Specialist neuro-rehabilitation services: providing for patients with complex rehabilitation needs

Background

Specialist rehabilitation services play a vital role in management of patients admitted to hospital by taking patients after their immediate medical and surgical needs have been met, and maximising their recovery and supporting safe transition back to the community. In doing so they help reduce the burden on acute and front line services and indeed are a critical component of the acute care pathway, without which networks for trauma, stroke, neurosciences etc will inevitably fail and patient outcomes will be compromised.

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[1-6]. 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[7, 8].

Coordinated networks

The Department of Health Specialist Services National Definition Set (SSNDS) 3rd edition published in 2009 defined four categoriess of patient need (A,B,C,D) (see Table 1) and three levels of specialist service (1, 2 and 3). These form a useful framework for planning and commssioning of specialist rehabilitation services.

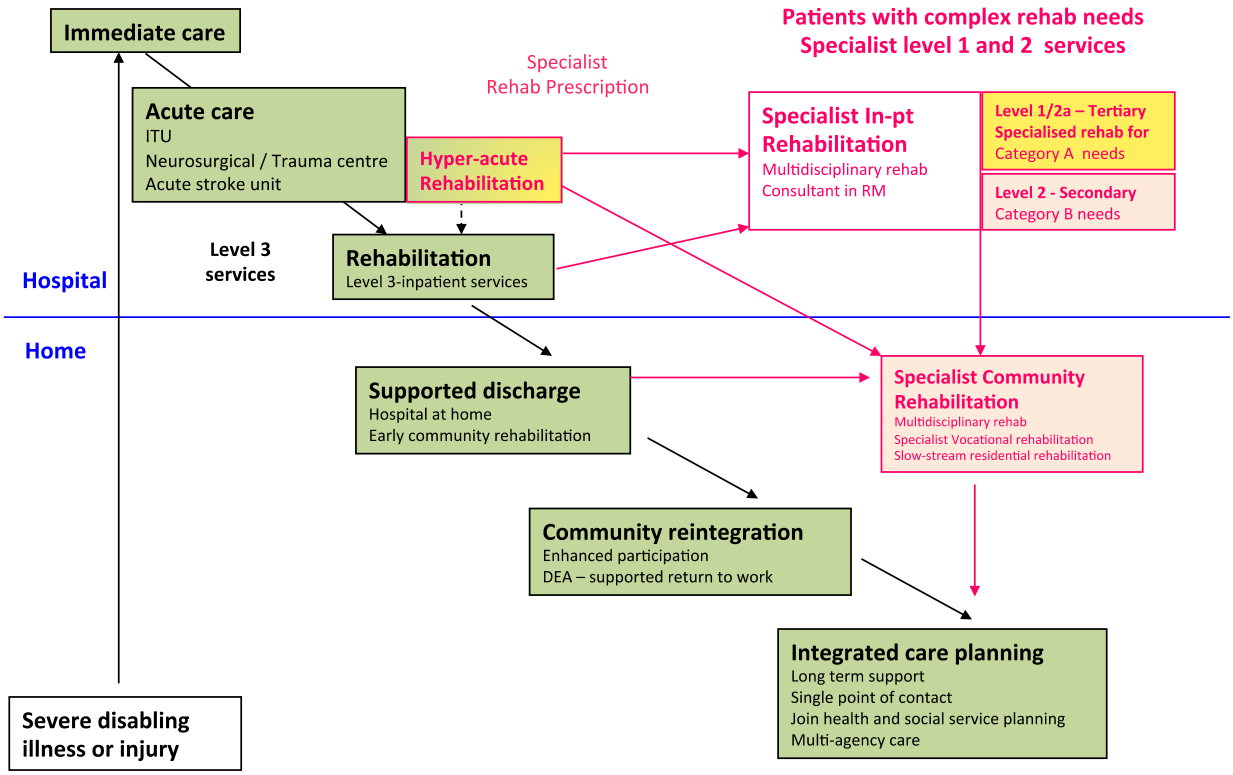
After severe disabling illness or injury many patients have category C or D rehabilitation needs and will progress satisfactorily down the pathway to recovery with the support of the local recovery, rehabilitation and re-enablement (R R &R) Level 3 services. (See Figure 1)

A significant number of patients will have more complex (Category B) needs requiring more prolonged treatment in a specialist (Level 2) rehabilitation service. The British Society of Rehabilitation Medicine (BSRM) Standards[9] recommend that there should be a local specialist rehabilitation service, led by a consultant trained and accredited in rehabilitation medicine, for every 250-350K population

A small number will have very complex needs requiring the special skills and facilities of a tertiary (Level 1) specialised rehabilitation service. Very highly trained rehabilitation professionals are in short supply in the UK, and it is not feasible or economical to duplicate these high cost/low volume services in every locality. The Warner Report on specialised commissioning (2006) recommended that these specialised services should be planned over a suitable geographical area (approximately 1-3 million population in this case), and therefore require collaborative commissioning arrangements[10].

The National Services Framework (NSF) for Long Term neurological Conditions[11] emphasises the need for provision at all levels, planned and delivered through co-ordinated networks in which specialist neuro-rehabilitation services work both in hospital and the community to support local rehabilitation and care support teams.

Figure 1: Pathways for rehabilitation following illness or injury



What is specialist rehabilitation?

Rehabilitation is a process of assessment, treatment and management by which the individual (and their family/carers) are 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 trajectory and stage of their condition

Specialist rehabilitation is the total active care of patients with a disabling condition, and their families, by a multi-professional team who have undergone recognised specialist training in rehabilitation, led /supported by a consultant trained and accredited in rehabilitation medicine (RM).

Generally, patients requiring specialist rehabilitation are those with complex disabilities. Such patients typically present with a diverse mixture of medical, physical, sensory, cognitive, communicative, behavioural and social problems, which require specialist input from a wide range of rehabilitation disciplines (eg rehabilitation-trained nurses, physiotherapy, occupational therapy, speech and language therapy, psychology, dietetics, orthotics, social work etc.) as well as specialist medical input from consultants trained in rehabilitation medicine, and other relevant specialties eg neuro-psychiatry).

