

## Report Synopsis from the National Clinical Audit of Specialist Rehabilitation following major Injury (NCASRI)

The National Clinical Audit of Specialist Rehabilitation following Major Injury (NCASRI) arose in the context of development of the Major Trauma Networks (MTN) from 2010 onwards. It is recognised that there is a lack of information on the extent of the current provision for rehabilitation and how specialist rehabilitation units integrate with the acute trauma services. *Appendix 1* describes the pathway following major trauma and provision of specialist rehabilitation services in the UK.

There is general acknowledgement that existing service capacity may be insufficient to meet demand but very little information is available about the rehabilitation needs of patients leaving the major trauma centres, or how well these are being met.

This review of Specialist Rehabilitation was divided into three areas, as follows:

	Description
1	An <i>organisational audit</i> to identify the current provision of specialist rehabilitation for trauma patients and to map the pathways of care into and out of these services (Completed October 2016 and described in our first Year report) <a href="https://www.kcl.ac.uk/nursing/departments/cicelysaunders/about/rehabilitation/national-clinical-audit-">https://www.kcl.ac.uk/nursing/departments/cicelysaunders/about/rehabilitation/national-clinical-audit-</a>
2	A <i>prospective clinical audit</i> of new patients presenting within NHS Major Trauma Centres (MTCs) and who have complex rehabilitation needs and receive specialist rehabilitation (Completed June 2018 and described in this final report) <a href="https://www.kcl.ac.uk/nursing/departments/cicelysaunders/about/rehabilitation/national-clinical-audit-">https://www.kcl.ac.uk/nursing/departments/cicelysaunders/about/rehabilitation/national-clinical-audit-</a>
3	A <i>feasibility study</i> for identifying the pathway and outcomes from existing data sources for patients who require specialist rehabilitation on discharge from MTCs, but do not subsequently attend (Completed June 2018 and described in this final report) <a href="https://www.kcl.ac.uk/nursing/departments/cicelysaunders/about/rehabilitation/national-clinical-audit-">https://www.kcl.ac.uk/nursing/departments/cicelysaunders/about/rehabilitation/national-clinical-audit-</a>

The National Audit of Specialist Rehabilitation following Major Injury was commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP). 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 in patient outcomes, and in particular, to increase the impact that clinical audit, outcome review programmes and registries have on healthcare quality in England and Wales. HQIP holds the contract to commission, manage and develop the National Clinical Audit and Patient Outcomes Programme (NCAPOP), comprising around 40 projects covering 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 with some individual projects, other devolved administrations and crown dependencies [www.hqip.org.uk/national-programmes](http://www.hqip.org.uk/national-programmes).

## Executive Summary

This is the third and final report on the provision of specialist rehabilitation following major trauma. Anyone involved with patients who have suffered from severe disabling injury will understand how important this area of healthcare is.

We found:

1. Participation in the review, by the major trauma centres was at 73%. Even in the contributing centres, there was clearly a lack of rehabilitation expertise. Across the board, there was a large proportion of patients (46% of those who actually underwent specialist rehabilitation), whose needs were not identified in the major trauma centres
2. The mean age of recruited patients was 50 years and the mean length of stay was 65 days
3. We estimate that the total current specialist rehabilitation bed capacity in England caters for 40% of those who need these services
4. Of the patients with complex rehabilitation needs who were formally recruited in the Major Trauma Centres (MTCs), only 40% received the requisite in-patient specialist rehabilitation
5. Of those who were identified as needing specialist rehabilitation, but did not receive it:
  - a. Approximately 11% did have some form of rehabilitation in a unit registered with the UK Rehabilitation Outcomes Collaborative (UKROC) indicating that there were at least some other centres capable of providing this service, but which are not yet designated as Level 1 or 2 services
  - b. A further 62% were tracked as receiving further inpatient treatment, but unfortunately, no further information was available about the rehabilitation services they received or how they fared, as standard NHS datasets do not currently collect any meaningful data about rehabilitation or functional outcomes
6. For those patients who did receive specialist rehabilitation there was evidence of functional improvement in the vast majority (94%)

The major drive to improve the care of patients presenting with major trauma, over the past decade, has brought great improvements with many more patients surviving their initial insult. However, this review demonstrates that failure to provide the rehabilitation to capitalise on these frontline gains. We now need concentrate on what happens further down the line. It would appear that access to specialist rehabilitation is limited and needs much closer attention paid to the implementation of the standards that already exist. There will be different models of improving such access, depending on the set up of the services in the different areas of the country. Nevertheless, when designing and managing trauma networks they need to review their compliance to these standards and see how they can be improved.

