



Rehabilitation in the wake of Covid-19 - A phoenix from the ashes

British Society of Rehabilitation Medicine (BSRM)

Lead Authors on behalf of the BSRM		Representing
Dr Margaret Phillips	Consultant in Rehabilitation Medicine	BSRM
Prof Lynne Turner-Stokes	Consultant in Rehabilitation Medicine	BSRM / Royal College of Physicians
Prof Derick Wade	Consultant in Neurological Rehabilitation	BSRM
Dr Krystyna Walton	Consultant in Rehabilitation Medicine	BSRM
Other key contributors		
Dr Mike Dille	Consultant Neuropsychiatrist	BSRM/ ?Royal College of Psychiatrists*
Prof Diane Playford	Professor of Neurological Rehabilitation	BSRM/?Association of British Neurologists*
Dr Stephen Ashford	Consultant Physiotherapist	BSRM/?Chartered Society of Physiotherapists*
Dr Chris Danbury	Consultant in Intensive Care	Faculty of Intensive Care Medicine
Craig Brown	Critical Care Physiotherapist	?Intensive Care Society*
Prof Sally Singh	Consultant Clinical Scientist, Pulmonary and Cardiac Rehabilitation	?British Thoracic Society*
Naomi Davis	Consultant in Paediatric Orthopaedic Surgery	Northern Children's Rehabilitation Board

* Representation being sought but not yet confirmed

This is a working document that will be reviewed and revised if necessary, as further evidence and information becomes available and as the Covid-19 situation develops.

Following publication of the initial draft on 27.4.2020 we are now working with individuals from several organisations to cross-link other relevant guidance surrounding key areas in the post intensive care rehabilitation pathways and to try to offer a cohesive approach. This collaboration is likely to expand as further partners are identified.

The focus of the document is on adults aged 16 and over, but it is anticipated that an appendix focusing on the particular needs of children will be added.

The document has been reviewed by members of the following BSRM committees:

- The Executive Committee
- The Research and Clinical Standards sub-committee.

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Executive Summary

Rehabilitation forms a critical component of the acute care pathway, helping to relieve pressure on the acute and frontline services. It is shown to be both effective and cost-effective, whether through improving independence and societal reintegration; or managing the impacts of long-term disability including neuro-palliative care.

The Covid-19 pandemic has already led to a marked increase in the burden of disease and disability and will continue to do so. It has produced many new challenges:

- A diminished workforce due to sickness, shielding and redeployment to frontline services.
- The many impacts of social distancing including
 - socio-economic and psychosocial effects
 - isolation of patients from their families
 - restrictions on interventions that involve hands-on treatment, group interventions or aerosol generating procedures.
- An as yet unquantifiable additional case-load of patients with post-Covid disability presenting with a wide range of problems due to cardio-pulmonary, musculoskeletal, neurological and psychological/psychiatric complications of the disease, compounded in many cases by de-conditioning from prolonged stays in ITU.

As NHS services re-boot in the wake of the pandemic, there is an important opportunity to work collaboratively to rebuild services on a better, more co-operative model – a phoenix from the ashes.

This document sets out the BSRM's recommendations for rehabilitation services for adults aged 16 years and over in the wake of the Covid-19 pandemic - in particular, the role of specialist rehabilitation to support patients with more complex rehabilitation needs.

The guidance is not just for patients who have had Covid-19, but for all patients leaving intensive and acute care after severe illness.

The rehabilitation pathway and coordinated networks

Given the diversity of presentation and rehabilitation needs, different patients require different types of services. Moreover, the same patient will require different services at different stages in their recovery.

Key elements of the model are illustrated in Figure 1, but can be summarised as follows:

Recovery pathways

- Rehabilitation should start as early as possible, ideally while the patient is still in intensive care.
- On step-down from intensive care, a rapid access acute rehabilitation programme can provide very early intervention and the opportunity for further triage into post-acute pathways in the network.
- The majority of patients are on a fairly fast recovery track. Their needs may be met by the local (Level 3) rehabilitation services, but these require significant expansion to enable patients to access them in a timely manner.
- A small number of patients will have more complex rehabilitation needs or a slower trajectory towards recovery. These may require specialist rehabilitation in a Level 1 or 2 service, often for longer periods. Hyper-acute specialist rehabilitation units provide rehabilitation for patients who continue to be medically unstable with input from all the

relevant medical and surgical specialties. There are currently 75 specialist rehabilitation units in England catering for around 2500 admissions per year.

Infection control

- Some post-Covid patients will still be shedding virus as they enter rehabilitation, especially in the early stages, so both Covid positive and Covid negative services are required.
- Rehabilitation typically involves close face-to-face care, so staff should have access to all the necessary Personal Protective Equipment (PPE) to manage this safely.

Rehabilitation Assessment and Prescription

- The Rehabilitation Prescription (RP) is used to record rehabilitation needs and make recommendations for how these should be met as patients leave the acute wards.
- Consultants in Rehabilitation Medicine (RM) have particular skills in the diagnosis, management and prognostication of complex disability regardless of its cause. They provide in-reach to acute services to assist with RPs and to help identify patients with complex needs and direct them down the appropriate pathway.

Specialist Rehabilitation Services

- In specialist rehabilitation services, patients with complex rehabilitation needs (of any aetiology) have access to a range of specialist skills, facilities and equipment. Rehabilitation is delivered by a coordinated multidisciplinary team of rehabilitation professionals led by a consultant in RM.

Community re-integration and rehabilitation

- As soon as they are fit to leave hospital, patients require access to supported discharge to enable them to get home, followed by community reintegration programmes once able to engage, to support them back to work and other activities.
- Some will require on-going specialist rehabilitation or generalist outpatient rehabilitation services in the community.
- This may also apply to patients who never get admitted to hospital, but who still have on-going needs for rehabilitation support 1-2 months after recovering from Covid, or Covid-like symptoms.

Integrated care planning for those with long term needs

- With the above interventions, the majority of patients will make a good recovery, but a small number will have long-term disability requiring on-going support. For these patients, multiagency care is essential including joined up health and social care in the community, working in association with input from third sector independent and charitable organisations as appropriate.
- Patients with life-long complex disability may require specialist nursing home care with input from and surveillance from the specialist outreach rehabilitation teams for the rest of their lives.
- Best interests decision-making may be required to determine their likely wishes for continued life sustaining treatment and, where appropriate, neuro-palliative and end-of-life care.