A subgroup of patients will have 'profound disability'; these are more severely affected patients who require help for all aspects of their basic care, as well specialist interventions e.g. spasticity management, postural support programmes and highly specialist equipment.

Specialist rehabilitation services may be provided along thee main (frequently overlapping) pathways:

- **Restoration of function** e.g. for those recovering from a 'sudden onset' or 'intermittent' condition, where patient goals are focussed not only on improving independence in daily living activities, but also on participatory roles such as work, parenting and other activities.
- **Disability management,** e.g. for those with stable or progressive conditions, where patient/family goals are focussed on maintaining existing levels of function and participation; compensating for lost function (eg through provision of equipment/adaptations); or supporting adjustment to change in the context of deteriorating physical, cognitive, and psychosocial function
- **Neuro-palliative rehabilitation** focuses on symptom management and interventions to improve quality of life during the later stages of a progressive condition or profound disability, at the interface between rehabilitation and palliative care.

Rehabilitation Service provision in the UK

Since the reorganisation of the NHS following the Health and Social Care Act 2012, tertiary specialist rehablitation 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)

1. **Within each locality (Level 3):**
   Local non-specialist rehabilitation teams provide general multi-professional rehabilitation and therapy support for a range of conditions within the context of acute services (including stroke units), intermediate care or community services.

2. **Local (district) specialist rehabilitation services (Level 2)** are typically planned over a district-level population of 350-500K, 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 multidisciplinary rehabilitation team provides advice and support for local general rehabilitation teams.

3. **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 co-ordinated service networks planned over a regional population of 1-5 million through specialised commissioning arrangements.
   These services are sub-divided into:
   - **Level 1a** - for patients with high physical dependency
   - **Level 1b** - mixed dependency
   - **Level 1c** - mainly walking wounded patients with cognitive/behavioural disabilities.

4. **Hyper-acute Specialist Rehabilitation services**. Since development of the Major Trauma Networks, a new category of 'Hyper-acute rehabilitation' unit has been developed. These units are sited within acute care settings. They take patients at a very early stage in the rehabilitation pathway when they still have medical and surgical needs requiring continued active support from the trauma, neuroscience or acute medical services.

Tertiary specialised rehabilitation services are thinly spread and, in some areas of the UK where access is poor, local specialist rehabilitation services have extended to support a **supra-district** catchment of 750K-1m, and take a higher proportion (at least 50%) of patients with very complex needs. These are **Level 2a** 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 full standards for a 'specialist rehabilitation service' (These are **Level 3a** services). These developments have lead to a 5-tier system as shown in Figure 1.

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

What is a specialist rehabilitation service?

Defining criteria for 'local specialist' and 'tertiary specialised' services are detailed in Annexe 1 and 2.

Key features of <u>any</u> specialist rehabilitation service are:

- The multi-professional team has undergone recognised specialist training in rehabilitation
- Led or supported by a consultant trained and accredited in Rehabilitation Medicine
- A co-ordinated inter-disciplinary team-working towards an agreed set of goals
- Take patients with more complex rehabilitation needs than non-specialist services
- Have specialist equipment, facilities and staffing levels to meet those needs
- Clinical data as defined by the UK National Dataset for Specialist Rehabilitation Services (including complexity and outcome data) are routinely collected and reported annually for all patients
- Meet the national BSRM standards for specialist rehabilitation services
- Support local rehabilitation teams in hospital and community
- Have a recognised role in education, training in the field of rehabilitation.

The **definition of a 'tertiary specialised' rehabilitation service** is based on five main criteria:

1. It is **led by a consultant trained and accredited in RM**, and/or neuropsychiatry depending on caseload
2. It covers a **population of >1 million** patients, therefore requires **collaborative commissioning**
3. It caters for people whose needs are beyond the scope of the local specialist services and therefore has a **high proportion of patients with very complex rehabilitation needs**
4. It provides a **higher level of service** in terms of specialist expertise, facilities and programme intensity to meet those needs (see Annexe 1 and 2)
5. It also plays a recognised **Networking role** which includes
    a. supporting local specialist and general teams in the management of complex cases and
    b. acting as resource for **research and development,** as well as education and training.

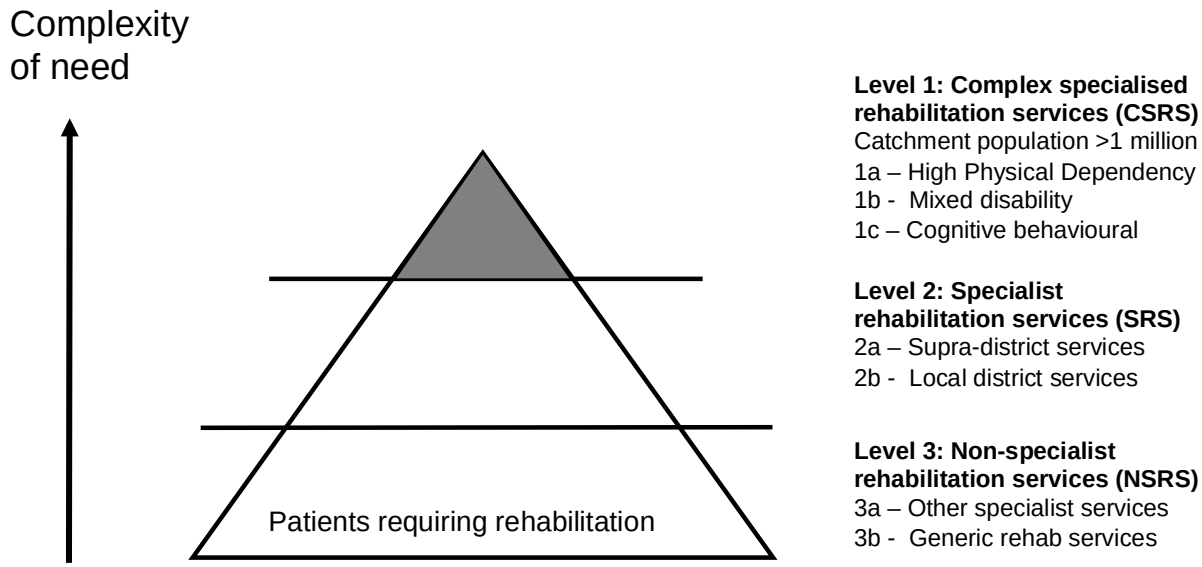
UK Rehabilitation Outcomes Collaborative (UKROC)

