necessarily coterminous, some consultants covered more than one network. Where any inconsistencies were identified, sites were re-contacted to clarify or amend submitted data.

Each centre received a summary of their questionnaire data to validate the accuracy of the information prior to inclusion in this report.

**It should be noted that the results given here are those reported by the interviewees, and may sometimes be at variance with actual data recorded, for example in TARN or UKROC.**

---

## 10.2 Key findings

All 22 Major Trauma Centres participated in the survey. Eighteen interviews were conducted with a consultant in RM or consultant neurologist/Director of Trauma. The remainder were completed by the Trauma Coordinator/Lead Physiotherapist. The list of participants and a summary for each MTC can be found in Appendix 1.

The Trauma Quality Improvement Network System states that each MTN requires a Director of Rehabilitation who should be a consultant in Rehabilitation Medicine with an agreed list of responsibilities within the trauma network, including involvement at executive level to coordinate strategic development of rehabilitation services for trauma patients.<sup>32</sup>

- 5/22 Networks (23%) indicated that there was no Director of Trauma Rehabilitation within their Network and the Tri-Network Director was not specifically for Trauma.
- The 17 remaining networks had a Director of Trauma Rehabilitation with 0.5–2 funded sessions per week.
  - In 12 of these networks, this post is held by a consultant in RM and the remaining 5 networks had a consultant therapist or network manager in this role.
  - In 16/22 Networks (73%) the Director of Trauma Rehabilitation was involved at executive level, attending network meetings as well as operational, executive and board meetings.

### 10.2.1 Patient flows – Access to Level 1 and 2 rehabilitation services and on-site rehabilitation beds

As the provision of specialist rehabilitation is not coterminous with the MTNs, there was considerable variability in the number and range of specialist rehabilitation services accessed.

Table 10.1 lists the 22 MTNs, with their catchment populations and respective numbers of MTCs and TUs to serve this population. It also shows number of specialist rehabilitation services (Level 1 and 2) that routinely take trauma patients from the MTN. It is important to note that some MTNs have to refer patients to rehabilitation facilities quite far away from the MTC due to lack of local rehabilitation units. The East of England MTN is one such example: the Network refers patients to four Level 1 units in London, but only has one Level 1 rehabilitation facility within the MTN.

**Table 10.1: Major Trauma Networks and the number of Level 1 and 2 rehabilitation services that routinely accept patients from them**

Major Trauma Network	Catchment population (million)	No. of MTCs and TUs		No. of specialist rehabilitation units		
		MTCs	TUs	Level 1	Level 2	Total
Northern (Newcastle, North East and Cumbria)	2	1	6	1	2	3
Northern (Middlesbrough and South)	1.5	1	2	0	1	1
West Yorkshire	2.1	1	6	0	3	3
North Yorkshire and Humberside	1.6	1	4	0	0	0
Lancashire and South Cumbria	1.6	1	4	1	2	3
Greater Manchester	3.3	3	3	1	4	5
Cheshire and Merseyside	2.5	3	8	1	3	4
South Yorkshire	1	1	4	0	2	2
North West Midlands and North Wales	2	1	5	0	1	1
Birmingham, Black Country, Hereford and Worcester	2	1	8	1	1	2
Central England	2	1	2	1	1	2
East Midlands	4.6	1	6	1	3	4
East of England	5.9	1	12	5	2	7
Thames Valley	3.5	1	5	1	1	2
Severn	2.3	1	5	1	1	2
North West London	1.9	1	6	5	9	14
North East London and Essex	3	1	11	5	5	10
South West London and Surrey	2.6	1	7	5	7	12
South East London, Kent and Medway	4.5	1	6	5	5	10
Sussex	1.6	1	3	1	2	3
Wessex	3.3	1	7	0	4	4
Peninsula	1.7	1	4	1	2	3
	<b>56.5</b>	<b>26</b>	<b>124</b>			

The population served by each MTN ranges between 1 million and 5.9 million. The number of MTCs ranges from 1–3 and the number of Trauma Units (TUs) ranges from 2–14.

All but one MTNs routinely refer to Level 1 and/or Level 2 specialist rehabilitation services; the total number of different services ranging from 1–14. Of the 22 MTNs, 5 (23%) reported that they had no access to any Level 1 services. This was principally a feature of the networks serving less densely populated areas, which is not surprising as the full 3-tier model – with a range of Level 1 and 2 services providing for different levels of need within the same area – tends to be most applicable in the larger metropolitan areas, such as London, Liverpool and Manchester.

Figure 10.1 illustrates the referral pathways between MTCs and the specialist Level 1 and 2 rehabilitation services across England. Some parts of the country (notably London) had highly interlinked referral pathways (see Figure 10.1a) whereas in other parts of the country (e.g. the North West of England), referral pathways were relatively discrete (see Figure 10.1b). The differences may be explained by variation in population density: sub-specialisation of services for different groups of patients is favoured when rehabilitation services are provided over a relatively small but densely populated area, such as London, where travelling distances are shorter.

#### On-site specialist rehabilitation beds

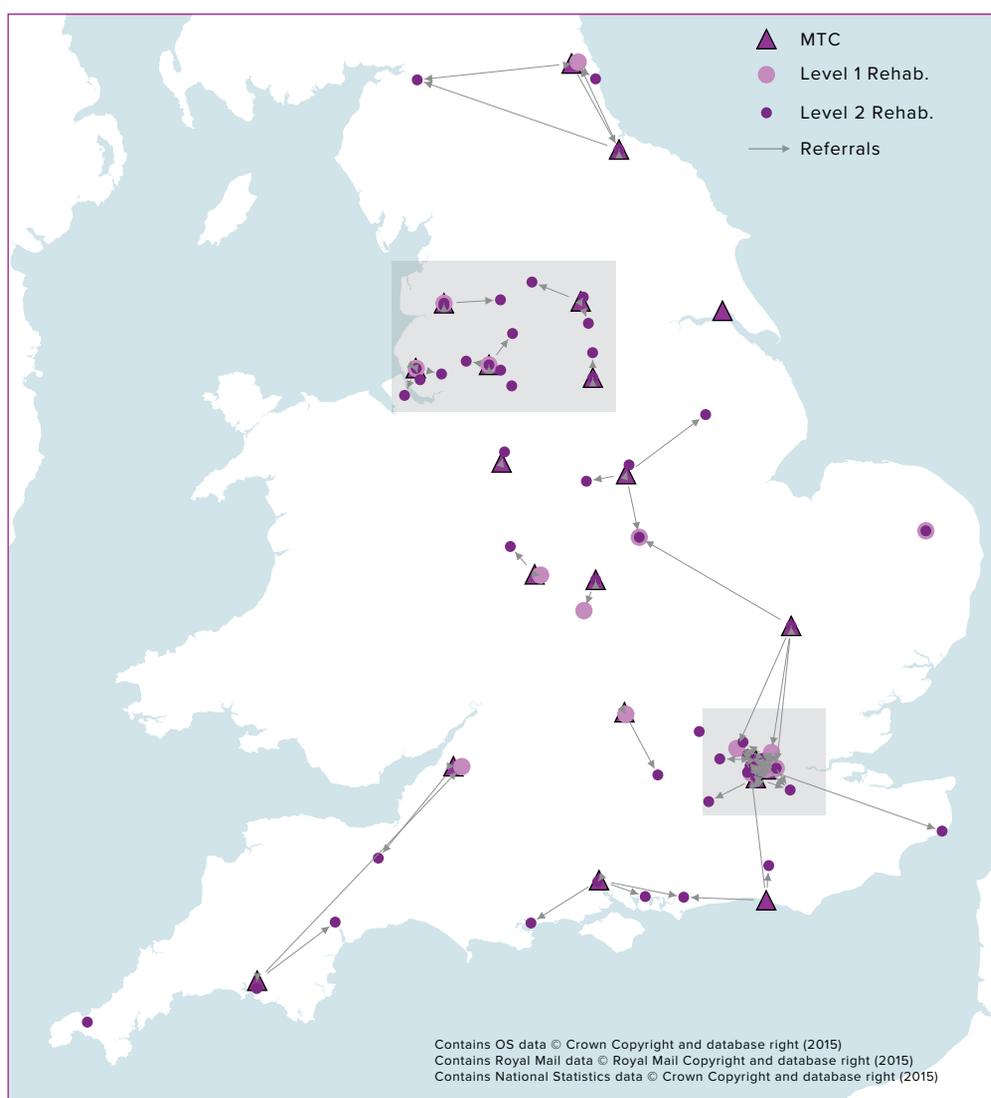
Nine MTC's had on-site specialist rehabilitation beds, as shown in Table 10.2. There were a total of 232 on-site beds: 40 hyper-acute (although only 30 were formally designated), 93 Level 1, and 99 Level 2 beds. These were for both trauma and non-trauma patients.

**Table 10.2: MTCs with on-site specialist rehabilitation beds**

Major Trauma Network	Hyper-acute	Level 1	Level 2
Lancashire and South Cumbria	-	13	12
Greater Manchester	20 (4 trauma)	22 (12 trauma)	-
Cheshire and Merseyside	10	20	35
South Yorkshire	-	-	14
Central England	-	-	12
East of England	10*	-	8
South West London and Surrey	-	10	-
Sussex	-	28	18
<b>Total</b>	<b>40</b>	<b>93</b>	<b>99</b>

\* Not formally designated by NHSE.

**Figure 10.1: Referral pathways from the MTCs to the specialist Level 1 and 2 rehabilitation services**



**Note:** In this map of England the purple triangles show the MTCs. The pink and purple dots indicate respectively the Level 1 and 2 specialist rehabilitation services. The arrows indicate the current referral pathways from the MTCs to the specialist rehabilitation services. More detail for the two areas shaded in grey (London and North West England) is given in the two figures below.

Figure 10.1a: Referral pathways from the MTCs in London

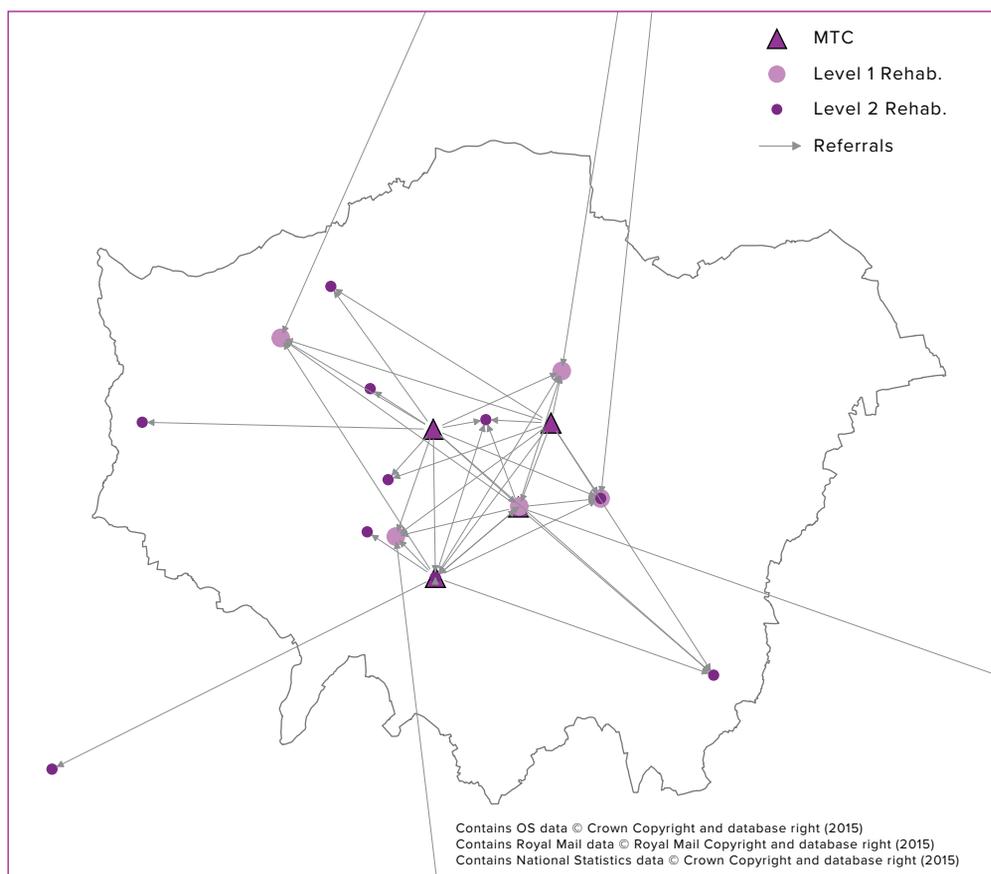


Figure 10.1b: Referral pathways from the MTCs in North West England



**Note:** Figure 10.1a shows the reported referral pathways from the MTCs in London, which are highly interlinked. There are four MTCs in London who can refer patients to up to 14 different Level 1 and 2 services. Figure 10.1b shows the referral pathways in the North West of England, which are relative discrete. The differences may be explained by variation in population density: sub-specialisation of services for different groups of patients is favoured when rehabilitation services are provided over a relatively small but densely populated area, such as London, where travelling distances are shorter.

## 10.2.2 RM consultant involvement in MTCs



### STANDARD

RM consultants should be closely involved, both at a clinical level and in the planning and delivery of all Major Trauma Networks to support and direct rehabilitation for patients with complex needs.

- Within each Major Trauma Centre (MTC), an identified RM consultant (or consultants) should be an integral part of the MTC Team.
- An RM consultant should attend the MTC at least 2–3 times per week, which should be written into their job plan.
- At an operational level, key roles for the consultant should include rounds of multi-disciplinary wards and team-based planning meetings.