Service Provision

To ensure seamless care, it follows from the above that services are needed in all elements of the pathway. Key requirements are:

1. Close networking links between Level 1, 2 and 3 services, with adequate capacity at all levels.
2. Covid-positive and Covid-negative streams, especially within the step-down/early rehabilitation stage after patients first leave the ITU setting when they may still be infectious.
3. Close integration of hospital and community services with collaborative commissioning arrangements. Primary care teams should be supported by outreach activity from secondary services including primary care supported by cardiopulmonary rehabilitation, sports and exercise medicine, neurorehabilitation and neurological disability services.
4. Multi-disciplinary rehabilitation teams comprising all the relevant disciplines, including rehabilitation medicine, psychiatric and neuropsychiatric support, rehabilitation nursing, physiotherapy, O/T, clinical psychology/neuropsychology, SLT, dietetics, social work
5. Facilities that include specialist equipment, electronic assistive technology and orthotics
6. Coordinated planning of health and social services provision, in collaboration with the third sector services where appropriate.

Critical care, acute medical and specialist rehabilitation teams should work closely together to develop rehabilitation pathways for patients who are recovering following treatment in intensive care and high dependency care (whether for Covid-related illness or other critical conditions).

Within each network an identified RM Consultant (or consultants) should be an integral part of the acute care pathway team.

Introduction

Covid-19, caused by the novel coronavirus SARS-CoV-2, has led to a pandemic that is increasing the burden of disease and disability throughout the world. It has brought many challenges and has caused major disruption to services. But we have also learned some new ways of doing things. As the NHS re-boots, there is an opportunity to rebuild services on a better, more collaborative, model.

In the aftermath of major illness injury, many patients require rehabilitation to help them back to normal function or to adapt to living with disability. Patients who have required intensive care for more than a few days often have wider physical, cognitive and mental health support needs following discharge from acute settings. In addition, as Covid-19 is a multi-system disease, we are increasingly recognising more subtle deficits in patients less severely affected, even in those who did not require hospital admission.

The British Society of Rehabilitation Medicine promotes the understanding and multidisciplinary management of acute and chronic disabling diseases and injuries, and the development of good practice in Rehabilitation Medicine. This document sets out our position and recommendations for the provision of rehabilitation for adults of 16 years and over in the 'new normal' of Covid-19.

Background

At this stage, just 4 months after the disease was recognised, far more is known about mortality, range of severity of symptoms and early disability, than about the long-term sequelae of this condition. Alongside the direct effects of the virus, however, there are numerous secondary effects that affect all aspects of life, which include those listed in Box 1.

Box 1: Some secondary effects of the Covid-19 pandemic

- **Inability to deliver normal rehabilitation services:** Rehabilitation services for patients at all stages of the pathway have been reduced due to re-deployment of staff, sickness or reconfiguration of beds to expand ITU capacity. Patients being re-patriated or discharged prematurely before rehabilitation programmes are completed.
- **Separation of families:** Patients undergoing inpatient rehabilitation for any condition being isolated from family and friends with hospitals not allowing visitors. This also impacts on the training of family/ carers which usually necessitates regular attendance to learn care skills.
- **Choice:** Patients and families not having a choice about placement for either on-going rehabilitation or for longer term care; this may mean that patients are being placed at significant distances from their homes and in a new environment without support of their families.
- **Difficult decision-making** about resuscitation status and escalation of care for people with long-term conditions.
- **Socio-economic effects**, including unemployment, poverty, and high likelihood of future recession.
- **Education**, including limitation of schooling and training of health and social care professionals.
- **Relationships**, including isolation, disruption of family life and increased rates of domestic abuse.
- **Emotional wellbeing**, affected by experiences of death and disability at work and at home, fear and uncertainty on a worldwide scale. Increased risk of significant mental health issues including suicide/attempted suicide and other self-harm.

In the early phase of the pandemic, the focus has been unavoidably on reducing spread and mortality. However, we are moving rapidly into a longer-term phase of optimising function and reducing disability following the condition.

Rehabilitation is the process of assessment, treatment and management with ongoing evaluation 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 living¹. It is vital both to reduce the pressure on acute care settings, and to re-integrate patients back to their normal lives, but this will require a coordinated and sustained multi-agency effort. Just as the scale of the pandemic is huge, the scale of the rehabilitation response required for the survivors will need to be on a far greater scale than previous recent experiences of rehabilitation. A well-planned and effective response will provide long-term benefits that will capitalise on the efforts made during the acute response, and it will continue to reduce pressure on acute care secondary to complications.

Fortunately, the response to the pandemic has also revealed how ingenuity and technology not available to previous generations can assist, and the rehabilitation response can also capitalise on this new learning^{2,3}.

- Systems such as the Rehabilitation Prescription can be used to identify and record rehabilitation needs, and to track patients as they move between services, as has been successfully demonstrated in the context of Major Trauma⁴
- For patients who require long-term care, the “Discharge to Assess” (D2A) programme has supported patient flows with timely discharge to an appropriate care setting where their on-going requirements can be planned jointly by health and social services.

Factors affecting the rehabilitation response

There are many factors that will affect rehabilitation for individual patients and the system that is giving that response, some of which are listed in Table 1. As ever, personal and health factors interact with social and environmental factors and this underlines the need for health and social care systems that can work together.

Direct complications of the disease

Our knowledge of the range of impairments and disabilities is still evolving and we do not know the long-term sequelae of the condition, but there is already information that will assist in estimating the scale and type of response⁵⁻⁷.

Covid-19 is a multi-systemic condition and some of the effects are long lasting⁸. Experience from China and Italy suggests that at least third of patients discharged from hospital following require assistance in ADL and a similar proportion have significant neurological sequelae⁵

There are several publications that highlight the range of impairments that may present following infection with Covid-19⁹, and other Coronavirus infections^{10 11}- and this literature is expanding daily. Table 2 sets out some of the more frequent complications that are likely to be encountered in patients recovering from moderate or severe disease.

In addition to patients who present following hospital admission, there are patients who never get admitted to hospital, but who develop a range of on-going debilitating symptoms that require rehabilitation support several weeks/months after recovering from Covid, or Covid-like symptoms¹². The underlying mechanism for this symptom complex and its long term course and outcome are not yet well understood and require further research⁸.