The UK Rehabilitation Outcomes Collaborative (UKROC) programme was established in 2008 with funding from an NIHR Programme Grant (RP-PG-0407-10185)[12] to establish a national clinical database for specialist rehabilitation. The UKROC database is held at Northwick Park as part of a collaborative venture between the British Society for Rehabilitative Medicine (BSRM) and the NHS Information Centre in a programme funded by the Department of Health to inform casemix development in rehabilitation services (see Annexe 3).

The UKROC database collates data on needs, inputs and outcomes for all patients admitted to inpatient specialist (Level 1 and 2) rehabilitation services in England. In addition, it provides quarterly benchmarking reports on quality and cost–efficiency, comparing the performance of each service with its peer group on key quality standards.

Since 2012, UKROC provides the commissioning dataset to NHS England. It is the vehicle by which specialist in-patient rehabilitation activity is counted and the complexity-weighted commissioning currency is implemented (described later in this document). To be designated and commissioned as a specialist rehabilitation service, all Level1 and 2 services must therefore be registered with UKROC and routinely reporting the UKROC dataset for all admitted patient episodes.

Figure 1: Different levels of complexity in rehabilitation service provision



TERTIARY SPECIALISED REHABILITATION SERVICES- provided at regional / national level		
Level 1:	**Specialised rehabilitation services** Provided by specialised rehab teams led by consultants trained and accredited in the specialty of rehabilitation medicine (RM) (and/or neuropsychiatry):	
	Serving a regional or supra-regional population and taking patients with Category A needs – ie severe physical, cognitive communicative disabilities or challenging behaviours, with highly complex rehabilitation needs* that are beyond the scope of their local specialist rehabilitation services, and have higher level facilities and skilled staff to support these. Collect and report full National Specialist Rehabilitation Dataset	Catchment: 1-3 million Predominantly highly complex caseload: At least 85% pts have Category A needs on admission At least 70% pts with RCS-E score ≥11 cross-sectionally
LOCAL REHABILITATION SERVICES - provided at district level		
Level 2:	**Local (district) specialist rehabilitation services** Provided by inter-disciplinary teams led/supported by a consultant in RM, and meeting the BSRM standards for specialist rehabilitation services	
Level 2a	Led by consultant in RM. Serving an extended local population in areas which have poor access to level 1 services. Take patients with a range of complexity, including Category B and some Category A with highly complex rehabilitation needs* Collect and report full National Specialist Rehabilitation Dataset	Catchment: 600K-1 million Mixed caseload 50-80% Category A needs on admission 50-70% RCS-E score ≥11 cross-sectionally
Level 2b	Led/supported by a consultant in RM. Serving a local population, predominantly patients with Category B needs. Collect and report at least the minimum national dataset	Catchment: 250-500K Less complex caseload eg 30-50 % Category A needs on admission 30-50% RCS-E score ≥11 cross-sectionally
Level 3:	**Local non-specialist services.** Includes generic rehabilitation for a wide range of conditions, provided in the context acute, intermediate care and community facilities, or other specialist services (eg stroke units)	
Level 3a	Other specialist services led or supported by consultants in specialties other than RM **-** eg services catering for patient in specific diagnostic groups (eg stroke) with Category C needs. Therapy / nursing teams have specialist expertise in the target condition	
Level 3b	Generic rehabilitation for a wide range of conditions, often led by non-medical staff, provided in the context acute, intermediate care and community facilities, for patients with Category D needs	

*Defined by Rehabilitation Complexity / Northwick Park nursing and Therapy Dependency Scores – see below for more detail

What type of patients need specialist rehabilitation services?

The different categories of need for rehabilitation are detailed in Table 1.

The majority of patients have category C or D rehabilitation needs and travel satisfactorily down the path from injury/illness to independence with the help of their local rehabilitation and support services.

For example a patient admitted to hospital following a moderate - severe stroke may have acute treatment followed by 4-6 weeks rehabilitation in a specialist stroke unit or intermediate care setting, and may then transfer satisfactorily on to their local community rehabilitation services without the need for specialist rehabilitation.

However, a small minority of patients will have more complex needs requiring specialist rehabilitation, and a few will have very complex needs or profound disability, requiring a tertiary specialised rehabilitation service.

Local Specialist rehabilitation:
The type of patients who need a specialist rehabilitation service would typically be younger, previously fitter patients with more complex needs such as cognitive, communicative, perceptual, behavioural and social difficulties requiring the co-ordinated input of a specialist consultant-led team in order to manage difficult to treat symptoms and to coordinate multi-agency referral and on-going care.

These patients with category B needs would typically be those who require:

1. Co-ordinated interdisciplinary intervention from 2-4 or more therapy disciplines, in addition to specialist rehabilitation medicine/nursing care in a rehabilitative environment
2. Medium-Longer durations of stay, ie usually >6 weeks – occasionally up to 6 months
3. Rehabilitation/support to return to productive roles, such as work or parenting.
4. Special facilities/ equipment or interventions

They may also have medical problems requiring ongoing investigation / treatment during rehabilitation.

Tertiary Specialised rehabilitation
Some patients have very complex needs for rehabilitation which are beyond the resources of their local specialist services, and require a tertiary 'specialised (Level 1) service'.