**The involvement of RM consultants varied widely across MTNs. Four MTCs had none at all**

The models for involvement of RM consultants in trauma rehabilitation varied widely across the MTNs: some consultants had paid sessions within the MTC; some provided ad hoc input, funded from within the specialist rehabilitation service; and some MTNs had no consultant involvement whatsoever.

Table 10.3 summarises the number of consultants in RM working in the MTNs and the time spent within the MTCs. A breakdown for each MTC is given in Appendix 2.

**Table 10.3: Consultants in RM (CRMs) working in the Major Trauma Centres (MTCs)**

	Mean	Median	Range
	Per MTN		
No. of CRMs within the MTN	5	4	1–12
	Per MTC		
No. of CRMs working in MTC	1.7	1	0–6
No. of sessions paid by MTC	3.3	1	0–11
	If there are paid sessions from the MTC		
No. of CRM visits to MTC per week	4.4	5	1–7

	Mean	Median	Range
Approx. hours per week CRM spends on MTC	22.8	19	3–45
<b>If there are no paid sessions from the MTC</b>			
No. of CRM visits to MTC per week	0.8	1	0–2
Approx. hours per week CRM spends on MTC	2.7	2.0	0–8

In total, approximately 114 RM consultants were identified as working within Major Trauma Networks across England (some of them part-time). The number of RM consultants per MTN ranged from 1–12, with a mean of 5 per Network. However, these numbers represent the involvement in *all* rehabilitation activity in that area, not the number directly involved in the MTCs and TUs.

A total of 37 consultants worked within the MTCs – the number ranging from 0–6 across the different Networks. Four MTCs (18%) had no RM consultant at all, although all of these had advertised consultant posts and failed to recruit. In all, there were 5.4 WTE vacant posts, with the number of allocated but unfilled sessions ranging from 3–30 per Network.

Of the 22 MTCs, 17 (77%) had designated RM consultant sessions paid by the MTC. Currently funded input varied from 1–11 sessions, while 6 centres (27%) had sessions funded by the rehabilitation service.

For those RM consultants who regularly visited the MTC, the median number of visits was 3 per week, but ranged from 1–7 visits week, and the time they spent in the MTC ranged from 1 or 2 hours up to >40 hours/week (with a median of 10 hours/week).

As expected, RM consultants spent significantly more time in the MTCs if they had paid, designated sessions from the MTC. Where there were paid sessions, consultants visited a median of 5 times per week, compared with once a week where there were none; they also spent a median of 19 hours/week at the centres compared with just 2 hours/week where there were no paid sessions.

Although London was the first part of the country to establish MTNs, its provision for rehabilitation input was particularly poor. There are no specific guidelines on how many funded sessions are required for RM per MTC. However, across the entirety of its 4 large networks, there was only one MTC-funded session for an RM consultant, and MTCs received visits either only once a week or on a purely ad hoc basis, instead of the required 2–3 times per week.

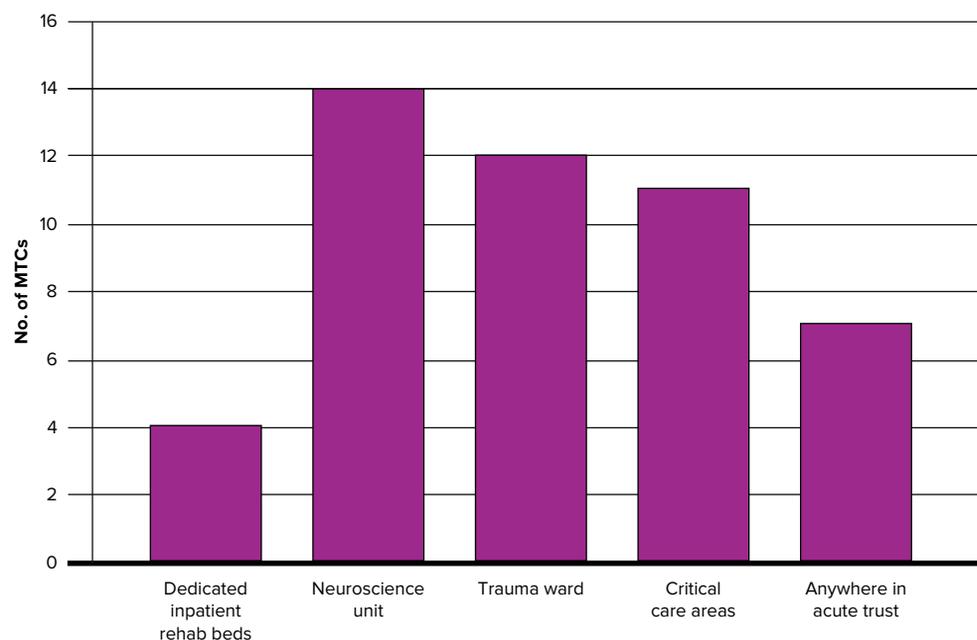
#### **RM Consultant involvement in multi-disciplinary ward rounds**

In 14 (64%) MTCs, the consultant in RM routinely attended multi-disciplinary team (MDT) ward rounds in the centre. The majority of MTCs had an MDT ward round once a week, although five MTCs (23%) had a ward round more than three times a week. Patients were seen in multiple locations at each MTC, but most commonly on the neurosurgery wards, in critical care or on the trauma ward where beds are co-located (Figure 10.2).

The MTCs also vary in how they identify patients to be seen by the consultant in RM:

- In general, a Trauma or Rehabilitation Coordinator (or other member of the multi-disciplinary team) identified patients to be reviewed by the CRM.
- In two MTCs, *all* trauma patients were seen by an RM consultant and then prioritised according to their rehabilitation needs.

**Figure 10.2: Location of multi-disciplinary team (MDT) ward rounds attended by the consultant in RM**



### 10.2.3 Implementation of Rehabilitation Prescriptions, data collection and reporting methods



#### STANDARD

For patients with severe injury (ISS score  $\geq 9$ ) a Rehabilitation Prescription is required to be completed and data entered into TARN to receive Best Practice Tariff (BPT).

The Specialist RP for patients with complex rehabilitation needs should include as minimum the following data, which should be entered into the UKROC database:

- The Rehabilitation Complexity Extended Trauma version (RCS-ET) adapted for other acute care settings.
- The full Patient Categorisation Tool (PCAT) to confirm Category A or B needs.
- The Northwick Park nursing Dependency Scale (NPDS).
- The Neurological/Trauma Impairment Set.

---

### **Implementation of the standard Rehabilitation Prescription (RP)**

All 22 MTCs reported that they complete the basic RP (i.e. the four mandatory questions; see Table A2.2 in Appendix 2 for details). However, this does not tell us anything about the quality of these RPs or the information included in it.

Methods of completion varied between centres:

- 11 (50%) used an electronic RP;
- 8 (36%) completed it on paper;
- 3 used a combination of the two.

The standard RP does not technically require input from a consultant in RM. The majority of RPs were completed by a variety of team members such as therapists, and in some units by the trauma coordinators. However, RM consultants were involved in drawing up the RP in 8 (36%) of the MTCs.

Rehabilitation needs are expected to change during the course of admission, but only 12 (55%) of the centres indicated that the RP was updated periodically throughout the patient's stay in the MTC – suggesting that in these locations, it may actually be used to record and guide rehabilitation, as opposed to just serving as a box-ticking exercise. Others reported that it was too onerous to complete.

In just 4 (18%) of MTCs the RP was held by the patient. A further 4 (18%) sometimes gave it to the patient on discharge, but in the remaining 14 (64%) MTCs, the RP was a clinically-held tool.

### **Implementation of the Specialist Rehabilitation Prescription (SpRP)**

Just 11 of the 22 centres (50%) indicated that the SpRP was implemented in their MTC.

- 5 used an electronic SpRP;
- 5 completed it on paper;
- 1 used a combination of the two.

The RM consultant provided input, with or without other disciplines, in 8 of the 11 centres. In the 3 MTCs that had no RM consultant input, the SpRP was completed by Band 7 therapists.

Table 10.4 shows the tools routinely collected within the SpRP by the 11 MTCs where it was implemented.

- All 11 Centres collected either the RCS-E or the RCS-ET (Trauma version).
- 2 centres also collected the Patient Categorisation Tool (PCAT), NIS-Trauma and NPDS.
- 3 centres also collected the UK FIM+FAM, but 2 of these were MTCs with on-site specialist rehabilitation beds.

A breakdown by MTC is given in Appendix 2.

**Table 10.4: Collection of standardised tools in the 11 MTCs who implemented the SpRP**

Tool	No. of centres collecting (N=11)
<b>Rehabilitation Complexity Scale</b>	11 (100%)
RCS-E v 12	7 (64%)
RCS-ET (Trauma version)	4 (36%)
<b>Patient Categorisation Tool (PCAT)</b>	2 (18%)
<b>NIS-Trauma</b>	2 (18%)
<b>NPDS</b>	2 (18%)
<b>UK FIM+FAM</b>	3 (27%)

### 10.3 Strengths and weaknesses of the current provision

#### Commonly reported strengths of the current MTNs were:

- Strong network engagement;
- Commitment to the development of rehabilitation services;
- High rates of completion of the Rehabilitation Prescription;
- Growing recognition of the importance of RM consultant input;
- Expanding links with community services;
- Trauma and Rehabilitation Coordinators were considered invaluable in the patient pathway where these posts existed.

#### Perceived gaps in the services included:

- Insufficient RM consultant input in the MTCs (due to lack of funding or recruitment failure);
- Limited capacity restricting access to specialist rehabilitation beds;
- Long delays in transfer to rehabilitation, resulting in repatriation to general medical/orthopaedic beds in settings with inadequate skills and resources to manage the patients' needs;
- Lack of dedicated rehabilitation facilities specifically for trauma, including specialist musculoskeletal rehabilitation and cognitive/behavioural units;
- Fragmented pathways after the initial acute care – particularly between the MTCs, Trauma Units and rehabilitation services, resulting in poor continuity of care;
- Lack of community-based and vocational rehabilitation;
- Lack of engagement from commissioners in some areas.

#### Suggestions for improving the service included:

- Robust data collection to define the gaps;
- Funding for Trauma Units to develop services and report data similar to that reported by the MTCs;
- Increased input from RM consultants funded by the MTNs, especially increased input into the Trauma Units;

- 
- Expansion of the Rehabilitation Coordinator role;
  - Increased rehabilitation bed capacity, particularly for hyper-acute rehabilitation in association with the MTCs and TUs.

## 10.4 Summary

The requirement for consultant presence in the emergency department, and for the follow-up care of patients in an MTC, has been recognised for some time.<sup>7</sup> However, the requirement for active involvement of RM consultants in the MTCs to address complex rehabilitation needs has not been appreciated with the same importance and urgency. This was evident in the National Peer Review Programme report for 2015.<sup>33</sup>

Whilst some Major Trauma Networks have acknowledged this need and provided funded sessions for an RM consultant, others have not. Some MTCs rely on sessions or ad hoc in-reach visits from the RM consultant, funded by the specialist rehabilitation service. Nearly one in five MTCs still have no RM consultant input at all, which will impact negatively on their ability to participate in the next stages of this national audit, as well as on patient care.

This MTN funding had a significant impact on the availability of RM consultants to assist in the management of patients with complex needs. But even where MTNs did have the close involvement of RM consultants, less than half were involved at executive level; although most were involved as a Clinical Lead.

Recruitment has posed a further problem. Rehabilitation medicine is a small and under-subscribed specialty, and the requirement for competencies in trauma rehabilitation has only recently been formally written into the training curriculum. Some MTCs have allocated sessions or even full-time RM consultant posts, but have been unable to fill them, so the funding was subsequently used elsewhere. There is a need for review of central workforce allocations and RM training programmes to ensure a sustainable supply of suitably trained consultants in RM to fill these sessions.

All centres acknowledged that the Trauma and Rehabilitation Coordinators were invaluable in the patient pathway.

The standard Rehabilitation Prescription was designed locally, and in some cases, was too onerous to complete, so for many MTCs its use has become restricted to completing the four mandatory items that are required to secure the Best Practice Tariff. Complexity, input and outcome measures were not routinely collected as part of the standard RP, but were completed to some extent in the 11 centres that implemented the SpRP.

**MTN commissioners should ensure that all MTCs have designated paid sessions for RM consultants to attend on site**

The results of this preliminary audit are important, as they will strengthen the interpretation of findings on the rehabilitation management of patients within MTCs, based on current practice and comparison with the prospective audit data in Element 2. However, the lack of availability of RM consultants poses a significant threat to successful completion of the prospective audit in some areas, and will not improve unless concerted attempts are made to provide designated sessions for RM consultants within the MTNs that currently lack this provision.

# 11 ANALYSIS OF EXISTING DATASETS FOR PATIENTS INCLUDED IN THE TRAUMA AUDIT RESEARCH NETWORK (TARN) DATABASE

## 11.1 Introduction

As noted above, until recently, many of the TARN performance criteria have focused on pre-hospital and acute management targets. The importance of rehabilitation has only been recognised more recently, with the introduction of the standard Rehabilitation Prescription (RP) in 2013,<sup>34,35</sup> and only since 2013 has the presence of an RP been part of the criteria for payment of the Best Practice Tariff in Major Trauma Centres.<sup>7</sup>

TARN does not currently capture the actual rehabilitation service or the complexity of patients that were transferred to rehabilitation, and it is not possible to identify from the current TARN records, either the patients requiring specialist rehabilitation, or those who were referred or discharged to specialist Level 1 and 2 rehabilitation units. The only additional information available is that recorded in the extended RP, where these have been completed. As noted above, this is not the same as the SpRP.