Table 1: Factors affecting the rehabilitation response

<i>Factors affecting rehabilitation for individuals</i>	<i>Factors affecting the healthcare system</i>
<ul style="list-style-type: none"> • The range of impairments and disabilities experienced. • The rate of recovery from these impairments. • Personal and environmental circumstances including: • Comorbidities. • Premorbid functional abilities. • Psychological background of the person, such as their usual coping mechanisms, self-efficacy and abilities to adapt. • The home environment or place that the individual will be discharged to. • Individual social context, such as the social group the person inhabits and their economic circumstances. • Occupation, whether paid, 'informal' or voluntary work. • Other activities that the person finds fulfilling. 	<ul style="list-style-type: none"> • Timing of Rehabilitation Assessment and Prescription <ul style="list-style-type: none"> ○ To be optimally effective this should be as the person is recovering from the acute infection. ○ Late or no assessment can result in avoidable complications affecting physical and psychological health, socioeconomic circumstances and relationships. • Discharge destination following acute infection: <ul style="list-style-type: none"> ○ Many patients are discharged directly home for review by Primary Care, and without referral to rehabilitation services. • The availability of professional and voluntary personnel to assist in rehabilitation. • The resources available, both generally and, more specifically, trained rehabilitation personnel. • Education of healthcare professionals regarding the consequences of Covid-19 infection, the resulting rehabilitation needs and routes of referral. This is particularly important in Primary Care who will be directly responsible for the long term care of Covid-19 survivors. • The effect of the condition and the worldwide situation on emotional and psychological well-being. • The proportions of different sectors of the population that are affected, e.g. in terms of age, social deprivation, ethnicity, gender. The acute infection disproportionately affects illness severity in males and in black, Asian and minority ethnic groups¹³, but it is not yet known whether there is a difference in long-term consequences. • The change in the socioeconomic background that is occurring alongside the pandemic.

Table 2: Complications in patients recovering from Covid-19

Most frequent	Common, but less frequent
<ul style="list-style-type: none"> • Cardiovascular, pulmonary and musculoskeletal deconditioning. • Restrictive lung disease. • Affective disorders: depression, anxiety, post-traumatic stress disorder. • Post intensive care syndrome, including ICU acquired weakness due to critical illness polyneuropathy/myopathy/both. • Other neurological consequences of the virus and critical care, such as encephalopathy, cerebrovascular events and cerebral hypoxia, • Acute confusional state, at least in the early stages of rehabilitation. • Fatigue. • Cognitive impairment. 	<ul style="list-style-type: none"> • Thromboembolic disease: <ul style="list-style-type: none"> ○ Myocardial infarction ○ Stroke ○ Pulmonary embolism • Musculoskeletal pain and discomfort. • Psychosis. • Dyskinesia. • Posterior reversible encephalopathy syndrome. • Cardiomyopathy.

We can also apply knowledge of recovery and rehabilitation in other contexts that cause prolonged ITU stay. Several authors have published data on the long-term effects of acute respiratory distress syndrome^{14, 15}, post-traumatic stress disorder¹⁶ and post intensive care syndrome^{17, 18}. For example, a pre-Covid study of patients in ITU for greater than 28 days described a clear history of severe weakness and functional impairment and prolonged recovery after hospital discharge in all the patients who participated. More than 90% still had significant weakness more than 5 years following the ITU stay¹⁹.

Late sequelae also include:

- Mental health consequences, such as depression and post-traumatic stress disorder;
- Conditions that result from avoidable increased sedentary behaviour as a result of effects on mobility not being fully addressed (e.g. cardiovascular disease, diabetes);
- Unemployment, abusive relationships, economic deprivation and increased dependency.

Both NICE²⁰ and Faculty of Intensive Care Medicine²¹ recommend rehabilitation starting early in the ICU stay, evaluation of needs for rehabilitation prior to discharge and routine follow-up at 2-3 months to review on-going needs for rehabilitation and support. This will be all the more important going forward.

Nature of rehabilitation input needed

Rehabilitation will require a person-centred approach, but is likely to involve improving physical strength and stamina, optimising psychological health, and addressing cardio-respiratory and neurological rehabilitation needs when necessary²². There is a risk that ‘hidden’, unexpected or unknown impairments will be missed. Assessment and formulation of a rehabilitation plan is required in the early stages of recovery while the patient is still in hospital^{20 21} or in specialist rehabilitation outpatients if referred from the community.

Rehabilitation services are required to evaluate rehabilitation needs and set out a rehabilitation plan encompassing both specific treatments and other resources that might help²³. Although the detailed treatments needed for individuals may differ, many will be common across the whole population and can be given or organised by rehabilitation teams²⁴ and delivered largely in the community and outpatient settings (see Box 2). More severely disabled patients will require multidisciplinary programmes delivered by specialist rehabilitation services (see below).

Box 2: Key contents of Level 3 and community-based rehabilitation programmes after Covid-19

Exercise: Exercise is likely to be needed by all patients, to overcome deconditioning, improve pulmonary function and any neuromuscular complications.

Practice of activities: Re-establishing patient autonomy in important activities, either undertaken as before or done differently with/without equipment and aids.

Emotional support: Psychological input to offer cognitive behavioural therapy, pacing of activities, acceptance and commitment therapy, and other input to help patients with the likely emotional sequelae – anxiety, depression, sleep disturbance etc.

Education and information: Provision of high-quality information both about the person's situation and about their future. Teaching self-management and goal-setting skills to patients and families

Equipment/adaptations. Some patients may need equipment or adaptations, at least in the short-term.

Monitoring progress: Review to monitor progress and adjust the programme in the light of change

The rehabilitation response

Given the diverse range of impairments, pathologies and environmental situations, the range of disabilities and their impact on societal participation will also be wide. The rehabilitation response will need to consider both the needs of the individual patient and those of the population. Analogous to rehabilitation following head injury, the much larger cohort of people rehabilitating from moderate disease may have a greater impact at a population level, but will have very different needs from those recovering from severe disease. In addition, these needs will be against a background of a population that is struggling with huge societal changes and it is likely that many different organisations may be separately trying to address the issue. In order to cater appropriately for the various different needs it will be critical to coordinate these efforts.

The scale of the response means that a very pragmatic approach will have to be taken to deliver the services required to assist people in their rehabilitation at the same time as giving an individualised element. Making full use of technology to deliver rehabilitation and assist in self-management will be important, as will be coordinating the many organisations that can assist in delivery. However, the individualised aspect of delivery of rehabilitation will need to run alongside this in order for rehabilitation to be effective, especially for those survivors who are more dependent. The numbers involved mean that an increase in staffing will be needed.

While Covid-19 continues to dominate the immediate planning, it is also important to remember that it is not the only condition requiring rehabilitation. During the pandemic, patients continue to experience other illnesses and injuries, so that future planning of rehabilitation services must cater for both groups.