These patients with category A needs would typically be those who require one or more of:

- Intensive, co-ordinated interdisciplinary intervention from 4 or more therapy disciplines, in addition to specialist rehabilitation medicine/nursing care in a rehabilitative environment
- Longer programmes - typically 2-4 months, but occasionally up to 6-12 months
- Very high intensity input – eg 1:1 nurse "specialling", or 2-3 trained therapists at one time
- Highly specialist clinical skills (see table 1 for details)
- Neuropsychiatric care, including risk management, treatment under the Mental Health Act
- Higher level facilities /equipment such as bespoke assistive technology
- Complex multi-agency vocational rehabilitation /support
- Ongoing management of complex / unstable medical problems in an acute hospital setting

A small number of patients have profound disability requiring specialised neuro-palliative rehabilitation services. Their needs are often substantial and ongoing and typically include support for family members as well as the patient him/herself. Specialised rehabilitation services often work closely with community rehabilitation teams, specialist nursing homes and palliative care services to support individuals during the later stages of their condition.

It is recognised that the complexity of patient needs changes over time. All specialist rehabilitation services will have a case mix that covers a range of complexity.

- Within a local specialist rehabilitation service it is expected that, a small number of patients (eg 30-50%) at any one time will be highly complex (RCS-E ≥11) – or 50-70% in the case of level 2a services
- In Level 1 services, >70% will be highly complex (RCS-E ≥11) at any one time, although all patients are expected to meet the admission criteria of needs beyond their local/specialist rehab services

It is therefore the proportion of complex patients that chiefly distinguishes these two levels of service.

Table 1: Four categories of patient need for rehabilitation services

Patients with Category A rehabilitation needs

- Patient goals for rehabilitation may include:
  - Improved physical, cognitive, social and psychological function / independence in activities in and around the home;
  - Participation in societal roles (eg work / parenting / relationships);
  - Disability management eg to maintain existing function; manage unwanted behaviours / facilitate adjustment to change
  - Improved quality of life and living including symptom management, complex care planning, support for family and carers, including neuropalliative rehabilitation
- Patients have complex or profound disabilities e.g. severe physical, cognitive communicative disabilities or challenging behaviours.
- Patients have highly complex rehabilitation needs and require specialised facilities and a higher level of input from more skilled staff than provided in the local specialist rehabilitation unit. In particular rehabilitation will usually include one or more of the following:
  - intensive, co-ordinated interdisciplinary intervention from 4 or more therapy* disciplines, in addition to specialist rehabilitation medicine/nursing care in a rehabilitative environment
  - medium length to long term rehabilitation programme required to achieve rehabilitation goals – typically 2-4 months, but up 6 months or more, providing this can be justified by measurable outcomes
  - very high intensity staffing ratios e.g. 24 hour 1:1 nurse "specialling", or individual patient therapy sessions involving 2-3 trained therapists at any one time
  - highest level facilities /equipment e.g. bespoke assistive technology / seating systems, orthotics, environmental control systems/computers or communication aids, ventilators.
  - complex vocational rehabilitation including inter-disciplinary assessment / multi-agency intervention to support return to work , vocational retraining, or withdrawal from work / financial planning as appropriate
- Patients may also require:
  - Highly specialist clinical input e.g. for tracheostomy weaning, cognitive and/or behavioural management, low awareness states, or dealing with families in extreme distress
  - ongoing investigation / treatment of complex / unstable medical problems in the context of an acute hospital setting
  - neuro-psychiatric care including: risk management, treatment under sections of the Mental Health Act,
  - support for medicolegal matters including mental capacity and consent issues
- Patients are treated in a specialised rehabilitation unit (i.e. a Level I unit).
- Patients may on occasion be treated in a Level 2 unit depending on the availability of expert staff and specialist facilities as well as appropriate staffing ratios.

Patients with Category B rehabilitation needs

- Patient goals for rehabilitation may be as for category A patients
- Patients have moderate to severe physical, cognitive and/or communicative disabilities which may include mild-moderate behavioural problems
- Patients require rehabilitation from expert staff in a dedicated rehabilitation unit with appropriate specialist facilities.
- In particular rehabilitation will usually include one or more of the following:
- Intensive co-ordinated interdisciplinary intervention from 2-4 therapy disciplines in addition to specialist rehabilitation medicine/nursing care in a rehabilitative environment
- medium length rehabilitation programme required to achieve rehabilitation goals – typically 1-3 months, but up to a maximum of 6 months, providing this can be justified by measurable outcomes
- special facilities/ equipment (e.g. specialist mobility/ training aids, orthotics, assistive technology) or interventions (e.g. spasticity management with botulinum toxin or intrathecal baclofen)
- interventions to support goals such as return to work, or resumption of other extended activities of daily living, eg home-making, managing personal finances etc
- Patients may also have medical problems requiring ongoing investigation/treatment
- Patients are treated in a local specialist rehabilitation unit (i.e. a Level 2 unit).

Patients with Category C rehabilitation needs

- Patient goals are typically focused in restoration of function / independence and co-ordinated discharge planning with a view to continuing rehabilitation in the community
- Patients require rehabilitation in the context of their specialist treatment as part of a specific diagnostic group (e.g. stroke)
- Patients may be medically unstable or require specialist medical investigation / procedures for the specific condition
- Patients usually require less intensive rehabilitation intervention from 1-3 therapy disciplines in relatively short rehabilitation programmes (i.e. up to 6 weeks)
- Patients are treated by a local specialist team (i.e. Level 3a service) which may be led by consultants in specialties other than Rehabilitative Medicine (e.g. neurology / stroke medicine) and staffed by therapy and nursing teams with specialist expertise in the target condition.

Patients with Category D rehabilitation needs

- Patient goals are typically focused in restoration of function / independence and co-ordinated discharge planning with a view to continuing rehabilitation in the community if necessary
- Patients have a wide range of conditions but are usually medically stable
- Patients require less intensive rehabilitation intervention from 1-3 therapy disciplines in relatively short rehabilitation programmes (i.e. 6-12 weeks)
- Patients receive an in-patient local non-specialist rehabilitation service (i.e. Level 3b) which is led by non-medical staff.

Therapy disciplines may include: physiotherapy, occupational therapy, speech and language therapy, psychology, dietetics, social work, orthotics, rehabilitation engineering, vocational / educational support (including play therapy in children's settings).