## Report Synopsis

A synopsis of the final report has been produced as the complete report contains a large amount of very valuable information, which will be of interest to those who manage, provide or commission these services - as well as to the patients themselves

<https://www.kcl.ac.uk/nursing/departments/cicelysaunders/about/rehabilitation/national-clinical-audit-> We wished to produce a synopsis so that the full depth of information was maintained, yet the main findings are presented in a clear manner.

Major trauma can lead to a wide range of injuries resulting in a diverse range of impairments and rehabilitation needs. We believe that the key to ensuring that patients receive the services they require in timely fashion lies in identifying and understanding the complexity of their individual requirements for rehabilitation and directing them to the most appropriate service as they leave the major trauma centres. During the course of the NCASRI project we have identified some important shortfalls in existing service provision and have demonstrated that existing NHS datasets fail to capture this complexity, but we have offered some potential solutions to manage this better in the future.

## Methods:

### Prospective audit

The National Clinical Audit of Specialist Rehabilitation following Major Injury (NCASRI) audit built on the existing mandated data collection within the Trauma Audit and Research Network (TARN) and UK Rehabilitation Outcomes Collaborative (UKROC) datasets. The NHS England service specification for Major Trauma mandates the collection of a rehabilitation prescription (RP) for severely injured patients, but at the outset of this audit, the RP included only very scant information on rehabilitation needs. NCASRI added the set of five tools comprised within the Specialist Rehabilitation Prescription (SpRP) recommended by the British Society of Rehabilitation Medicine to identify and describe patients with complex rehabilitation needs in the Major Trauma Centres (MTCs).

The prospective NCASRI audit was conducted in the 18-month period between July 2016 and December 2017, with patient recruitment in the MTCs from 01.07.2016 – 31.08.2017 (14 months).

Eligible patients were severely injured adults (16+ years with ISS  $\geq 9$ <sup>1</sup>) who required specialist in-patient rehabilitation (category A or B needs<sup>2</sup>) at the point when they were ready to be discharged from an MTC (*see Appendix 1*).

---

<sup>1</sup> ISS; Injury Severity Score: Those who are injured may have one or many injuries and the Injury Severity Score (ISS) is an anatomical score that measures the overall severity of injured patients. <https://www.tarn.ac.uk/Content.aspx?c=3117>

<sup>2</sup> Rehabilitation category: For the majority of patients (category C or D needs) rehabilitation is provided and commissioned through the local general (Level 3) rehabilitation services along a Re-enablement and Rehabilitation pathway. Patients with more complex rehabilitation needs (category B) will require specialist rehabilitation from their local Level 2 services, which are further divided into Level 2a (supra-district) and 2b (local) specialist services. A small number with very complex (category A) needs will require rehabilitation in a tertiary (Level 1) service - or in a level 2a service with enhanced capacity to support patients with highly complex needs <https://www.bsrn.org.uk/downloads/bsrm-core-standards-for-major-trauma-24-10-13-version1.4newlogo-forpublication-finalforweb-checked1-12-14.pdf>

## Case ascertainment

Case ascertainment is defined as the number of patients recruited compared to the number eligible.

According to the NHS England service specification, the need for specialist rehabilitation should ideally be confirmed by a consultant in Rehabilitation Medicine (RM). However, there were three problems with relying on this for case ascertainment, which meant that a proportion of eligible patients might not be recruited:

1. Only 16 of the 22 MTCs<sup>3</sup> (73%) participated in this first prospective round of the audit
2. Even in participating MTCs, many lacked RM consultant input to confirm complex needs
3. Some patients may only develop complex needs for rehabilitation after leaving the MTC

Therefore, in order to maximise recruitment:

- Patients were included if the MTC team believed them to have category A or B needs on the basis of the Complex Needs (Checklist (CNC) and Rehabilitation Complexity Scale-Trauma (RCS-ET) without the rest of the SpRP tools
- Where a consultant in RM was not available, experienced members of the MTC clinical team could complete the other SpRP tools if they felt able to do so
- Data linkage between UKROC and TARN was performed both forwards and backwards, to include any patients who may have developed complex needs only after leaving the MTC

