National Institute for Health and Care Excellence

Final

Rehabilitation in adults with complex psychosis and related severe mental health conditions

[D] Effectiveness of rehabilitation services

NICE guideline NG181

Evidence review

August 2020

Final

This evidence review was developed by the National Guideline Alliance which is part of the Royal College of Obstetricians and Gynaecologists

Disclaimer

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or service users. The recommendations in this guideline are not mandatory and the guideline does not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian.

Local commissioners and/or providers have a responsibility to enable the guideline to be applied when individual health professionals and their patients or service users wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with compliance with those duties.

NICE guidelines cover health and care in England. Decisions on how they apply in other UK countries are made by ministers in the Welsh Government, Scottish Government, and Northern Ireland Executive. All NICE guidance is subject to regular review and may be updated or withdrawn.

Copyright

ISBN: 978-1-4731-3828-5

Contents

The effectiveness of rehabilitation services compared with standard care

Review question: What is the effectiveness of rehabilitation services compared with standard care?

Introduction

Inpatient and community rehabilitation services aim to restore functional capacity, promote independent living and reduce the amount of support needed for people with complex psychosis and related severe mental health conditions. This review examines the effectiveness of active rehabilitation compared to standard care for a person's mental health condition.

The title of the guideline changed to "Rehabilitation for adults with complex psychosis" during development. The previous title of the guideline has been retained in the evidence reviews for consistency with the wording used in the review protocols.

Summary of the protocol

Please see Table 1 for a summary of the Population, Intervention, Comparison and Outcome (PICO) characteristics of this review.

Table 1: Summary of the protocol (PICO table)

Population	Adults (aged 18 years and older) with complex psychosis and related severe mental health conditions
Intervention	• Inpatient rehabilitation services • Community based rehabilitation services
Comparison	• Continued treatment as inpatient or in community (including supported housing) – but without formal active rehabilitation

Outcomes	**Critical**
	• Social functioning (including management of own mental + physical health)
	• Out of area treatments (also referred to as out of area placements)
	• Reduction in amount of support needed:
	  ○ for inpatients - discharge to a sustained community placement (successful community living/ accommodation instability / placement breakdown)
	  ○ for those in community placement - sustained move to a less supported placement
	Important
	• Contact with criminal justice system.
	• Achievement of personal recovery goals.
	• Attendances at A&E.
	• Number of days as inpatient
	• Activities of daily living.
	• Quality of life

A&E: accident and emergency;

For further details see the review protocol in appendix A.

Clinical evidence

Included studies

Five studies were identified for this review, 1 systematic review (Dieterich 2017) including 40 randomised controlled trials (RCTs), 1 RCT (Salkever 2014) and 3 observational studies (Bunyan 2016; Lavelle 2011; Macpherson 1999).

The included studies are summarised in Table 2.

The systematic review (Dieterich 2017) compared intensive case management to standard care. Intensive case management is a long-term intensive approach to the patient in the community providing a comprehensive range of treatment, rehabilitation and support services. One RCT compared a recovery-oriented, comprehensive, and coordinated package of community-based treatment and rehabilitation services to standard care. 3 observational studies compared outcomes before and after inpatient or community rehabilitation (Bunyan 2016; Lavelle 2011; Macpherson 1999) and 1 study compared patients in inpatient or community rehabilitation to a matched waiting list control group (Lavelle 2011).

See the literature search strategy in appendix B and study selection flow chart in appendix C.

Excluded studies

Studies not included in this review with reasons for their exclusions are provided in appendix K.

Summary of clinical studies included in the evidence review

A summary of the studies that were included in this review are presented in Table 2.

Table 2: Summary of included studies

Study	Population	Intervention	Comparison	Outcomes
Bunyan 2016 Observational study UK	Primary psychotic diagnosis in inpatient rehabilitation unit.	Inpatient rehabilitation	Before versus after rehabilitation	• Number of days as inpatient
Dieterich 2017 SR	Severe mental illness in the community.	Intensive case management	Standard care	• Social functioning • Reduction in amount of support needed • Contact with criminal justice system. • Achievement of personal recovery goals. • Attendances at A&E. • Number of days as inpatient • Quality of life
Lavelle 2011 Observational study	Severe and enduring mental health problems and a history of high use of inpatient services. In	Inpatient or community rehabilitation service	• Before versus after rehabilitation	• Social functioning • Reduction in amount of support needed:

Study	Population	Intervention	Comparison	Outcomes
Ireland	inpatient units, supported hostels or in own/family home.		• Waiting list control	• Number of days as inpatient
Macpherson 1999 Observational study UK	Patients admitted to an active rehabilitation hostel. 69% had schizophrenia.	Active rehabilitation hostel	Before versus after rehabilitation	• Number of days as inpatient
Salkever 2014 RCT USA	Severe and enduring mental health problems, in receipt of Social Security Disability benefits in the community.	Recovery-oriented, comprehensive, and coordinated package of community-based treatment and rehabilitation (MHTS service)	Standard care	• Attendances at A&E. • Number of days as inpatient

A&E: accident and emergency; MHTS: mental health treatment study; RCT: randomised controlled trial; SR: systematic review

See the full evidence tables in appendix D and the forest plots in appendix E.

Quality assessment of clinical outcomes included in the evidence review

See the clinical evidence profiles in appendix F.

Economic evidence

Included studies

A systematic review of the economic literature was conducted but no economic studies were identified which were applicable to this review question.

Excluded studies

Studies not included in this review with reasons for their exclusions are provided in appendix K.

Summary of studies included in the economic evidence review

No economic evidence was identified for this review (and so there are no economic evidence tables).

Economic model

An economic analysis was undertaken to estimate the cost effectiveness in a cohort of patients before and after they had rehabilitation in an inpatient facility (see appendix J for the full report of the economic analysis).

Overview of methods

The economic model conducted took the form of a cost utility analysis (CUA), with the units of effectiveness expressed in terms of quality-adjusted life years (QALYs). The model setting was for the NHS and the population were adults (aged 18 years and older) with primary psychotic diagnosis in an inpatient rehabilitation unit. The model inputs were informed

entirely from a single study included in the accompanying clinical review which was a before-after study of the same cohort (Bunyan 2016). 'Post-rehabilitation' served as the intervention and 'pre-rehabilitation' served as the comparator. Effectiveness in the model was based on the number of admissions to acute inpatient facilities, which was characterised as entailing higher costs and a QALY decrement.

In accordance with NICE methodology, a NHS and Personal Social Services (PSS) perspective was adopted with the cost of an acute inpatient bed taken from the most recently available NHS Reference Costs at the time of writing (2017-2018). EQ-5D utilities were used to compute QALYs, with values elicited from the general public, as line in with the NICE reference case. The study on which this analysis is based did not describe the intervention, rehabilitation, in detail and a comparator was not stated. Therefore, a series of 'what-if' probabilistic sensitivity analyses (PSA) were run at different hypothetical costs for rehabilitation in comparison to a supposed comparator. The committee were of the view that a comparator to rehabilitation might be extended stays in acute admission wards. As there was no data available to inform modelling the comparator, the costs of rehabilitation are assumed to be incremental to the comparator.

Main findings

The main results, displayed in Table 3, are presented in the form of a series of PSA and are based on 10,000 Monte Carlo simulations of the model. When the mean incremental net monetary benefit (iNMB) is positive, this can be interpreted as the intervention being cost effective at a cost effectiveness threshold of £20,000 per QALY gained.

Table 3: Mean incremental net monetary benefit and probability of rehabilitation being cost effective

Incremental Cost of Rehabilitation	iNMB	Probability post-rehabilitation is cost effective (n=10,000)
£10,000	£102,343	99.94%
£20,000	£92,108	99.82%
£40,000	£72,179	98.44%
£60,000	£51,896	93.38%
£80,000	£32,195	81.22%
£100,000	£11,449	57.91%
£120,000	-£7,474	33.51%

The results of this analysis show that post-rehabilitation 'dominates' pre-rehabilitation. That is, post-rehabilitation is associated with lower costs and a higher quality of life than when compared with pre-rehabilitation. A series of one-way sensitivity analysis show that the number of acute inpatient admissions in the pre-rehabilitation arm and the cost of an acute bed are the key drivers of the model.

The results should be viewed in context of the evidence elicited from the accompanying clinical review. The study which informs the clinical inputs is a before-after study and was assessed as very low quality evidence. Given that the study also had a small sample size, the reduction in inpatient admissions could have occurred by chance. The study did not provide great detail on the nature of the intervention and did not state a comparator. Therefore, this model is structured as a 'what if' analysis and demonstrates that the incremental costs of a rehabilitation service may be sufficiently offset by a reduction in inpatient admissions.

Subject to the substantial limitations in the clinical data underpinning this analysis, this model demonstrates that rehabilitation may be cost effective when compared to standard care in terms of reducing inpatient admissions.

Evidence statements

Clinical evidence statements

Comparison 1. Intensive case management (ICM) versus standard care

Critical outcomes

Social functioning

- Low quality evidence from 1 RCT (N=71) indicates a clinically important increase in compliance with medication with ICM compared to standard care.

Out of area treatments

- No evidence was identified to inform this outcome.

Reduction in amount of support needed

- Very low quality evidence from 3 RCTs (N=418) indicates no clinically important difference in rates of homelessness with ICM compared to standard care.
- Very low quality evidence from 4 RCTs (N=1185) indicates a clinically important increase in rates of independent living with ICM compared to standard care.
- Very low quality evidence from 1 RCT (N=168) indicates a clinically important increase in rates of living in stable accommodation with ICM compared to standard care.
- Moderate quality evidence from 5 RCTs (N=475) indicates a clinically important increase in rates of remaining in contact with psychiatric services with ICM compared to standard care.

Important outcomes

Contact with criminal justice system

- Very low quality evidence from 1 RCT (N=179) indicates no clinically important difference in rates of arrest with ICM compared to standard care.
- Very low quality evidence from 5 RCTs (N=168) indicates no clinically important difference in rates of imprisonment with ICM compared to standard care.

Achievement of personal recovery goals

- Low quality evidence from 5 RCTs (N=818) indicates a clinically important benefit in Global Assessment of Function with ICM compared to standard care.

Attendances at Accident and Emergency

- Very low quality evidence from 1 RCT (N=178) indicates no clinically important difference between attendances at Accident and Emergency with ICM compared to standard care.

Number of days as inpatient

- Low quality evidence from 24 RCTs (N=3595) indicates approximately 1 fewer inpatient day per month with ICM compared to standard care.

Activities of daily living

- No evidence was identified to inform this outcome.

Quality of life

- Moderate quality evidence from 3 RCTs (N=174) indicates no clinically important difference in quality of life (as measured by the Lancashire Quality of Life Profile) with ICM compared to standard care.
- Moderate quality evidence from 2 RCTs (N=132) indicates no clinically important difference in quality of life (as measured by Lehman's Quality of Life Interview) with ICM compared to standard care.

Comparison 2. After versus before rehabilitation

Critical outcomes

Social functioning

- No evidence was identified to inform this outcome.

Out of area treatments

- No evidence was identified to inform this outcome.

Reduction in amount of support needed

- No evidence was identified to inform this outcome.

Important outcomes

Contact with criminal justice system

- No evidence was identified to inform this outcome.

Achievement of personal recovery goals

- No evidence was identified to inform this outcome.

Attendances at Accident and Emergency

- No evidence was identified to inform this outcome.

Number of days as inpatient

- Very low quality evidence from 3 observational studies (N=281) indicates a clinically important difference reduction in the number of inpatient days in the period after rehabilitation (whether in inpatient or community setting) compared to the period before admission to the rehabilitation unit.

Activities of daily living

- No evidence was identified to inform this outcome.

Quality of life

- No evidence was identified to inform this outcome.

Comparison 3. Mental Health Treatment Study service versus standard care

Critical outcomes

Social functioning

- No evidence was identified to inform this outcome.

Out of area treatments

- No evidence was identified to inform this outcome.

Reduction in amount of support needed

- No evidence was identified to inform this outcome.

Important outcomes

Contact with criminal justice system

- No evidence was identified to inform this outcome.

Achievement of personal recovery goals

- No evidence was identified to inform this outcome.

Attendances at Accident and Emergency

- High quality evidence from 1 RCT (N=1858) indicates no clinically important difference in the rate of attendance at Accident and Emergency with the MHTS service compared to standard care.

Number of days as inpatient

- Moderate quality evidence from 1 RCT (N=1863) indicates a clinically important decrease in the number of inpatient days with the MHTS service compared to standard care.

Activities of daily living

- No evidence was identified to inform this outcome.

Quality of life

- No evidence was identified to inform this outcome.

Comparison 4. Rehabilitation versus waiting list control

Critical outcomes

Social functioning

- No evidence was identified to inform this outcome.

Out of area treatments

- No evidence was identified to inform this outcome.

Reduction in amount of support needed

- Moderate quality evidence from 1 observational study (N=200) indicates a clinically important increase in the rate of successful progression with rehabilitation compared to a waiting list control group.

Important outcomes

Contact with criminal justice system

- No evidence was identified to inform this outcome.

Achievement of personal recovery goals

- No evidence was identified to inform this outcome.

Attendances at Accident and Emergency

- No evidence was identified to inform this outcome.

Number of days as inpatient

- Very low quality evidence from 1 observational study (N=200) indicates no clinically important difference in the rate of inpatient admission with rehabilitation compared to a waiting list control group.
- Moderate quality evidence from 1 observational study (N=200) indicates that in those who were admitted as inpatients, lengths of inpatient stays were longer in patients undergoing rehabilitation than patients in a waiting list control group.

Activities of daily living

- No evidence was identified to inform this outcome.

Quality of life

- No evidence was identified to inform this outcome.

Economic evidence statements

- Evidence from the guideline economic analysis suggested that rehabilitation could be cost effective when compared to standard treatment. The economic analysis is directly applicable to the NICE decision-making context and is characterised by serious limitations.

The committee's discussion of the evidence

Interpreting the evidence

The outcomes that matter most

Social functioning and reduction in amount of support needed were critical outcomes, because effective rehabilitation should enable many service users to participate in society with increased independence. Out of area treatment was also a critical outcome because lack of a local rehabilitation service would require service users to be rehabilitated away from their family and community.

Other important outcomes were selected because rehabilitation may affect overall recovery and reduce the need for healthcare. Important outcomes related to personal recovery were: achievement of personal recovery goals, activities of daily living and quality of life. Important adverse outcomes related to relapse of mental health problems were contact with criminal justice system, number of days as inpatient and attendances at Accident and Emergency.

The quality of the evidence

Evidence about social function was assessed as low quality using GRADE. There was very low to moderate quality evidence about the reduction in amount of support needed, contact

with the criminal justice system, achievement of recovery and number of days as an inpatient. There was moderate quality evidence about quality of life and high quality evidence about attendances at Accident and Emergency. There was no evidence about the rate of out of area treatments (out of area placements) or activities of daily living.

Evidence from RCTs as assessed using GRADE was downgraded for risk of bias (due to lack of blinding or incomplete outcome reporting) and for imprecision. Evidence from before and after studies of rehabilitation was downgraded for bias due to the study design. Evidence from an observational study comparing rehabilitation to waiting list control group was downgraded due to risk of baseline differences in the groups and potential differences between units in the rehabilitation provided.

Benefits and harms

The committee thought that rehabilitation would enable many people with complex psychosis and related severe mental health conditions to move to lower support settings or on to independent living. They considered rehabilitation would reduce the likelihood of further admissions to hospital. The committee recommended the availability of inpatient and community rehabilitation because different levels of support are needed as service users' progress through rehabilitation. Given that rehabilitation is effective the committee recommended that rehabilitation should be offered to all people with treatment-resistant symptoms and functional impairments. In the experience of the committee, recurrent or extended stays in hospital, or a breakdown of a supported accommodation placement, can indicate that the person has treatment resistance and functional impairments.

A potential harm of rehabilitation is people remaining too long in a rehabilitation unit, but the committee thought this would be mitigated by recommendations made elsewhere in the guideline about expected maximum lengths of stay and planning for transitions between care settings.

The committee also discussed the evidence from this review within the context of the finding that shorter illness duration (less than 15 years) is positively correlated with home discharge (from review A). The committee were aware that as many as 1 in 5 people leaving early intervention services for psychosis will have a complex psychosis or related severe mental health conditions, with significant residual disability in terms of persisting symptoms and functional impairment. However, it was not possible from the current evidence review to determine whether providing very early access to rehabilitation, when leaving early intervention services, could prevent repeated admissions and problems in daily living. Given that earlier access to rehabilitation services could have important clinical and economic benefits, the committee made a research recommendation to assess the efficacy and cost effectiveness of rehabilitation services for people leaving early intervention services.

Cost effectiveness and resource use

A systematic review of the economic literature was conducted but no relevant studies were identified which were applicable to this review question. The committee also noted that the nature of the topic, and the evidence elicited from the accompanying clinical review, did not allow for a full cost effectiveness analysis, and so was not a priority for economic modelling in the economic plan. The committee were guided in their decision making by referring to policy documents such as The Five Year Forward View for Mental Health (NHS England 2016). This document makes a recommendation for NHS England to lead a:

> "*Comprehensive programme of work to increase access to high quality care that prevents avoidable admissions and supports recovery and 'step down' for people of all ages who have severe mental health problems and significant risk or safety issues in the least restrictive setting, as close to home as possible. This should seek to address existing fragmented pathways in secure care, increase provision of community based services such as residential*

rehabilitation, supported housing and forensic or assertive outreach teams and identify new co-commissioning, funding and service models."