A patient categorisation tool (PCAT) has been developed to assist clinicians in identifying the patient category of needs (see Annex 4)

Defining Complexity in Rehabilitation

In rehabilitation, diagnosis is a poor indicator of need for rehabilitation or the costs of providing it.
The key factors that determine complexity of **rehabilitation needs** are:

- Needs for basic care and safety
- Needs for skilled nursing care
- Needs for therapy input – no of disciplines involved and intensity of treatment
- Needs for medical care and intervention
- Needs for specialist equipment / facilities.

However, if a service is to take patients with complex needs, it must be able to demonstrate that it provides a **level of rehabilitation inputs** and facilities commensurate with those needs.
And if the commissioners are to fund these higher-level services, there must be measurable **outcomes** to demonstrate that useful gain has been made.

A hierarchical series of tools has been developed to capture needs, inputs and outcomes, with more detailed tools being used to define higher levels of complexity in low volume–high cost services. These form part of the National Dataset for Specialist Rehabilitation Services, and are collated through the UK Rehabilitation Outcomes Collaborative (UKROC) database.

Needs and inputs

- The **Rehabilitation Complexity Scale (RCS-E)** is designed as simple tool to measure the complexity ofneeds for rehabilitation resourecs interms of nursing care, medical support therapies, and specialist equipment. It is easy and quick to apply and performs well as a casemix measure. It does not provide any information on how clinical teams spend their time with patients
- The **Northwick Park nursing and therapy dependency tools** have been developed to provide a more detailed evaluation of needs / inputs for use in the high cost/low volume services
    - The **NPDS** is an ordinal measure of needs for care and skilled nursing.

      It translates by a computerised algorithm into an assessment of **care hours** (the **NPCNA** (Northwick Park care needs assessment))
    - The **NPTDA** is an equivalent tool for assessment needs for therapy intervention

      It also translated by a computerised algorithm into **therapy hours** for each discipline

All of these tools may be applied either prospectively (to measure *needs for rehabilitation*) or retrospectively to measure *inputs actually provided*, and hence to confirm that needs have been adequately provided for – or alternatively to identify gaps in the level of service provision.

Within the UKROC dataset, each registered service is required to collect cross-sectional parallel data with a minimum of 100 sets of paired RCS-E, NPDS and NPTDA scores each year. They also submit a service profile listing their activity, staffing level and facilities, which is update annually.

Outcome

The dataset is not designed to be restrictive – units are still encouraged to collect any outcomes that they consider to be most relevant to their caseload. However for the purpose of comparative description all units are now required to collect a minimum of standardised outcome data,

- The UK Functional Assessment Measure (UK FIM+FAM) is now the standard outcome measure for all Level 1 and 2 services
- The Northwick Park nursing Dependency Scale (NPDS) and Care Needs Assessment (NPDS/NPCNA) are used to provide data on cost-efficiency of the services calculated as the 'mean time taken for the cost of each rehabilitation episode to be offset by savings in the cost of on-going care in the community'.

The FIM and the NPDS both translate to a Barthel score, so any of these tools can provide a common language at the level of the Barthel Index.

In patients with profound disabilities, where the focus of the programme is on neuropalliative rehabilitation, the goals for rehabilitation may be focussed more on symptom management and quality of life than gains in functional independence. Goal attainment scaling (GAS) is included in the UKROC software and offers a useful option for capturing individualized person centred outcomes or putting together the outcomes from a range of different measures, where the standardised measures of physical disability fail to capture the intended purpose of the programme.

Casemix and costing of specialist services

The UKROC project is registered as a PbR Improvement Project. Data from the UKROC database have been used to provide more accurate costing for specialist rehabilitation services than was available from reference costing alone. This information was used to develop indicative tariffs for rehabilitation services under the Payment by Results (PbR) programme.

A challenge for development of casemix and commissioning currencies for rehabilitation is the wide range of case complexity with variable time-course for change. Diagnostic and procedure codes which underpin the Department of Health's standard casemix system (HRG-v4) are poor indicators of cost in rehabilitaion. After extensive exploration of other international payment models for rehabilitation[13] the expert Reference Pandel for casemix development in Rehabilitation developed a novel commissioning currency.

Because each level of service carries a range of patients at different levels of complexity at any one time, the best way to define costs is by a weighted tariff based on patient complexity, as opposed to fixed tariffs for different levels of service.

The panel has proposed a model where the cost is weighted proportionately to the period for which the patient is at a given complexity level, i.e. a multiple level tariff that can change over time according to the complexity of the patient's needs.

Units seeking to use this flexible tariff will need to record and report serial data and to demonstrate that they are able to provide inputs commensurate with patient needs.