This capture/recapture supported the identification of potentially eligible patients who were missed in the MTCs. The rehabilitation group therefore comprised two subgroups:

- The recruited rehabilitation group - those identified as having complex (category A/B) needs for rehabilitation in the participating MTCs
- The non-recruited rehabilitation group who were not identified as having complex rehabilitation needs in the MTCs but were subsequently admitted. These included patients who were admitted to non-participating MTCs (patients in this group were therefore not expected to have had the NCASRI tools collected in the MTCs)

## Results:

- A total of 1381 patients with category A/B needs were formally recruited in the participating MTCs, of which 550 (40%) received the requisite specialist Level 1/2 rehabilitation
- Our broader case ascertainment strategy identified an additional 87 patients as having or possibly having complex (category A/B) needs for rehabilitation on leaving the MTCs, of which 79 went on to have specialist rehabilitation
- The remaining 831 patients (60%) did not receive specialist Level 1 / 2 rehabilitation (the 'non-rehabilitation' group). Their further hospital treatment and outcomes were tracked using Hospital Episode Statistics (HES) data
- However, a further 525 patients were subsequently admitted to Level 1/2 rehabilitation who had not been identified as having complex needs in the MTC, giving a total of 1154 who received specialist rehabilitation

---

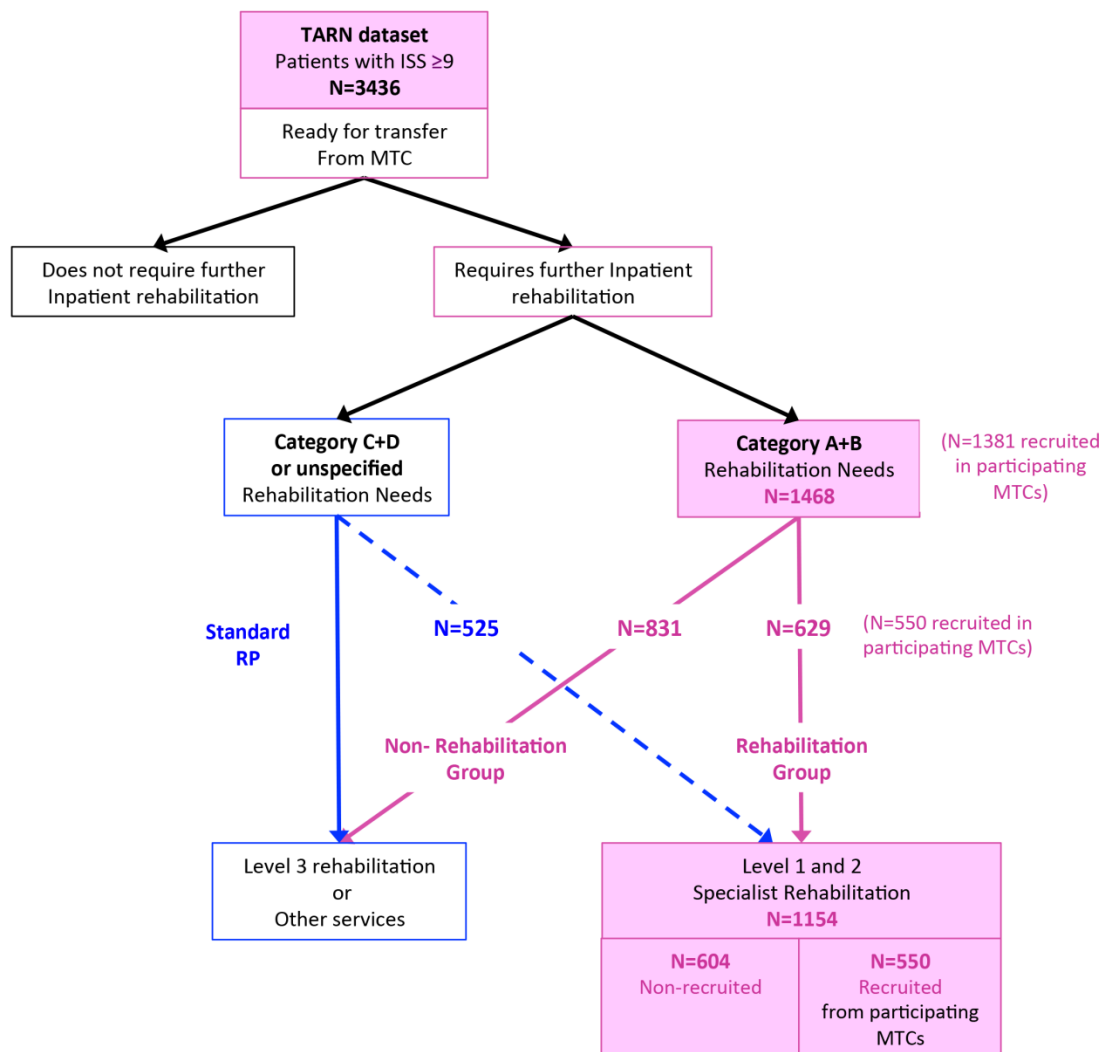
<sup>3</sup> The Major trauma Centres not participating were: West Yorkshire; Lancashire and South Cumbria; Thames Valley; North East London and Essex; South East London, Kent and Medway; Sussex.