Economic analysis suggested that rehabilitation in an inpatient rehabilitation unit could be cost effective when compared to standard treatment. This was because rehabilitation was associated with having fewer admissions to acute mental health wards. The alternative to rehabilitation is that a patient often has recurrent admissions to acute inpatient mental health wards. Other economic analysis conducted for this guideline (see evidence report E) suggested that there may be further substantial overall cost savings where rehabilitation leads to faster discharge rates, and more sustained living period in community settings. More generally, using a qualitative assessment of cost-effectiveness, the committee were unanimous that there are both clinical and health benefits from providing rehabilitation services to people with long term and complex mental health needs. Namely that, where there is a lack of local provision, service users with complex needs can become stuck in expensive acute mental health inpatient wards, which the committee believed are detrimental to their recovery.

The committee took the view that it was difficult to assess the degree to which offering rehabilitative services constitutes a high resource impact as this depends on the components of rehabilitation services and regional variation depending on the local need for services. The high level, broad recommendation to provide inpatient and community rehabilitation services to people with complex psychosis and related severe mental health conditions may reflect current practice in some trusts. Many already have available facilities in the form of rehabilitation units on site. In instances where there are no rehabilitation units, the committee advised that in most cases, physical facilities would not be built from scratch, but would most likely reopen wards that previously existed. In addition, many of those stuck in lengthy out-of-area placements would not necessarily all be moved to NHS rehabilitation wards, but could be housed in supported accommodation which is substantially less costly in the short term. In the long term, there would be further cost savings as people with severe mental illness and complex psychosis are discharged to supported accommodation at a faster rate than is current practice, having come from a community based inpatient rehabilitation unit (see economic analysis in evidence review E).

The committee noted that roughly half of all trusts in England currently have community mental health teams and were mindful that recommendations might suggest a high resource impact. However, it was also noted that community mental health teams are already co-coordinating people in out-of-area placements which often take a substantial amount of time to review. The committee was of the view that often existing community mental health team staff transfer to set up a new community rehabilitation mental health team, relieving community mental health teams of existing clients in out-of-area treatments and supported accommodation, thus creating capacity within those teams. The committee believed that this would thus entail a reorganisation of existing resources.

References

Bunyan 2016

Bunyan, M., Ganeshalingam, Y., Morgan, E., Thompson-Boy, D., Wigton, R., Holloway, F., Tracy, D. K., In-patient rehabilitation: clinical outcomes and cost implications, BJPsych Bull, 40, 24-8, 2016

Dieterich 2017

Dieterich, M., Irving, C. B., Bergman, H., Khokhar, M. A., Park, B., Marshall, M., Intensive case management for severe mental illness, Cochrane Database of Systematic Reviews, 2017 (1), 2017

Lavelle 2011

Lavelle, E; Ijaz, A; Killaspy, H, Mental Health Rehabilitation and Recovery Services in Ireland: a multicentre study of current service provision, characteristics of service users and outcomes for those with and without access to these services, 2011

Macpherson 1999

Macpherson, R., Butler, J., Effect of treatment in an active rehabilitation hostel on the need for hospital treatment, Psychiatric Bulletin, 23, 594-597, 1999

Salkever 2014

Salkever, D., Gibbons, B., Ran, X., Do comprehensive, coordinated, recovery-oriented services alter the pattern of use of treatment services? Mental health treatment study impacts on SSDI beneficiaries' use of inpatient, emergency, and crisis services, The journal of behavioral health services & research, 41, 434-446, 2014

Appendices

Appendix A – Review protocols

Review protocol for review question: What is the effectiveness of rehabilitation services compared with standard care?

Table 4: Review protocol for pharmacological treatments for spasticity

Field (based on PRISMA-P)	Content
Review question	What is the effectiveness of rehabilitation services compared with standard care?
Type of review question	Intervention review
Objective of the review	This review aims to compare the effectiveness of treatment with and without active rehabilitation.
Eligibility criteria – population/disease/condition/issue/domain	Adults (aged 18 years and older) with complex psychosis and related severe mental health conditions (as defined in scope) Studies with mixed populations should include at least 66% with complex psychosis and related severe mental health conditions. Mixed study population will be examined in a sensitivity analysis as a potential source of heterogeneity.
Eligibility criteria – intervention(s)/exposure(s)/prognostic factor(s)	• Inpatient rehabilitation services • Community based rehabilitation services
Eligibility criteria – comparator(s)/control or reference (gold) standard	• Continued treatment as inpatient or in community (including supported housing) – but without formal active rehabilitation
Outcomes and prioritisation	**Critical** • Social functioning (including management of own mental + physical health) • Out of area treatments (also referred to as out of area placements) • Reduction in amount of support needed: o for inpatients - discharge to a sustained community placement (successful community living/ accommodation instability / placement breakdown) o for those in community placement – sustained move to a less supported placement

Field (based on PRISMA-P)	Content
	Important • Contact with criminal justice system. • Achievement of personal recovery goals. • Attendances at A&E. • Number of days as inpatient • Activities of daily living. • Quality of life
Eligibility criteria – study design	RCTs. If no RCTs are available for either of the interventions (inpatient or community rehabilitation), comparative observational studies will be considered for that intervention.
Other inclusion exclusion criteria	Date limit: 1990 The date limit for studies after 1990 was suggested by the GC considering the change in provision of mental health services from institutionalized care in the 1970s to deinstitutionalise and community based care from 1990s onwards. Country limit: UK, USA, Australasia, Europe, Canada. The GC limited to these countries because they have similar cultures to the UK, given the importance of the cultural setting in which mental health rehabilitation takes place.

Proposed sensitivity/sub-group analysis, or meta-regression	Subgroup analysis
	• Setting of rehabilitation:
	  ○ Community rehabilitation
	  ○ Inpatient rehabilitation
	• Out of area treatment (out of area treatment will not be an outcome for this subgroup)
	• Type of rehabilitation
	Confounders that will be used to explain heterogeneity:
	• Value based culture / social engagement (including therapeutic relationships - family, carers; team sports/activities)
	• Family involvement
	• Black, Asian and minority ethnic groups
	• Type of healthcare system (including rural versus urban)
	
	Observational studies should adjust for the following:

Field (based on PRISMA-P)	Content
	• Age • Measure of clinical severity • Gender
Selection process – duplicate screening/selection/analysis	A random sample of the references identified in the search will be sifted by a second reviewer. This sample size of this pilot round will be 10% of the total, (with a minimum of 100 studies). All disagreements in study inclusion will be discussed and resolved between the two reviewers. The senior systematic reviewer or guideline lead will be involved if discrepancies cannot be resolved between the two reviewers.
Data management (software)	NGA STAR software will be used for study sifting, data extraction, recording quality assessment using checklists and generating bibliographies/citations. RevMan will be used to generate plots and for any meta-analysis. 'GRADEpro' will be used to assess the quality of evidence for each outcome
Information sources – databases and dates	Sources to be searched: Embase, Medline, PsycINFO, Cochrane library (CDSR and CENTRAL), DARE and HTA (via CRD) Limits (e.g. date, study design): Human studies /English language
Identify if an update	Not an update
Author contacts	For details please see https://www.nice.org.uk/guidance/indevelopment/gid-ng10092
Highlight if amendment to previous protocol	For details please see section 4.5 of Developing NICE guidelines: the manual 2014
Search strategy – for one database	For details please see appendix B.
Data collection process – forms/duplicate	A standardised evidence table format will be used, and published as appendix D (clinical evidence tables) or H (economic evidence tables).
Data items – define all variables to be collected	For details please see evidence tables in appendix D (clinical evidence tables) or H (economic evidence tables).
Methods for assessing bias at outcome/study level	Standard study checklists were used to critically appraise individual studies. For details please see section 6.2 of Developing NICE guidelines: the manual 2014.

Field (based on PRISMA-P)	Content
	The risk of bias across all available evidence was evaluated for each outcome using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group http://www.gradeworkinggroup.org/.
Criteria for quantitative synthesis	For details please see section 6.4 of Developing NICE guidelines: the manual 2014
Methods for quantitative analysis – combining studies and exploring (in)consistency	For details please see the methods supplementary document.
Meta-bias assessment – publication bias, selective reporting bias	For details please see section 6.2 of Developing NICE guidelines: the manual 2014.
Confidence in cumulative evidence	For details please see sections 6.4 and 9.1 of Developing NICE guidelines: the manual 2014
Rationale/context – what is known	For details please see the introduction to the evidence review.
Describe contributions of authors and guarantor	A multidisciplinary committee developed the evidence review. The committee was convened by the National Guideline Alliance (NGA) and chaired by Dr Gillian Baird in line with section 3 of Developing NICE guidelines: the manual 2014. Staff from the NGA undertook systematic literature searches, appraised the evidence, conducted meta-analysis and cost effectiveness analysis where appropriate, and drafted the guideline in collaboration with the committee. For details please see the methods supplementary document.
Sources of funding/support	The NGA is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists.
Name of sponsor	The NGA is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists.
Roles of sponsor	NICE funds NGA to develop guidelines for those working in the NHS, public health and social care in England
PROSPERO registration number	Not applicable

A&E: accident and emergency; GC: guideline committee; GRADE: Grading of Recommendations Assessment, Development and Evaluation; NGA: National Guideline Alliance; NHS: National health service; NICE: National Institute for Health and Care Excellence; RCT: randomised controlled trial; RoB: risk of bias; SD: standard deviation

Appendix B – Literature search strategies

Literature search strategies for review question: What is the effectiveness of rehabilitation services compared with standard care?

Databases: Embase/Medline/PsycInfo

Date searched: 04/02/2019

#	Searches
1	exp psychosis/
2	exp schizophrenia/
3	schizoaffective psychosis/
4	exp bipolar disorder/
5	Depressive psychosis/
6	Delusional disorder/
7	mental disease/
8	or/1-7
9	8 use emczd
10	Psychotic disorders/
11	exp schizophrenia/ or exp "schizophrenia spectrum and other psychotic disorders"/
12	exp "Bipolar and Related Disorders"/
13	mental disorders/
14	or/10-13
15	14 use ppez
16	exp psychosis/
17	exp schizophrenia/ or "fragmentation (schizophrenia)"/
18	schizoaffective disorder/
19	exp bipolar disorder/
20	delusions/
21	mental disorders/
22	or/16-21
23	22 use psyh
24	(psychos?s or psychotic).tw.
25	(schizophren* or schizoaffective*).tw.
26	((bipolar or bipolar type) adj2 (disorder* or disease or spectrum)).tw.
27	(delusion* adj3 (disorder* or disease)).tw.
28	(psychiatric adj2 (illness* or disease* or disorder* or disabilit* or problem*)).tw.
29	((severe or serious) adj3 (mental adj2 (illness* or disease* or disorder* or disabilit* or problem*))).tw.
30	(complex adj2 (mental adj2 (illness* or disease* or disorder* or disabilit* or problem*))).tw.
31	or/24-30
32	9 or 15 or 23 or 31
33	High dependency unit/
34	Rehabilitation center/
35	Community based rehabilitation/
36	*community mental health center/
37	or/33-36
38	37 use emczd
39	rehabilitation centers/
40	*Community Mental Health Centers/
41	or/39-40
42	41 use ppez
43	*Community Mental Health Centers/

#	Searches
44	rehabilitation centers/
45	43 or 44
46	45 use psyh
47	high dependency.tw.
48	((inpatient or in-patient or long-stay) adj2 (rehabilitation or rehabilitative)).tw.
49	(rehab* adj2 ward*).tw.
50	(lock* adj2 ward* adj2 treatment*).tw.
51	(open adj2 ward* adj2 (rehabilitation or treatment*)).tw.
52	(Low adj2 secure).tw.
53	((lock* or open) adj communit*).tw.
54	(communit* adj3 rehabilitation).tw.
55	(community-based and rehabilitation).tw.
56	(Community-based adj3 (inpatient or in-patient)).tw.
57	(communit* adj2 team*).tw.
58	community mental health team*.tw.
59	(communit* adj2 placement).tw.
60	(Rehabilitation adj2 service*).tw.
61	"out of area".tw.
62	38 or 42 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61
63	32 and 62
64	limit 63 to (yr="1990 - current" and english language)
65	limit 64 to yr="2005 -current"
66	limit 64 to yr="1990 - 2004"
67	remove duplicates from 65
68	remove duplicates from 66
69	67 or 68

Database: Cochrane Library

Date searched: 04/02/2019

#	Searches
1	MeSH descriptor: [Psychotic Disorders] explode all trees
2	(psychos?s or psychotic):ti,ab,kw
3	MeSH descriptor: [Schizophrenia] explode all trees
4	MeSH descriptor: [Schizophrenia Spectrum and Other Psychotic Disorders] explode all trees
5	(schizophren* or schizoaffective*):ti,ab,kw
6	MeSH descriptor: [Bipolar Disorder] explode all trees
7	(((bipolar or bipolar type) near/2 (disorder* or disease or spectrum))):ti,ab,kw
8	MeSH descriptor: [Delusions] this term only
9	((delusion* near/3 (disorder* or disease))):ti,ab,kw
10	MeSH descriptor: [Mental Disorders] this term only
11	((psychiatric near/2 (illness* or disease* or disorder* or disabilit* or problem*))):ti,ab,kw
12	(((severe or serious) near/3 (mental adj2 (illness* or disease* or disorder* or disabilit* or problem*)))):ti,ab,kw
13	((complex near/2 (mental adj2 (illness* or disease* or disorder* or disabilit* or problem*)))):ti,ab,kw
14	(#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13)
15	MeSH descriptor: [Rehabilitation Centers] this term only
16	MeSH descriptor: [Community Mental Health Centers] this term only
17	(high dependency):ti,ab,kw
18	((inpatient or in-patient or long-stay) near/2 (rehabilitation or rehabilitative)):ti,ab,kw
19	(rehab* near/2 ward*):ti,ab,kw
20	(lock* near/2 ward* near/2 treatment*):ti,ab,kw

#	Searches
21	(open near/2 ward* near/2 (rehabilitation or treatment*)):ti,ab,kw
22	(Low near/2 secure):ti,ab,kw
23	((lock* or open) near communit*):ti,ab,kw
24	(communit* near/3 rehabilitation):ti,ab,kw
25	(community-based and rehabilitation):ti,ab,kw
26	(Community-based near/3 (inpatient or in-patient)):ti,ab,kw
27	(communit* near/2 team*):ti,ab,kw
28	(community mental health team*):ti,ab,kw
29	(communit* near/2 placement):ti,ab,kw
30	(Rehabilitation near/2 service*):ti,ab,kw
31	("out of area"):ti,ab,kw
32	(communit* near/2 recover* near/2 (team* or service*)):ti,ab,kw
33	(#15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32)
34	#14 AND #33 with Cochrane Library publication date Between Jan 1990 and Feb 2019

Database: CRD

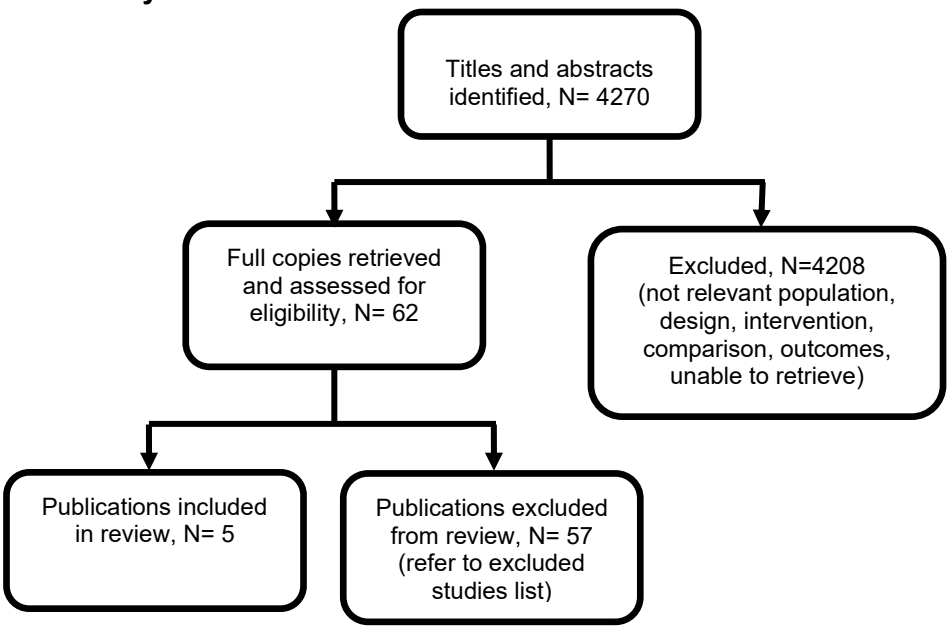
Date searched: 04/02/2019

#	Searches
1	MeSH DESCRIPTOR Psychotic Disorders EXPLODE ALL TREES IN DARE,HTA
2	(psychos*s or psychotic) IN DARE, HTA
3	MeSH DESCRIPTOR Schizophrenia EXPLODE ALL TREES IN DARE,HTA
4	(schizophren* or schizoaffective*) IN DARE, HTA
5	MeSH DESCRIPTOR Bipolar Disorder EXPLODE ALL TREES IN DARE,HTA
6	(((bipolar or bipolar type) NEAR2 (disorder* or disease or spectrum))) IN DARE, HTA
7	MeSH DESCRIPTOR Delusions IN DARE,HTA
8	(delusion* NEAR3 (disorder* or disease)) IN DARE, HTA
9	MeSH DESCRIPTOR Mental Disorders IN DARE,HTA
10	(psychiatric NEAR2 (illness* or disease* or disorder* or disabilit* or problem*)) IN DARE, HTA
11	((severe or serious) NEAR3 (mental NEAR2 (illness* or disease* or disorder* or disabilit* or problem*))) IN DARE, HTA
12	(complex NEAR2 (mental NEAR2 (illness* or disease* or disorder* or disabilit* or problem*))) IN DARE, HTA
13	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12
14	MeSH DESCRIPTOR Rehabilitation IN DARE,HTA
15	MeSH DESCRIPTOR Rehabilitation, Vocational IN DARE,HTA
16	MeSH DESCRIPTOR Residential Facilities IN DARE,HTA
17	MeSH DESCRIPTOR Assisted Living Facilities IN DARE,HTA
18	MeSH DESCRIPTOR Halfway Houses IN DARE,HTA
19	(resident* NEAR (care or centre or center)) IN DARE, HTA
20	((inpatient or in-patient or long-stay) NEAR3 (psychiatric or mental health)) IN DARE, HTA
21	((Support*) NEAR (hous* or accommodat* or living)) IN DARE, HTA
22	(halfway house* or assist* living) IN DARE, HTA
23	(rehabilitation or rehabilitative or rehabilitate) IN DARE, HTA
24	#14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23
25	#13 AND #24

Appendix C – Clinical evidence study selection

Clinical study selection for: What is the effectiveness of rehabilitation services compared with standard care?