When patients leave the MTC, there are a number of options within TARN to record where the patient went (these are listed in Table 11.1). Among the destinations that users can record are 'transfers' – a category that includes repatriation to Trauma Units or further specialist care (including rehabilitation) – and 'rehabilitation', which may include either in-patient or out-patient services at any level: 1, 2 or 3.

**Table 11.1: Options in TARN for recording transfers and discharge from MTCs**

Transfer out options available in TARN	Discharge options available in TARN
Repatriation/reverse transfer	Home
No Paediatric Critical Care Bed	Died
Further specialist care	Nursing home
No critical care beds	Other acute hospital
Network protocol	Rehabilitation
Not known	Alive at 30 days
	Other institution
	Not known

This section reports on the data collected and available for the previous three years.

---

## 11.2 Extraction, analysis and key findings

We examined the data collated in TARN for adults  $\geq 16$  years with ISS scores  $\geq 9$  for the three years 2012–2015 to obtain a pre-audit picture of:

1. Reporting practice related to completion of the Rehabilitation Prescription;
2. The proportion of patients repatriated to their local services or discharged to further rehabilitation.

We also examined the year-on-year trends in reporting as the services gradually developed over their first 3 years.



---

### STANDARD

---

All patients with ISS scores  $\geq 9$  should have a rehabilitation prescription (RP).

Rehabilitation planning (including the commencement of the RP) should start within 48 hours of admission.

---

Table 11.2 shows a breakdown by year of the number of patients with RPs, and transfer rates for all patients with ISS score  $\geq 9$  (including those who did not survive to discharge).

The number of patients entered on to the TARN database with an ISS  $\geq 9$  has increased each year, from 14,000 in 2012/13 to over 20,000 in 2014/15.

The proportion of these patients for whom the presence of an RP was recorded has also increased year-on-year, from under 60% in 2012/13 to over 81% in 2014/15. However, the proportion of patients that have extended RP information recorded has remained relatively stable, at less than a quarter (22%).

The number of patients reported as having been discharged to rehabilitation has also remained stable at around 10% overall but, as noted above, this does not necessarily reflect the number transferring to Level 1 and 2 rehabilitation services.

**Table 11.2: Breakdown by year of the number of patients with RPs and transfer rates**

	2012/13			2013/14			2014/15		
	n	Median n per MTC (IQR)*	%	n	Median n per MTC (IQR)	%	n	Median n per MTC (IQR)	%
<b>ISS ≥9</b>	14,263	540 (320–676)		18,328	597 (370–847)		20,011	780 (451–906)	
<b>RP</b>	8,522	267 (144–406)	59.7%	13,680	437 (302–656)	74.6%	16,292	499 (356–805)	81.4%
<b>Extended RP</b>	2,505	11 (2–61)	17.6%	4,126	3 (1–154)	22.5%	4,362	1 (0–89)	21.8%
<b>Transferred out**</b>	2,358	74 (49–105)	16.5%	3,024	91 (53–132)	16.5%	2,703	72 (41–141)	13.5%
<b>Discharge to rehabilitation***</b>	1,485	29 (7–59)	10.4	1,891	37 (12–99)	10.3%	2,035	41 (22–99)	10.2%

\* IQR = Inter-quartile range

\*\* Patients transferred for ongoing acute care may subsequently be discharged to rehabilitation.

\*\*\* The discharge destination is recorded as 'rehabilitation' (which includes Level 3 services).

We examined variation in these parameters between MTCs but, because of the year-on-year improvements, we looked only at the patients admitted between April 2014 and March 2015 and who survived to discharge (n=18,334).

Table 11.3 shows a breakdown by MTN completion, transfer and discharge rates by MTC. The proportion of patients who were reported to have a standard RP ranged from 52–99% (mean 85.5%), and the proportion with an eRP ranged from 0–90%.

It will be noted that the data do not exactly match the rates of RP completion estimated by the consultants interviewed in Section 6 (see Appendix 2: Table A2.2), which tended to be slightly higher – indicating that clinicians tend to over-estimate the compliance of their services.

There was also considerable variation between the individual MTNs in the number of patients transferred and those discharged to rehabilitation. Transfer rates ranged from 2–26% and discharge to rehabilitation services (of any type) ranged from 1.7–30%.

**Table 11.3: Breakdown by MTN of the proportion of patients with RPs and transfer rates for those who were admitted in 2014–2015 and survived to discharge\***

MTN**	ISS ≥9 N	Standard RP (%)	Extended RP (%)	Transferred (%)	Discharged to rehabilitation (%)
Northern (Cumbria, Newcastle, Middlesbrough and the south)	1,191	95.4%	41.6%	9.4%	10.2%
West Yorkshire	819	98.4%	0.2%	2.0%	12.9%
North Yorkshire and Humberside	476	97.9%	0%	12.4%	8.6%
Lancashire and South Cumbria	595	59.7%	0%	22.7%	1.7%
Greater Manchester	1,542	90.1%	0%	13.6%	8.0%
Cheshire and Merseyside	1,233	83.3%	0%	24.8%	14.8%
South Yorkshire	918	91.3%	74.9%	11.7%	6.3%
North West Midlands and North Wales	824	87.6%	0%	2.4%	30.1%
Birmingham, Black Country, Hereford and Worcester	800	98.6%	0%	17.8%	17.0%
Central England	912	93.3%	0%	4.7%	7.6%
East Midlands	1,096	93.4%	0%	14.1%	6.8%
East of England	750	96.1%	0.3%	14.3%	5.7%
Thames Valley	944	91.8%	90.5%	16.7%	3.3%
Severn	963	96.2%	9.7%	10.6%	30.0%
North West London	738	84.3%	84.3%	19.1%	8.8%
North East London and Essex	989	59.0%	49.9%	18.8%	2.2%
South West London and Surrey	675	65.9%	65.5%	17.9%	6.1%
South East London, Kent and Medway	816	75.7%	75.6%	26.0%	3.6%
Sussex	490	99.4%	0%	16.7%	9.6%
Wessex	715	51.9%	1.7%	22.5%	14.1%
Peninsula	848	86.3%	0.1%	14.6%	23.0%

\* Median and IQR scores, and ISS and NISS scores, are given in Appendix 3.

\*\* TARN data combines the two Northern MTNs into one, so there are only 21 MTNs in this table.

We were also interested to know whether the RP was appropriate for all types of injury. Table 11.4 shows the rates of RP completion for patients with ISS  $\geq 9$  (all three years, 2012–2015) who survived until discharge, broken down by site of injury. Patients may appear in multiple columns if they have more than one severe injury (Abbreviated Injury Scale (AIS) 3+). The most common type of injuries were head injuries (38%), followed by injuries to the extremities (35%) and then chest (28%). The ‘other’ category includes burns, asphyxia, electrocution, etc. RP completion rates varied from 68–81% across the different injury groups and were considered ‘not appropriate’ in 10–20% of cases. Rehabilitation Prescriptions appear to be broadly applicable for most types of injury.

**Table 11.4: RP completion rates, by site of injury, for patients with ISS  $\geq 9$  and who survived to discharge (2012–2015)\***

Site of injury	N	% of total	RP complete (%)	No RP (%)	N/A (%)
Head	18,179	38%	77%	9%	14%
Face	218	0%	77%	7%	16%
Chest	13,623	28%	79%	7%	14%
Abdomen	2,691	6%	73%	6%	21%
Spine	6,159	13%	81%	7%	13%
Extremities	16,660	35%	83%	8%	10%
Other	361	1%	68%	12%	20%

**Note:** Some percentages may not add up, due to rounding.

### 11.3 Summary

Overall rates of completion of the RP and eRP for patients with an ISS  $\geq 9$  have increased over the past three years, but there is still significant variation between the different MTCs: completion rates ranged from 45.5–99% for the standard RP.

About one-third of units are using the TARN database to record more extended information in an electronic RP, but it was not possible to evaluate completion of the tools within the SpRP, as the data fields to record these did not exist in TARN.

Reported rates of transfer to rehabilitation have remained more or less stable at around 10%, but this includes all levels of rehabilitation service.

---

It is evident that more patients are transferred to other services than are discharged to rehabilitation. There may be several reasons for this, which include:

- **Administrative reasons:** e.g. inconsistent data collection for discharge destination; lack of available information to TARN coordinators; or failure to separate episodes of care between MTC and rehabilitation, where patients may be transferred to acute rehabilitation services on the same site.
- **Clinical reasons:** e.g. patients being transferred from the MTC at a time when they are still medically or surgically unstable, and not yet ready for rehabilitation (although some of these could possibly be managed in hyper-acute rehabilitation units if there were more capacity in these services); or patients are transferred to their local Trauma Unit or district general hospital, simply to wait for rehabilitation due to pressure on beds in the MTC.

---

# 12 ANALYSIS OF EXISTING DATASETS IN UKROC FOR TRAUMA PATIENTS RECEIVING SPECIALIST REHABILITATION

## 12.1 Introduction

Data collated for trauma patients within UKROC over the equivalent three-year period (2012–2015) were examined. As well as establishing approximately how many patients to expect for the next stages of the audit, we wished to know how long people currently wait for assessment and transfer to specialist rehabilitation services. We also wanted to obtain a pre-audit picture of reporting practice for the various process and outcome measures (see below) that will be used in the course of this audit, and to examine baseline data on key outcomes.

## 12.2 Data extraction and analysis

We selected all in-patient episodes submitted to specialist rehabilitation service and discharged during the three-calendar-year period 1 January 2013 to 31 December 2015. This represented all adults aged 16 and over who were admitted to specialist rehabilitation services Level 1 and 2 (**N=3,281 – the ‘Trauma’ population**). All 65 Level 1 and 2 rehabilitation services were represented. This staggered cohort was designed to capture broadly the patients admitted to TARN during the three-year analysis period who would have taken 3–4 or more months to filter through to the specialist rehabilitation services.

We selected patients with length of stay between 8 and 400 days, in order to exclude patients admitted for brief assessment or long-term care, and so to identify plausible admissions for rehabilitation (**N=3,155 – the ‘Trauma rehabilitation’ population**).

Some units have specialist programmes for assessment of prolonged disorders of consciousness (PDOC). These patients are not expected to change in terms of function or dependency, and were therefore excluded from the analysis of functional outcome and cost-efficiency. In addition, the collection of outcome and cost-efficiency information is not mandated for all levels of service, so is not available for all patients. Therefore, our analysis of cost-efficiency was restricted to the cohort of patients admitted for specialist rehabilitation that *were not still in PDOC* on discharge and had the relevant cost information available, (**N=1,858 – the ‘Efficiency’ population** (Figure 12.1).

### 12.2.1 Cost-efficiency calculation

Cost-efficiency is recorded as the time taken to offset the cost of rehabilitation by the resulting savings in the cost of ongoing care in the community. This is calculated by dividing the 'mean episode cost of rehabilitation' by the 'mean reduction in weekly cost of care' between admission and discharge, as estimated by the NPCNA.

The cost of each episode is calculated per patient as bed-day cost multiplied by length of stay in days. In this analysis, the cost per bed-day was calculated retrospectively based on the same costing methodology as our previously published cost analysis.<sup>16</sup> The mean bed-day costs that we have used for the different levels of service are as follows:

Level 1 hyper-acute: £670, 1a: £540, 1b: £483, 1c: £634, 2a: £452, 2b: £418.

Figure 12.1. Flow chart for extraction of data

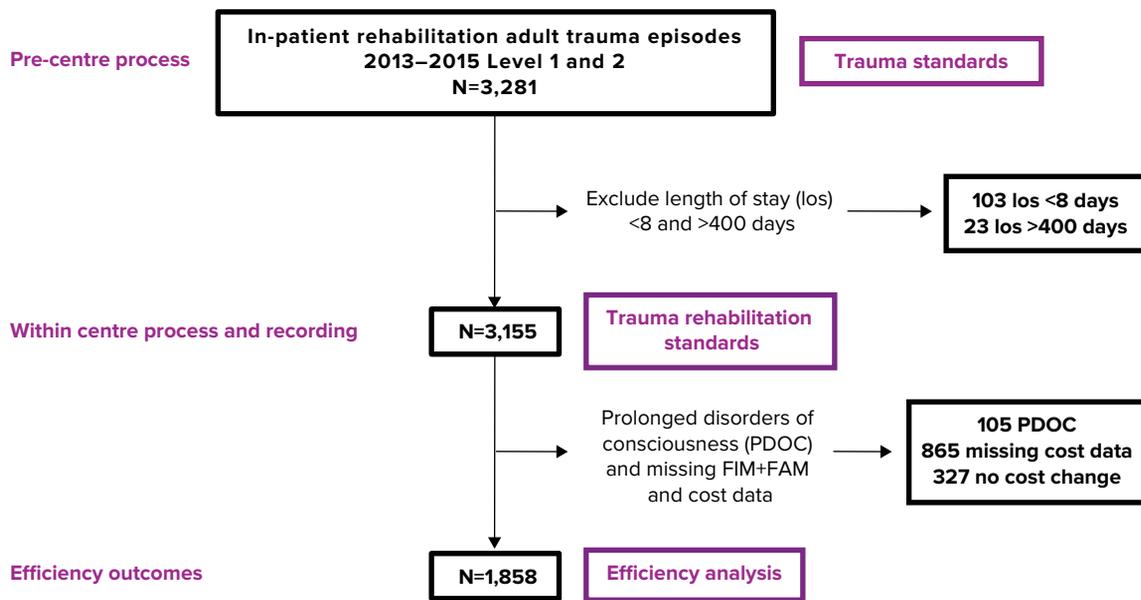


Table 12.1 shows the demographics for these three populations. No striking differences were seen except that a higher proportion of patients have been discharged home (67.6%) in the efficiency population compared to trauma and trauma rehabilitation populations (60%;  $p < 0.0001$ ).