- These findings emphasise the fact that existing practices failed to identify patients with complex rehabilitation requirement and emphasised the need for a more systematic approach to the assessment of needs for rehabilitation within the MTCs

Implementation of the rehabilitation prescription has continued to develop throughout the course this audit. The full SpRP was burdensome to collect, but a simpler minimum SpRP dataset comprising just the Complex Needs Checklist (CNC), the Rehabilitation Complexity Scale (RCS-ET), and the clinical category of rehabilitation need proved feasible to collect and still provided reasonably accurate identification of category A/B needs for rehabilitation.

### Summary of Case Ascertainment:

**Figure 1: Case ascertainment groups**



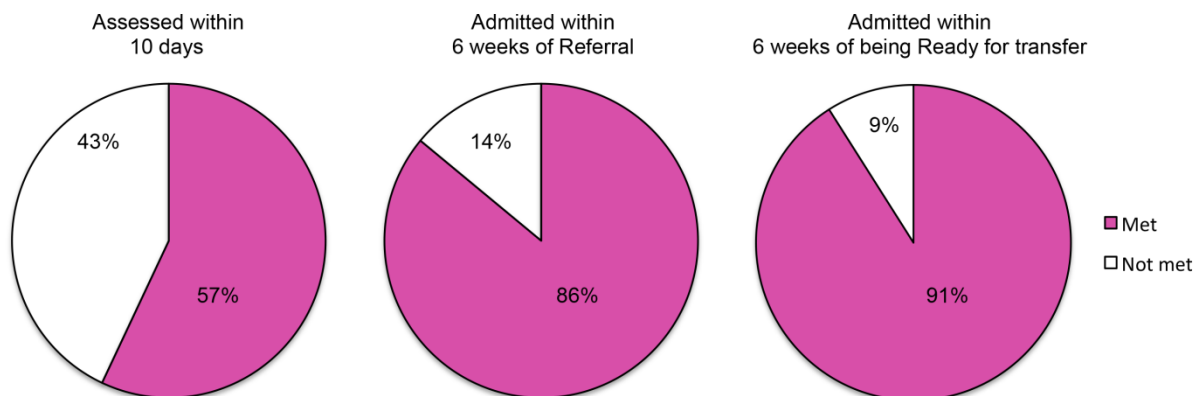
### Timely transfer to specialist rehabilitation

*Standard: Assessment within 10 days of referral and transferred to rehabilitation with 6 weeks of being fit for transfer.*

Within the prospective audit, overall compliance with the standard waiting times was as follows (see Figure 2, page 6):

- 57% of patients were assessed within 10 days of referral
- 86% were transferred to specialist rehabilitation within six weeks of referral
- 91% were admitted within six weeks of being ready for transfer

**Figure 2: Performance against standards for response times**



Comparing the recruited and non-recruited groups:

- 54 % vs. 60% were assessed within 10 days
- 91% of both groups were transferred within six weeks of being ready

Although the waiting times for assessment were similar, the identification of complex (category A/B) needs within the MTC shortened the overall transfer time by about six days.

However, these findings require some interpretation in terms of mean waiting times.