Figure 1: Study selection flow chart



Appendix D – Clinical evidence tables

Clinical evidence tables for review question: What is the effectiveness of rehabilitation services compared with standard care?

Table 5: Clinical evidence tables

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Bunyan, M., Ganeshalingam, Y., Morgan, E., Thompson-Boy, D., Wigton, R., Holloway, F., Tracy, D. K., In-patient rehabilitation: clinical outcomes and cost implications, BJPsych Bull, 40, 24-8, 2016 **Ref Id** 973934 **Country/ies where the study was carried out** United Kingdom **Study type** Before and after study	**Sample size** 22 **Characteristics** Primary psychotic diagnosis, most commonly paranoid schizophrenia most common (n = 13) Mean (SD) length of admission: 701 (385) days Mean (SD) age: 49 (12.23)years **Inclusion criteria** Retrospective evaluation of individuals discharged from three rehabilitation units between October	**Interventions** Intervention: Rehabilitation with 24 hour nursing and a range of professional inputs	**Details** Data were collected retrospectively on bed occupancy, costs, risk, meaningful social activity in the 2 years prior, the time during and the 2 years after rehabilitation care. Information was gathered using the trust's electronic records system.	**Results** **Mean number of admission days:** Before rehabilitation, Mean 379.45 (SE = 56.26) bed days After rehabilitation, Mean 110.59 (SE = 52.45) bed days (t(21) = 3.052, P = 0.006) **Successful rehabilitation outcomes:** 12 admitted to residential care 7 admitted to less intense support (2 to independent living)	**Limitations** EPOC checklist for interrupted time series: Intervention independent of other changes. High risk Shape of the intervention effect pre-specified. High risk Intervention unlikely to affect data collection. Low risk Knowledge of the allocated interventions adequately prevented during the study. High risk Incomplete outcome data. Low risk Selective outcome reporting. Low risk Other risks of bias. None **Other information** None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To evaluate the clinical and economic effectiveness of three in-patient rehabilitation units across one London National Health Service trust **Study dates** 2007-2012 **Source of funding** Not reported	2009 and September 2010 **Exclusion criteria** Spent less than 6 weeks at a unit				
Full citation Dieterich, M., Irving, C. B., Bergman, H., Khokhar, M. A., Park, B., Marshall, M., Intensive case management for severe mental illness, Cochrane Database of Systematic Reviews, 2017 (1) (no pagination), 2017	**Sample size** 40 trials with 7524 participants were included. **Characteristics** 20/40 trials included patients with "severe mental illness" - the definition of this varied across studies from	**Interventions** 29 trials compared intensive case management (ICM) with standard care. Intensive case management is a long-term intensive approach to the patient in the community providing a	**Details** Standard Cochrane review methods. The comparison ICM vs standard care is of relevance to the guideline because it compares: a comprehensive range of treatment, rehabilitation, and support services *versus* treatment ±	**Results** Primary outcome was service use (days in hospital and not remaining in contact with psychiatric services). Secondary outcomes were: service use (readmission, use of emergency services, adverse effects, global state, Social functioning, Mental state, Behaviour, Quality of life, Satisfaction and costs.	**Limitations** ROBIS checklist summary Concerns regarding specification of study eligibility criteria. LOW CONCERN Concerns regarding methods used to identify and/or select studies. LOW CONCERN Concerns regarding methods used to collect data and appraise studies. LOW CONCERN Concerns regarding methods used to synthesize results. LOW CONCERN Risk of bias: Low

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 894151 **Country/ies where the study was carried out** International: included trials from Australia, Canada, USA, Europe; and one trial from China. **Study type** Systematic review **Aim of the study** 1) To compare the effectiveness of intensive case management versus standard care in people with severe mental illnesses 2) To compare the effectiveness of intensive case management versus non intensive case management in people with severe mental illnesses	schizophrenic disorder alone to wider diagnostic groups including schizophrenic, affective, and personality disorder. 18/40 trials involved patients with various diagnoses but the majority had a psychotic disorder. In two trials it was unclear what diagnostic criteria were used. The overall mean age (reported in 32/40 trials) was 38 years. All trials were in the community setting. **Inclusion criteria** Studies with: 1) Study design: Randomised controlled trials, quasi randomised controlled trials and economic evaluations	comprehensive range of treatment, rehabilitation, and support services 12 trials compared ICM with non-ICM. Intensive case management was defined as: where the majority of people received a package of care based on the: Assertive Community Treatment model, Assertive Outreach model or Case Management model. With a caseload of 20 people or less. Non-intensive case management was defined as: where the majority of people received a package of care based on the: Assertive Community Treatment model,	specialised services, such as rehabilitation	Follow-up was grouped as follows: short term (up to 6 months), medium term (6 to 12 months) and long term (over 12 months). **ICM *versus* standard care** non-compliance with medication (long term) RR 0.35 (95% CI 0.15 to 0.81) homelessness (long term) RR 0.78 (95% CI 0.34 to 1.82) non-independent living (long term) RR 0.65 (95% CI 0.49 to 0.88) Not living in stable accommodation. (long term) RR 0.80 (95% CI 0.65 to 0.98) Not remaining in contact with psychiatric services (long term) Risk Ratio (M-H, Random, 95% CI) 0.27 [0.11, 0.66] Arrested (long term), Risk Ratio (M-H, Random, 95% CI) 0.66 [0.32, 1.37] Imprisoned (long term), Risk Ratio (M-H, Random, 95% CI) 0.86 [0.45, 1.65]	Risk of bias for individual outcomes is based on the critical appraisal reported in the review **Other information** None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates Literature search date was 2015. **Source of funding** The study was carried out by the Cochrane Schizophrenia Group. The National Institute for Health Research (NIHR) is the largest single funder of this group.	accompanying RCTs 2) Population: Age between 18 and 65 years and a diagnosis of severe mental illness or schizophrenia, schizophrenia-like disorders, bipolar disorder, depression with psychotic features or/ and personality disorder; and not having acute illness and being treated in a community setting 3) Intervention: Intensive case management including assertive community treatment, assertive outreach model and case management model, with a case load of up to 20 people for intensive and more than 20 for	Assertive Outreach model or Case Management model. With a caseload of more than 20 people. Standard care was defined as: where the majority of people received a community or outpatient model of care not specifically shaped on either the model of Assertive Community Treatment and Case Management, and not working within a designated named package or approach to care. Standard care was variable across trials in different countries at different time periods. Presence of further specialised		Mean GAF score (long term), Mean difference (IV, Random, 95% CI) 3.41 [1.66, 5.16] Mean days in hospital (over 2 years follow-up, skewed data sample size >=200) Mean Difference (IV, Random, 95% CI) -0.86 [-1.37, -0.34] Mean days in hospital (over 2 years follow-up, skewed data sample size <200) Mean Difference (IV, Random, 95% CI) -0.46 [-0.95, 0.03] Mean days in hospital over 2 years follow-up, Mean Difference (IV, Random, 95% CI) -1.01 [-1.74, -0.28] Admitted to A&E (long term), Risk Ratio (M-H, Random, 95% CI) 1.13 [0.72, 1.76] QOL – LQoLP (long term), Mean Difference (IV, Random, 95% CI) -0.13 [-0.38, 0.12] QOL – QOLI (long term), Mean Difference (IV, Random, 95% CI) 0.09 [-0.24, 0.42]	

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	non intensive case management. 4) Outcomes: Service use, adverse effects, global state, social functioning, mental state, behaviour, quality of life, satisfaction, costs **Exclusion criteria** 1) Studies with observational study design 2) Studies with participants having substance abuse disorder alone	services, such as rehabilitation or psychotherapist services, were variable within standard care services. In some studies, both ICM and standard care incorporated services for substance abuse treatment and homelessness care.			
Full citation Macpherson, R., Butler, J., Effect of treatment in an active rehabilitation hostel on the need for hospital treatment,	**Sample size** 103 **Characteristics** Diagnosis 69% schizophrenia/schizoaffective	**Interventions** An active rehabilitation hostel (The Vron, Gloucester). The unit was set up to provide short- or medium-term active training in	**Details** Health records were used to determine the number of hospital admission days in the year before and the two years after rehabilitation.	**Results** Duration of hospitalisation fell 73% from mean 105.8 days (range 0-365, SD= 106.5) in the year before Vron treatment to mean 28.6 days (range 0-365, SD.=75.4) in the year after. Hospitalisation fell 58% from	**Limitations** EPOC checklist for interrupted time series: Intervention independent of other changes. High risk Shape of the intervention effect pre-specified. High risk Intervention unlikely to affect data

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Psychiatric Bulletin, 23, 594-597, 1999 **Ref Id** 967892 **Country/ies where the study was carried out** UK **Study type** Before and after study. **Aim of the study** To report the effectiveness of an active rehabilitation hostel over a 10 year period. **Study dates** 1986 to 1996 **Source of funding** Not reported	disorder. 65% male. Mean age on admission 35 years. Most were referred from an acute ward or supported lodgings. **Inclusion criteria** All patients admitted to the unit over a ten year period. **Exclusion criteria** Not reported	rehabilitation with emphasis on domestic and social skills. The unit was not registered to treat patients under the Mental Health Act 1983, and did not have the status of a hospital, but provided 24-hour nursing care. A multi-disciplinary team met weekly, with senior psychiatric, occupational therapy, social work and psychological input.		138.0 days (range 0-730, SD=160.3) in the two years before Vron treatment to mean 57.1 days (range 0-730, SD =134.9) in the two years after Vron treatment.	collection. Low risk Knowledge of the allocated interventions adequately prevented during the study. High risk Incomplete outcome data. Low risk Selective outcome reporting. Low risk Other risks of bias. None **Other information** None
Full citation Salkever, D., Gibbons, B., Ran,	**Sample size** N=1929	**Interventions** Intervention group received a recovery-	**Details** At study enrolment, researchers administered the baseline interview to	**Results** Follow-up 24 months: Rehab vs treatment as usual (TAU)	**Limitations** Cochrane RoB-2 checklist summary: Risk of bias arising from the

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
X., Do comprehensive, coordinated, recovery-oriented services alter the pattern of use of treatment services? Mental health treatment study impacts on SSDI beneficiaries' use of inpatient, emergency, and crisis services, The journal of behavioral health services & research, 41, 434-446, 2014 **Ref Id** 896010 **Country/ies where the study was carried out** USA **Study type** RCT **Aim of the study** To compare a recovery-oriented, comprehensive,	**Characteristics** The proportions with *schizophrenia*, bipolar disorder are not reported in this publication but a separate publication from this study indicates 36.4% had *schizophrenia*, 30.5% depression and 29.3% bipolar disorder. Mean age 45 years (SD 8 years). Ethnicity was 62% white, 38% non-white. **Inclusion criteria** 1) a Social Security Disability (SSDI) beneficiary with a primary disabling diagnosis of *schizophrenia*, bipolar disorder or depression, 2) between the ages of 18 and 55 years	oriented, comprehensive, and coordinated package of *community*-based treatment and *rehabilitation* services. The care was based on the Chronic Care Model, and consisted of three core components: (1) evidence-based systematic medication management (SMM), (2) evidence-based individual placement and support (IPS) supported employment (SE), and (3) other behavioural health (OBH) or related services. A multi-disciplinary team at each of the 23 sites (all but two of the sites were *community* mental health centres) was responsible for	each participant, including assessments of employment, mental health, physical health, and quality of life. Participants who were randomly assigned to the treatment group also received a diagnostic interview and physical examination. Over the 24 months following enrolment, researchers administered eight quarterly follow-up interviews to participants. During each follow-up interview, participants were asked to report the following seven indicators of health care use since the date of their prior completed interview: numbers of overnight hospital stays, number of nights spent as hospital *inpatient*, numbers of overnight hospital stays for a mental health problem, number of nights spent as a hospital *inpatient* for mental health problems, number of emergency room visits, number of emergency room visits for mental health problems, and psychiatric emergency or crisis program visits.	inpatient days, mean difference (95% CI) -1.64 [-3.24, -0.03] A&E visits, mean difference (95% CI) -1.64 [-3.24, -0.03]	randomization process (Low concerns) Risk of bias due to deviations from the intended interventions (Low concerns) Missing outcome data (Low concerns) Risk of bias in measurement of the outcome (Low concerns) Risk of bias in selection of the reported result (Low concerns) **Other information** Employment outcomes are reported in another paper: https://www.ssa.gov/disabilityresearch/documents/MHTS_Final_Report_508.pdf

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
and coordinated package of *community*-based treatment and *rehabilitation* services to standard care in people with severe and persistent mental health disorders. **Study dates** 2006 to 2010 **Source of funding** Funded by Contract SS00-05-60072 between the U.S. Social Security Administration and Westat.	3) residing within the primary or secondary catchment area of one of the study sites (as designated by the site itself) **Exclusion criteria** 1) resident in a nursing home or other custodial setting 2) had a legal guardian 3) a life-threatening physical illness 4) employed in a competitive job within the 30 days prior to enrolment 5) had been receiving supported employment services from their study site within 6 months prior to enrolment.	overseeing the intervention. People in the intervention group were helped financially to cover the costs of the care package. The control group was treatment as usual. Around 66% had at least one visit to a mental health clinic in the 3 months prior to the study but only about 7% reported any receipt of vocational services from a mental health program over the study period.	(The latter measure excluded emergency room visits but included treatments from mobile treatment or outreach teams, crisis centres, psychiatric stabilization program, and other programs providing psychiatric crisis care.) Each of these seven items was summed across all follow-up interviews for each participant to obtain the totals over the full 24-month follow-up period for each of the seven outcome measures.		
Full citation	**Sample size** 229 patients recruited from 5	**Interventions** Rehabilitation services (N=126)	**Details** Participants' symptoms were assessed through	**Results** Successful progress over the 18 month study period was	**Limitations** RoBINs-I checklist summary:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Lavelle, E; Ijaz, A; Killaspy, H, Mental Health Rehabilitation and Recovery Services in Ireland: a multicentre study of current service provision, characteristics of service users and outcomes for those with and without access to these services, 2011 **Ref Id** 1000656 **Country/ies where the study was carried out** Ireland **Study type** Multicentre audit **Aim of the study** i) describe current rehabilitation service provision in Ireland; ii) describe a representative sample of users of	centres. 126 (63%) were receiving mental health rehabilitation services and 74 (37%) were wait listed for rehabilitation. **Characteristics** Diagnosis: 82% schizophrenia, 8% schizoaffective disorder, 10% bipolar disorder. 64% participants were male with a mean age of 45 years. **Inclusion criteria** Clinical diagnosis of a severe and enduring mental health problems (schizophrenia, schizoaffective disorder, bipolar affective disorder) and a history of high use of inpatient services	: 12% were in inpatient rehab wards, 19% in high support hostel, 16% in medium support hostel, 10% in low support hostel, 20% with family or friends, 22% were independent tenancy or own home. For the waiting list control group: 66/74 (89%) were living in the community and 8/74 (11%) were inpatients.	face to face interviews using the Positive and Negative Syndrome Scale (PANSS), cognitive functioning was assessed using the Mini Mental State Examination (MMSE) and quality of life was assessed using the Manchester Short Assessment of Quality of Life (MANSA). Staff rated participants' social functioning using the Life Skills Profile (LSP), challenging behaviours using the Special Problems Rating Scale (SPRS), drug and alcohol use using the Clinician Alcohol and Drugs Scale (CADS) and mental health needs using the short version of the Camberwell Assessment of Needs. Problems associated with community discharge were assessed by the researcher using the Community Placement Questionnaire (CPQ), with ratings made on the basis of collation of information from participants, staff and case notes. Data on interventions and treatments received over the preceding three months	defined in two ways: 1) If recruited as an inpatient, having been discharged from hospital and able to maintain a community placement without placement breakdown or readmission to hospital; if recruited as a community patient, maintaining the community placement or moving to less supported accommodation without any admission to hospital; 2) Statistically significant improvement in social functioning as assessed by the Life Skills Profile **Rehabilitation *versus* control** Reduction in amount of support needed: successful progression at 18 months follow-up OR 8.44 [4.16, 17.13] (favours rehabilitation) Admitted as inpatient in the 6 months between 12 and 18 months follow-up RR 0.76 [0.51, 1.13]	Bias due to confounding: (moderate - some differences between those in rehabilitation & those on wait-list in terms of employment & accommodation) Bias in selection of participants into the study: (low) Bias in classification of interventions: (moderate - rehabilitation based on Vision for Change criteria for specialist mental health rehabilitation services but potential differences between units) Bias due to deviations from intended interventions: low Bias due to missing data: low Bias in measurement of outcomes: low Bias in selection of the reported result: low Overall bias: moderate risk of bias **Other information** None

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
these services and investigate clinical outcomes and costs for those receiving and those wait listed for rehabilitation; iii) investigate service and service user characteristics associated with better clinical outcomes. **Study dates** 2007 - 2010 **Source of funding** Funded by the Mental Health Commission Research Scholarship Programme	(at least six admissions over their lifetime or at least three admissions or 180 inpatient days within the last two years). Treated in one of five mental health services located in urban and rural areas of Ireland: St Ita's Hospital, Dublin; St Loman's Hospital, Dublin; Cavan/Monaghan ; Clare; St Senan's Hospital, Wexford. Each centre aimed to recruit 25 participants in receipt of rehabilitation services and 15 participants receiving standard care from the local mental health service who had been referred for rehabilitation (wait listed).		were collected from staff and case files for each participant including medications, psychosocial interventions (family interventions, cognitive behavioural therapy or other psychological interventions) and hours per week engaged in a meaningful occupation (attendance at day centre/vocational rehabilitation centre/voluntary or paid work/educational course).		