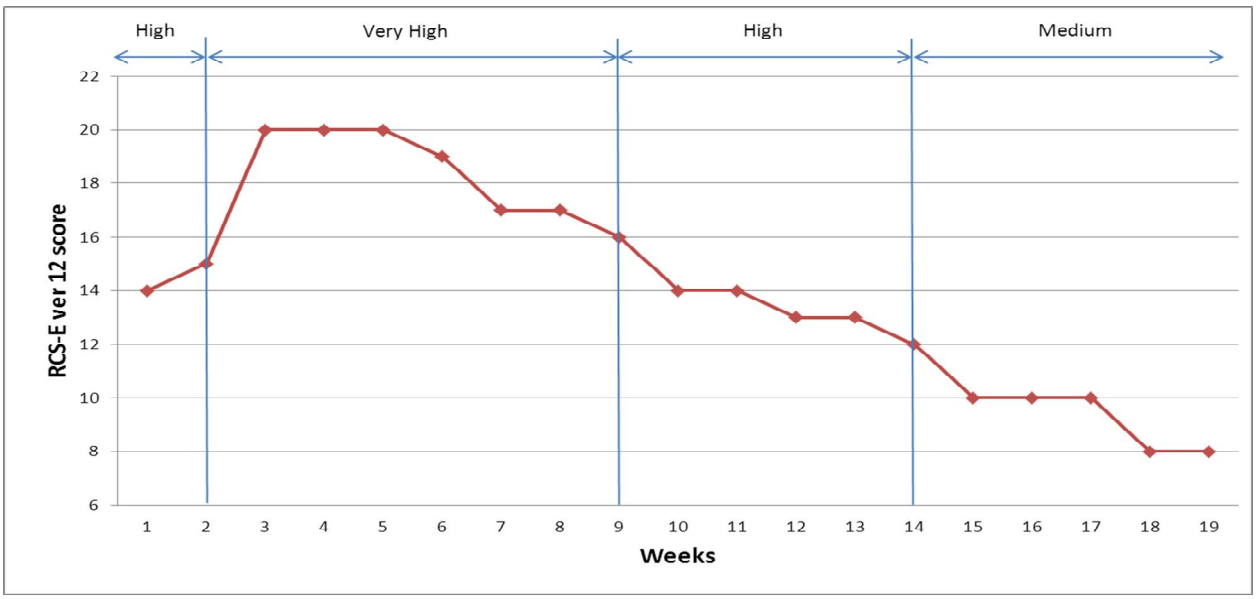
Weighted costing model

The costing methodology is described in more detail in a paper entitled "Determination of bed-day costs for specialist neurorehabilitation services". The model has been developed based on data from one service. It is now being extended to capture data from a wider range of services across the UK.

The multi-level weighted payment model is based on a per diem payment adjusted for complexity of rehabilitation needs.

- As the patient improves during rehabilitation, their needs may decrease over time.
- The daily tariff falls as complexity is reduced over time
- The model is designed to provide fair payment for higher cost patients but at the same time to provide an incentive to early discharge
- The model is based on serial assessment of complexity using the Rehabilitation Complexity Scale version 12 (RCS-E), which is applied at fortnightly intervals throughout the patients stay.

Figure 1 below shows an example of the multi level tariff in a patient who stayed 133 days



Mandated Commissioning Currency – 5-tier weighted per diem model

- The commissioning currency is operationalised through the UKROC dataset
- The currency is the weighted bed day – based on a 5-tier structure, in which a set of five weighting factors are applied to the standard per diem rate
- The weighting factors were derived from the relative proportion of nursing and therapy staff time used by patients within the different levels of complexity[1], so that higher complexity scores attract a higher weighting
- At the level of an individual episode: The total weighted bed days are derived from the number of days the patient spent at each of the five levels of complexity, multiplied by the weighting factors for each of the levels
- At service level, the total annual occupied bed days (OBDs) within each of the five levels are multiplied by their respective weighting factors and summed to calculate the total number of weighted bed days (WBD). The total annual cost is then divided by the total weighted bed days to calculate the weighted per diem cost
- **For simplicity, the multi-level WBD currency is expressed in terms of a single WBD figure for activity with a single WBD costs, although UKROC can provide more detailed breakdown on request.**

More information about the weighted payment model and how it is applied is available on the 'Commissioning tools' page of the UKROC website:

http://www.kcl.ac.uk/lsm/research/divisions/cicelysaunders/research/studies/ukroc/Commissioning-Tools.aspx

[1] Turner-Stokes L et al. Healthcare tariffs for specialist inpatient neurorehabilitation services: Rationale and development of a UK casemix and costing methodology. *Clin. Rehabil.* 2011;26(3):264-79

Annexe 1: Defining Criteria for 'Local Specialist' and 'Specialised' (Level 1) rehabilitation services

Criterion	**Local specialist rehabilitation service (Level 2)**	**Tertiary specialised rehabilitation service (Level 1)**
National standards	Meets the national standards for specialist rehabilitation laid down by the Royal College of Physicians and the British Society of Rehabilitation Medicine (BSRM).	
Specialist team	Rehabilitation is provided by a multi-professional team of nurses, allied health professionals (AHPs) and doctors who have undergone recognised specialist training in rehabilitation.	
Inter-disciplinary working practice	The team works in an inter-disciplinary, co-ordinated fashion towards an agreed set of goals to assist them to achieve their desired level of independence, autonomy and participation in society.	
RM Consultant leadership	Led or supported by a consultant, trained and accredited within the specialty of rehabilitation medicine with input from other specialists (eg neurology, psychiatry) as required.	Led by a consultant, trained and accredited within the specialty of rehabilitation medicine and/or neuropsychiatry.
Catchment	Catchment population typically 350-650 K (Level 2a: 600K-1m)	Catchment population typically >1 million
Complex caseload	Carries a more complex caseload than non-specialist services, as defined by agreed criteria (eg the Rehabilitation Complexity Scale (RCS) or equivalent)	Takes a selected group of patients with complex rehabilitation needs beyond the scope of their local general and specialist rehabilitation services (category A). These include patients with severe physical, cognitive communicative disabilities or challenging behaviours – (or other highly complex needs defined by NPDS/NPTDA scores),
Facilities	Has specialist facilities as appropriate to the caseload – eg assistive technology, specialist orthotics, special seating, spasticity management programmes	In addition to facilities for specialist rehab services, has higher level facilities as appropriate to caseload eg bespoke assistive technology, ventilators, acute/ specialist medical facilities, rehab engineering, etc.
Staffing	Has appropriately skilled staff in numbers sufficient to provide rehabilitation at a level of intensity commensurate with the patients needs (see BSRM minimum standard staffing levels.)	Has higher level skilled staff and increased staff numbers to cope with complex case load.
Monitoring	It routinely monitors casemix and outcome data for the purpose of benchmarking and quality monitoring.	
	Systematically reports minimum mandatory Dataset for Specialist Rehabilitation Services through the national database (see Annexe 3)	Systematically reports full Dataset for Specialised (Level 1) Rehabilitation Services through the national database (see Annexe 3)
Networking	Acts as a resource for advice and support to other professional staff in local general and community rehabilitation services	Acts as a resource for advice and support to local specialist, as well as general and community rehabilitation teams in the management of patients with complex disabilities.
Education and training	Serves a recognised role in education, training for development of specialist rehabilitation in the field	Serves a recognised role in education, training and publishes audit/ research/development in the field of specialist rehabilitation