- For patients admitted to specialist rehabilitation, the mean time from onset to admission was 70 days (95% CI 58-90) but a small minority of patients (4%) waited > six months
- A proportion of this time, however, was taken stabilising the patients before they were ready for rehabilitation. The mean time from referral to assessment was six days, and from assessment to admission the mean time was 20 days - although the mean waiting time after being ready for admission was just seven days

There had been a modest improvement in response times since the baseline analysis reported in the first year report <https://www.kcl.ac.uk/nursing/departments/cicelysaunders/about/rehabilitation/national-clinical-audit>. The mean waiting time for assessment was reduced from nine to six days and the overall waiting time from referral to admission reduced by six days.

## Functional gain following specialist rehabilitation

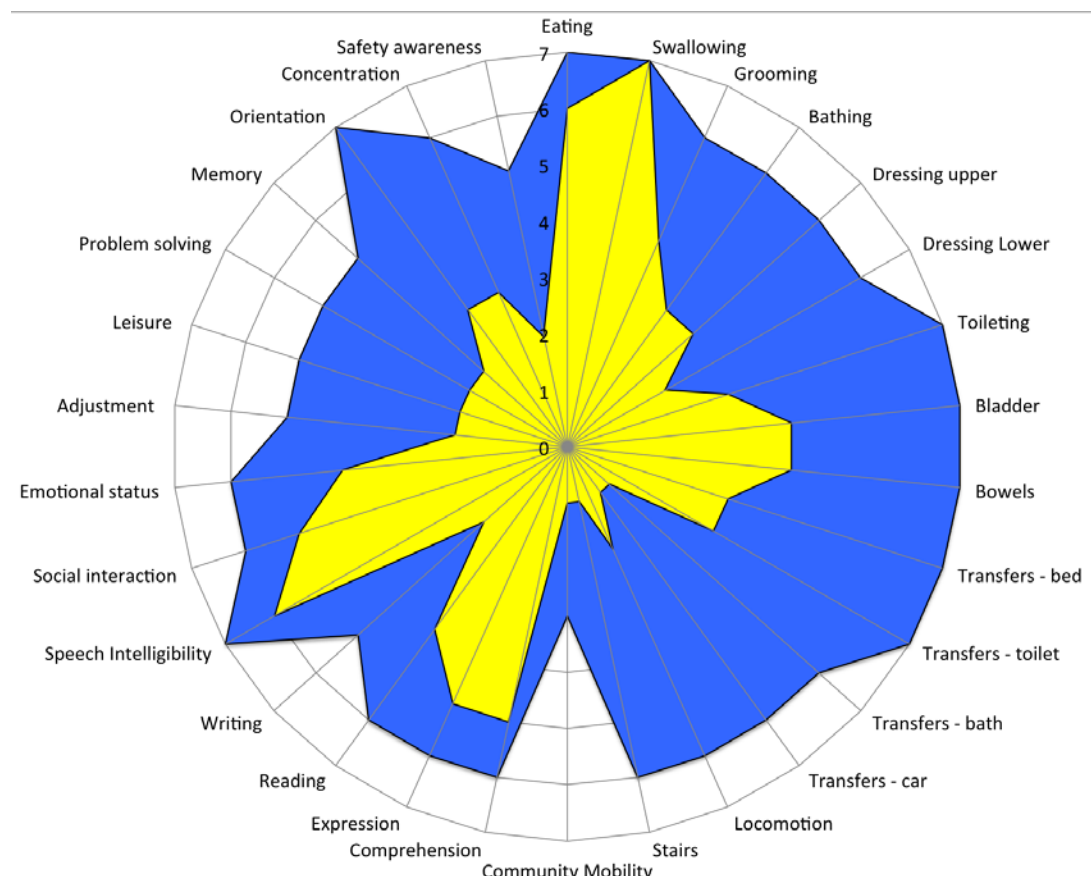
Key goals for rehabilitation are often, but not always, improved independence in self-care and other activities of daily living. The UK Functional Independence Measure (UK FIM), The UK Functional Assessment Measure (UK FAM) and the Northwick Park Nursing Dependency Score (NPDS) are standardised measures of independent function within the UKROC dataset. The Goal Attainment Scale (GAS) is a measure of the attainment of individual goals for rehabilitation.