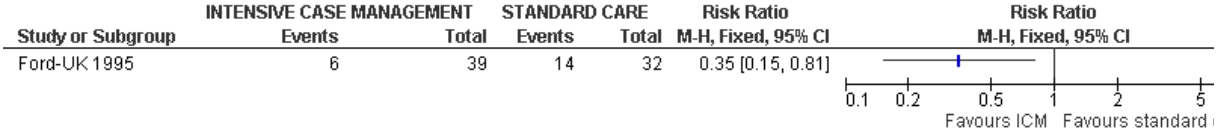
Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Exclusion criteria In order to minimise a "dose" effect of rehabilitation, those patients most recently taken on for rehabilitation (within the last 12 months) were recruited first. Recruitment was extended to those who had received rehabilitation longer than this only if 25 participants had not been recruited in a given rehabilitation centre.				

A&E: accident and emergency department; CI: confidence interval; ICM: intensive case management; GAF: global assessment of functioning; LQoLP: Lancashire Quality of Life Profile; MHTS: Mental Health Treatment Study; QOLI: Lehman's Quality of Life Interview ; TAU: treatment as usual

Appendix E – Forest plots

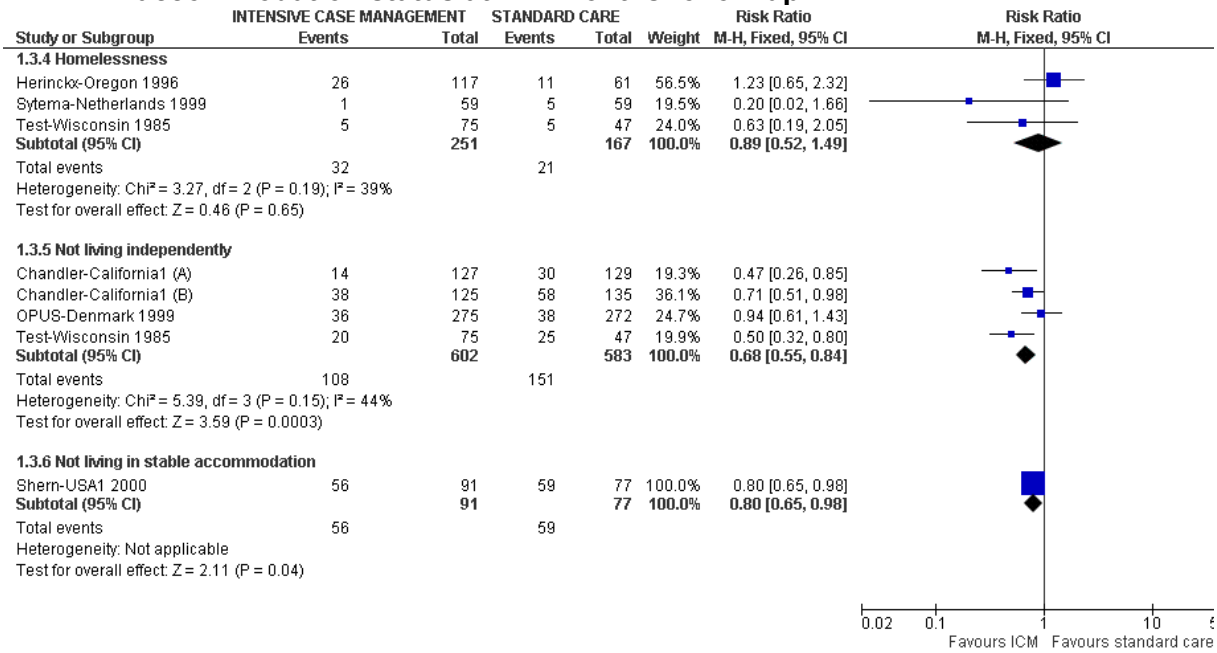
Forest plots for review question: What is the effectiveness of rehabilitation services compared with standard care?

Figure 2: Comparison 1: ICM versus standard care. Social functioning: not compliant with medication at >12 months follow-up.



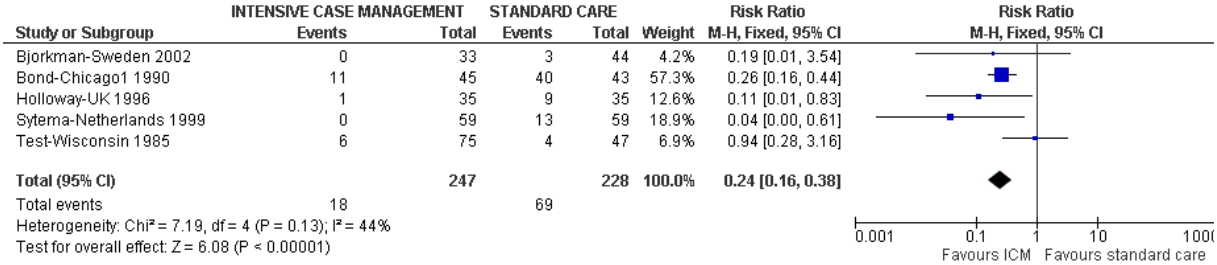
CI: confidence interval; ICM: intensive case management;

Figure 3: Comparison 1: ICM versus standard care. Reduction in support needed: accommodation status at >12 months follow-up.



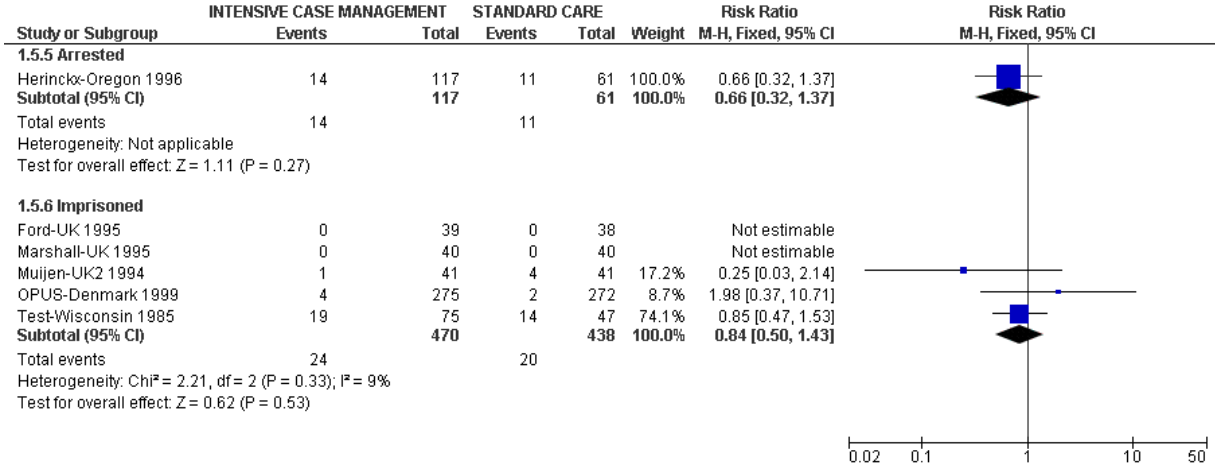
CI: confidence interval; ICM: intensive case management;

Figure 4: Comparison 1: ICM versus standard care. Reduction in support needed: not remaining in contact with psychiatric services at >12 months follow-up.



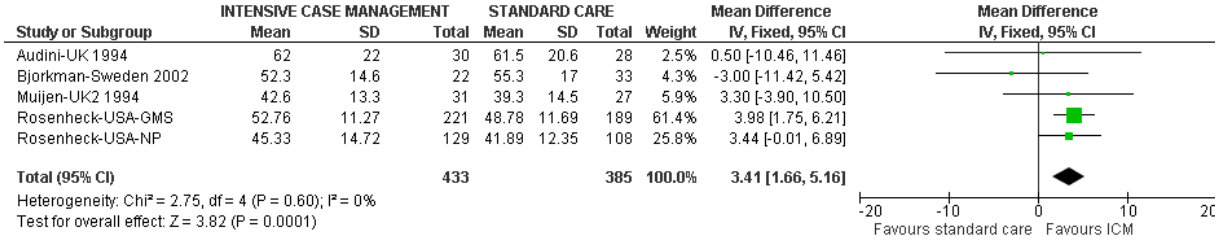
CI: confidence interval; ICM: intensive case management;

Figure 5: Comparison 1: ICM versus standard care. Contact with criminal justice system at >12 months follow-up.



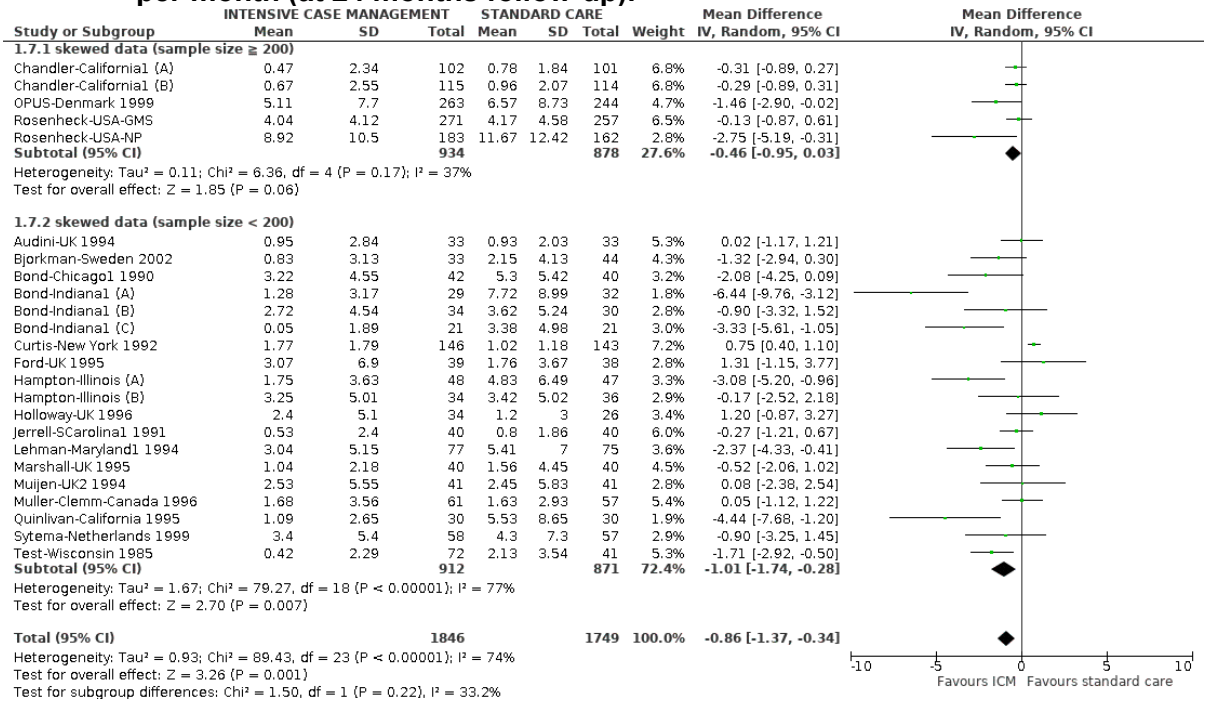
CI: confidence interval; ICM: intensive case management;

Figure 6: Comparison 1: ICM versus standard care. Achievement of recovery: average endpoint GAF score at >12 months follow-up. Higher is better.



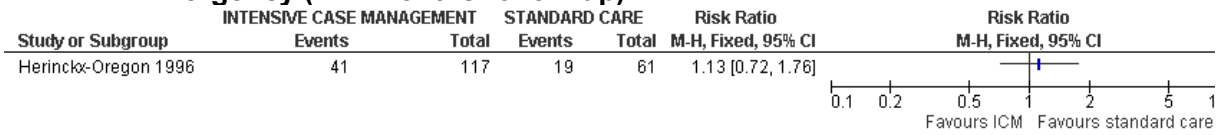
CI: confidence interval; ICM: intensive case management; GAF: global assessment of functioning

Figure 7: Comparison 1: ICM versus standard care. Mean number of inpatient days per month (at 24 months follow-up).



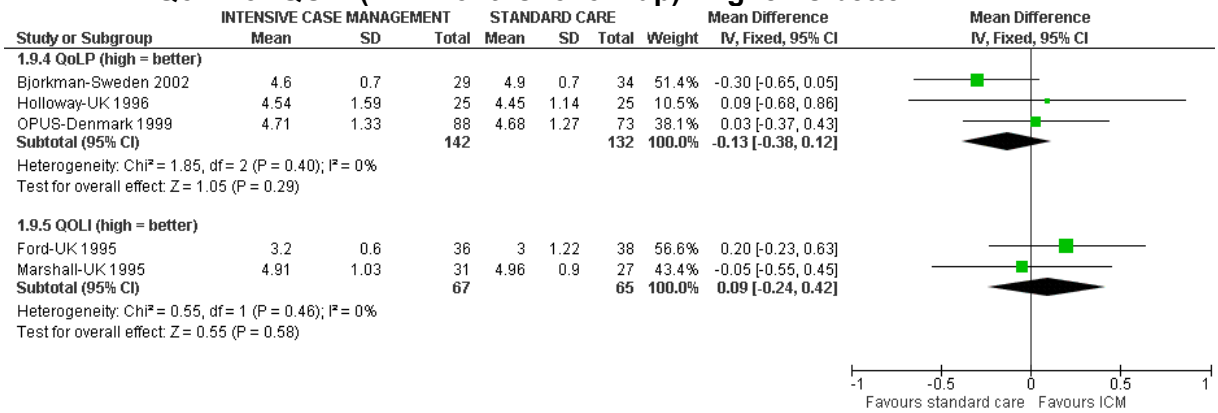
CI: confidence interval; ICM: intensive case management

Figure 8: Comparison 1: ICM versus standard care. Admitted to Accident and Emergency (>12 months follow-up).



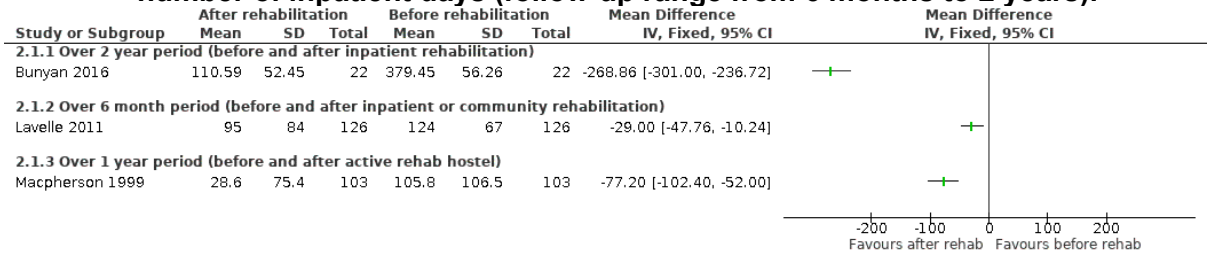
CI: confidence interval; A&E: accident and emergency department; ICM: intensive case management

Figure 9: Comparison 1: ICM versus standard care. Quality of life measured with LQoLP or QOLI (>12 months follow-up). Higher is better.



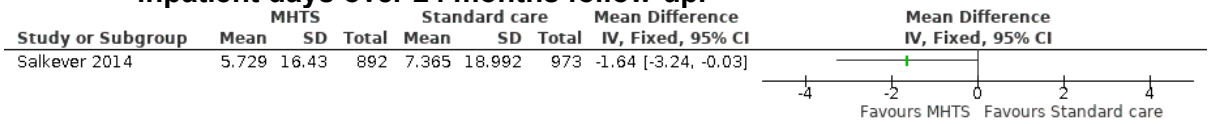
CI: confidence interval; ICM: intensive case management; LQoLP: Lancashire Quality of Life Profile; QOLI: Lehman's Quality of Life Interview ;

Figure 10: Comparison 2: after rehabilitation versus before rehabilitation. Mean number of inpatient days (follow-up range from 6 months to 2 years).



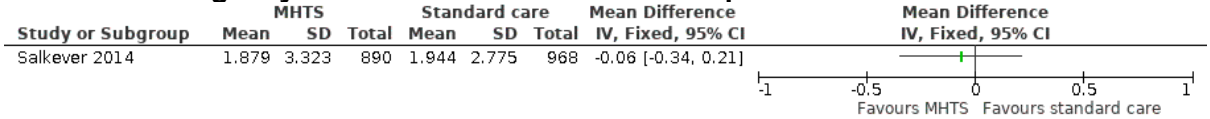
CI: confidence interval;

Figure 11: Comparison 3: MHTS service versus standard care. Mean number of inpatient days over 24 months follow-up.