The hyper-acute (HA) episodes are separately identifiable for the two units (HA units A and B) that deliver this service in a separate ward area. One of these HA services had a high proportion of missing data, for reasons explained below. Therefore the data for these two services are reported separately.

**Table 12.1: Socio-demographic characteristics of the adult trauma population**

	Trauma population (N=3,281)		Trauma rehabilitation population (N=3,155)		Efficiency population (N=1,858)	
<b>Mean age Standard Deviation (SD)</b>	50.3 years (SD 19.4) Range 16–100		50.2 years (SD 19.2) Range 16–100		51.0 years (SD 19.4) Range 16–100	
<b>Male : female</b>	75% : 25%		75% : 25%		73% : 27%	
<b>Mean length of stay Standard Deviation (SD)</b>	76 days (SD 78.3) Range 1–4,105		75.1 days (SD 67.7) Range 8–400		74.8 days (SD 63.3) Range 8–393	
<b>Diagnosis</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
Acquired brain injury	2,789	85.0%	2,680	84.9%	1,547	83.3%
Spinal cord injury	352	10.7%	340	10.7%	230	12.4%
Peripheral neurology	25	0.8%	25	0.8%	17	0.9%
Other trauma	115	3.5%	110	3.5%	64	3.4%
<b>Service level</b>						
Level 1 HA (Hyper-acute)	240	7.3%	226	7.2%	22	1.2%
Level 1a (Tertiary Physical)	457	13.9%	436	13.8%	201	10.8%
Level 1b (Tertiary Mixed)	473	14.4%	458	14.5%	289	15.6%
Level 1c (Tertiary Cognitive)	58	1.8%	55	1.7%	24	1.3%
Level 2a (Supra-district)	600	18.3%	580	18.4%	382	20.6%
Level 2b (District)	1,453	44.3%	1,400	44.4%	940	50.6%
<b>Discharge year</b>						
2013	1,002	30.5%	957	30.3%	519	27.9%
2014	1,145	34.9%	1,109	35.1%	644	34.7%
2015	1,134	34.5%	1,089	34.5%	695	37.4%
<b>Discharge destination</b>						
Home	1,972	60.1%	1,898	60.2%	1,236	66.5%
Acute hospital trust	295	9.0%	274	8.7%	95	5.1%
Nursing home and residential care	696	21.2%	675	21.4%	382	20.6%
Episode continuing	76	2.3%	74	2.3%	28	1.5%
Other	181	5.5%	174	5.4%	85	4.6%
Missing	61	1.9%	60	1.9%	32	1.7%

## 12.3 Key standards

Table 12.2 shows the key standards addressed by this analysis and the relevant population in which data recording and performance were examined.

**Table 12.2: Key standards for reporting and outcomes addressed by this analysis**

2	Assessment and transfer to Level 1/2 service	Population
2.1	Following referral, the patients should be assessed by the Level 1/2 service within 10 days.	Trauma N=3,281
2.2	A consultant in RM (or their designated deputy) should complete a Patient Categorisation Tool (PCAT) to confirm that the patient has complex (Category A or B) needs for rehabilitation.	Trauma N=3,281
2.4	Patients identified as requiring Level 1/2 in-patient rehabilitation should be transferred to specialist in-patient rehabilitation within six weeks of being fit for transfer.	Trauma N=3,281

3	Specialist Level 1 and 2 in-patient rehabilitation services	Population
3.4	Assessment of function and rehabilitation needs should be documented within the first 10 days of admission and within the last 7 days before discharge, including RCSE v13, NPDS and UK FIM+FAM.	Trauma rehabilitation N=3,155
3.5	By discharge, all patients should have achieved some measurable gain or goal achievement, as measured by UK FIM+FAM, NPDS or GAS T-score (or other approved measure), or the reason for no gain is recorded. Discharge destination will also be recorded.	Trauma rehabilitation N=3,155
3.6	Excluding patients who remain in prolonged disorders of consciousness (PDOC) at discharge, cost-efficiency for trauma patients (measured in time to offset the costs of rehabilitation) should be within two SDs of the mean within each service group for 85% of patients.  The reasons for any outlying services should have been explored and reported.	Efficiency N=1,858

## 12.4 Assessment and transfer to Level 1 or 2 service

### 12.4.1 Process times

These three standards were evaluated in the whole 'Trauma' population (N=3,281).

In order to interpret the data, it is appropriate to set it in the context of the overall average time since the onset of trauma and process times for referral assessment and admission.

Table 12.3 shows a breakdown of process times for the trauma population across the different levels of service.

**Table 12.3: Process times for referral, assessment and admission  
(Trauma population N=3,281)**

	Mean (SD) days			
	Onset to admission	Referral to assessment	Assessment to admission	Fit for transfer to admission
<b>Missing data</b>	16%	15%	4%	10%
<b>Level 1 HA</b>	-*	7 (48)	-2 (18)	-5 (37)
HA Unit A	All missing	9 (58)	-7 (16)	-2 (36)
HA Unit B	73 (150)	2 (6)	14 (15)	-22 (37)
<b>Level 1a</b>	240 (1,064)	12 (33)	16 (37)	9 (29)
<b>Level 1b</b>	230 (97)	12 (39)	24 (39)	8 (40)
<b>Level 1c</b>	753 (1,342)	21 (61)	50 (37)	17 (39)
<b>Level 2a</b>	215 (1,163)	9 (210)	21 (8)	18 (155)
<b>Level 2b</b>	250 (1,494)	7 (38)	13 (31)	6 (24)
<b>Total population</b>	224 (1,239)	9 (93)	16 (60)	8 (72)

\* Not recorded because data were available from only one service.

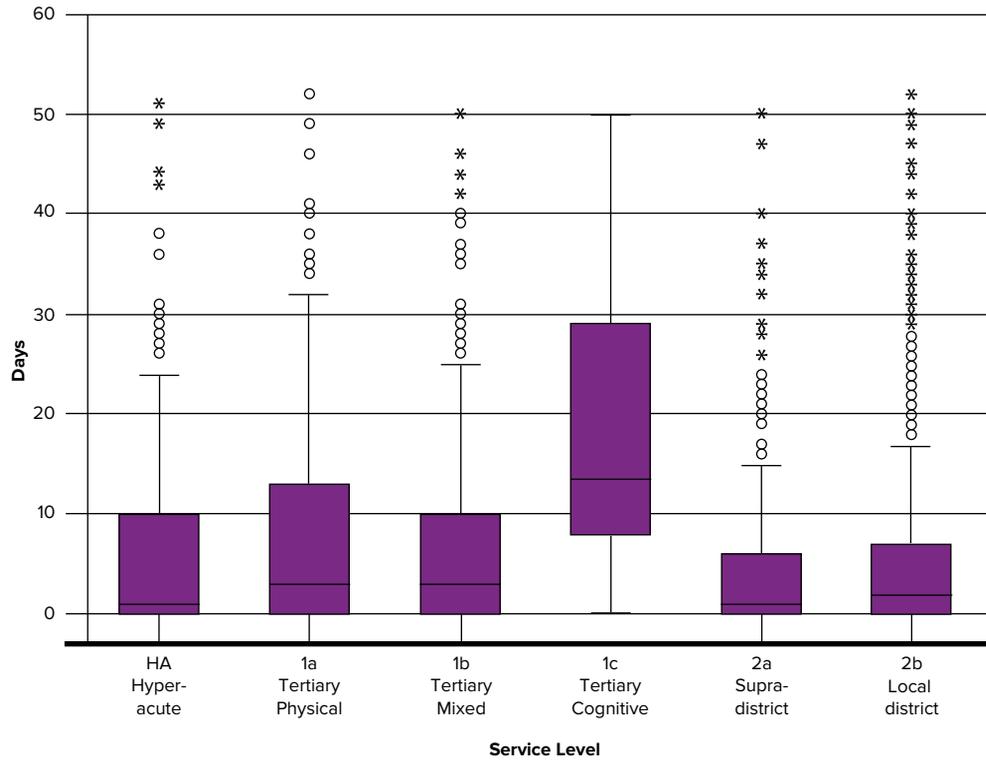
Overall the mean time from injury to admission to a Level 1 or 2 service was about eight months (224 days). However, there was a long tail on the distribution, such that the median time was about 6–7 weeks (45 days, IQR 23–85). The waiting times between being fit for transfer and admission are much shorter than the overall times from onset to admission. This highlights the length of time that this highly selected group of patients with complex rehabilitation needs generally spend in the acute services, before their medical/surgical needs have stabilised sufficiently for them to be ready for transfer to rehabilitation.

As expected from the above, transfer times were somewhat shorter for the hyper-acute services (mean 73 days, median 36, IQR 24–70) and considerably longer in the Level 1c cognitive-behavioural units (mean over 2 years, median 149 days, IQR 101–649).

Negative values within the hyper-acute services may reflect the ability of these services to take patients early in the recovery period, at a time when they are still medically unstable. Co-location of the HA services within the same vicinity as the acute services means that transfer may occur so rapidly that it precedes the transfer paperwork.

Figure 12.2 illustrates the distribution of waiting times from referral to assessment. Across all services, the mean waiting time was 9 days (SD 93). But only the HA and the Level 2 services had means within the standard. Longer mean waiting times in the Level 1c units (mean 21 days) probably reflect the relative scarcity of these services, as the survey showed that there are only three Level 1c services in England, with just seven beds for trauma patients between them.

**Figure 12.2: Waiting times from referral to assessment**



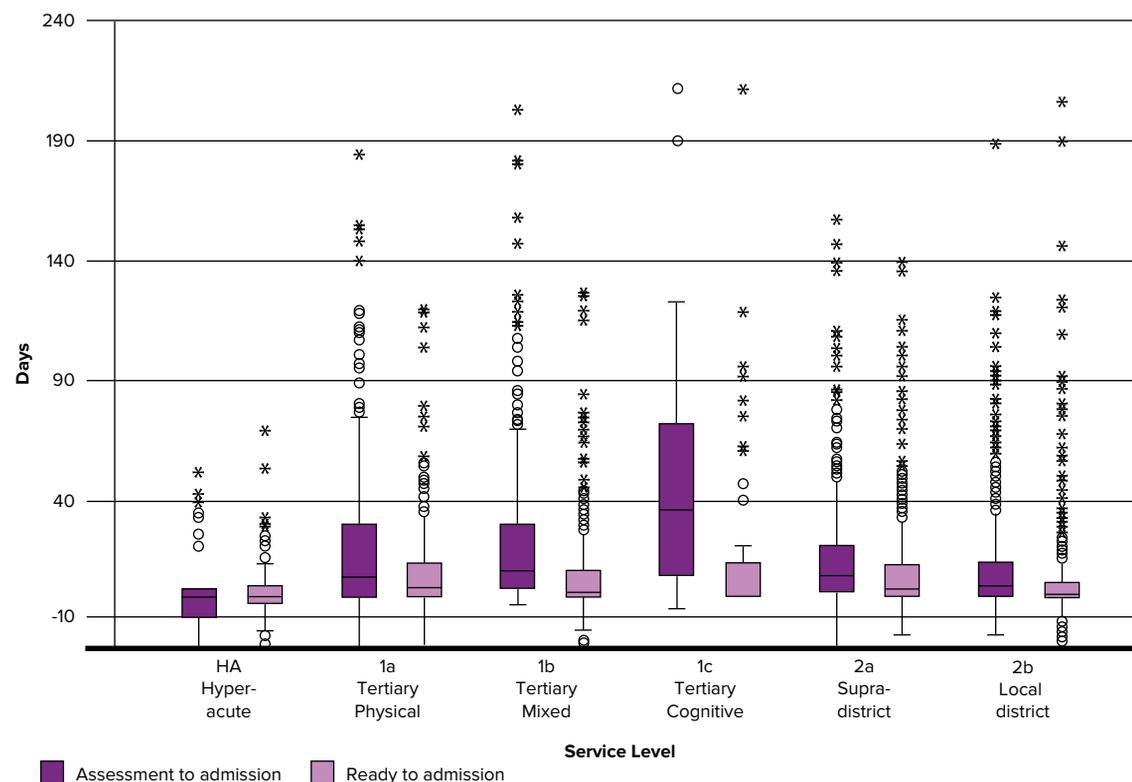
**Note:** Medians are denoted by solid black lines and the box represents the interquartile range. The T-bars, or 'whiskers', denote the largest and smallest values within 1.5 times the interquartile range.  
 o = outlier, \* = extreme outlier

Figure 12.3 illustrates the process times between a) assessment (i.e. confirmation that the patient requires specialist rehabilitation) and admission, and b) being fit for transfer and admission.

Except for the HA services, the time from assessment to admission was significantly longer than the time from being fit to transfer. Overall, there was a mean of 8 days (SD 93) between these two time-points ( $t=4.5$ ,  $p<0.001$ ). The difference was most marked in the Level 1c services (mean 33, SD 53).

Because of the wide range and skewed distribution, as well as giving the percentage of episodes that met the standard, we also give the median and IQR for the range in the tables below.

**Figure 12.3: Waiting times from assessment to admission and from time when fit to transfer to admission**



**Note:** Medians are denoted by solid black lines and the box represents the interquartile range. The T-bars, or 'whiskers', denote the largest and smallest values within 1.5 times the interquartile range.  
o = outlier, \* = extreme outlier

### 12.4.2 Meeting the standards for assessment and transfer



#### STANDARD 2.1

Following referral, patients should be assessed by the Level 1/2 service within 10 days.