Of 1154 admissions for specialist rehabilitation, a total of 1044 episodes were completed at the time of linkage. Of these, 984 (94%) showed some 'functional gain' captured by one or more of these measures, and the discharge destination was recorded in 99% across all providers. There has been substantial improvement in reporting rates for most outcome measures across the individual rehabilitation service providers since the first year report

<https://www.kcl.ac.uk/nursing/departments/cicelysaunders/about/rehabilitation/national-clinical-audit->

The UK FIM+FAM profile provides an evaluation of independence on admission and discharge, which can be helpful for describing and comparing case-mix. The 'FAM-Splat' provides graphic presentation of the disability profile in a radar chart. The 30 items are arranged as 'spokes of the wheel' and the levels from 1 (total dependence) to 7 (total independence) run from the centre outwards. Thus a perfect score would be demonstrated as a large circle. Figure 3 shows a FAM splat of the median scores on admission and discharge for the 1154 patients admitted for specialist rehabilitation demonstrating all-round improvements in physical, cognitive and communicative function.

**Figure 3: A FAM-splat of the median score scores on admission and discharge from rehabilitation**





### Cost-efficiency of specialist rehabilitation

The UKROC database incorporates an evidence-based algorithm for estimating individual lifetime savings in the cost of on-going care. Based on this data set, overall compliance with the standards for reporting cost-efficiency was 74%.

- The mean episode cost of rehabilitation was estimated at £39,398
- The average age of this sample was 50 years and the mean length of stay was 65 (Standard Deviation (SD) 56) days

### Implications for bed capacity

A key underpinning question for NCASRI was whether the existing bed capacity for specialist in-patient rehabilitation was sufficient to meet demand within the patient population with complex rehabilitation needs following major trauma, and if not to estimate the additional bed capacity that would be required.

The total bed occupancy of the 1154 patients who received specialist rehabilitation was 75,839 bed days (equivalent to 218 beds at 95% bed occupancy).

Approximately 40% of the 1381 recruited patients completed a specialist in-patient rehabilitation programme, suggesting that the existing bed capacity catered for about 40% of patients with category A/B needs who required it.

The total capacity required to meet demand may therefore be estimated at approximately 2.5 times the existing capacity to cater for approximately 2885 patients per year. This would require a total allocation of approximately 547 Specialist Level 1 and 2 beds in England (i.e. an increased provision of 328 beds) bringing the total average bed numbers to 8.2 per million population.

### What happened to those patients who were not admitted for rehabilitation?

A total of 831 patients with confirmed complex needs were not admitted to a specialist rehabilitation unit. Of these, 89 (11%) were identified as having received rehabilitation in other services registered with UKROC, that are not currently designated as Level 1 or 2 services. These patients also made significant functional gains. Some had similar levels of complexity and dependency to those in the designated Level 1 and 2 services, suggesting that there are additional rehabilitation units out there that would be eligible for designation and commissioning as a Level 1 / 2 service to help meet the requirement for additional bed capacity.

This left 742 patients for whom data was requested from NHS Digital's Data Access and Request Service (DARS). Data were received for 677 surviving patients, for whom further details are given in the main report online.

<https://www.kcl.ac.uk/nursing/departments/cicelysaunders/about/rehabilitation/national-clinical-audit->

Nearly two-thirds (62%) of this group had further inpatient treatment after leaving the MTC. The mean length of stay was about six weeks. Unfortunately, it was not possible to extract any



meaningful data from HES on either the rehabilitation activity or outcomes for these patients, other than simple discharge destination. By the time of data linkage in December 2017, 79% had been discharged home or to temporary accommodation but 10% were still in hospital. This emphasises the need for better collection of rehabilitation activity outcomes within the Level 3 services.

## Recommendations:

### Commissioners:

1. All MTNs should regularly review their processes and referral pathway for rehabilitation, following major trauma, and ensure that standards for rehabilitation provision and availability of specialist rehabilitation practitioners, in the MTCs, are met
2. Commissioners should consider opportunities for development of specialist rehabilitation capacity, both for inpatient and community-based services
3. Once the capacity issues are addressed, it would be timely to review the current standards of 10 days for assessment and 6 weeks for transfer, as these represent long delays, creating pressure on the acute services. Commissioners should also help lobby for national guidelines that describe processes to try and reduce variation, as well as increase efficiency

### Audit Providers:

4. TARN and UKROC should work together to develop a national database that includes accurate identification of patients with complex needs for rehabilitation using the SpRP minimum dataset to allow regular benchmarking and comparative data reporting
5. These audit providers should encourage the consistent use of this data in local and national quality improvement
6. The data providers, TARN and UKROC, to seek to further develop data linkage and analysis