A further complication is the infectious nature of Covid-19. While some advice can be given from a distance, much of rehabilitation (especially in the context of severe physical disability) requires hands-on intervention. Some of the interventions are aerosol-generating procedures (AGPs), which pose a significant health risk to the professionals who treat patients, as well as a risk of spreading infection to others. It is likely therefore that Covid-positive and Covid-negative streams will be required. Regular and repeated testing for Covid will be necessary to support segregation and it is essential that staff have access to the all the necessary personal protective equipment (PPE) to be able to treat patients safely.

Specialist rehabilitation

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/supported by a consultant trained and accredited in Rehabilitation Medicine (RM)¹.

Consultants in Rehabilitation Medicine

RM Consultants have particular skills in the diagnosis, management and prognostication of complex disability. They work as expert generalists and are skilled in interpreting multiple symptoms and impairments in differing social and psychological contexts. Using that interpretation, they formulate a realistic rehabilitation plan that balances the multi-professional input required.

RM consultants play a vital role in post-acute care and should be closely involved, not only at a clinical level, but also at system level in the planning and delivery of services across all components of the acute care pathway.

- They are particularly involved with the planning of specialist services for patients with complex needs, but also provide a networking role to support local non-specialist services through in-reach and out-reach activity.
- They have knowledge of the local service options available and play a critical role in signposting patients towards the services that are best able to meet the individual's rehabilitation needs at any given time, facilitating timely progress along the rehabilitation pathway by expediting referrals etc.
- For patients who lack capacity to make decisions about their own care, RM consultants play an important role in best interests decision-making to determine the patient's likely wishes for continued treatment and, where appropriate, to support neuro-palliative and end-of-life care.
- They also provide an important resource for advice and training of staff within acute care settings with respect to rehabilitation needs and interventions.

Rehabilitation pathways

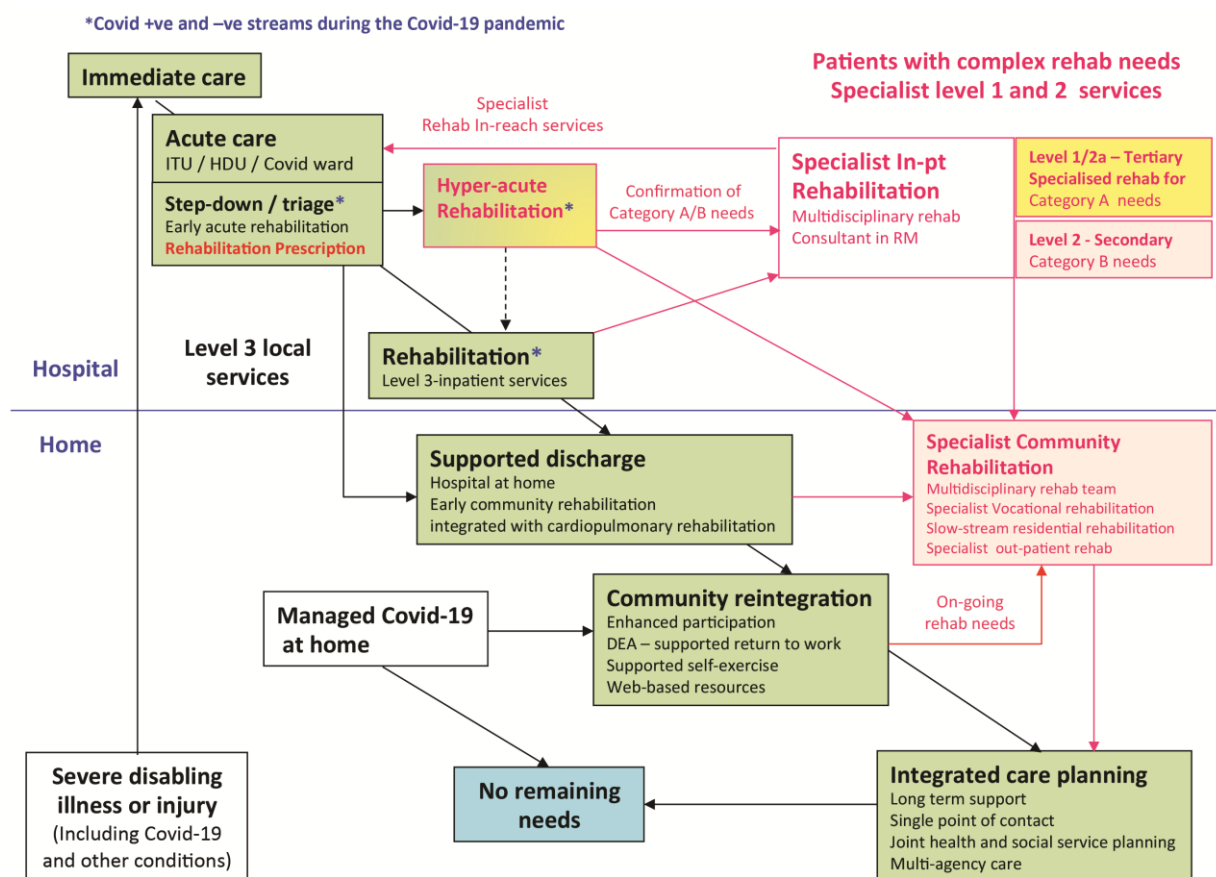
The large majority of patients in the acute care pathway will have an uncomplicated recovery and their rehabilitation needs can be met within their local general (Level 3) rehabilitation services (see Figure 1). However, NHS England's Service specification for Specialised Rehabilitation for patients with Highly Complex needs²⁵ defined three levels of service (1-3) and four categories of patient need (A-D). Patients with more complex needs (category A or B) require specialist rehabilitation. Details of these levels and categories may be found on the BSRM website²⁶. There are currently 75 specialist rehabilitation units in England catering for around 2500 admissions per year.

In 2014, the BSRM published [*core standards for specialist rehabilitation in the acute care pathway following severe disabling illness or injury*](#), which set out the various rehabilitation pathways and made recommendations for the organisation of networked rehabilitation services²⁷. Figure 1 shows the rehabilitation pathway, which has been adapted to the current situation in the wake of Covid-19.

Early specialist rehabilitation has been repeatedly demonstrated to be effective, efficient and cost effective²⁸⁻³¹. Critical care, acute medical and specialist rehabilitation teams therefore need to work closely together to develop rehabilitation pathways for patients who are recovering following treatment in intensive care and high dependency care (whether for Covid-related illness or other critical conditions).