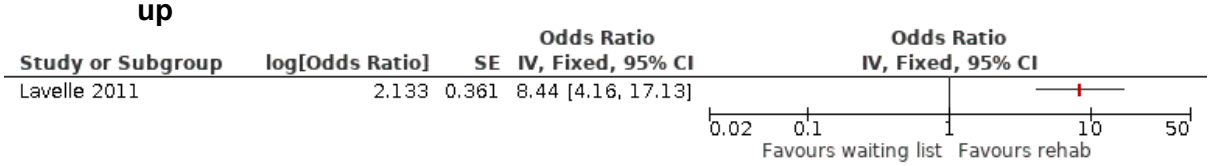
CI: confidence interval; MHTS: Mental Health Treatment Study

Figure 12: Comparison 3: MHTS service versus standard care. Accident and Emergency visits over 24 months follow-up.



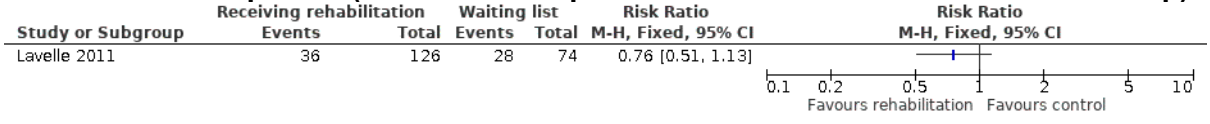
A&E: accident and emergency department; CI: confidence interval; MHTS: Mental Health Treatment Study

Figure 13: Comparison 4: rehabilitation service versus waiting-list control. Reduction in amount of support needed: successful progression at 18 months follow-up



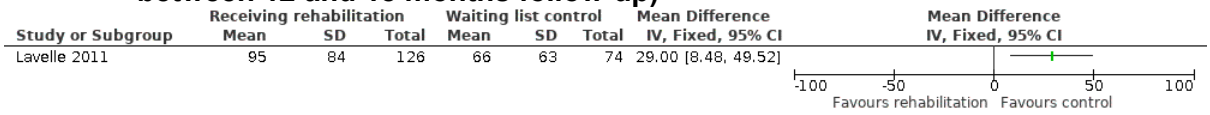
CI: confidence interval;

Figure 14: Comparison 4: rehabilitation service versus waiting-list control. Admitted as an inpatient (in the 6 month period between 12 and 18 months follow-up)



CI: confidence interval;

Figure 15: Comparison 4: rehabilitation service versus waiting-list control. Mean number of inpatient days for those admitted only (in the 6 month period between 12 and 18 months follow-up)



CI: confidence interval;

Appendix F – GRADE tables

GRADE tables for review question: What is the effectiveness of rehabilitation services compared with standard care?

Table 6: Clinical evidence profile for comparison 1. Intensive case management versus standard care

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Intensive Case Management	Standard care	Relative (95% CI)	Absolute	Quality	Importance
Social functioning: Not compliant with medication (follow-up > 12 months)												
1	randomised trials	very serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	6/39 (15.4%)	14/32 (43.8%)	RR 0.35 (0.15 to 0.81)	284 fewer per 1000 (from 83 fewer to 372 fewer)	LOW	CRITICAL
Reduction in support needed: Accommodation status - Homelessness (follow-up > 12 months)												
3	randomised trials	serious[2]	no serious inconsistency	no serious indirectness	very serious[3]	none	32/251 (12.7%)	21/167 (12.6%)	RR 0.89 (0.52 to 1.49)	14 fewer per 1000 (from 23 fewer to 62 more)	VERY LOW	CRITICAL
Reduction in support needed: Accommodation status - Not living independently (follow-up > 12 months)												
4	randomised trials	very serious[4]	no serious inconsistency	no serious indirectness	serious[5]	none	108/602 (17.9%)	151/583 (25.9%)	RR 0.68 (0.55 to 0.84)	83 fewer per 1000 (from 41 fewer to 117 fewer)	VERY LOW	CRITICAL
Reduction in support needed: Accommodation status - Not living in stable accommodation (follow-up > 12 months)												
1	randomised trials	very serious[4]	no serious inconsistency	no serious indirectness	serious[5]	none	56/91 (61.5%)	59/77 (76.6%)	RR 0.8 (0.65 to 0.98)	153 fewer per 1000 (from 15 fewer to 268 fewer)	VERY LOW	CRITICAL
Reduction in support needed: Not remaining in contact with psychiatric services (follow-up > 12 months)												

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Intensive Case Management	Standard care	Relative (95% CI)	Absolute	Quality	Importance
5	randomised trials	serious[2]	no serious inconsistency	no serious indirectness	no serious imprecision	none	18/247 (7.3%)	69/228 (30.3%)	RR 0.24 (0.16 to 0.38)	230 fewer per 1000 (from 188 fewer to 254 fewer)	MODERATE	CRITICAL
Contact with criminal justice system - Arrested (follow-up > 12 months)												
1	randomised trials	very serious[4]	no serious inconsistency	no serious indirectness	very serious[3]	none	14/117 (12%)	11/61 (18%)	RR 0.66 (0.32 to 1.37)	61 fewer per 1000 (from 123 fewer to 67 more)	VERY LOW	IMPORTANT
Contact with criminal justice system - Imprisoned (follow-up > 12 months)												
5	randomised trials	very serious[4]	no serious inconsistency	no serious indirectness	very serious[3]	none	24/470 (5.1%)	20/438 (4.6%)	RR 0.84 (0.50 to 1.43)	7 fewer per 1000 (from 23 fewer to 20 more)	VERY LOW	IMPORTANT
Achievement of recovery (follow-up > 12 months; measured with: Average endpoint score of Global Assessment of Function ; Better indicated by higher values)												
5	randomised trials	serious[2]	no serious inconsistency	no serious indirectness	serious[5]	none	433	385	-	MD 3.41 higher (1.66 to 5.16 higher)	LOW	IMPORTANT
Number of days as inpatient (per month) (follow-up 24 months; Better indicated by lower values)												
24	randomised trials	serious[2]	serious6	no serious indirectness	no serious imprecision	none	1846	1749	-	MD 0.86 lower (1.37 to 0.34 lower)	LOW	IMPORTANT
Admitted to A&E (follow-up > 12 months)												
1	randomised trials	very serious[4]	no serious inconsistency	no serious indirectness	very serious[3]	none	41/117 (35%)	19/61 (31.1%)	RR 1.13 (0.72 to 1.76)	40 more per 1000 (from 87 fewer to 237 more)	VERY LOW	IMPORTANT
Quality of life (follow-up > 12 months; measured with: Lancashire Quality of Life Profile at endpoint; Better indicated by higher values)												

Quality assessment							No of patients		Effect			
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Intensive Case Management**	**Standard care**	**Relative (95% CI)**	**Absolute**	**Quality**	**Importance**
3	randomised trials	serious[2]	no serious inconsistency	no serious indirectness	no serious imprecision	none	142	132	-	MD 0.13 lower (0.38 lower to 0.12 higher)	MODERATE	IMPORTANT
Quality of life (follow-up > 12 months; measured with: Lehman's Quality of Life Interview at endpoint; Better indicated by lower values)												
2	randomised trials	serious[2]	no serious inconsistency	no serious indirectness	no serious imprecision	none	67	65	-	MD 0.09 higher (0.24 lower to 0.42 higher)	MODERATE	IMPORTANT

1 High risk of bias due to lack of blinding and incomplete outcome data.
2 Downgraded one level for risk of bias: randomisation not well described; problematic to blind.
3 Downgraded two levels as 95% CI of effect crosses both MID thresholds.
4 High risk of bias due to lack of blinding and selective reporting.
5 Downgraded one level as 95% CI of effect includes one default MID threshold.
6 Downgraded one level for inconsistency (I2 = 74%). Subgroup analysis by skewed vs not skewed data does not reduce heterogeneity. Random effects model used.

Table 7: Clinical evidence profile for comparison 2. After versus before rehabilitation

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	After rehabilitation	Before rehabilitation	Relative (95% CI)	Absolute		
Number of days as inpatient (follow-up 2 years; in the period before & after inpatient rehab; Better indicated by lower values)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	22	22	-	MD 268.86 lower (301 to 236.72 lower)	VERY LOW	IMPORTANT
Number of days as inpatient (follow-up 6 months; in the period before and after inpatient or community rehabilitation; Better indicated by lower values)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	126	126	-	MD 29 lower (47.76 to 10.24 lower)	VERY LOW	IMPORTANT
Number of days as inpatient (follow-up 1 years; in the period before and after active rehab hostel; Better indicated by lower values)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	103	103	-	MD 77.2 lower (102.4 to 52 lower)	VERY LOW	IMPORTANT

1 Bias due to before and after design - severity of illness likely to be different before and after admission to rehabilitation.

Table 8: Clinical evidence profile for comparison 3. MHTS service versus standard care

Quality assessment							No of patients		Effect			
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	MHTS service	Standard care	Relative (95% CI)	Absolute	Quality	Importance
Number of days as inpatient (follow-up 2 years; Better indicated by lower values)												
1	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	serious[1]	none	892	973	-	MD 1.64 lower (3.24 to 0.03 lower)	MODERATE	IMPORTANT
Attendances at A&E (follow-up 2 years; Better indicated by lower values)												
1	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	no serious imprecision	none	890	968	-	MD 0.07 lower (0.34 lower to 0.21 higher)	HIGH	IMPORTANT

1 Downgraded one level as 95% CI of effect includes one default MID threshold.

Table 9: Clinical evidence profile for comparison 4. Rehabilitation versus waiting list control

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Rehabilitation	Waiting list control	Relative (95% CI)	Absolute		
Reduction in support needed (follow-up 18 months; assessed with: successful progression)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	-/126[2]	-/74[2]	OR 8.44 (4.16 to 17.13)	-	MODERATE	CRITICAL
Admitted as inpatient (follow-up 6 months; assessed in the 6 month period from 12 to 18 months follow-up)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	very serious[3]	none	36/126 (28.6%)	28/74 (37.8%)	RR 0.76 (0.51 to 1.13)	91 fewer per 1000 (from 185 fewer to 49 more)	VERY LOW	IMPORTANT
Number of days as inpatient (follow-up 6 months; for those admitted only (in the 6 month period from 12 to 18 months follow-up); Better indicated by lower values)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	126	74	-	MD 29 higher (8.48 to 49.52 higher)	MODERATE	IMPORTANT

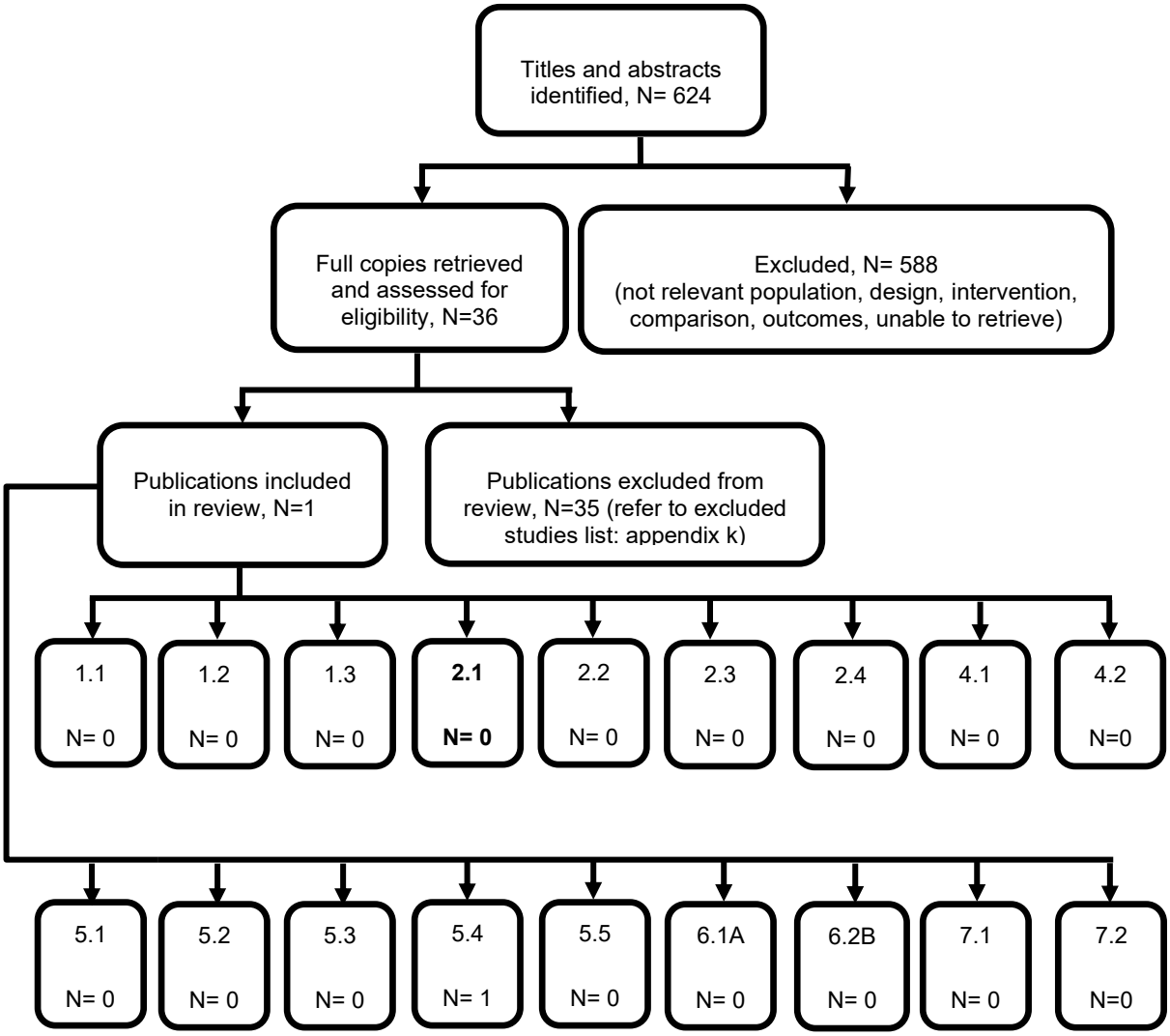
1 Risk of bias due to baseline differences in rehabilitation and waiting list control groups, and potential differences between units in the rehabilitation provided.
2 Event rates for successful progression not reported.
3 Confidence interval of the effect estimate includes both default MID thresholds.

Appendix G – Economic evidence study selection

Economic evidence study selection for review question 2.1: What is the effectiveness of rehabilitation services compared with standard care?

A global health economic literature search was undertaken, covering all review questions in this guideline. However, as shown in Figure 16, no evidence was identified which was applicable for review question 2.1.

Figure 16: Health economic study selection flow chart



Appendix H – Economic evidence tables

Economic evidence tables for review question 2.1: What is the effectiveness of rehabilitation services compared with standard care?

No evidence was identified which was applicable to this review question.

Appendix I – Economic evidence profiles

Economic evidence profiles for review question 2.1: What is the effectiveness of rehabilitation services compared with standard care?

No evidence was identified which was applicable to this review question.

Appendix J – Economic analysis

Economic evidence analysis for review question 2.1: What is the effectiveness of rehabilitation services compared with standard care?

1.1 Introduction

Rehabilitation services aim to restore functional capacity and promote independent living for people with complex psychosis and severe mental illness. Early economic planning within this guideline identified this topic area as potentially entailing a high resource impact for bodies that commission public services. The committee were aware that there was a large amount of regional variation in the extent to which rehabilitation services are provided, but noted policy documents supporting the commissioning of such services. The Mental Health Five Year Forward View (NHS England 2016) highlights that:

> *"People want care in the least restrictive setting that is appropriate to meet their individual needs, at any age, and is close to home. People living with severe mental health problems, such as schizophrenia or personality disorder, should not be held in restrictive settings for longer than they need to be. The NHS should expand proven community-based services for people of all ages with severe mental health problems who need support to live safely as close to home as possible."*

The Joint Commissioning Panel for Mental Health (JCPMH 2018) describes people using rehabilitation services as a 'low volume, high needs' group, with around half of the mental health and social care budget being spent on services for people with longer term mental health problems. Of this budget, half is already spent on rehabilitation services and specialist mental health accommodation.

A systematic review of the economic literature was conducted but no relevant studies were identified which were applicable to this review question. The committee were mindful that recommendations within this topic area could have significant resource implications, though also believed that any potential recommendations might lead to a reallocation of funds already being spent. For these reasons, the committee felt this topic warranted de novo economic modelling. The accompanying clinical review mostly did not include studies that were relevant to the areas that the committee believed were key concerns relevant for economic analysis. One included UK study, Bunyan (2016) looked at the number of admission days in a before-after intervention study (Bunyan, 2016) and it was this study that informed the effectiveness data for this economic analysis.

1.1.1 Aim

To estimate the cost-effectiveness of in-patient rehabilitation units in reducing hospital admission days.

1.2 Methods

1.2.1 Cost utility analysis

This economic evaluation is conducted in the form of a CUA, with the units of effectiveness expressed in terms of cost per quality-adjusted life years gained. The cost-effectiveness of an intervention is determined by examining the incremental cost (Ci – Cc) divided by the incremental effect (Ei – Ec), where Ci and Cc represent the cost of the intervention and control groups respectively, and Ei and Ec represent the outcomes of the intervention and control groups respectively. This analysis, in the absence of data from an RCT or

rehabilitation per say in an intervention/comparator study has assumed post-rehabilitation as the 'intervention' and pre-rehabilitation as the 'control'. The result is expressed as the incremental cost effectiveness ratio (ICER). The results are also expressed as the incremental net monetary benefit (iNMB). The analysis was conducted from the perspective of the NHS and Personal Social Services (PSS), as outlined in the NICE Reference Case.