### Service providers and clinical teams:

7. The integration of rehabilitation with front line services has lagged behind and should be addressed by:
  - i. Each MTC defining its needs to improve their services
  - ii. How to address the need for specialists in rehabilitation
  - iii. How to improve timely transfer to appropriate rehabilitation services
8. Clinicians in MTCs need training in the identification of those with complex needs so that early rehabilitation can be started with the associated benefits later in the patients' journey

**Professional Educators and workforce planning:**

9. Health Education England should address how to increase the numbers of suitably qualified rehabilitation practitioners available for this service including RM consultants as well advanced clinical practice and consultant roles that include AHP and nursing staff to work alongside

## Appendix 1:

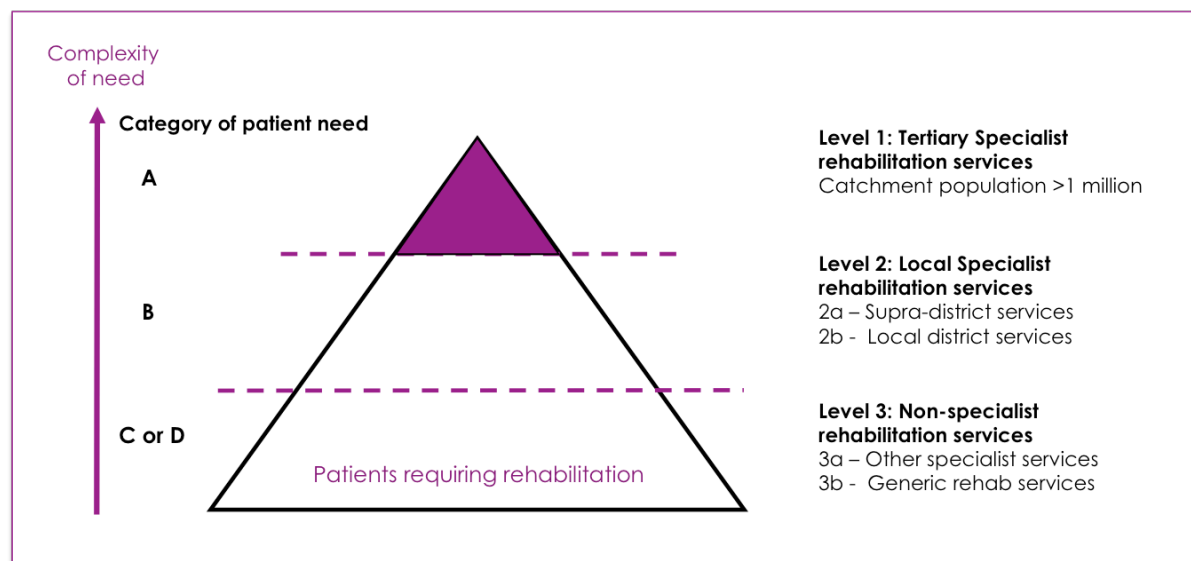
### Specialist rehabilitation service provision in the UK

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 are commissioned directly by NHS England. Local specialist and general services are commissioned by the Clinical Commissioning Groups (CCGs).

Specialist rehabilitation is also provided across regionally-based networks, although these are not necessarily co-terminus with the MTNs.

**Hyper-acute specialist rehabilitation services:** development of the MTNs has instigated a new category of 'Hyper-acute rehabilitation' unit (19). 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 (Turner-Stokes et al 2016).

**Figure 4: Different levels of specialisation in rehabilitation service provision in England**



**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.

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

Reference: Turner-Stokes L, Bavikatte G, Williams H, Bill A, Sephton K. Cost-efficiency of specialist hyperacute in-patient rehabilitation services for medically unstable patients with complex rehabilitation needs: a prospective cohort analysis. *BMJ open*. 2016;6(9):e012112.

These services are sub-divided into:

- **Level 1a:** for patients with high physical dependency
- **Level 1b:** mixed dependency
- **Level 1c:** 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 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 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 one 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 five-tier system, as shown in *Figure 5*. **The focus of this audit is on patients requiring hyper-acute and Level 1 and 2 specialist rehabilitation services only.**

**Figure 5: Pathway for patients with trauma**