On step down from intensive care, rapid access to an acute rehabilitation programme provides very early intervention and the opportunity for further triage into post-acute pathways in the network to meet physical, cognitive, neuro-behavioural and musculoskeletal rehabilitation needs.

Figure 1: Rehabilitation care pathways in the wake of Covid-19



For the majority of patients (category C or D needs) rehabilitation is provided and commissioned through the local general (Level 3) rehabilitation services (ie the green pathway in Figure 1). These are typically led by allied health professions or by consultants in specialities other than RM such as Care of the Elderly, and experts in stroke, cardio-pulmonary rehabilitation and exercise medicine.

- Patients with more complex rehabilitation needs (category B) will require specialist rehabilitation (pink pathway) from their local Level 2 inpatient and specialist community services.
- A small number with very complex (category A) needs will require rehabilitation in a tertiary (Level 1/2a) service with enhanced capacity to support patients with highly complex needs.

Category A needs describe very complex needs for rehabilitation requiring the highly specialised skills and facilities of a tertiary (Level1) centre. Patients with category B needs have complex needs, requiring specialist rehabilitation, but these can be met by a local specialist (Level 2) service.

The precise nature of these needs (over and above those listed in Box 2) will vary from patient to patient and will dictate the specific nature of the service required, but they fall broadly under six main headings:

- Specialist rehab medical (RM) or neuropsychiatric needs, including management of unstable medical / psychiatric conditions
- Specialist clinical rehabilitation needs (for physical, cognitive, emotional or behavioural management of patients and support for their families)
- High intensity, and/or longer duration of rehabilitation programme
- Specialist Vocational Rehabilitation
- Medico-legal and ethical issues eg complex best interests decision-making
- Specialist facilities/equipment needs.

A Rehabilitation Prescription can be used to identify the category of needs for on-going rehabilitation.

The Rehabilitation Prescription (RP)

The Rehabilitation Prescription was first developed in the context of the Major Trauma Networks³². Introduced at an early stage in the recovery pathway, the RP identifies each individual's need for rehabilitation and specifies how these will be met after discharge from the major trauma centre. A minimum RP dataset is now mandated for collection in the Trauma Audit and Research Network (TARN) registry. Published in 2019, the National Clinical Audit for Specialist Rehabilitation following major injury (NCASRI) linked data from the national clinical registries for trauma and specialist rehabilitation and used the RP to track patients and determine whether they received the rehabilitation they needed, and to evaluate the outcomes following major trauma⁴. It demonstrated the feasibility of this approach to quantify any gaps in capacity to meet demand for rehabilitation.

The same principle can equally be applied for other disabling illness/injury²⁷ and a modified RP has been drawn up alongside a minimum UKROC (UK Rehabilitation Outcomes Collaborative) dataset for use in the current Covid-19 situation is shown in Appendix 1.

The key data elements of the RP are as follows:

- Does the patient have on-going needs for rehabilitation? Yes / No
- If yes, rehabilitation needs checklist:
 - Physical needs for rehabilitation
 - Cognitive or mood disturbance
 - Psychosocial needs
- Are they being transferred to the appropriate facility? Yes / No
 - What type of rehabilitation does the patient need?
 - What is their discharge destination?
 - What is the reason for variance?
- A brief description of further needs for rehabilitation.

The RP should travel with the patient and should be reviewed and updated at appropriate intervals to record actions undertaken to implement the recommendations.

Using the RP prior to hospital discharge and for those patients who are not identified as having needs initially but are recognised 1-2 months after recovery from the acute illness will allow the patient's rehabilitation pathway to be planned. It will also allow recurrent review of rehabilitation needs at population level in order to target services.

For patients with more complex needs the RP may be extended to a specialist RP providing more detail on the nature of those needs. A proforma for the Specialist RP is available on the BSRM website²⁷.

Long term care

With the above interventions, the majority of patients will make a good recovery, but a small number will have long-term disability requiring on-going support. For these patients, multi-agency care is essential including joined up health and social care in the community, working in association with input from third sector independent and charitable organisations as appropriate.

Patients with life-long complex disability may require specialist nursing home care with input from and surveillance from the specialist outreach rehabilitation teams for the rest of their lives.

Rehabilitation services - coordinated networks

To ensure seamless care, services are needed in all elements of the pathway.

Key requirements are as follows:

1. Rehabilitation services planned and delivered in coordinated networks with close links between Level 1, 2 and 3 services, with adequate capacity at all levels.
2. In view of the infectious nature of Covid-19, Covid-positive and Covid-negative streams are required especially within the step-down / early rehabilitation stage after patients first leave the ITU setting.
3. Close integration of hospital and community services with collaborative commissioning arrangements. Primary care teams should be supported by outreach activity from secondary services including;
 - a. Cardio-pulmonary rehabilitation
 - b. Sports and exercise medicine
 - c. Neurorehabilitation and neurological disability services
 - d. Vocational rehabilitation.
4. Specialist rehabilitation should be delivered by coordinated multi-disciplinary rehabilitation teams comprising:
 - a. Rehabilitation Medicine
 - b. Psychiatric and neuropsychiatric support
 - c. Rehabilitation nursing
 - d. Physiotherapy
 - e. Occupational therapy (O/T)
 - f. Clinical psychology/neuropsychology
 - g. Speech and Language therapy (SLT)
 - h. Dietetics
 - i. Social work.
5. Facilities that include specialist equipment, electronic assistive technology and orthotics.
6. Joined up multi-agency long-term care from health, social services and the 3rd sector where appropriate.

Data collection

It is accepted that some elements of this pathway are aspirational at present due to limited capacity, but the inpatient elements of data collection are supported within the UKROC national clinical registry and database which is currently in use in all specialist (Level 1 and 2) services in England. The dataset has over 50,000 episodes and continues to be influential and informative for describing needs, inputs and outcomes and cost-benefits of rehabilitation at both individual patient and group level. UKROC has the permissions to collect identifiable data for clinical purposes to support tracking of individual patients as they move through the pathway. Linkage with other clinical registries supports analysis of capacity and demand⁴.

The BSRM and RCP JSC recommend that, as services re-boot, all specialist (Level 1 and 2) rehabilitation units should continue to collect the full UKROC dataset for each episode admitted for in-patient rehabilitation to be collated in the UKROC database³³. We also recommend that the RP should be recorded for all patients who have significant on-going needs for rehabilitation on discharge from ITU/HDU step-down, and acute care; and that Level 3 rehabilitation services should collect at least the minimum UKROC rehabilitation dataset (see Appendix 1) which can also be collated in the UKROC database going forward.