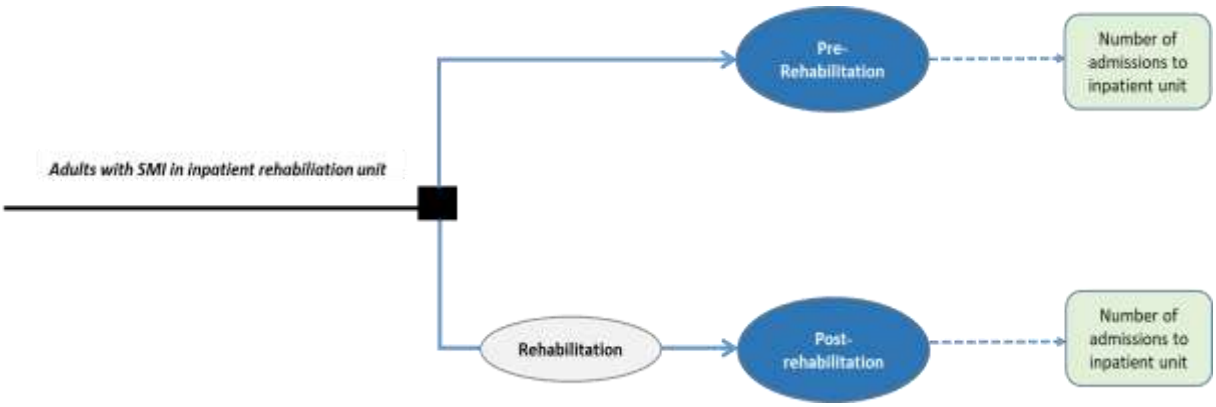
1.2.2 Setting and population

The model setting was for the NHS and the population were adults (aged 18 years and older) with primary psychotic diagnosis in inpatient rehabilitation unit.

1.2.3 Model Structure

A simple decision tree framework was developed in Microsoft Excel®, as displayed in Figure 17. The structure of the model was informed by the availability of the data elicited in the accompanying clinical review which had one included study that had data on the effectiveness of rehabilitation in a UK setting (Bunyan 2016). This study was a before versus after observational study of patients who had undergone treatment in an inpatient rehabilitation unit, with the main outcome being the number of days spent in an acute inpatient unit, before/after rehabilitation. Details of this study and the committee's discussion of the clinical evidence is highlighted elsewhere in this evidence review (see Included studies). The study's outcome serves as a proxy for measuring relapse, which would correspond with a decrease in health-related quality of life. This model observes the structure of the Bunyan paper by assuming that the 'before' outcomes act as a comparator and the 'after' rehabilitation outcomes act as the intervention. The time horizon of 2 years reflects the period of data collection in the Bunyan study.

Figure 17: Model schematic of the cost effectiveness of in-patient rehabilitation units in reducing hospital admission days



1.2.4 Clinical outcomes

The main outcome is the mean number of admissions (bed days) to inpatient units before/after rehabilitation. The reported deterministic (mean point) estimates are shown in Table 10.

When undertaking a probabilistic sensitivity analysis (PSA), these outcomes were sampled using a normal distribution, with the distribution informed from the reported standard errors.

Table 10: Clinical outcomes

Outcome	Deterministic	Standard error	Probabilistic distribution	Source
Admissions – **pre**-rehabilitation	379.45	56.26	Normal distribution	Bunyan (2016)
Mean number of admissions – **post**-rehabilitation	110.59	52.45	Normal distribution	Bunyan (2016)

1.2.5 Quality-adjusted life years

As recommended in the NICE reference case, the model estimates effectiveness in terms of quality-adjusted life years (QALYs). The QALY is a composite metric of 2 important features of a health intervention or programme: increasing longevity and increasing quality of life. QALYs are calculated by aggregating the number of years lived, weighted by the relative quality of life attached to the given health state of an individual at the time.

In this analysis, health state utilities were obtained from Briggs 2008. This study estimated EQ-5D utility scores of stable schizophrenia and relapse, derived from laypersons from the UK. This study has been validated as an appropriate measure of utilities in mental health guidelines (Mavranezouli 2010) and corresponds with the preferred method of deriving utilities in the NICE reference case.

In order to attach quality of life weights in the model, it was assumed that admission to an inpatient unit occurs when there is a relapse of schizophrenia. The utility associated with not being admitted to an inpatient unit was computed as:

Utility decrement associated with admission: Utility of stable schizophrenia – Relapse.

The QALYs associated with the pre and post rehabilitation arms were then calculated as:

Number of inpatient admission days ÷ ((365 x 2) x Health state utility of not relapsing)

A Beta distribution was assigned as this constrains values on an interval scale between 0-1 and is characterised by distribution parameters α and β.

Table 11: Utilities used in the model to compute QALYs

Utilities	Value	A	β	Probabilistic distribution	Source
Stable schizophrenia	0.865	64.88	10.13	Beta	Briggs (2008)
Relapse of schizophrenia	0.479	35.93	39.08	Beta	Briggs (2008)
Utility decrement [a]	0.386	-	-	-	Calculated

(a) In the probabilistic analysis, samples are informed from sampling of the utilities of stable and relapse of schizophrenia

1.2.6 Costs

In accordance with NICE methodology, a NHS and PSS perspective was adopted for this analysis. Costing was based on a 2017/2018 price year, reflecting the most recently available NHS Reference Costs at the time of writing. Therefore, adjusting for inflation was deemed unnecessary.

The NHS reference costs code 'MHCC13 – Cluster 13: Ongoing or recurrent psychosis (high symptom and disability)' was advised as the relevant population group by the committee's expert opinion with the unit cost per occupied bed day extracted as the relevant cost estimate. As there is no uncertainty associated with this value, it was handled as a deterministic input in the probabilistic sensitivity analysis.

Table 12: Costs of admission to inpatient unit

Costs	Value	Source
Cluster 13: Ongoing or recurrent psychosis (high symptom and disability)	£408	NHS Reference Costs 17/18
Hypothetical cost of rehabilitation	£10,000	Nominal assumption

The Bunyan study did not specify the details of an intervention, other than that outcomes were observed from patients in three inpatient rehabilitation units. Owing to the unavailability of data for this service, and the difficulty in a 'bottom up' costing of such a service, a number of hypothetical costs of rehabilitation, incremental to the comparator, were assumed for this analysis. A conservative default cost of £10,000 was assumed as the additional unit cost of rehabilitation relative to a comparator of extended or recurrent stays in an acute inpatient ward which is more costly than the intervention.

1.2.7 Data analysis and presentation of results

A PSA was undertaken using Monte Carlo simulation in order to reflect uncertainty inherent in the model parameters by sampling from an assigned probability distribution to each model input. The mean costs and QALYs were calculated across all simulations and, as a summary measure of cost effectiveness, a mean iNMB was calculated based on a cost effectiveness threshold of £20,000 per QALY gained.

The results are also presented in deterministic form, where the results are computed from the original point estimates. In addition, a series of one-way sensitivity analyses were also undertaken, where a single parameter is varied according to a specified high/value, whilst holding all other inputs constant at their deterministic value. All relevant parameters were varied in order to ascertain the key drivers of the model. The degree to which varying one input impacts on the mean iNMB are stacked in rank order and have an appearance of a 'Tornado'. The values used in the analysis are displayed in Table 13.

Table 13: Variables included in one-way sensitivity analysis (Tornado diagram)

Variable	Low value	High value
Pre-rehabilitation bed days	303	455
Post-rehabilitation bed days	89	133
Cost of a bed in an acute inpatient unit	326	490
Utility decrement from relapse	0.31	0.46
What-if cost of rehabilitation	£5,000	£100,000

1.3 Results

1.3.1 Probabilistic sensitivity analysis

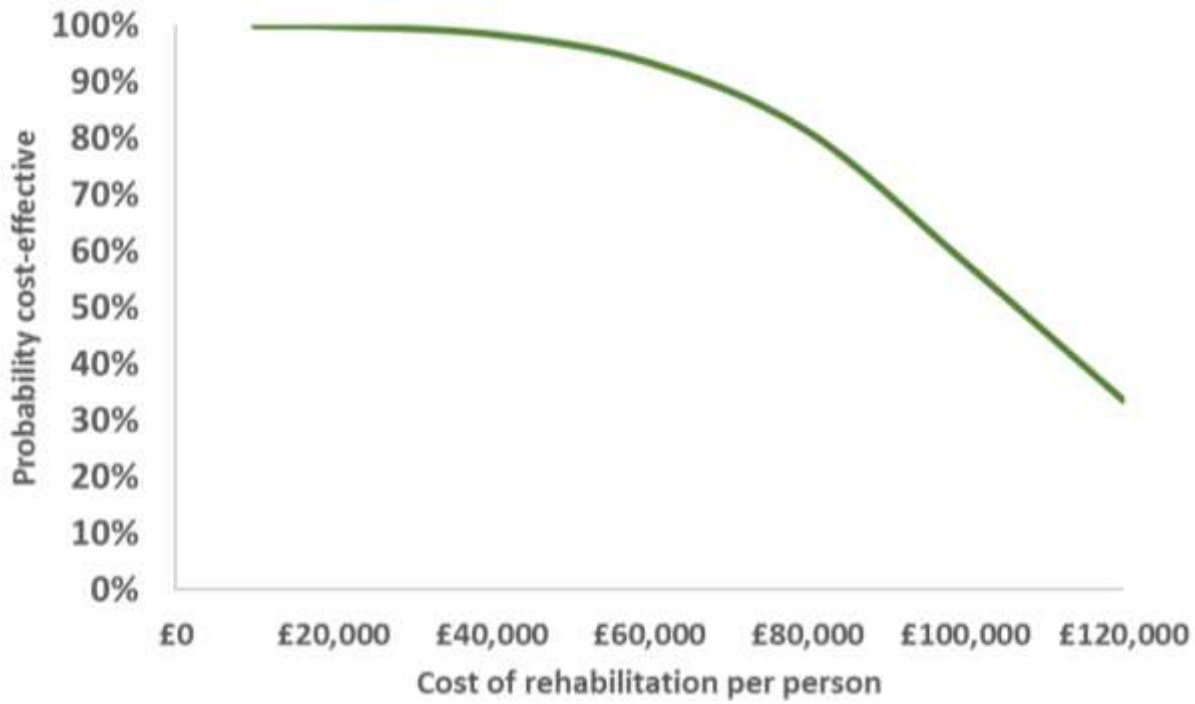
The results of the PSA (n=10,000) are displayed in Table 14 and Figure 19. The mean iNMB is used to inform the probability that post-rehabilitation is cost effective when compared with

pre-rehabilitation. When the iNMB is more than 0, this would indicate that the intervention is cost effective at £20,000 per QALY gained. For each simulation the results are calculated across different hypothetical costs of rehabilitation.

Table 14: Mean incremental net monetary benefit and the probability of cost effectiveness for rehabilitation versus pre-rehabilitation

Incremental Cost of Rehabilitation	iNMB	Probability post-rehabilitation is cost effective (n=10,000)
£10,000	£102,343	99.94%
£20,000	£92,108	99.82%
£40,000	£72,179	98.44%
£60,000	£51,896	93.38%
£80,000	£32,195	81.22%
£100,000	£11,449	57.91%
£120,000	-£7,474	33.51%

Figure 18: Probability of cost effectiveness at different hypothetical assumptions for rehabilitation



The mean cost and QALYs of each treatment strategy, where the incremental cost of rehabilitation is £10,000, along with the incremental differences are displayed in Table 15.

Table 15: Mean costs, quality adjusted life years and incremental differences

	Cost		QALYs		
Treatment Strategy	**Total**	**Incremental**	**Total**	**Incremental**	**ICER (n=10,000)**
Pre-rehabilitation	£154,474	-	0.201	-	-
Post-rehabilitation	£55,444	£-99,030	0.059	0.14	Dominant

QALYs in this analysis are computed as a QALY decrement. Therefore, the incremental QALY gain is the least amount of QALY decrement from an admission in a given treatment strategy. This is computed as:

- [post-rehabilitation QALYs – pre-rehabilitation QALYs]

A graphical representation of the probabilistic results are presented in the form of a cost effectiveness acceptability curve (CEAC) in Figure 19. The scatterplot which generated the CEAC is displayed in Figure 20. The yellow plot represents the average of all simulations and the red line represents the cost effectiveness threshold at £20,000 per QALY.

Figure 19: Cost effectiveness acceptability curve for post-rehabilitation versus pre-rehabilitation

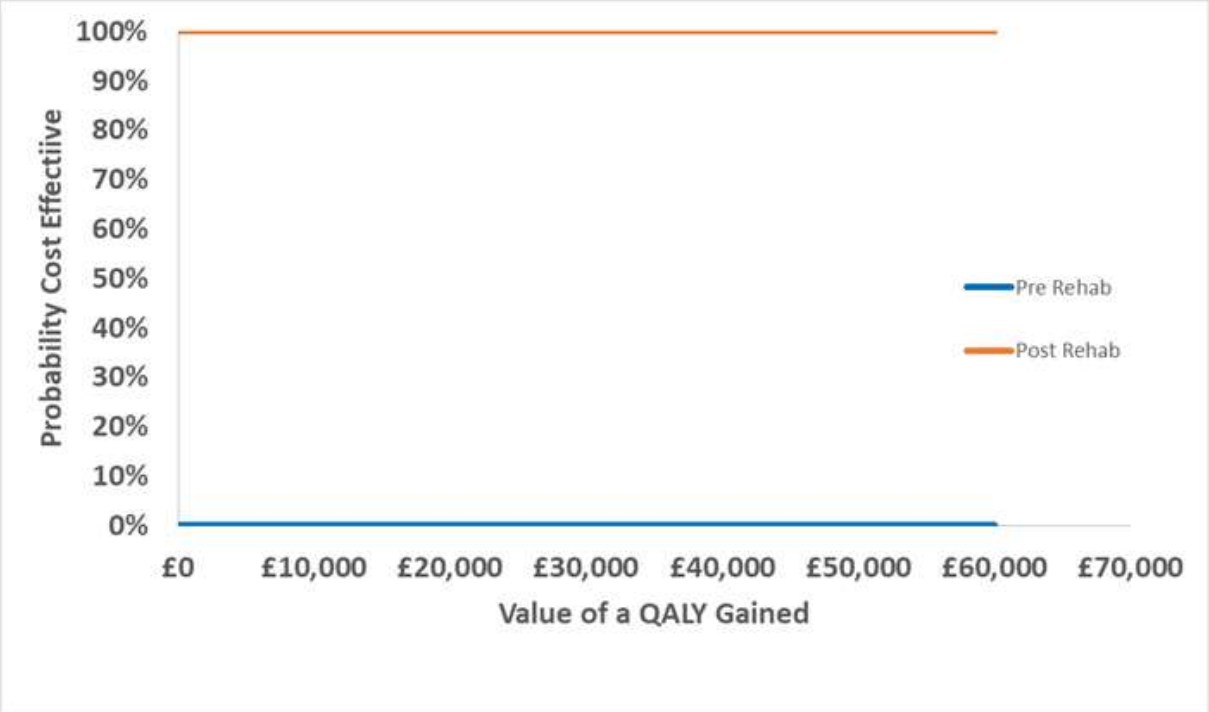
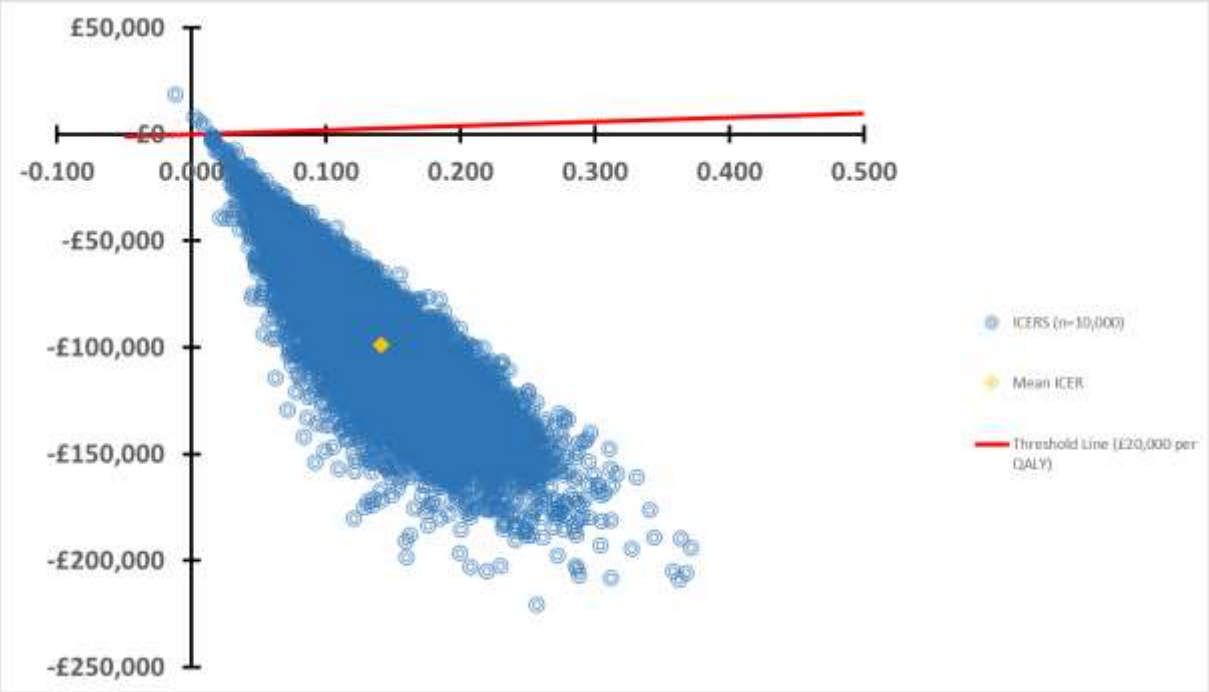


Figure 20: Cost effectiveness plane of post-rehabilitation vs. pre-rehabilitation - incremental NHS and PSS costs and QALYs (10,000) iterations



1.3.2 Deterministic analysis

The results of the deterministic analysis are presented in the table below.