Annexe 2: Minimum staffing provision for specialist in-patient rehabilitation service[2]

	Specialised rehabilitation service WTE Per 20 beds			**Local specialist rehabilitation service WTE Per 20 beds**	
	Hyper-acute	**Level 1a**	**Level 1b**	**Level 2a**	**Level 2b**
Medical Staff - Consultants accredited in rehabilitation medicine	3.0-3.5	2.5-3.0	2.0	2.0	1.5
Medical staff – Junior (Training grades above FY1 or Trust grades)	3.0-3.5	2.0-2.5	1.5-2.0	1.5-2.0	1.5-2.0
Nurses	45-60	40-50	35-40	35-40	35-40
% Qualified nursing staff (Band 5 or above) (Depending on acuity of caseload)	65-75%	50-60%	45-50%	45-55%	45-55%
% Nurses with specific rehab training		At least 45%	At least 40%	At least 40%	At least 30%
Therapy Staff					
Physiotherapists (Depending on proportion of patients with tracheostomy or requiring 2:1 therapy)	6.0-7.0	6.0-7.0	5.5-6.5	5.5- 6.0	4.5-5.5
Occupational therapists	5.5-6.5	6.0-7.0	5.5-6.5	5.5- 6.0	4.5-5.5
Speech and language therapists (Depending on proportion of patients with tracheostomy)	3.0-4.0	3.0-3.5	2.5-3.0	2.0-2.5	1.5-2.0
Clinical psychologist/counselling (Depending on whether patients with severe behavioural problems are accepted)	2.5-3.0	2.5-3.5	2.5-3.5	1.5-2.5	1.5-2.0
Social Worker / discharge co-ordinator	1.0-1.5	1.5-2.0	1.5-2.0	1.5-2.0	1.0-1.5
Dietitian (Depending on the proportion of patients on enteral feeding / complex nutrition needs)	1.0	1.0	0.5-1.0	0.75-1.0	0.5-0.75
Clerical staff	3.0 WTE, but dependent on caseload and throughput				

Note:
These staffing levels support both the inpatient activity and associated out-reach work including assessments home-visits, follow-up, case-conferences etc.
Additional resources are required if the services also offers community rehabilitation services.
Additional staff eg technicians, engineers, prosthetists etc may also be required depending on the caseload.

Tertiary specialised services taking patients with more complex needs the skill mix is adjusted to cater for the specific group of patients they serve – for example a cognitive behavioural rehabilitation services would require:

- A higher proportion of psychology/counselling staff
- Consultant neuropsychiatrist support
- A proportion of registered mental health nurses, and sufficient staffing levels to provide a safe environment for high risk patients, including 1:1 supervision when needed

[2] * These recommendations are adapted from the RCP/BSRM National Guidelines for rehabilitation following Acquired Brain Injury 2003.

Annexe 3: National Minimum dataset for Specialist Rehabilitation Services

CATEGORY	DATA FIELD	RESPONSE
Unit details	Unit identifier	Unit Name / code
(Fixed for each unit)	Designation	Level 1 (CSRS) / Level 2 (SRS) / Level 3 (Non specialist)
Patient details	**Person identifier (Mandatory)**	NHS number
	Date of Birth / Age at admission	Date: Birth
	Gender	List: Male / Female
	Race	List: Race/ethnicity
	Postcode	Post code
	PCT	PCT / code
	Strategic Health Authority	SHA / code
	Diagnosis at assessment	Text: primary diagnosis
	Date of onset	Date: (set at first of month or year, if not precise)
Referral	Source of referral	List: Hospital / Community
and processing	Date of referral	Date: referred
	Date of assessment	Date: assessed
	Details of assessor / team	List: Uni-disciplinary / Multidisciplinary
	Date of decision / waiting list	Date: on waiting list
Admission details	Admission date	Date: Admitted
	Admitted from	List: Hospital specialist / DGH / home / nursing home
	Type of admission	List: Assessment only / Active rehab / disability management
	Dependency category on admission	List: High / medium / low
	Anticipated discharge date	Date:
	If delayed discharge - reason	Text or List (eg waiting for housing/ care package)
Interruption of rehab	Total interruption days	Number: Days transferred to other ward
If any	Reason for interruption	Text or List (e.g. intercurrent illness/ procedure)
Discharge	Discharge date	Date: Discharged
	Length of stay (Mandatory)	Number: Days (calculated field)
	Mode of episode end	List: discharge / death / transfer to other ward
	Discharge destination	List: Home, nursing home/ residential care / other rehab
Diagnosis / coding	**HRG category (Mandatory)**	HRG code
	Primary ICD code (Mandatory)	primary ICD or diagnosis
	Secondary ICD codes	Secondary codes
Spinal cord injury	ASIA impairment scale (SCI)	ASIA score
Amputee rehab	SIGAM grade (lower limb)	
Costing data	Unit cost per bed day	£---
	Total cost of episode/spell	£---
	(Mandatory))	
Standardised costing and outcome data		
Complexity	**Admission**	**Discharge**
All services	**RCS: C, N, T, M, Total (Mandatory)**	**RCS: C, N, T, M, Total (Mandatory)**
Level 1 services	NPDS	NPDS
Level 1 services	NPTDA	NPTDA
Outcome	**Admission**	**Discharge**
All services	**Barthel Index (Mandatory)**	**Barthel Index (Mandatory)**
Level 2 services	FIM Motor	FIM Motor
Level 2 services	FIM Cognitive	FIM Cognitive
Level 1 services	FIM+FAM Motor	FIM+FAM Motor
Level 1 services	FIM+FAM Cognitive	FIM+FAM Cognitive
Optional	GAS	GAS
Optional	(FIM+FAM Impairment Set)	

The National Database for Specialist Rehabilitation Services is held at Northwick Park Hospital and managed in collaboration with the BSRM.

All specialist rehabilitation services should submit de-identified data to the database:

- Level 2b services: at minimum report the five mandatory fields
- Level 1 and 2a (Specialised services) should report the full dataset

Annex 4: Patient Categorisation Tool: Patient ID:.....