Key recommendations

At individual level	
1.	Patients with severe disabling illness/injury should have access to appropriate rehabilitation to optimise their recovery, including early rehabilitation while still in hospital and longer-term community-based support.
2.	Patients stepping down from ITU or HDU should have immediate access to an acute rehabilitation programme that provides very early intervention and the opportunity for further triage into post-acute pathways in the network.
3.	Patients with on-going rehabilitation needs after the immediate early rehabilitation phase should have a Rehabilitation Prescription (RP) outlining their physical, cognitive, neuro-behavioural and musculoskeletal rehabilitation needs and how/where they will be met.
4.	RM consultants should be involved from an early stage in the patient's acute care pathway to assess patients with complex rehabilitation needs and participate in the planning and execution of their interim care and rehabilitation. A consultant neuropsychiatrist should be involved in the management of patients with challenging behaviour or complex psychiatric issues.
5.	Patients who have (or are likely to have) on-going complex needs for requiring specialist rehabilitation should have a complex needs checklist completed and should be assessed by an RM Consultant prior to discharge from the acute unit. The RM consultant (or their designated deputy) is responsible for confirming category A or B needs (using the PCAT Tool), and for expediting referral and transfer for on-going specialist rehabilitation as soon as they are fit enough.
6.	Patients who are ready to go home should have supported discharge and early community-based rehabilitation, with access to a range of services according to their individual needs, including but not limited to primary care, cardiopulmonary rehabilitation, sports and exercise medicine, psychological /mental health, neurorehabilitation and neurological disability services.
7.	Patients who are ready to leave hospital but require long-term care should be discharged to an appropriate care setting under the "Discharge to Assess" programme, where their on-going requirements for health and social care can be planned in close integration.
At organisational level	
8.	Critical care, acute medical and specialist rehabilitation teams should work closely together to develop rehabilitation pathways for patients who are recovering following treatment in intensive care and high dependency care (whether for Covid-related illness or other critical conditions). Within each network an identified RM Consultant (or consultants) should be an integral part of the acute care pathway team.
9.	There should be integrated planning and close networking links between Level 1, 2 and 3 services, with adequate capacity at all levels.
10.	There should be close integration of hospital and community services with collaborative commissioning arrangements. Patients who require long-term support should have joined up provision of health and social care.
11.	There should be networking with general practice so that patients who present with late rehabilitation needs are identified and referred for a Rehabilitation Prescription.
12.	During the Covid-19 pandemic there should be Covid-positive and Covid-negative streams for rehabilitation. Regular and repeated testing for Covid should be undertaken to support segregation and staff should have access to all the necessary PPE to be able to treat patients safely.

References

1. Medical rehabilitation in 2011 and beyond. London: Royal College of Physicians; 2011; Available from: <https://http://www.bsrm.org.uk/downloads/medical-rehabilitation-2011-and-beyond.pdf>.
2. Greenhalgh T, Wherton J, Shaw S, Morrison C. Video consultations for covid-19. *Bmj* 2020;368:m998.
3. Barsom EZ, Feenstra TM, Bemelman W, Bonjer JH, Schijven MP. Coping with COVID-19: scaling up virtual care to standard practice. *Nat Med*. 2020: Available from: <https://doi.org/10.1038/s41591-020-0845-0>
4. Mao L, Jin H, Wang M, Hu Y, Chen S, He Q, et al. Neurologic Manifestations of Hospitalized Patients With Coronavirus Disease 2019 in Wuhan, China. *JAMA Neurol* 2020.
5. National Clinical Audit for specialisr Rehabilitation following major Injury (NCASRI). Final Report. London: Health Quality Improvement Partnership; 2019
6. Wu Y, Xu X, Chen Z, Duan J, Hashimoto K, Yang L, et al. Nervous system involvement after infection with COVID-19 and other coronaviruses. *Brain Behav Immun* 2020.
7. Klok FA, Kruip MJHA, van der Meer NJM, Arbous MS, Gommers DAMPJ, Kant KM, et al. Incidence of thrombotic complications in critically ill ICU patients with COVID-19. *Thrombosis Res*. 2020: Available from: <https://doi.org/10.1016/j.thromres.2020.04.013>.
8. Roberts R, Levi M, Schilling R, Lim WS, Grocott MPW, McKee M. Covid-19: a complex multisystem clinical syndrome *Brit Med J* [serial on the Internet]. 2020: Available from: <https://blogs.bmj.com/bmj/2020/05/01/covid-19-a-complex-multisystem-clinical-syndrome/>.
9. Khan F, Amatya B. Medical Rehabilitation in Pandemics: Towards a New Perspective. *J Rehabil Med* 2020;52(4):jrm00043.
10. Ahmed, Patel K, Greenwood D, Halpin S, Lewthwaite P, Salawu A, et al. Long-term clinical outcomes in survivors of coronavirus outbreaks after hospitalisation or ICU admission: a systematic review and meta-analysis of follow-up studies. *medRxiv*. 2020: [Pre-print. Not peer reviewed] Available from: <https://doi.org/10.1101/2020.04.16.20067975>.
11. Carda S, et al. The role of physical and rehabilitation medicine in the COVID-19 pandemic: the clinician's view [Letter. Not peer reviewed] *Annals of Physical and Rehabilitation Medicine* (2020), doi: <https://doi.org/10.1016/j.rehab.2020.04.001>
12. Garner P. Paul Garner: For 7 weeks I have been through a roller coaster of ill health, extreme emotions, and utter exhaustion. *Brit Med J* 2020; 05/05/2020: Available from: <https://blogs.bmj.com/bmj/2020/05/05/paul-garner-people-who-have-a-more-protracted-illness-need-help-to-understand-and-cope-with-the-constantly-shifting-bizarre-symptoms/>
13. Intensive Care National Audit and Research Centre (ICNARC). Covid-19 report 2020.04.172020c: Available from: <https://http://www.icnarc.org/Our-Audit/Audits/Cmp/Reports>.
14. Sasannejad C, Ely EW, Lahiri S. Long-term cognitive impairment after acute respiratory distress syndrome: a review of clinical impact and pathophysiological mechanisms. *Critical care* 2019;23(1):352.
15. Herridge MS, Moss M, Hough CL, Hopkins RO, Rice TW, Bienvenu OJ, et al. Recovery and outcomes after the acute respiratory distress syndrome (ARDS) in patients and their family caregivers. *Intensive Care Med* 2016;42(5):725-38.
16. Righy C, Rosa RG, da Silva RTA, Kochan R, Migliavac CB, Robinson CC, et al. Prevalence of post-traumatic stress disorder symptoms in adult critical care survivors: a systematic review and meta-analysis. *Crit Care* 2019;23(213):<https://doi.org/10.1186/s13054-019-2489-3>
17. Bein T, Bienvenu OJ, Hopkins RO. Focus on long-term cognitive, psychological and physical impairments after critical illness. *Intensive Care Med* 2019;45,(1466–1468).
18. Post-Intensive Care Syndrome. Lessons from the ICU. Cham: Springer International Publishing; 2020. Available from: <https://doi.org/10.1007/978-3-030-24250-3>.
19. Fletcher SN, Kennedy DD, Ghosh IR, Misra VP, Kiff K, Coakley JH, et al. Persistent neuromuscular and neurophysiologic abnormalities in long-term survivors of prolonged critical illness. *Crit Care Med* 2003;31(4):1012-6.