Table 16: Deterministic (base-case) results: Comparison of incremental costs, quality adjusted life years and the resultant incremental cost effectiveness ratio of post-rehabilitation versus pre-rehabilitation.

	Cost		QALYs [a]		
Treatment Strategy	Total	Incremental	Total	Incremental	ICER (n=10,000)
Pre-rehabilitation	£154,632	-	0.200	-	-
Post-rehabilitation	£55,288	£-99,344	0.059	0.14	Dominant

QALYs in this analysis are computed as a QALY decrement. Therefore, the incremental QALY gain is the least amount of QALY decrement from an admission in a given treatment strategy. This is computed as:

- [post-rehabilitation QALYs – pre-rehabilitation QALYs]

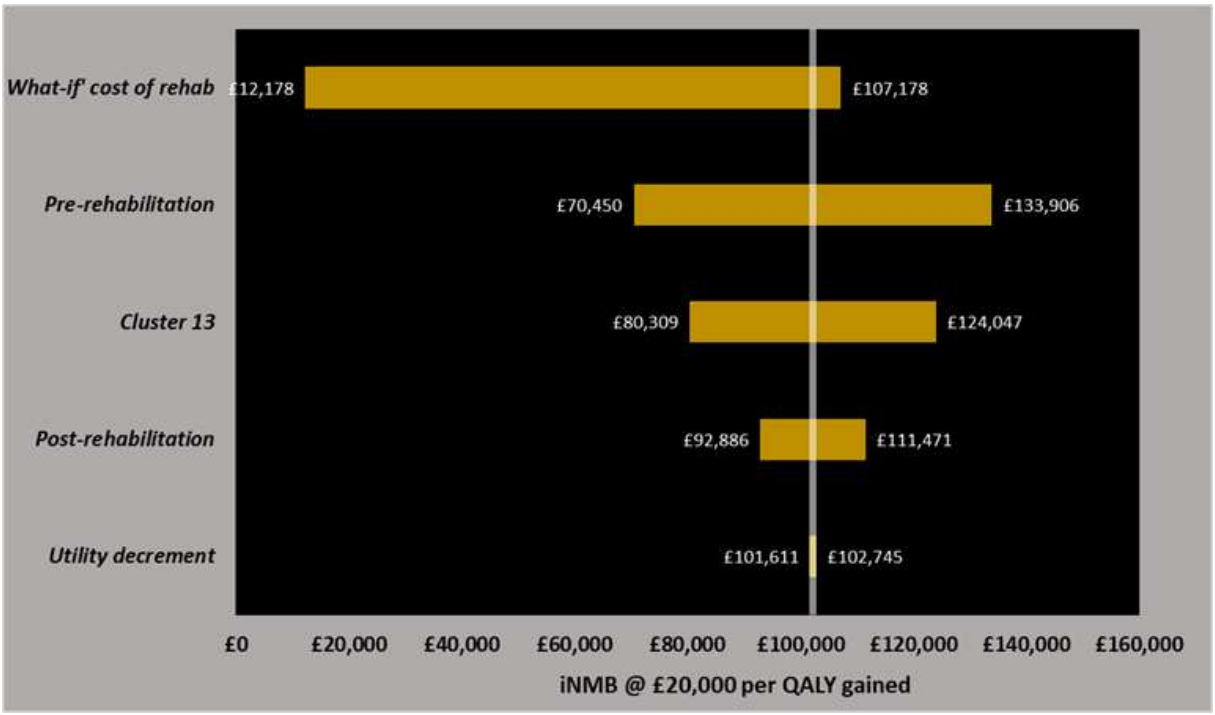
In addition to these results, a threshold analysis indicated that the post-rehabilitation arm would need to have an incremental cost of services of up to £112,178 compared to the comparator in order for the ICER and iNMB to be equal to zero. This can also be interpreted as the maximum amount post rehabilitation could cost per person, in comparison to the comparator.

1.3.3 Deterministic sensitivity analysis

The results of a series of one-way sensitivity analysis are displayed in Figure 21. In this sensitivity analysis, each parameter was varied between a low and high value whilst holding

all other inputs constant at their base-case value. The white translucent line in the middle represents the iNMB of the base-case analysis. The wider yellow bars indicate the variables that have the greater effect on the model output.

Figure 21: Tornado diagram displaying the effect of a high/low value of each parameter on the incremental net monetary benefit, set at £20,000 per QALY gained.



1.4 Discussion

It is important to note the limitations in the study (Bunyan 2016) that provided the clinical data which underpin this analysis when interpreting the model results. The study is an uncontrolled, before-after design of the same population over a period of time. Such studies are noted for often overestimating the benefit of interventions (Goodacre 2015). The main outcome of the study, and upon which the effectiveness data was analysed in this economic analysis, is based on a reduction of acute inpatient admissions. Coupled with the small sample size, the reduction of inpatient admissions after rehabilitation could have resulted by chance. The authors of the paper also acknowledge that other time varying factors cannot be ruled out. Furthermore, the study population was conducted in a single NHS trust in South London which may not be a reflective sample of the wider relevant population in England and Wales.

The PSA results suggest that post-rehabilitation when compared with pre-rehabilitation is highly cost effective, with the outcome set as the number of inpatient admissions. The committee believed this finding reflected their own professional experience. The results over 10,000 simulations demonstrate that, on average, post-rehabilitation is dominant compared with pre-rehabilitation. That is, post rehabilitation was less costly and had the least QALY decrement. The deterministic results more or less matched those found in the probabilistic analysis. The results of the series of one-way sensitive analysis demonstrate, at least if all other variables are held constant, that the number of pre-rehabilitation beds and the cost of an inpatient bed are they key drivers of the model. The hypothetical cost of rehabilitation was

found to be the most sensitive input owing to the hypothetical extreme high value assumption of the cost of the intervention.

A key limitation of this economic analysis is that data on extra costs that would be incurred for undergoing rehabilitation have not been specifically costed. Therefore, a nominal cost of £10,000 per person has been included in the model as an incremental cost for rehabilitation services. It was the committee's view that this was a conservative estimate as they believed that the comparator to rehabilitation would likely be recurrent admissions or extended stays in acute inpatient facilities for most patients. In order to gauge the degree of cost effectiveness, a series of PSA were run at differing hypothetical cost assumptions for rehabilitation services. Nevertheless, owing to the limitations of the clinical review, the results of the economic analysis may be subject to bias and, consequently, may overestimate the economic and health benefits of rehabilitation.

1.5 Conclusion

Subject to the substantial limitations in the clinical data underpinning the model and the lack of data from the accompanying clinical review, this analysis lends support with respect to recommendations to offer rehabilitative services. The model suggests that rehabilitation is likely to be cost effective, largely driven by a reduction in admission costs to inpatient units.

References

Briggs 2008

Briggs, Andrew, Diane Wild, Michael Lees, Matthew Reaney, Serdar Dursun, David Parry, and Jayanti Mukherjee. "Impact of schizophrenia and schizophrenia treatment-related adverse events on quality of life: direct utility elicitation." Health and quality of life outcomes 6, no. 1. 2008. 105.

Goodacre 2015

Goodacre, S. Uncontrolled before-after studies: discouraged by Cochrane and the EMJ. 2015

JCPMH 2016

Joint Commissioning Panel for Mental Health. Rehabilitation services for people with complex mental health needs. 2016

Mavranezouli 2010

Mavranezouli, I. A review and critique of studies reporting utility values for schizophrenia-related health states. Pharmacoeconomics, 28(12), 1109-1121. 2010

NHS England 2016

NHS England. The Five Year Forward View for Mental Health. A report from the independent Mental Health Taskforce to the NHS in England, NHS England: London, 2016.

Appendix K – Excluded studies

Excluded clinical and economic studies for review question: What is the effectiveness of rehabilitation services compared with standard care?

Clinical studies

Table 17: Excluded studies and reasons for their exclusion

Study	Reason for Exclusion
Bhugra, D., Ayonrinde, O., Butler, G., Leese, M., Thornicroft, G., A randomised controlled trial of assertive outreach vs. treatment as usual for black people with severe mental illness, Epidemiology and Psychiatric Sciences, 20, 83-89, 2011	Assertive outreach (AO) vs TAU. AO did not include vocational rehab. Other rehab not mentioned
Boardman, Anthony P., Hodgson, Richard E., Lewis, Martyn, Allen, Keith, North Staffordshire Community Beds Study: Longitudinal evaluation of psychiatric in-patient units attached to community mental health centres: I: Methods, outcome and patient satisfaction, The British Journal of Psychiatry, 175, 70-78, 1999	Study related to services designed to supplement acute inpatient care
Bradford, D. W., Gaynes, B. N., Kim, M. M., Kaufman, J. S., Weinberger, M., Can shelter-based interventions improve treatment engagement in homeless individuals with psychiatric and/or substance misuse disorders?: a randomized controlled trial, Medical Care, 43, 763-768, 2005	<10% had psychosis.
Brekke, J. S., Ansel, M., Long, J., Slade, E., Weinstein, M., Intensity and continuity of services and functional outcomes in the rehabilitation of persons with schizophrenia, Psychiatric Services, 50, 248-256, 1999	Does not compare different rehabilitation units.
Burnam, M. A., Morton, S. C., McGlynn, E. A., Petersen, L. P., Stecher, B. M., Hayes, C., Vaccaro, J. V., An experimental evaluation of residential and nonresidential treatment for dually diagnosed homeless adults, Journal of Addictive Diseases, 14, 111-34, 1995	<50% had schizophrenia. Number with bipolar disorder not reported
Calsyn, R. J., Yonker, R. D., Lemming, M. R., Morse, G. A., Klinkenberg, W. D., Impact of assertive community treatment and client characteristics on criminal justice outcomes in dual disorder homeless individuals, Criminal Behaviour and Mental Health, 15, 236-248, 2005	Included in Dieterich 2017 systematic review.
Clark, R. E., Teague, G. B., Ricketts, S. K., Bush, P. W., Xie, H., McGuire, T. G., Drake, R. E., McHugo, G. J., Keller, A. M., Zubkoff, M., Cost-effectiveness of assertive community treatment versus standard case management for persons with co-occurring severe mental illness and substance use disorders, Health Services ResearchHealth Serv Res, 33, 1285-308, 1998	Included in Dieterich 2017 systematic review.
Coldwell, C. M., Bender, W. S., The effectiveness of assertive community treatment for homeless populations with severe mental illness: A meta-analysis, American Journal of Psychiatry, 164, 393-399, 2007	Systematic review of ACT - studies included in Dieterich 2017 systematic review.
Compton, M. T., Kelley, M. E., Pope, A., Smith, K., Broussard, B., Reed, T. A., DiPolito, J. A., Druss, B. G., Li, C., Haynes, N. L., Opening doors to recovery: Recidivism and recovery among persons with serious mental illnesses and repeated hospitalizations, Psychiatric Services, 67, 169-175, 2016	Non-randomised - before and after study.

Study	Reason for Exclusion
Connolly, J., Marks, I., Lawrence, R., McNamee, G., Muijen, M., Observations from community care for serious mental illness during a controlled study, Psychiatric Bulletin, 20, 3-7, 1996	Daily living program intervention - does not appear to involve rehabilitation. Trial results not reported in this paper.
Craig, T. K. J., Garety, P., Power, P., Rahaman, N., Colbert, S., Fornells-Ambrojo, M., Dunn, G., The Lambeth Early Onset (LEO) Team: Randomised controlled trial of the effectiveness of specialised care for early psychosis, British Medical Journal, 329, 1067-1070, 2004	Early psychosis population. Trial focuses Assertive Outreach for patients presenting for the first or second time.
Cusack, K. J., Morrissey, J. P., Cuddeback, G. S., Prins, A., Williams, D. M., Criminal justice involvement, behavioral health service use, and costs of forensic assertive community treatment: a randomized trial, Community Mental Health Journal, 46, 356-63, 2010	Population were all imprisoned at the time of enrolment.
Fardig, R., Lewander, T., Melin, L., Folke, F., Fredriksson, A., A randomized controlled trial of the illness management and recovery program for persons with schizophrenia, Psychiatric Services, 62, 606-12, 2011	All patients were in the same outpatient rehab units - but some received illness management intervention (relevant for 5.2).
Gold, P. B., Meisler, N., Santos, A. B., Keleher, J., Becker, D. R., Knoedler, W. H., Carnemolla, M. A., Williams, O. H., Toscano, R., Stormer, G., The Program of Assertive Community Treatment: Implementation and Dissemination of an Evidence-Based Model of Community-Based Care for Persons with Severe and Persistent Mental Illness, Cognitive and Behavioral Practice, 10, 290-303, 2003	Expert review of ACT.
Gooch, C., Leff, J., Factors affecting the success of community placement: the TAPS project 26, Psychological Medicine, 26, 511-20, 1996	Does not involve a rehabilitation intervention
Havassy, B. E., Shopshire, M. S., Quigley, L. A., Effects of substance dependence on outcomes of patients in a randomized trial of two case management models, Psychiatric Services, 51, 639-44, 2000	Included in Dieterich 2017 systematic review.
Herdelin, Andrea C., Scott, Diane L., Experimental studies of the Program of Assertive Community Treatment (PACT), Journal of Disability Policy Studies, 10, 53-89, 1999	Systematic review of ACT - studies included in Dieterich 2017 systematic review.
Herinckx, H. A., Kinney, R. F., Clarke, G. N., Paulson, R. I., Assertive community treatment versus usual care in engaging and retaining clients with severe mental illness, Psychiatric services (Washington, D.C.), 48, 1297-1306, 1997	Included in Dieterich 2017 systematic review.
Heslin, M., Patel, A., Stahl, D., Gardner-Sood, P., Mushore, M., Smith, S., Greenwood, K., Onagbesan, O., O'Brien, C., Fung, C., Ohlsen, R., Hopkins, D., Lowe, P., Arbuthnot, M., Mutatsa, S., Todd, G., Kolliakou, A., Lally, J., Stubbs, B., Ismail, K., David, A., Murray, R., Atakan, Z., Gaughran, F., Randomised controlled trial to improve health and reduce substance use in established psychosis (IMPaCT): Cost-effectiveness of integrated psychosocial health promotion, BMC Psychiatry, 17 (1) (no pagination), 2017	Health promotion intervention - check for RQ 5.4.
Holloway, F., Carson, J., Intensive case management for the severely mentally ill. Controlled trial, British Journal of Psychiatry, 172, 19-22, 1998	Included in Dieterich 2017 systematic review.
Kavanagh, Annette, Lavelle, Ena, The impact of a rehabilitation and recovery service on patient groups residing in high support	Non comparative. See Lavelle 2011 for comparative data from this cohort.

Study	Reason for Exclusion
community residences, Irish Journal of Psychological Medicine, 25, 5-10, 2008	
Killaspy, H., Bebbington, P., Blizard, R., Johnson, S., Nolan, F., Pilling, S., King, M., The REACT study: Randomised evaluation of assertive community treatment in north London, British Medical Journal, 332, 815-818, 2006	Included in Dieterich 2017 systematic review.
Killaspy, H., Harden, C., Holloway, F., King, M., What do mental health rehabilitation services do and what are they for? A national survey in England, Journal of Mental Health, 14, 157-165, 2005	Survey of rehab service models in England.
Killaspy, H., Johnson, S., Pierce, B., Bebbington, P., Pilling, S., Nolan, F., King, M., Successful engagement: A mixed methods study of the approaches of assertive community treatment and community mental health teams in the REACT trial, Social Psychiatry and Psychiatric Epidemiology, 44, 532-540, 2009	Included in Dieterich 2017 systematic review.
Killaspy, H., Marston, L., Green, N., Harrison, I., Lean, M., Holloway, F., Craig, T., Leavey, G., Arbuthnott, M., Koeser, L., McCrone, P., Omar, R. Z., King, M., Clinical outcomes and costs for people with complex psychosis; a naturalistic prospective cohort study of mental health rehabilitation service users in England, BMC Psychiatry, 16 (1) (no pagination), 2016	No direct comparison of outcomes in different types of unit. Include for Q 2.4.
Killaspy, H., Marston, L., Omar, R. Z., Green, N., Harrison, I., Lean, M., Holloway, F., Craig, T., Leavey, G., King, M., Service quality and clinical outcomes: An example from mental health rehabilitation services in England, British Journal of Psychiatry, 202, 28-34, 2013	Features of rehab units associated with quality measures
Killaspy, H., Mas-Exposito, L., Marston, L., King, M., Ten year outcomes of participants in the REACT (Randomised Evaluation of Assertive Community Treatment in North London) study, BMC Psychiatry, 14, 296, 2014	Included in Dieterich 2017 systematic review.
Killaspy, H., Rambarran, D., Harden, C., Fearon, D., Caren, G., McClinton, K., A comparison of service users placed out of their local area and local rehabilitation service users, Journal of Mental Health, 18, 111-120, 2009	Compares characteristics of service users in OATS and those in local rehab services.
Killaspy, H., Ritchie, C. W., Greer, E., Robertson, M., Treating the homeless mentally ill: Does a designated inpatient facility improve outcome?, Journal of Mental Health, 13, 593-599, 2004	Observational study of case management / assertive outreach. RCT evidence available for this intervention.
Killaspy, Helen, Kingett, Stella, Bebbington, Paul, Blizard, Robert, Johnson, Sonia, Nolan, Fiona, Pilling, Stephen, King, Michael, Randomised evaluation of assertive community treatment: 3-year outcomes, The British Journal of Psychiatry, 195, 81-82, 2009	Included in Dieterich 2017 systematic review.
Kroon, H., Boevink, W., Van Vugt, M., Delespaul, P., Van Os, J., TREE: a Dutch multi-centre (cluster) randomized trial of a recovery program of/for persons with severe mental illness, Psychiatrische praxis, 38, 2011	Conference abstract
Kuipers, E., Holloway, F., Rabe-Hesketh, S., Tennakoon, L., An RCT of early intervention in psychosis: croydon Outreach and Assertive Support Team (COAST), Social psychiatry and psychiatric epidemiology, 39, 358-363, 2004	Early intervention for psychosis. 5 years or less since their first episode.
Lafave, H. G., De Souza, H. R., Gerber, G. J., Assertive community treatment of severe mental illness: A Canadian experience, Psychiatric Services, 47, 757-759, 1996	Included in Dieterich 2017 systematic review.