Table 12.4 shows the percentage of cases meeting this standard. Overall, 80% of trauma patients who were subsequently admitted to specialist rehabilitation services were assessed within 10 days following referral. However, there was a long tail in the distribution, with 10% of patients waiting more than three weeks for assessment and 1.6% waiting over three months. Approximately a quarter of services (18/65) met the standards for less than half of their trauma patients. All service levels except for Level 1c had median waiting times for assessment of less than 10 days. The lower rates of achievement – in terms of meeting assessment standards – within the Level 1c services are understandable in the context of the longer waiting times for admission (see below). Pragmatically, there is little point in rushing to assess patients when there is no capacity to admit them. However, this underlines the relative scarcity of these services (as mentioned previously, there are only three Level 1c services in England, with just 7 beds for trauma patients between them).

**Table 12.4: Percentage of episodes meeting the standard: ‘patients should be assessed within 10 days’ (Trauma population N=3,281)**

Standard: 0–10 days	Total episodes N	% recorded	% of recorded episodes meeting the standard	Median (IQR) days
Level 1 HA	240	65%	43.3%	1 (0–10)
HA Unit A	202	58.4%*	33.2%	0 (3–14)
HA Unit B	38	100%	97.4%	0 (0–2)
Level 1a	457	97.6%	64.1%	3 (0–13)
Level 1b	473	89.4%	59.4%	3 (0–10)
Level 1c	58	100%	34.5%	14 (8–30)
Level 2a	600	77.7%	64.8%	1 (0–6)
Level 2b	1,453	83.1%	67.9%	1 (2–7)

\*Missing 42%.



2.2

## STANDARD 2.2

A consultant in RM (or designated deputy) should complete a Patient Categorisation Tool (PCAT) to confirm that the patient has complex (Category A or B) needs for rehabilitation.

The PCAT tool is relatively new, and was only included in the UKROC database from April 2013. The completion rate increased after 2014 when PCAT reporting became a requirement for NHSE-commissioned services (i.e. Levels 1 and 2a), but reporting rates are lower for the Level 2b services, where its use is not yet mandated.

**By 2015, the PCAT tool was recorded for over 90% of the trauma patients admitted to Level 1 services and 84% of those in Level 2a units**

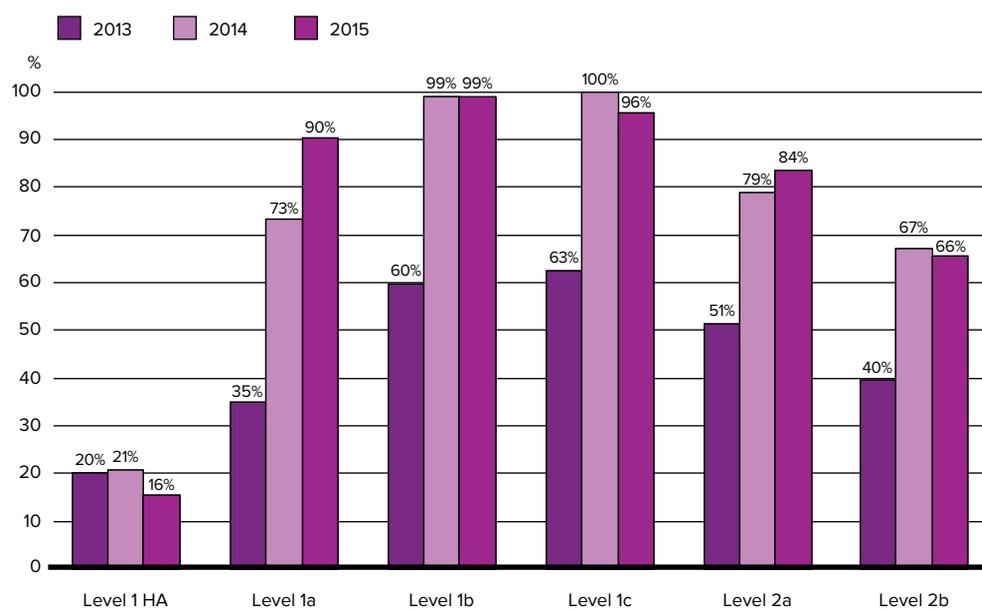
Table 12.5 and Figure 12.4 show the completion rates, broken down by year and service level. By 2015, the PCAT tool was recorded for over 90% of the trauma patients admitted to Level 1 services and 84% of those in Level 2a units. Only about two-thirds of the patients admitted to Level 2b services had a PCAT recorded.

It should be noted, however, that the majority of these PCAT tools would have been completed in the specialist rehabilitation unit rather than in a major trauma centre.

**Table 12.5: Percentage of trauma patients with PCAT recorded, by year of discharge (Trauma population N=3,281)**

Standard; completed	2013; PCAT completed			2014; PCAT completed		2015; PCAT completed	
	Total	N	%	N	%	N	%
<b>Level 1 HA</b>	240	12	19.7%	17	20.7%	15	15.5%
HA Unit A	202	0	0%	0	0%	7	7.8%
HA Unit B	38	12	92.3%	17	100.0%	8	100.0%
<b>Level 1a</b>	457	49	35.0%	112	73.2%	148	90.2%
<b>Level 1b</b>	473	81	59.6%	185	98.9%	148	98.7%
<b>Level 1c</b>	58	10	62.5%	20	100.0%	21	95.5%
<b>Level 2a</b>	600	101	51.3%	169	79.0%	158	83.6%
<b>Level 2b</b>	1,453	179	39.6%	328	67.1%	336	65.6%

**Figure 12.4: Percentage of patients with PCAT recorded, by service level and year**





## STANDARD 2.4

Patients identified as requiring Level 1 or 2 in-patient rehabilitation should be transferred to specialist in-patient rehabilitation within six weeks of being fit for transfer.

**Whilst most transfers were timely, a small number of patients waited up to a year for admission to specialist rehabilitation**

Where patients were transferred from was recorded in 99% of episodes. About half came direct from MTCs or other tertiary centres (26% and 27% respectively); 36% came from secondary services; 5% came from the community; and 4% from other services.

Table 12.6 shows the percentage of cases meeting the standard for waiting times for transfer.

Overall, 95.4% of the trauma patients were transferred to specialist rehabilitation services within six weeks of being fit for transfer. The proportion varied from just over 84% for the Level 1c services to approaching 100% for the others. Across all services, the median transfer time was one day (IQR 0–9) after the patient was fit to transfer. However, there was a long tail to the distribution, with a small minority of patients (n=44; 1.3%) waiting for more than three months, and some even up to a year for admission. Even though uncommon, these long waits could potentially have a serious negative impact on long-term outcomes for those patients. It is known from other analyses that those who wait longest tend to be the highly dependent patients (e.g. those with tracheostomy or highly challenging behaviours), for whom there is a particular shortage of specialist rehabilitation beds. Data from Elements 2 and 3 of this audit will help to determine any specific barriers for trauma patients.

Although the current standard is **'six weeks to admission from being fit to transfer'**, it is also pertinent to ask whether even a six-week delay is appropriate, given the pressure on the acute services, or whether this standard should now be reduced to perhaps 2–4 weeks. In this series, 68% would have met a two-week standard and 82% a four-week standard.

**Table 12.6: Percentage of episodes meeting the standard: ‘transfer within six weeks’ (Trauma population N=3,281)**

Standard: 0–10 days	Total episodes	% recorded	% of recorded episodes meeting the standard	Median (IQR) days	
				Assessment to admission	Fit for transfer to admission
<b>Level 1 HA</b>	240	95.6%	97.3%	0 (-10 to 3)	0 (-5 to 3)
HA Unit A	202	95.0%	98.3%	0 (-17 to 1)*	0 (-5 to 3)
HA Unit B	38	100.0%	100%	11 (2–17)	0 (-52 to 3.5)
<b>Level 1a</b>	457	99.3%	94.5%	9 (0–30)	4 (0–14)
<b>Level 1b</b>	473	100.0%	93.9%	11 (3–30)	1 (0–11)
<b>Level 1c</b>	58	100.0%	83.6%	37 (9–72)	0 (0–14)
<b>Level 2a</b>	600	96.9%	93.8%	8 (2–21)	4 (0–14)
<b>Level 2b</b>	1,453	92.3%	96.9%	4 (0–14)	1 (0–6)

\* Missing data 39%.

## 12.5 Specialist Level 1 and 2 in-patient rehabilitation services

Standards 3.4 and 3.5 were evaluated in the **Trauma rehabilitation population (N=3,155)**.



### STANDARD 3.4

Assessment of function and rehabilitation needs will be documented within 10 days of admission and within the last 7 days before discharge, including RCSE v13, NPDS and UK FIM+FAM.

Overall, the assessment of resource requirements (RCS-E), dependency (NPDS), and outcome (UK FIM+FAM) were documented within the standard of 10 days from admission and 7 days from discharge for over 75% of the trauma rehabilitation population: 94.4% for RCS-E, 88.6% for UK FIM+FAM and 76.4% for NPDS.

There was some variation in compliance between the service levels, as shown in Table 12.7. With the exception of one HA unit, compliance was consistently high for the RCSE and UK FIM+FAM; recording rates were much more variable for the NPDS.

**Table 12.7: Percentage of episodes meeting the standard for recording of valid RCS-E, UK FIM+FAM and NPDS on admission and discharge (Trauma rehabilitation population N=3,155)**

	Valid score on admission		Valid score on discharge		Valid score on both admission and discharge
	Total	% recorded	Total	% recorded	% recorded
<b>RCS-E</b>					
Level 1 HA	226	77.4%	226	78.8%	76.1%
HA Unit A	189	73.0%	189	74.6%	71.4%
HA Unit B	37	100%	37	100%	100%
Level 1a	436	95.2%	436	97.5%	94.5%
Level 1b	458	99.3%	458	97.8%	97.6%
Level 1c	55	92.7%	55	98.2%	90.9%
Level 2a	580	98.3%	580	95.5%	95.3%
Level 2b	1,400	98.4%	1,400	96.9%	96.0%
<b>UK FIM+FAM</b>					
Level 1 HA	226	80.5%	226	92.9%	77.0%
HA Unit A	189	76.7%	189	91.5%	72.5%
HA Unit B	37	100%	37	100%	100%
Level 1a	436	97.0%	436	95.4%	94.0%
Level 1b	458	98.3%	458	95.9%	94.5%
Level 1c	55	98.2%	55	94.5%	92.7%
Level 2a	580	94.3%	580	92.6%	90.3%
Level 2b	1,400	92.9%	1,400	87.4%	85.9%
<b>NPDS</b>					
Level 1 HA	226	44.2%*	226	52.2%*	40.3%*
HA Unit A	189	36.0%	189	45.5%	32.3%
HA Unit B	32	86.5%	37	86.5%	81.1%
Level 1a	436	88.5%	436	87.8%	84.4%
Level 1b	458	83.6%	458	83.2%	77.1%

	Valid score on admission		Valid score on discharge		Valid score on both admission and discharge
	Total	% recorded	Total	% recorded	% recorded
Level 1c	55	65.5%	55	72.7%	60.0%
Level 2a	580	84.5%	580	83.3%	78.3%
Level 2b	1,400	84.4%	1,400	81.1%	79.3%

\* High proportion of missing data reflects one service only.



3.5

### STANDARD 3.5

*By discharge, all patients will have achieved some measurable gain or goal achievement, as measured by UK FIM+FAM, NPDS or GAS T-score (or other approved measure). Discharge destination will also be recorded.*

**87% of patients achieved at least some measurable gain from specialist rehabilitation**

Not all patients will necessarily change in their level of independence. Some will remain totally dependent on others for care but will nevertheless achieve their goals for rehabilitation. Others may deteriorate due to intercurrent illness or a second stroke etc.

Overall 2,754 (87%) of the Trauma rehabilitation population achieved some measurable gain in the course of their specialist in-patient rehabilitation programme. Of those who did not, 118 (27%) were admitted for assessment or disability management, but 323 (72%) were admitted for goal-oriented rehabilitation.

Of the patients admitted for goal-orientated rehabilitation who made 'no gain', a higher proportion (47%) were discharged to an acute hospital, further rehabilitation or nursing home care, compared with those in the group who made 'some gain' (29%).

Table 12.8 shows the distribution of gains recorded across the different service levels. The lower rates of functional gain in the HA and Level 1c services are not surprising. Patients with cognitive/behavioural problems are known to change more slowly and clinicians report that the standardised measures within UKROC are not always sensitive to the types of change that they make. Similarly, the role of hyper-acute services is usually to stabilise the patients medically before transfer on to other Level 1 or 2 services, and many will not make significant functional gains during this time.

Goal Attainment Scaling (GAS) offers an opportunity to demonstrate achievement of the intended goals for admission, that are not reflected in the standardised assessments – however, very few services currently record GAS in UKROC, even if they do set goals for individual patients within their clinical practice.