20. Rehabilitation after critical illness (CG83)2009 (checked 2018): NICE. Available from: <https://http://www.nice.org.uk/guidance/cg83/evidence/full-guideline-pdf-242292349>.
21. Guidance for the provision of intensive care services (Edition 2)2019: Faculty of Intensive Care Medicine. London. Available from: <https://http://www.ficm.ac.uk/sites/default/files/gpics-v2.pdf>.
22. Report of an ad-hoc international task force to develop an expert-based opinion on early and short-term rehabilitative interventions (after the acute hospital setting) in covid-19 Survivors. (Co-chairs: Spruit MA, Holland AE, Singh SJ, Troosters T.) 2020: Available from: <https://http://www.ersnet.org/covid-19-blog/covid-19-and-rehabilitation>
23. Wade DT. Rehabilitation – a new approach. Part two: the underlying theories. Clin Rehabil 2015;29:1145-54.
24. Wade DT. What is Rehabilitation? An empirical investigation leading to an evidence-based description. Clin Rehabil. 2020: Available from: <https://journals.sagepub.com/doi/full/10.1177/0269215520905112>.
25. NHS Standard Contract for Specialist Rehabilitation for Patients with Highly Complex Needs (all ages): D02. London2013 [cited 2014]; Available from: <http://www.england.nhs.uk/wp-content/uploads/2014/04/d02-rehab-pat-high-needs-0414.pdf>.
26. Specialist neuro-rehabilitation services: providing for patients with complex rehabilitation needs. London: British Society of Rehabilitation Medicine (2010). Updated 2015.
27. Rehabilitation for patients in the acute care pathway following severe disabling illness or injury: BSRM core standards for specialist rehabilitation. London: British Society of Rehabilitation Medicine 2014.
28. Turner-Stokes L, Pick A, Nair A, Disler PB, Wade DT. Multi-disciplinary rehabilitation for acquired brain injury in adults of working age. Cochrane Database Syst Rev 2015(12):CD004170.
29. 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.
30. Turner-Stokes L, Dzingina M, Shavelle R, Bill A, Williams H, Sephton K. Estimated Life-Time Savings in the Cost of Ongoing Care Following Specialist Rehabilitation for Severe Traumatic Brain Injury in the United Kingdom. J Head Trauma Rehabil 2019.
31. 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(2):e010238.
32. NHS Standard Contract for Major Trauma service (all ages). D15/S/a. London2013 [cited 2014]; Available from: <https://http://www.england.nhs.uk/wp-content/uploads/2014/04/d15-major-trauma-0414.pdf>.
33. UKROC: UK Rehabilitation Outcomes Collaborative. London 2010; Available from: <https://http://www.kcl.ac.uk/nursing/departments/cicelysaunders/research/studies/uk-roc/index.aspx>.

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Appendix 1: Proposed UKROC minimum dataset and RP during COVID Crisis

Unit		CCG	
Pt Name		Date referred/...../20
DoB/...../.....	Date admitted/...../20
NHS No		Date discharged/...../20

Diagnostic category	Sub-category	Admitted from	Programme type
Neurological <input type="checkbox"/> Acquired Brain Injury <input type="checkbox"/> Spinal Cord Injury <input type="checkbox"/> Peripheral nerve injury <input type="checkbox"/> Progressive disease Non-neurological <input type="checkbox"/> Complex MSK <input type="checkbox"/> Limb- loss <input type="checkbox"/> Functional <input type="checkbox"/> Other:	<input type="checkbox"/> Vascular (stroke) <input type="checkbox"/> Trauma <input type="checkbox"/> Inflammatory <input type="checkbox"/> Anoxic <input type="checkbox"/> Toxic <input type="checkbox"/> Degenerative <input type="checkbox"/> Tumour <input type="checkbox"/> Other:	Tertiary <input type="checkbox"/> Major Trauma <input type="checkbox"/> Stroke Unit <input type="checkbox"/> Neurosciences Secondary: <input type="checkbox"/> Acute DGH <input type="checkbox"/> Other Rehab unit Primary care <input type="checkbox"/> Community/home <input type="checkbox"/> Other:	<input type="checkbox"/> Assessment only <input type="checkbox"/> Active rehabilitation <input type="checkbox"/> Disability management <input type="checkbox"/> PDOC programme <input type="checkbox"/> Rapid triage and discharge planning <input type="checkbox"/> Other:

Rehab Complexity Score (RCS-E v14 – non trauma)	Category of needs		UKROC Discharge destination
	Admission	Discharge	
Care /Risk (0-4)	<input type="checkbox"/> A	<input type="checkbox"/> A	<input type="checkbox"/> Home <input type="checkbox"/> Temporary accommodation <input type="checkbox"/> Nursing / residential home <input type="checkbox"/> Acute Hospital <input type="checkbox"/> Other rehabilitation <input type="checkbox"/> Overseas <input type="checkbox"/> Other
Nursing (0-4)	<input type="checkbox"/> B	<input type="checkbox"/> B	
Medical (0-6)	<input type="checkbox"/> C	<input type="checkbox"/> C	
Therapy Disciplines (0-4)	<input type="checkbox"/> D	<input type="checkbox"/> D	
Therapy Intensity (0-4)			
Equipment (0-3)			