	Category A needs (Score 3)	Category B needs (Score 2)	Category C needs (Score 1)
Specialist medical / neuropsychiatric needs			
Medical	❒ Complex specialist investigation/ intervention **or** ❒ Medically /surgically unstable	❒ Routine investigation/ intervention **or** ❒ Currently well but potentially unstable	❒ No investigation/ intervention **and** ❒ Medically stable
Neuropsychiatric	❒ Complex/unstable psychiatric needs **or** ❒ High Risk management **or** ❒ Treatment under section of the MHA	❒ Psychiatric condition stable but requires monitoring **or** ❒ Medium Risk management	❒ No psychiatric condition **and** ❒ Low or no risk
Intensity	❒ ≥5 therapy disciplines **or** ❒ >25 hours total therapy time per week **or** ❒ requires 1:1 supervision **or** ❒ ≥2 trained therapists to treat at one time	❒ 4 therapy disciplines **or** ❒ 20-25 hours total therapy time per week	❒ 1-3 therapy disciplines **and** ❒ <20 hours total therapy time per week
Clinical needs			
Physical	❒ Complex postural tone /contracture management ❒ ≥ 2 to handle	❒ Routine physical issues ❒ 1 to handle	❒ Higher function problems only or ❒ No physical issues
Tracheostomy/ ventilatory	❒ Unstable tracheostomy requiring intensive suction **or** ❒ O_2 sats monitoring programme **or** ❒ Active weaning programme **or** ❒ Assisted ventilation	❒ Tracheostomy in situ but stable	❒ No tracheostomy
Swallowing / nutrition	❒ Complex swallowing evaluation (eg FEES) **or** ❒ Complex nutritional requirements requiring intensive dietary support/intervention	❒ Enteral feeding programme **or** ❒ Moderate monitoring – eg progressive consistency, dietary content **or** ❒ Dietary education (eg healthy eating, weight reduction)	❒ Normal or stable modified diet **and** ❒ Able to eat independently or with supervision from care staff only **and** ❒ Standard dietary / Weight monitoring only
Communication	Complex communication needs requiring: ❒ Specialist evaluation **or** ❒ Complex communication aid set/up provision	❒ Moderate communication issues with some listener burden, but able to communicate basic needs and ideas	❒ Higher function problems only or ❒ No problems with communication
Cognitive	Severe cognitive problems requiring ❒ Intensive support for carryover / orientation etc **or** ❒ Complex cognitive / neuropsychological assessment	Moderate cognitive problems requiring ❒ Structured environment, strategies **or** ❒ Routine cognitive assessment eg by O/T	❒ Higher function problems only ❒ No cognitive problems **Or** ❒ Stable cognitive deficit not requiring Ix
Behavioural	❒ Highly challenging behaviours (eg physical/verbal aggression) requiring interactive behavioural management programme	❒ Mild/moderate behavioural issues controlled in structured environment	❒ No significant behavioural problems
Mood/emotion	Severe anxiety / depression / emotional lability requiring: ❒ Specialist evaluation **or** ❒ Active management and frequent crisis intervention	❒ Mood disorder/adjustment issues under active management with planned programme	❒ No significant mood / adjustment issues

Complex disability management	Complex disability management eg ❒ Evaluation of low awareness state ❒ Neuro-palliative rehabilitation / end of life care	❒ Standard disability management eg set-up of care progamme, care booklet, carer training etc	❒ None required
Social / discharge planning	❒ Complex placement / housing /funding issues requiring extensive multi-agency negotiation	❒ Active discharge planning requiring liaison with community SW/DN/OT eg to arrange care package	❒ No major discharge issues, taken care of by family / allocated social worker
Family support	❒ Major family distress issues require frequent support or crisis intervention	❒ Routine family support needs (met by planned meetings)	❒ No significant family problems
Emotional load on staff	❒ Demanding situation requiring highly experienced staff / extra support for staff	❒ Somewhat challenging situation but manageable	❒ Minimal or no emotional load on staff

Vocational rehabilitation	Specialist vocational rehabilitation needs eg ❒ Multi-disciplinary vocational assessment ❒ Multi-agency support for return to work, retraining or work withdrawal ❒ Complex support in other roles (eg single-parenting)	Moderate vocational support, ❒ Work visits or employer liaison or ❒ Support for other roles, eg home-maker / parenting	❒ Not of working age or ❒ No significant needs for vocational support
Medico-legal issues	Complex medico-legal issues eg requiring interaction with legal system: ❒ Complex Best interests decisions ❒ Court of protection applications ❒ DoLs / PoVA applications ❒ Litigation issues ❒ Complex mental capacity / consent issues	Standard medico-legal issues eg ❒ Mental capacity evaluation ❒ Standard consent / best interests decisions ❒ LPoA, advance care planning	❒ No significant medico-legal issues
Specialist equipment / facilities	Highly specialist equipment /facilities required eg ❒ Bespoke Assistive technology ❒ Highly specialist seating/wheelchair needs ❒ Bespoke orthotics ❒ Electronic assistive technology ❒ Assisted ventilation	Moderate specialist equipment needs eg ❒ Adapted Wheelchair / seating ❒ Electric standing frame ❒ Treadmill/harness training ❒ Assisted cycling (eg motor-med) ❒ Splinting / casting	❒ No equipment needs or ❒ Basic off the shelf equipment only and ❒ Standard exercise facilities, eg plinth, bike tilt-table, parallel bars

Expected duration of admission	**Needs Category**	**Service level required**	**Priority**	**Reasoning / Alternative recommendations:**
❒ Assessment / rapid intervention (eg 2-4 wks) ❒ Short stay (eg 6-8 wks) ❒ Medium stay (eg 3-4 mths) ❒ Long stay (eg 5-6 mths)	❒ A ❒ B ❒ C ❒ D	❒ Level 1 ❒ Level 2a ❒ Level 2b ❒ Level 3	❒ High ❒ Medium ❒ Low	

Assessor (Print Name)	Signed:	Date:

Has onward referral been made?

❒ Yes – if so where.....
❒ No

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