**Table 12.8: Percentage of episodes showing gain on any outcome measure (Trauma rehabilitation population N=3,155)**

	UK FIM+FAM total		NPDS total		GAS T score		Any measurable gain	
	% recorded	% with gain	% recorded	% with gain	% recorded	% with gain	% recorded	% with any gain
<b>Level 1 HA</b>	77.0%	71.2%	40.3%	25.7%	0%	-	86.7%	77.9%
HA Unit A	72.5%	68.3%	32.3%	22.2%	0%	-	76.2%	76.2%
HA Unit B	100%	86.5%	81.1%	43.2%	0%	-	86.4%	86.4%
<b>Level 1a</b>	94.0%	70.6%	84.4%	57.3%	24.8%	23.9%	98.4%	85.3%
<b>Level 1b</b>	94.5%	82.8%	77.1%	54.6%	8.5%	8.1%	96.7%	90.0%
<b>Level 1c</b>	92.7%	70.9%	60.0%	30.9%	0%	-	98.2%	74.5%
<b>Level 2a</b>	90.3%	83.3%	78.3%	64.7%	4.8%	3.8%	96.2%	91.4%
<b>Level 2b</b>	85.9%	80.4%	79.3%	63.3%	6.9%	6.7%	92.4%	87.4%

Table 12.9 summarises the recording of discharge destination. Almost all (98.1%) of the trauma rehabilitation patients had their discharge destination recorded during the hospital admission.

**Table 12.9: Percentage of episodes with recorded discharge destination (Trauma rehabilitation population N=3,155)**

	Total	No. recorded	% recorded
<b>Level 1 HA</b>	226	226	100%
HA Unit A	189	189	100%
HA Unit B	37	37	100%
<b>Level 1a</b>	436	435	99.8%
<b>Level 1b</b>	458	450	98.3%
<b>Level 1c</b>	55	55	100%
<b>Level 2a</b>	580	563	97.1%
<b>Level 2b</b>	1,400	1,366	97.6%



### STANDARD 3.6

Cost-efficiency data should be reported in all episodes. Excluding patients who remain in prolonged disorders of consciousness (PDOC) at discharge, cost-efficiency for trauma patients should be within two SDs of the mean within each service group for 85% of patients. The reasons for any outlying services will have been explored and reported.

Cost-efficiency (i.e. time to offset the cost of rehabilitation by savings in the cost of ongoing care in the community, as measured by the NPDS/NPCNA) is now a mandatory standard for outcome evaluation required by NHSE, although not yet for Level 2b services. It is also one of the principal outcomes to be examined in the prospective audit, so we wished to examine the proportion of services that have collected these data in the three years preceding the audit.

Some outliers are expected, but the standard proposed for this audit is for 85% of the episodes to fall within two SDs of the mean for each service group.

We examined performance against this standard for the data that we have (excluding the patients who were discharged while still in a prolonged disorder of consciousness (PDOC) and the patients with no change in cost between admission and discharge for which cost-efficiency is not computable) to determine whether or not the standard needs adjusting. The results are given in Table 12.10.

**Table 12.10: Percentage of episodes in which cost-efficiency was recorded, within each service level (Trauma rehabilitation population excluding prolonged disorders of consciousness N=3,050)**

Standard: 85%	Total	No. recorded for cost-efficiency analysis (a)	No. with no cost change* (b)	No. recorded total (a+b)	% cost-efficiency data recorded
<b>Level 1 HA</b>	219	22	9	31	14.2
HA Unit A	187	3	1	4	2.1
HA Unit B	32	19	8	27	84.4
<b>Level 1a</b>	393	201	67	268	68.2
<b>Level 1b</b>	435	289	43	332	76.3
<b>Level 1c</b>	55	24	8	32	58.2
<b>Level 2a</b>	568	382	52	434	76.4
<b>Level 2 b</b>	1,380	940	148	1,088	78.8
<b>Total</b>	3,050	1,858	327	2,185	71.6

\* Cost efficiency recorded but not computed because there is no cost change between admission and discharge (cost change equals zero).

Within this dataset (N=3,050), 2,185 (71.6%) episodes had cost-efficiency data available. Excluding the one outlying hyper-acute service, the percentage data reporting across the service levels ranged from 58.2% in the Level 1c services to 78.8% in the Level 2b services.

Table 12.11 shows the cost-efficiency calculated on a population level as the time taken to offset the cost of rehabilitation. The **overall cost-efficiency was 21.8 months**. Between the different service levels, it ranged from 14 (Level 1a) to 125 months (Level 1c).

**On average, the time taken to offset the cost of the rehabilitation episode was 22 months**

**Table 12.11: Cost-efficiency of rehabilitation, by service level (Efficiency population (N=1,858))**

	Length of stay, days, mean (SD)	Cost of episode of rehabilitation*	Reduction in care costs per week	Time taken to offset the cost of rehabilitation (months)**
			Mean (SD)	Mean (SD)
<b>Level 1 HA</b>	36 (36)	£24,453 (23,843)	£310 (762)	32.1 (94)
HA Unit A	29 (22)	£19,508 (14,623)	£370 (778)	18.6 (49)
HA Unit B	80 (62)	£53,348 (41,296)	£301 (774)	34.2 (100)
<b>Level 1a</b>	95 (76)	£51,703 (41,045)	£522 (946)	14.0 (106)
<b>Level 1b</b>	92 (70)	£44,447 (33,832)	£492 (805)	21.0 (119)
<b>Level 1c</b>	133 (93)	£84,725 (58,817)	£72 (561)	124.6 (925)
<b>Level 2a</b>	72 (64)	£32,511 (29,002)	£656 (829)	15.6 (108)
<b>Level 2 b</b>	66 (60)	£27,540 (25,241)	£594 (772)	29.6 (280)
<b>Total</b>	73 (66)	£34,800 (32,459)	£570 (812)	21.8 (238)

\* Cost of episode = bed-day cost multiplied by length of stay.

\*\* Time taken to offset cost of rehabilitation is calculated on a population basis from 'mean episode cost divided by mean reduction in NPCNA-estimated weekly cost of care from admission to discharge'.

For the 1,858 episodes in which cost-efficiency was reported and cost change was different from zero, the mean time for savings in the cost of ongoing care to offset the cost of the rehabilitation episode was 22 months (SD 238). However, Table 12.11 shows consistently wide distributions, with SDs too large to use as a useful margin for compliance with the standard. We will therefore take this back to the CRGs and the BSRM Trauma Group to consider revision of this particular standard.

---

## 12.6 Summary

This chapter describes the reporting practice for the various process and outcome measures for Level 1 and 2 specialist rehabilitation services in England, in both 'Trauma' and 'Trauma rehabilitation' populations.

We found that:

- Although 80% of the trauma patients who were subsequently admitted to specialist rehabilitation services were **assessed within 10 days of referral**, a small minority of patients had unacceptably long waits. There was also considerable variation between services, with 18/65 services meeting this standard for less than half of their admissions. This was particularly evident in the Level 1c (cognitive) services.
- Following assessment, the mean **waiting time for admission** was just over 2 weeks (16 days), but many patients were assessed before they were fit to transfer. The large majority of trauma patients (95%) were admitted to specialist rehabilitation within six weeks of being fit for transfer – the median waiting time being just one day (IQR 9). A small minority of patients (n=44; 1.3%) waited for more than three months, and some even up to a year for admission. Even though uncommon, these long waits could potentially have a serious negative impact on long-term outcomes for those patients, and more needs to be done to understand the reason for these delays.
- The large proportion of specialist rehabilitation units are already compliant with standards for **recording of complexity and functional gain** at the start and end of each rehabilitation programme, although there is room for improvement in the timeliness of completing the assessments. However, only just over three-quarters of services routinely record the NPDS on discharge, which is necessary for computation of cost-efficiency. Cost-efficiency is a mandatory standard for outcome evaluation required by NHSE, and also one of the principal outcomes to be examined in the prospective audit, so this shortfall will need to be addressed as part of the training and support for the prospective audit to optimise the outputs of this programme.
- The large majority (87%) of the trauma rehabilitation population **achieved some measurable gain in the course of their specialist in-patient rehabilitation programme**. Lower rates of gain were found in the Level 1c (cognitive/behavioural) and hyper-acute services, but this was not unexpected as the standardised measures within UKROC are not always sensitive to the types of change that are made by patients in these services. Although Goal Attainment Scaling (GAS) offers an opportunity to demonstrate achievement of the intended goals for admission, even if they are not reflected in the standardised assessments, none of the Level 1c or HA services currently record GAS in UKROC, thereby missing an opportunity to demonstrate meaningful change.
- Almost all trauma patients (98%) had a **discharge destination recorded** and the cost-efficiency for nearly all episodes (99%) fell within two SD of the mean for each service level.
- For the episodes with cost-efficiency data recorded, the overall **time to offset the cost of rehabilitation** by savings in ongoing care in the community was 22 months. Within

---

the different service levels, it ranged from 14 (Level 1a) to 125 (Level 1c) months. This is a relatively short time span for this young population who may have many years of life ahead of them, in which to accrue the long-term cost-benefits.

Due to the wide distribution of cost-efficiency data, the proposed standard for cost-efficiency (within 2 SD of the mean for the service level) requires revision.

In conclusion, the majority of specialist rehabilitation services currently approach the standards for rehabilitation from NICE, the National Service Framework for Long Term Conditions and the British Society of Rehabilitation Medicine. However, some shortfalls have been identified. These will be addressed, so far as is possible, through training and support in the subsequent elements of this programme.

---

# 13 DESIGN OF THE NCASRI PROSPECTIVE AUDIT

In addition to the work described above, a substantial task for this first year of the NCASRI programme has been to develop and finalise the dataset for the prospective audit in Element 2 of the study. This has involved:

1. Consulting with stakeholders to determine feasibility and methods of collection;
2. Obtaining approval from the overseeing bodies, including the Clinical Reference Groups (CRGs) and the British Society of Rehabilitation Medicine (BSRM);
3. Considering the data reporting and data linkage implications, such as identifying where the various data will be drawn from existing sources, and whether it will be added to either UKROC or TARN databases;
4. Programming the additional tools and data fields into the TARN and UKROC software;
5. Providing manuals and training materials to the MTCs and clinicians who will collect the data;
6. Working with the Caldicott Guardians and Health Research Authority (HRA) to obtain the relevant permissions to collect the identifiable data in order to link the TARN and UKROC datasets and track individual patient journeys.

The flow chart for the approved data collection process in the prospective audit is summarised in **Appendix 5**.

An important development that has occurred during the first year of the NCASRI programme is the addition of five new fields to the TARN dataset, addressing the following questions:

1. Did the patient receive a copy of the RP?
2. Patient categorisation of rehabilitation needs.
3. Recommended destination for rehabilitation.
4. Actual destination for rehabilitation.
5. Reason for variance.

**These fields are mandated on TARN as from 1 July 2016**, and will go some way towards identifying the group of patients with complex needs for rehabilitation that are the subject of the next stage of the NCASRI audit – even in those centres where there is no consultant to complete the SpRP.

Nevertheless, the lack of consistent availability of RM consultants to lead the audit on the ground remains the largest threat to the successful completion of Elements 2 and 3 of this National Clinical Audit of Specialist Rehabilitation following Major Injury.

As discussed previously, Wales will not be included in Element 2 of the project due to the current absence of organised trauma networks.

# 14 APPENDIX 1: PARTICIPANTS IN THE ORGANISATIONAL AUDIT, WITH INDIVIDUAL MTC ORGANISATION

Major Trauma Network (MTN)	Major Trauma Centre (MTC)	Rehabilitation Lead/(Deputy)
Northern (Newcastle, North East and Cumbria)	Royal Victoria Infirmary, Newcastle	Dr Laura Graham
Northern (Middlesbrough and South Tees)	James Cook University Hospital, Middlesbrough	Dr Khalid Anwar (Alison Carter)
West Yorkshire	Leeds General Infirmary	Dr Matthew Smith
North Yorkshire and Humberside	Hull Royal Infirmary	Dr Abayomi Salawu
Lancashire and South Cumbria	Royal Preston Hospital	Dr David Shakespeare
Greater Manchester	Manchester Collaborative MTC	Dr Krystyna Walton
Cheshire and Merseyside	Liverpool Collaborative MTC	Dr Ganesh Bavikatte
South Yorkshire	Northern General Hospital Sheffield and Royal Hallamshire Hospital	Dr Sachin Watve
North West Midlands and North Wales	University Hospital of North Staffordshire, Stoke-on-Trent	Dr Alex Ball
Birmingham, Black Country, Hereford and Worcester	Queen Elizabeth Hospital Birmingham	Dr Alex Ball and Dr Steve Sturman
Central England	University Hospital Coventry	Dr Alex Ball
East Midlands	Queen's Medical Centre, Nottingham	Dr Naseer Haboubi
East of England	Addenbrookes, Cambridge	Dr Fahim Anwar and Dr Kate McGlashan
Thames Valley	John Radcliffe Hospital, Oxford	Prof Derick Wade
Severn	Southmead Hospital, Bristol	(Debbie Cleary and Melissa Varia)
North West London	St Mary's Hospital, London	Dr Ajoy Nair
North East London and Essex	Royal London Hospital	Dr Clarence Liu
South West London and Surrey	St George's Hospital, London	Dr Sancho Wong
South East London, Kent and Medway	King's College Hospital, London	Dr Emer McGilloway (Jacqui Wakefield)
Sussex	Royal Sussex County Hospital, Brighton	(Karen Poole)
Wessex	Southampton General Hospital	Dr Caroline Hutchings
Peninsula	Plymouth Derriford	Dr Rachel Botell

**Survey questionnaire:** Please see electronic appendix: A1.1

**MTC summary sheets:** Please see electronic appendix: A1.2

# 15 APPENDIX 2: ORGANISATIONAL AUDIT – BREAKDOWN BY MTN

## 15.1 RM consultant involvement in the MTCs

Table A2.1 summarises the number of consultants in RM working in the MTNs and the time spent within the each MTC.