Rehabilitation Prescription

Does the patient have COMPLEX on-going clinical needs for rehabilitation? <input type="checkbox"/> Yes <input type="checkbox"/> No		
(If yes please tick all that apply)		
Complex Physical eg	Complex Cognitive / Mood eg	Complex Psychosocial eg
<input type="checkbox"/> Complex neuro-rehabilitation <input type="checkbox"/> Prolonged Disorder of Consciousness <input type="checkbox"/> Tracheostomy weaning <input type="checkbox"/> Ventilatory support <input type="checkbox"/> Complex nutrition / swallowing issues <input type="checkbox"/> Profound disability / neuro-palliative rehabilitation <input type="checkbox"/> Neuro-psychiatric rehab <input type="checkbox"/> Post ICU syndrome <input type="checkbox"/> Complex MSK management <input type="checkbox"/> Complex amputee rehabilitation needs <input type="checkbox"/> Re-conditioning / cardiopulmonary rehab <input type="checkbox"/> Complex pain rehabilitation <input type="checkbox"/> Specialist bespoke equipment needs <input type="checkbox"/> Other	<input type="checkbox"/> Complex communication support <input type="checkbox"/> Cognitive assessment/management <input type="checkbox"/> Challenging Behaviour management <input type="checkbox"/> Mental Health difficulties <ul style="list-style-type: none"> <input type="checkbox"/> Pre-injury <input type="checkbox"/> Post injury <input type="checkbox"/> Mood evaluation / psychological support <input type="checkbox"/> Major family distress / support <input type="checkbox"/> Emotional load on staff <input type="checkbox"/> Other	<input type="checkbox"/> Complex discharge planning eg <ul style="list-style-type: none"> <input type="checkbox"/> Housing / placement issues <input type="checkbox"/> Major financial issues <input type="checkbox"/> Uncertain immigration status <input type="checkbox"/> Drugs/alcohol misuse <input type="checkbox"/> Complex medicolegal issues (Best interests decisions, safeguarding, DOLS, litigation) <input type="checkbox"/> Educational <input type="checkbox"/> Vocational /job role requiring specialist vocational rehab <input type="checkbox"/> Other

Are they being transferred to the appropriate facility? <input type="checkbox"/> Yes <input type="checkbox"/> No (Please tick all that apply)		
What is the pts' rehabilitation need	What is the pts' destination	What is the reason for variance?
<input type="checkbox"/> Specialist inpatient rehabilitation <ul style="list-style-type: none"> <input type="checkbox"/> Category A <input type="checkbox"/> Category B <input type="checkbox"/> Specialist out-patient rehabilitation <ul style="list-style-type: none"> <input type="checkbox"/> Multidisciplinary <input type="checkbox"/> Single discipline <input type="checkbox"/> Non-specialist inpatient <ul style="list-style-type: none"> <input type="checkbox"/> Category C/D <input type="checkbox"/> Community rehabilitation <ul style="list-style-type: none"> <input type="checkbox"/> Specialist MDT <input type="checkbox"/> Generic MDT <p><i>*NB If the patient is considered to have Category A or B needs, complete the Complex Needs Checklist (CNC) below, (Or the Patient Categorisation Tool (PCAT) may be completed by an RM consultant)</i></p>	<input type="checkbox"/> Transferred for ongoing medical/surgical needs <input type="checkbox"/> Local hospital <ul style="list-style-type: none"> <input type="checkbox"/> Without specialist rehab <input type="checkbox"/> Awaiting specialist rehab <input type="checkbox"/> Other in-pt rehabilitation than that recommended in the RP <input type="checkbox"/> Own home <ul style="list-style-type: none"> <input type="checkbox"/> Without rehabilitation <input type="checkbox"/> With rehabilitation <input type="checkbox"/> Nursing home <ul style="list-style-type: none"> <input type="checkbox"/> Specialist NH / Slow-stream rehab <input type="checkbox"/> Other residential <input type="checkbox"/> Mental health unit without physical rehabilitation <input type="checkbox"/> Other	<input type="checkbox"/> Service exists but access is delayed <input type="checkbox"/> Service does not exist <input type="checkbox"/> Service exists but funding is refused <input type="checkbox"/> Patient / carer declined <input type="checkbox"/> Ongoing medical / surgical needs requiring rehabilitation at a later date
Covid status: <input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Don't know		
Is a review planned for when things settle down? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know		

Complex needs checklist (Complete if the patient is thought to have category A or B needs)

Checklist of needs that are likely to require specialist rehabilitation (tick any that apply) (Examples)		Specialist needs?
Specialist rehab medical (RM) or neuropsychiatric needs	<input type="checkbox"/> On-going specialist investigation/ intervention <input type="checkbox"/> Complex / unstable medical/surgical condition <input type="checkbox"/> Complex psychiatric needs <input type="checkbox"/> Risk management or Treatment under section of the MHA	<input type="checkbox"/> Yes <input type="checkbox"/> No
Specialist rehabilitation environment	<input type="checkbox"/> Co-ordinated inter-disciplinary input <input type="checkbox"/> Structured 24 hour rehabilitation environment <input type="checkbox"/> Highly specialist therapy /rehab nursing skills	<input type="checkbox"/> Yes <input type="checkbox"/> No
High intensity	<input type="checkbox"/> 1:1 supervision <input type="checkbox"/> ≥4 therapy disciplines required <input type="checkbox"/> High intensive programme (>20 hours per week) <input type="checkbox"/> Length of of rehabilitation ≥ 3 months	<input type="checkbox"/> Yes <input type="checkbox"/> No
Specialist Vocational Rehab	<input type="checkbox"/> Specialist vocational assessment <input type="checkbox"/> Multi-agency vocational support (for return to work /re-training /work withdrawal) <input type="checkbox"/> Complex support for other roles (eg single parenting)	<input type="checkbox"/> Yes <input type="checkbox"/> No
Medico-legal issues	<input type="checkbox"/> Complex mental capacity / consent issues <input type="checkbox"/> Complex Best interests decisions <input type="checkbox"/> DoLs / PoVA applications <input type="checkbox"/> Litigation issues	<input type="checkbox"/> Yes <input type="checkbox"/> No
Specialist facilities / equipment needs	<input type="checkbox"/> Customised / bespoke personal equipment needs (eg Electronic assistance technology, communication aid, customised seating, bespoke prosthetics/orthotics) <input type="checkbox"/> Specialist rehabilitation facilities (eg treadmill training, computers, FES, Hydrotherapy etc)	<input type="checkbox"/> Yes <input type="checkbox"/> No

Rehabilitation Prescription - summary of recommendations

Brief summary of further needs:

How will these be met?

Referrals made (or to be made)

Completed by:

Date:..../..../....