**Table A2.1: Consultants in RM (CRMs) provision within the Major Trauma Centres**

Unit ID	No. CRMs within the MTN	No. CRMs working in MTC	No. CRM vacant posts	No. sessions paid by MTC	No. CRM visits to MTC/ week	Approx hours/wk CRM spends on MTC
Northern (Newcastle, North East and Cumbria)	4	1	-	3	3	12
Northern (Middlesbrough and South Tees)	2	0	2	0 (20)	Ad hoc	Sporadic
West Yorkshire	7	1	-	5	7	30
North Yorkshire and Humberside	3	1	-	0	2	4
Lancashire and South Cumbria	3	2	-	2	7	Variable
Greater Manchester	12	6	-	7	6	40
Cheshire and Merseyside	6	4	-	0	1	2–3
South Yorkshire	5	3	-	10	3	20
North West Midlands and North Wales	5	2	-	11	5	44
Birmingham, Black Country, Hereford and Worcester	10	2	-	10	5	45
Central England	4	4	-	5	5	15–20
East Midlands	8	2	-	4 (8)	3 (5)	14
East of England	7	3	-	10	6	40
Thames Valley	10	0	1	0 (10)	Ad hoc	Sporadic

**Note:** Figures in brackets indicate vacant posts.

Unit ID	No. CRMs within the MTN	No. CRMs working in MTC	No. CRM vacant posts	No. sessions paid by MTC	No. CRM visits to MTC/ week	Approx hours/wk CRM spends on MTC
Severn	2	0	2	0 (20)	0	0 (40)
North West London	4	1	-	1	1	4
North East London and Essex	3	1	-	0	Ad hoc	1–2
South West London and Surrey	1	1	-	0	Ad hoc	Variable
South East London, Kent and Medway	2	1	-	0	1	8
Sussex	3	0	0.4	0 (3)	0 (3)	0 (12)
Wessex	9	1	-	1	1.5	3
Peninsula	4	1	1	1 (10)	Ad hoc	4
<b>Total</b>	<b>113</b>	<b>40</b>	<b>5.4</b>	<b>70</b>	<b>55+</b>	<b>233+</b>

**Note:** *Figures in brackets indicate vacant posts.*

## 15.2 Implementation of the Rehabilitation Prescription

The standard RP was implemented at some level by all 22 MTCs. Table A2.2 gives a breakdown of how it is completed in the 22 MTCs.

The standard RP does not require completion of any measures, but many centres do incorporate measures of rehabilitation needs, dependency or outcome. Five centres did not have any standard measures within their standard RP, but 16 centres completed the Rehabilitation Complexity Scale (RCS): 5 in addition to the Barthel Index (BI); 1 in addition to the Patient Categorisation Tool (PCAT); and 1 in addition to the Glasgow Outcome Scale (GOS).

**Table A2.2: Completion of the basic RP**

	How completed	Completed by	Completed for	Rate of compliance
Northern (Newcastle, North East and Cumbria)	Paper	MTC and CRM*	ISS ≥9	99%
Northern (Middlesbrough and South Tees)	Paper	Therapists without CRM	ISS ≥9	98%
West Yorkshire	Mixture	MTC without CRM	ISS ≥9	80%
North Yorkshire and Humberside	Electronically	MTC; no CRM input	All MTC patients	98%
Lancashire and South Cumbria	Paper	MTC; no CRM input	All MTC patients	100%
Greater Manchester	Electronically	MTC with CRM	ISS ≥9	97–98%
Cheshire and Merseyside	Paper	MTC with CRM	ISS ≥9	100%
South Yorkshire	Paper	MTC with CRM	ISS ≥9	95–96%
North West Midlands and North Wales	Electronically	Varies	ISS ≥9	90%
Birmingham, Black Country, Hereford and Worcester	Electronically	Varies	ISS ≥9	98%
Central England	Paper	MTC with and without CRM	ISS ≥9	96%
East Midlands	Electronically	MTC with CRM	All MTC patients	100%
East of England	Electronically	MTC with CRM	ISS ≥9	98%
Thames Valley	Paper	MTC without CRM	ISS ≥9	70%
Severn	Electronically	MTC without CRM	ISS ≥9	98%
North West London	Electronically	MTC without CRM	All MTC patients	100%
North East London and Essex	Electronically	Varies	ISS ≥9	90%
South West London and Surrey	Electronically	MTC without CRM	All patients	100%
South East London, Kent and Medway	Mixture	Varies	Clinical need	100%
Sussex	Mixture	MTC without CRM	ISS ≥9	100%
Wessex	Electronically	MTC without CRM	All patients	Unknown
Peninsula	Paper	Varies	All patients	95%

**Table A2.2: Completion of the basic RP (continued)**

	Time started	Time completed	Updated	Patient-held
Northern (Newcastle, North East and Cumbria)	≤72hrs	Clinically stable	No	No
Northern (Middlesbrough and South Tees)	≤48hrs	4–5 days	Yes	Sometimes
West Yorkshire	≤48hrs	Discharge	No	Yes
North Yorkshire and Humberside	≤5 days	When started	No	No
Lancashire and South Cumbria	≤72hrs	Varies	No	No
Greater Manchester	≤24hrs	Discharge	Yes	Yes
Cheshire and Merseyside	≤24hrs	Ongoing	Yes	No
South Yorkshire	≤72hrs	≤4 days	Yes	No
North West Midlands and North Wales	≤72hrs	Discharge	Yes	Sometimes
Birmingham, Black Country, Hereford and Worcester	≤48hrs	Discharge	Yes	Sometimes
Central England	≤72hrs	Discharge	Yes	No
East Midlands	≤72hrs	Not stated	Yes	No
East of England	≤48hrs	Discharge	Yes	No
Thames Valley	≤48hrs	Discharge	Yes	No
Severn	≤48hrs	Discharge	Yes	No
North West London	≤48hrs	Discharge	No	Yes
North East London and Essex	≤72hrs	Discharge	No	No
South West London and Surrey	≤48hrs	Discharge	Yes	No
South East London, Kent and Medway	≤48hrs	Discharge	No	No
Sussex	≤48hrs	Discharge	Yes	Yes
Wessex	Not sure	Discharge	No	No
Peninsula	≤72hrs	Discharge	No	Sometimes

\* CRM = Consultant in Rehabilitation Medicine.

The Specialist Rehabilitation Prescription (SpRP) was implemented in only 11 (50%) of the 22 MTCs. The SpRP uses the same basic information as the standard RP, but adds four standardised tools:

- The Patient Categorisation tool (PCAT);
- The Rehabilitation Complexity Scale (RCS-E or RCS-ET (Trauma version));
- The Neurological Impairment Scale (NIS-Trauma);
- The Northwick Park nursing Dependency Scale (NPDS/NPCNA).

Table A2.3 shows the tools routinely collected within the SpRP by the 11 MTCs where it was implemented. Only four of the six tools are mandatory: either the RCS-E or RCS-ET can be used and the UK FIM+FAM is voluntary.

- All 11 centres collected either the RCS-E or the RCS-ET;
- 2 centres collected the PCAT, NIS-Trauma and NPDS;
- 3 centres collected the UK FIM+FAM, but 2 of these were sites with on-site specialist rehabilitation beds.

One unit collected the Barthel Index (BI) and another collected the Glasgow Outcome Scale (GOS), but these do not form part of the SpRP.

**Table A2.3: Tools routinely collected within the Specialist Rehabilitation Prescription (SpRP)**

	PCAT	RCS-ET	RCS-E	NIS-Trauma	NPDS	UK FIM+FAM
Northern (Cumbria)	–	✓		–	–	–
Northern (North East)	–		✓	–	–	✓
North Yorkshire and Humberside	–	✓		–	–	✓
Greater Manchester	✓		✓	✓	✓	✓
Cheshire and Merseyside	✓		✓	✓	✓	–
South Yorkshire	–		✓	–	–	–
North West Midlands and North Wales	–	✓		–		–
Birmingham, Black Country, Hereford and Worcester	–	✓		–	–	–
Central England	–	✓		–	–	–
East of England	–	✓		–	✓	–
South East London, Kent and Medway	–	✓		–	–	–

# 16 APPENDIX 3: REHABILITATION PRESCRIPTION – COMPLETION AND TRANSFER RATES

**Table A3.1: RP completion and transfer rates**

MTN*	ISS ≥9	RP	eRP	Transferred to	Discharged to rehab	Median ISS (IQR)	Median NISS (IQR)
Northern (Newcastle, North East and Cumbria, Middlesbrough and South Tees)	1,191	1,136 (95.4%)	495 (41.6%)	112 (9.4%)	121 (10.2%)	14 (9–22)	18 (13–34)
West Yorkshire	819	806 (98.4%)	2 (0.2%)	16 (2%)	106 (12.9%)	16 (9–25)	22 (13–34)
North Yorkshire and Humberside	476	466 (97.9%)	0 (0%)	59 (12.4%)	41 (8.6%)	13 (9–24)	17 (12–34)
Lancashire and South Cumbria	595	355 (59.7%)	0 (0%)	135 (22.7%)	10 (1.7%)	13 (9–22)	18 (13–34)
Greater Manchester	1,542	1,389 (90.1%)	0 (0%)	210 (13.6%)	124 (8%)	16 (9–25)	22 (13–34)
Cheshire and Merseyside	1,233	1,027 (83.3%)	0 (0%)	306 (24.8%)	183 (14.8%)	16 (9–25)	22 (13–41)
South Yorkshire	918	838 (91.3%)	688 (74.9%)	107 (11.7%)	58 (6.3%)	16 (9–24)	18 (13–34)
North West Midlands and North Wales	824	722 (87.6%)	0 (0%)	20 (2.4%)	248 (30.1%)	16 (9–25)	22 (13–34)
Birmingham, Black Country, Hereford and Worcester	800	789 (98.6%)	0 (0%)	142 (17.8%)	136 (17%)	16 (9–25)	25 (16–34)
Central England	912	851 (93.3%)	0 (0%)	43 (4.7%)	69 (7.6%)	16 (9–25)	22 (14–34)
East Midlands	1,096	1,024 (93.4%)	0 (0%)	154 (14.1%)	75 (6.8%)	16 (9–25)	22 (13–34)
East of England	750	721 (96.1%)	2 (0.3%)	107 (14.3%)	43 (5.7%)	17 (10–26)	27 (17–41)
Thames Valley	944	867 (91.8%)	854 (90.5%)	158 (16.7%)	31 (3.3%)	16 (9–25)	22 (13–34)
Severn	963	926 (96.2%)	93 (9.7%)	102 (10.6%)	289 (30%)	16 (9–25)	22 (13–34)
North West London	738	622 (84.3%)	622 (84.3%)	141 (19.1%)	65 (8.8%)	16 (9–25)	22 (13–34)
North East London and Essex	989	584 (59%)	494 (49.9%)	186 (18.8%)	22 (2.2%)	18 (10–26)	27 (17–41)
South West London and Surrey	675	445 (65.9%)	442 (65.5%)	121 (17.9%)	41 (6.1%)	16 (9–25)	22 (13–34)
South East London, Kent and Medway	816	618 (75.7%)	617 (75.6%)	212 (26%)	29 (3.6%)	16 (9–25)	24 (16–34)
Sussex	490	487 (99.4%)	0 (0%)	82 (16.7%)	47 (9.6%)	14 (9–24)	22 (13–34)
Wessex	715	371 (51.9%)	12 (1.7%)	161 (22.5%)	101 (14.1%)	16 (9–25)	22 (13–36)
Peninsula	848	732 (86.3%)	1 (0.1%)	124 (14.6%)	195 (23%)	14 (9–25)	20 (11–34)

\* TARN data combines the two Northern MTNs into one, so there are only 21 in this table.

---

# 17 APPENDIX 4: UKROC DATA ANALYSIS – SUMMARY BY PROVIDER

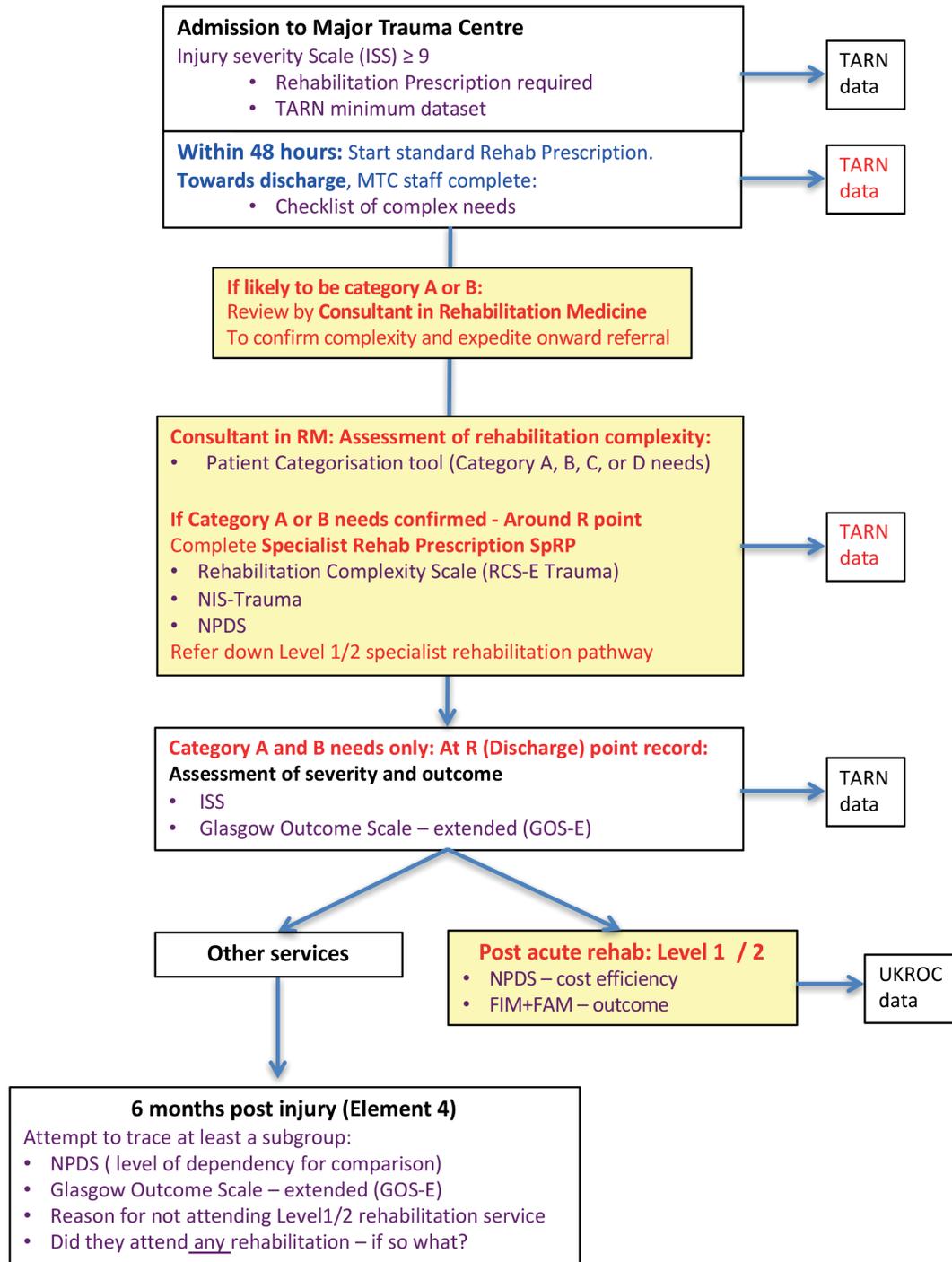
Please see electronic spreadsheets:

**Unit by unit analysis of compliance 2013–2015**

**Unit by unit analysis of compliance 2014–2015**

# 18 APPENDIX 5: FLOW CHART FOR THE PROSPECTIVE AUDIT

**Proposed Flowchart for Trauma Outcomes Assessment**  
Adapted from BSRM Core Standards for Rehabilitation Following Trauma



Copyright Prof L Turner-Stokes. Reproduced with permission.

# 19 APPENDIX 6: SUMMARY OF RECOMMENDATIONS IN RELATION TO AUDIENCE

## Recommendations for people who deliver care in MTNs: clinicians, allied health professionals, clinical audit/QI professionals

Issue	Issue/Problem	Recommendation
<b>Within the Major Trauma Centre:</b>		
Completion of the Rehabilitation Prescription (RP)	Although reported RP completion rates have increased over the last 3 years, compliance still varies between MTCs. Recording rates range from 52% to 99%.	All MTCs should ensure that patients with an ISS $\geq 9$ have a Rehabilitation Prescription.
Completion of the Specialist Rehabilitation Prescription (SpRP) and associated tools for patients with complex rehabilitation needs	Less than half of MTCs are currently providing an SpRP for patients who have complex rehabilitation needs.  Completion of the tools recommended in the SpRP is very sporadic.	All patients who have complex (Category A or B) rehabilitation needs at the point when they are ready to leave the MTC should have a Specialist Rehabilitation Prescription completed by a consultant in RM, including the 4 measurement tools, as recommended in the BSRM core standards.
<b>Within the specialist Rehabilitation Services:</b>		
Recording of data on functional gain and cost-efficiency for national benchmarking	The NHSE service specification for specialist rehabilitation requires the recording of standardised measures within the UKROC dataset to demonstrate functional gain, reduction in dependency and cost-efficiency.  The collection of cost-efficiency data (Northwick Park Dependency Scores (NPDS/NPCNA) at both admission and discharge) was particularly poor – with missing data for over a quarter of episodes.	All providers of Level 1 and 2 services should review their data reporting to ensure complete collection of outcome measures, particularly the NPDS/NPCNA at both admission and discharge for the estimation of cost-efficiency.  Not all patients are expected to make functional gain (especially if they are admitted for 'disability management' or 'neuro-palliative rehabilitation' programmes), but in this case, specialist rehabilitation services should at minimum report Goal Attainment Scaling.

**Recommendations for people who commission, plan and provide trauma care within the MTNs:  
NHS England, CCGs, NHS trusts**

Issue	Problem	Recommendation
<b>Coordinated and timely rehabilitation for patients with complex needs across the MTNs</b>	This report highlights marked variation in access to Level 1 and 2 specialist rehabilitation across the 22 major trauma networks.	Commissioners and providers should work together to review their current capacity and pathways for patients requiring specialist rehabilitation following major trauma, and develop a local action plan to address any shortfalls.
<b>Leadership and coordination of rehabilitation within the MTNs</b>	Many MTNs did not have a Director of Rehabilitation to coordinate the provision of rehabilitation services.	MTNs that do not have a Director of Rehabilitation should appoint one.
<b>Specialist input from a consultant in RM from the early stages of trauma care</b>	The NHSE service specification for major trauma requires that an RM consultant should attend the MTCs at least 3 times per week to assist in the management and transfer of patients.  Only half of the MTCs met this standard and a quarter still do not have any designated paid sessions for a consultant in RM. This is particularly a problem in London.	MTNs that do not currently provide sufficient funded sessions for RM consultants to meet this requirement should review their funding allocations to ensure that it is met.
<b>Ensuring a sustainable workforce of RM consultants to manage trauma</b>	Many MTCs that do not have RM consultant input had advertised but failed to recruit suitably trained applicants.	The bodies responsible for central workforce allocations and training programmes within specialist RM should review workforce planning to ensure a sustainable supply of RM consultants trained in trauma rehabilitation.
<b>Acknowledged shortfalls in service capacity for specialist rehabilitation</b>	Although the majority of patients were transferred to Specialist rehabilitation within the standard (6 weeks), this often meant repatriation to their local district general hospital or trauma unit, resulting in unnecessary delay in appropriate care.  A small number waited for unacceptably long periods of up to a year. Highly dependent patients with tracheostomies or those with challenging behavioural problems were most likely to face delays in transfer, due to limited bed capacity.	NHSE and standard setting bodies (such as the BSRM) should review their standards to ensure that they are suitably ambitious.  NHSE and CCG commissioners should review their commissioned service capacity in specialist rehabilitation for trauma patients – especially within the Level 1c and hyper-acute rehabilitation services.
<b>Under-commissioning Level 1 and 2 rehabilitation units</b>	In the absence of a national tariff for specialist rehabilitation, between half and two-thirds of the Level 1 and 2 units reported under-commissioning, with staffing levels below the national standards and insufficient staffing to manage a complex caseload.	NHSE and CCG commissioners should work with Providers to review their service contracts in order to ensure that the commissioned rates for Level 1 and 2 services are sufficient to provide safe and effective care that meets the national standards.

---

# 20 REFERENCES

1. The NHS Clinical Advisory Group Report on Regional Networks for Major Trauma. Department of Health. London: 2010.
2. Specialist Rehabilitation in the Trauma Pathway: BSRM core standards. The British Society of Rehabilitation Medicine (BSRM). London: 2013.
3. Trauma Audit Research Network (TARN). [www.tarn.ac.uk](http://www.tarn.ac.uk)
4. UK Rehabilitation Outcomes Collaborative (UKROC). [www.kcl.ac.uk/lsm/research/divisions/cicelysaunders/research/studies/ukroc/index.aspx](http://www.kcl.ac.uk/lsm/research/divisions/cicelysaunders/research/studies/ukroc/index.aspx)
5. National Clinical Audit of Specialist Rehabilitation following Major Injury (NCASRI). Edited by Prof L Turner-Stokes. King's College London: 2015.
6. Baker SP, O'Neill B, Haddon W Jr., Long WB: The injury severity score: a method for describing patients with multiple injuries and evaluating emergency care. *The Journal of Trauma-Injury Infection and Critical Care* March 1974, 14: 187–196.
7. NHS standard contract for major trauma service (all ages). NHS England. London: 2013.
8. NHS standard contract for specialist rehabilitation for patients with highly complex needs (all ages). NHS England. London: 2013.
9. Levels of specialist rehabilitation services for patients with complex rehabilitation needs. British Society for Rehabilitation Medicine (BSRM). 2010.
10. Turner-Stokes L, Disler PB, Nair A, Wade DT. Multi-disciplinary rehabilitation for acquired brain injury in adults of working age. *Cochrane Database of Systematic Reviews* July 2005, 20(3): Cd004170. Updated 2015.
11. Andelic N, Bautz-Holter E, Ronning P, Olafsen K, Sigurdardottir S, Schanke AK, Sveen U, Tornas S, Sandhaug M, Roe C: Does an early onset and continuous chain of rehabilitation improve the long-term functional outcome of patients with severe traumatic brain injury? *Journal of Neurotrauma* 2012, 29: 66–74.
12. Bai Y, Hu Y, Wu Y, Zhu Y, He Q, Jiang C, Sun L, Fan W: A prospective, randomized, single-blinded trial on the effect of early rehabilitation on daily activities and motor function of patients with hemorrhagic stroke. *Journal of Clinical Neuroscience* 2012, 19: 1376–1379.
13. Turner-Stokes L, Paul S, Williams H: Efficiency of specialist rehabilitation in reducing dependency and costs of continuing care for adults with complex acquired brain injuries. *Journal of Neurology, Neurosurgery and Psychiatry* 2006, 77: 634–639.
14. Turner-Stokes L: Cost-efficiency of longer-stay rehabilitation programmes: can they provide value for money? *Brain Injury* 2007, 21: 1015–1021.
15. Oddy M, da Silva Ramos S: The clinical and cost-benefits of investing in neurobehavioural rehabilitation: a multi-centre study. *Brain Injury* 2013, 27: 1500–1507.
16. Turner-Stokes L, Williams H, Bill A, Bassett P, Sephton K: Cost-efficiency of specialist inpatient rehabilitation for working-aged adults with complex neurological disabilities: a multicentre cohort analysis of a national clinical data set. *BMJ Open* 2016, 6 :e010238.

- 
17. Turner-Stokes L: Cost-efficient service provision in neurorehabilitation: defining needs, costs and outcomes for people with long term neurological conditions (RP-PG-0407-10185). Edited by Northwick Park Hospital, London: National Institute for Health Research (NIHR) Programme Grant for Applied Research, 2008–15.
  18. Turner-Stokes L, Thu A, Williams H, Casey R, Rose H, Siegert RJ: The Neurological Impairment Scale: reliability and validity as a predictor of functional outcome in neurorehabilitation. *Disability Rehabilitation* 2014, 36: 23–31.
  19. Turner-Stokes L, Williams H, Siegert RJ: The Rehabilitation Complexity Scale version 2: a clinimetric evaluation in patients with severe complex neurodisability. *Journal of Neurology, Neurosurgery and Psychiatry* 2010, 81: 146–153.
  20. Turner-Stokes L, Scott H, Williams H, Siegert R: The Rehabilitation Complexity Scale – extended version: detection of patients with highly complex needs. *Disability Rehabilitation* 2012, 34:715–720.
  21. Turner-Stokes L, Tonge P, Nyein K, Hunter M, Nielson S, Robinson I: The Northwick Park Dependency Score (NPDS): a measure of nursing dependency in rehabilitation. *Clinical Rehabilitation* 1998, 12: 304–318.
  22. Turner-Stokes L, Nyein K, Halliwell D: The Northwick Park Care Needs Assessment (NPCNA): a directly costable outcome measure in rehabilitation. *Clinical Rehabilitation* 1999, 13: 253–267.
  23. Siegert RJ, Turner-Stokes L: Psychometric evaluation of the Northwick Park Dependency Scale. *Journal of Rehabilitation Medicine* 2010, 42: 936–943.
  24. Turner-Stokes L, Nyein K, Turner-Stokes T, Gatehouse C: The UK FIM+FAM: Development and evaluation. *Clinical Rehabilitation* 1999, 13: 277–287.
  25. Turner-Stokes L, Siegert RJ: A comprehensive psychometric evaluation of the UK FIM+FAM. *Disability Rehabilitation* 2013, 35: 1885–1895.
  26. National Service Framework for Long Term Conditions. Edited by Department of Health, London: 2005.
  27. Rehabilitation after critical illness [CG83]. National Institute of Health and Care Excellence (NICE). London: 2009.
  28. Standards for Rehabilitation Services mapped on to the NSF for long-term neurological conditions. British Society of Rehabilitation Medicine (BSRM). London: 2009.
  29. BSRM specialist neuro-rehabilitation services: Providing for patients with complex rehabilitation needs. British Society of Rehabilitation Medicine (BSRM). London: original version 2010, updated 2015.
  30. Specialised Services National Definition Set No. 7: Complex specialised rehabilitation for brain injury and complex disability (adult). Department of Health. London: 2009.
  31. Sentinel Stroke National Audit Programme (SSNAP). Royal College of Physicians. [www.strokeaudit.org/results/Clinical-audit/National-Results.aspx](http://www.strokeaudit.org/results/Clinical-audit/National-Results.aspx)
  32. Trauma Quality Improvement Network System (TQuINS). In *National Peer Review Programme*. NHS England. London: 2016.
  33. National Peer Review Report: Trauma Services 2015. NHS England. London: 2015.
  34. Sleat G, Willett K. Evolution of trauma care in the UK: current developments and future expectations. *Injury* 2011,42(8): 838–40.
  35. Ardolino A, Sleat G, Willett K: Outcome measurements in major trauma: results of a consensus meeting. *Injury* 2012.