Study	Reason for Exclusion
Leff, J., Aiding resocialization of the chronic psychotic patient, International Clinical Psychopharmacology, 12, S19-S24, 1997	Expert review
Macpherson, R., Edwards, T. R., Chilvers, R., David, C., Elliott, H. J., Twenty-four hour care for schizophrenia, Cochrane Database of Systematic ReviewsCochrane Database Syst Rev, CD004409, 2009	The only included study in this systematic review (Hyde 1987)does not meet the date cut off for inclusion.
Malm, U. I., Ivarsson, BÅ, Allebeck, P., Durability of the efficacy of integrated care in schizophrenia: a five-year randomized controlled study, Psychiatric services (Washington, D.C.), 65, 1054-1057, 2014	Included in Dieterich 2017 systematic review.
Malm, U., Lewander, T., Uku,, Consumer satisfaction in schizophrenia. A 2-year randomized controlled study of two community-based treatment programs, Nordic Journal of Psychiatry, 55 Suppl 44, 91-96, 2001	Included in Dieterich 2017 systematic review.
Malone, D., Marriott, S., Newton-Howes, G., Simmonds, S., Tyrer, P., Community mental health teams (CMHTs) for people with severe mental illnesses and disordered personality, Cochrane Database of Systematic Reviews, (3) (no pagination), 2007	Systematic review - studies included in Dieterich 2017 systematic review.
Marks, I. M., Connolly, J., Muijen, M., Audini, B., McNamee, G., Lawrence, R. E., Home-based versus hospital-based care for people with serious mental illness, British Journal of Psychiatry, 165, 179-194, 1994	Included in Dieterich 2017 systematic review.
Marshall, M., Crowther, R., Almaraz-Serrano, A., Creed, F., Sledge, W., Kluiter, H., Roberts, C., Hill, E., Wiersma, D., Bond, G. R., Huxley, P., Tyrer, P., Systematic reviews of the effectiveness of day care for people with severe mental disorders: (1) acute day hospital versus admission; (2) vocational rehabilitation; (3) day hospital versus outpatient care, Health Technology Assessment (Winchester, England)Health Technol Assess, 5, 1-75, 2001	None of the included studies met the inclusion criteria for the review question, either population not relevant or study beyond date cut off for inclusion.
Marshall, M., Lockwood, A., WITHDRAWN: Assertive community treatment for people with severe mental disorders, Cochrane database of systematic reviews (Online), 4, CD001089, 2011	Cochrane Review - withdrawn from publication.
Martins, V., Silva, T., Silva, C., Jesus, M., Cagigal, C., Franco, C., The role of treatment in day hospital in dual disorders patients, Heroin Addiction and Related Clinical Problems, 20 (Supplement 2), 27-28, 2018	Conference abstract
Maxwell, A., Tsoutsoulis, K., Menon Tarur Padinjareveettil, A., Zivkovic, F., Rogers, J. M., Longitudinal analysis of statistical and clinically significant psychosocial change following mental health rehabilitation, Disability & Rehabilitation, 1-13, 2018	Cannot extract useful data - follow-up only available for 33/210 patients.
Mohamed, Somaia, Kasckow, John W., Granholm, Eric, Jeste, Dilip V., Community-based treatment of schizophrenia and other severe mental illnesses, 205-222, 2003	Book chapter
Morse, G. A., Calsyn, R. J., Klinkenberg, W. D., Trusty, M. L., Gerber, F., Smith, R., Tempelhoff, B., Ahmad, L., An experimental comparison of three types of case management for homeless mentally ill persons, Psychiatric Services, 48, 497-503, 1997	Included in Dieterich 2017 systematic review.
Muijen, M., Cooney, M., Strathdee, G., Bell, R., Hudson, A., Community psychiatric nurse teams: intensive support versus generic care, British Journal of Psychiatry, 165, 211-7, 1994	Included in Dieterich 2017 systematic review.

Study	Reason for Exclusion
Muijen, M., Marks, I., Connolly, J., Audini, B., Home based care and standard hospital care for patients with severe mental illness: a randomised controlled trial, BMJ (clinical research ed.), 304, 749-754, 1992	Included in Dieterich 2017 systematic review.
Muller-Clemm, Werner J., Halting the "revolving door" of serious mental illness: Evaluating an assertive case management program, Dissertation Abstracts International: Section B: The Sciences and Engineering, 58, 5133, 1998	Thesis
O'Campo, P., Stergiopoulos, V., Nir, P., Levy, M., Misir, V., Chum, A., Arbach, B., Nisenbaum, R., To, M. J., Hwang, S. W., How did a Housing First intervention improve health and social outcomes among homeless adults with mental illness in Toronto? Two-year outcomes from a randomised trial, BMJ Open, 6, e010581, 2016	Housing first intervention - check for RQ 6.1a.
Paton, F., Wright, K., Ayre, N., Dare, C., Johnson, S., Lloyd-Evans, B., Simpson, A., Webber, M., Meader, N., Improving outcomes for people in mental health crisis: A rapid synthesis of the evidence for available models of care, Health Technology Assessment, 20, 1-69, xi-xix, 2016	Models of care for mental health crisis
Rutter, D., Tyrer, P., Emmanuel, J., Weaver, T., Byford, S., Hallam, A., Simmonds, S., Ferguson, B., Internal vs. external care management in severe mental illness: Randomized controlled trial and qualitative study, Journal of Mental Health, 13, 453-466, 2004	Compares intensive case management by case managers inside vs outside the CMHT.
Salyers, M. P., McGuire, A. B., Rollins, A. L., Bond, G. R., Mueser, K. T., Macy, V. R., Integrating assertive community treatment and illness management and recovery for consumers with severe mental illness, Community Mental Health Journal, 46, 319-29, 2010	Included in Dieterich 2017 systematic review.
Simmonds, S., Coid, J., Joseph, P., Marriott, S., Tyrer, P., Community mental health team management in severe mental illness: A systematic review, British Journal of Psychiatry, 178, 497-502, 2001	Systematic review - studies included in Dieterich 2017 systematic review.
Slade, M., Bird, V., Clarke, E., Le Boutillier, C., McCrone, P., Macpherson, R., Pesola, F., Wallace, G., Williams, J., Leamy, M., Supporting recovery in patients with psychosis through care by community-based adult mental health teams (REFOCUS): a multisite, cluster, randomised, controlled trial, The Lancet. Psychiatry, 2, 503-514, 2015	Not specific to rehabilitation
Slade, M., Bird, V., Le Boutillier, C., Williams, J., McCrone, P., Leamy, M., REFOCUS Trial: Protocol for a cluster randomised controlled trial of a pro-recovery intervention within community based mental health teams, BMC Psychiatry, 11 (no pagination), 2011	Trial protocol - see Slade 2015 for full publication
Sun, L. H., Li, X. Z., Yuan, L. J., Zhang, Y. L., Differences of curative efficacy, relapse rate and cost between female patients with chronic schizophrenia under community-based rehabilitation and inpatient care, Chinese journal of clinical rehabilitation, 9, 28-30, 2005	Study based in China
Sytema, S., Wunderink, L., Bloemers, W., Roorda, L., Wiersma, D., Assertive community treatment in the Netherlands: a randomized controlled trial, Acta Psychiatrica Scandinavica, 116, 105-112, 2007	Included in Dieterich 2017 systematic review.

Economic studies

A global economic literature search was undertaken for this guideline, covering all18 review questions in this guideline. The table below is a list of excluded studies across the entire guideline and studies listed were not necessarily identified for this review question.

Table 18: Excluded studies from the economic component of the review

Study	Reason for Exclusion
Aitchison, K J, Kerwin, R W, Cost-effectiveness of clozapine: a UK clinic-based study (Structured abstract), British Journal of PsychiatryBr J Psychiatry, 171, 125-130, 1997	Available as abstract only.
Barnes, T. R., Leeson, V. C., Paton, C., Costelloe, C., Simon, J., Kiss, N., Osborn, D., Killaspy, H., Craig, T. K., Lewis, S., Keown, P., Ismail, S., Crawford, M., Baldwin, D., Lewis, G., Geddes, J., Kumar, M., Pathak, R., Taylor, S., Antidepressant Controlled Trial For Negative Symptoms In Schizophrenia (ACTIONS): a double-blind, placebo-controlled, randomised clinical trial, Health Technology Assessment (Winchester, England)Health Technol Assess, 20, 1-46, 2016	Does not match any review questions considered in the guideline.
Barton, Gr, Hodgekins, J, Mugford, M, Jones, Pb, Croudace, T, Fowler, D, Cognitive behaviour therapy for improving social recovery in psychosis: cost-effectiveness analysis (Structured abstract), Schizophrenia ResearchSchizophr Res, 112, 158-163, 2009	Available as abstract only.
Becker, T., Kilian, R., Psychiatric services for people with severe mental illness across western Europe: what can be generalized from current knowledge about differences in provision, costs and outcomes of mental health care?, Acta Psychiatrica Scandinavica, SupplementumActa Psychiatr Scand Suppl, 9-16, 2006	Not an economic evaluation.
Beecham, J, Knapp, M, McGilloway, S, Kavanagh, S, Fenyo, A, Donnelly, M, Mays, N, Leaving hospital II: the cost-effectiveness of community care for former long-stay psychiatric hospital patients (Structured abstract), Journal of Mental HealthJ Ment Health, 5, 379-94, 1996	Available as abstract only.
Beecham, J., Knapp, M., Fenyo, A., Costs, needs, and outcomes, Schizophrenia BulletinSchizophr Bull, 17, 427-39, 1991	Costing analysis prior to year 2000
Burns, T., Raftery, J., Cost of schizophrenia in a randomized trial of home-based treatment, Schizophrenia BulletinSchizophr Bull, 17, 407-10, 1991	Not an economic evaluation. Date is prior to 2000
Bush, P. W., Drake, R. E., Xie, H., McHugo, G. J., Haslett, W. R., The long-term impact of employment on mental health service use and costs for persons with severe mental illness, Psychiatric ServicesPsychiatr Serv, 60, 1024-31, 2009	A United States costing analysis. Outcomes which relate to the Welfare system differs in substantial ways to a UK context.

Study	Reason for Exclusion
Chalamat, M., Mihalopoulos, C., Carter, R., Vos, T., Assessing cost-effectiveness in mental health: vocational rehabilitation for schizophrenia and related conditions, Australian & New Zealand Journal of PsychiatryAust N Z J Psychiatry, 39, 693-700, 2005	Australian cost-benefit analysis - welfare system differs from UK context.
Chan, S., Mackenzie, A., Jacobs, P., Cost-effectiveness analysis of case management versus a routine community care organization for patients with chronic schizophrenia, Archives of Psychiatric NursingArch Psychiatr Nurs, 14, 98-104, 2000	Study conducted in Hong Kong. A costing analysis.
Clark, R. E., Teague, G. B., Ricketts, S. K., Bush, P. W., Xie, H., McGuire, T. G., Drake, R. E., McHugo, G. J., Keller, A. M., Zubkoff, M., Cost-effectiveness of assertive community treatment versus standard case management for persons with co-occurring severe mental illness and substance use disorders, Health Services ResearchHealth Serv Res, 33, 1285-308, 1998	Not cost-utility analysis. Cost-effectiveness analysis but does not consider UK setting. Date of study is prior to year 2000.
Crawford, M. J., Killaspy, H., Barnes, T. R., Barrett, B., Byford, S., Clayton, K., Dinsmore, J., Floyd, S., Hoadley, A., Johnson, T., Kalaitzaki, E., King, M., Leurent, B., Maratos, A., O'Neill, F. A., Osborn, D., Patterson, S., Soteriou, T., Tyrer, P., Waller, D., Matisse project team, Group art therapy as an adjunctive treatment for people with schizophrenia: a randomised controlled trial (MATISSE), Health Technology Assessment (Winchester, England)Health Technol Assess, 16, iii-iv, 1-76, 2012	Study not an economic evaluation.
Dauwalder, J. P., Ciompi, L., Cost-effectiveness over 10 years. A study of community-based social psychiatric care in the 1980s, Social Psychiatry & Psychiatric EpidemiologySoc Psychiatry Psychiatr Epidemiol, 30, 171-84, 1995	Practice has changed somewhat since 1980s - not a cost effectiveness study.
Garrido, G., Penades, R., Barrios, M., Aragay, N., Ramos, I., Valles, V., Faixa, C., Vendrell, J. M., Computer-assisted cognitive remediation therapy in schizophrenia: Durability of the effects and cost-utility analysis, Psychiatry ResearchPsychiatry Res, 254, 198-204, 2017	Cost effectiveness study, but population of interest is not focussed on rehabilitation for people with complex psychosis.
Hallam, A., Beecham, J., Knapp, M., Fenyo, A., The costs of accommodation and care. Community provision for former long-stay psychiatric hospital patients, European Archives of Psychiatry & Clinical NeuroscienceEur Arch Psychiatry Clin Neurosci, 243, 304-10, 1994	Economic evaluation predates 2000. organisation and provision of care may have changed by some degree.
Hu, T. W., Jerrell, J., Cost-effectiveness of alternative approaches in treating severely mentally ill in California, Schizophrenia BulletinSchizophr Bull, 17, 461-8, 1991	A United States costing analysis. Outcomes which relate to the Welfare system differs in substantial ways to a UK context.
Jaeger, J., Berns, S., Douglas, E., Creech, B., Glick, B., Kane, J., Community-based vocational rehabilitation: effectiveness and cost impact of a	Study is a New-Zealand based costing analysis of limited applicability to the UK.

Study	Reason for Exclusion
proposed program model.[Erratum appears in Aust N Z J Psychiatry. 2006 Jun-Jul;40(6-7):611], Australian & New Zealand Journal of PsychiatryAust N Z J Psychiatry, 40, 452-61, 2006	
Jonsson, D., Walinder, J., Cost-effectiveness of clozapine treatment in therapy-refractory schizophrenia, Acta Psychiatrica ScandinavicaActa Psychiatr Scand, 92, 199-201, 1995	Costing analysis which predates year 2000.
Knapp, M, Patel, A, Curran, C, Latimer, E, Catty, J, Becker, T, Drake, Re, Fioritti, A, Kilian, R, Lauber, C, Rossler, W, Tomov, T, Busschbach, J, Comas-Herrera, A, White, S, Wiersma, D, Burns, T, Supported employment: cost-effectiveness across six European sites (Structured abstract), World Psychiatry, 12, 60-68, 2013	Available as abstract only.
Lazar, S. G., The cost-effectiveness of psychotherapy for the major psychiatric diagnoses, Psychodynamic psychiatry, 42, 2014	Review of clinical and cost studies on psychotherapy. Studies cited do not match population for relevant review question.
Leff, J, Sharpley, M, Chisholm, D, Bell, R, Gamble, C, Training community psychiatric nurses in schizophrenia family work: a study of clinical and economic outcomes for patients and relatives (Structured abstract), Journal of Mental HealthJ Ment Health, 10, 189-197, 2001	Structured abstract. Not a cost effectiveness study.
Liffick, E., Mehdiyoun, N. F., Vohs, J. L., Francis, M. M., Breier, A., Utilization and Cost of Health Care Services During the First Episode of Psychosis, Psychiatric ServicesPsychiatr Serv, 68, 131-136, 2017	A United States costing analysis. Outcomes which relate to the Welfare system differs in substantial ways to a UK context.
Mihalopoulos, C., Harris, M., Henry, L., Harrigan, S., McGorry, P., Is early intervention in psychosis cost-effective over the long term?, Schizophrenia BulletinSchizophr Bull, 35, 909-18, 2009	Not a cost utility analysis. Australian costing analysis.
Perlis, R H, Ganz, D A, Avorn, J, Schneeweiss, S, Glynn, R J, Smoller, J W, Wang, P S, Pharmacogenetic testing in the clinical management of schizophrenia: a decision-analytic model (Structured abstract), Journal of Clinical Psychopharmacology, 25, 427-434, 2005	Structured abstract. Does not match any review question considered in this guideline.
Quinlivan, R., Hough, R., Crowell, A., Beach, C., Hofstetter, R., Kenworthy, K., Service utilization and costs of care for severely mentally ill clients in an intensive case management program, Psychiatric ServicesPsychiatr Serv, 46, 365-71, 1995	A United States costing analysis. Outcomes which relate to the Welfare system differs in substantial ways to a UK context.
Roine, E., Roine, R. P., Rasanen, P., Vuori, I., Sintonen, H., Saarto, T., Cost-effectiveness of interventions based on physical exercise in the treatment of various diseases: a systematic literature review, International Journal of	Literature review on cost effectiveness studies based on physical exercise for various diseases and population groups - none of which are for complex psychosis.

Study	Reason for Exclusion
Technology Assessment in Health CareInt J Technol Assess Health Care, 25, 427-54, 2009	
Rosenheck, R A, Evaluating the cost-effectiveness of reduced tardive dyskinesia with second-generation antipsychotics (Structured abstract), British Journal of PsychiatryBr J Psychiatry, 191, 238-245, 2007	Structured abstract. Does not match any review question considered in this guideline.
Rund, B. R., Moe, L., Sollien, T., Fjell, A., Borchgrevink, T., Hallert, M., Naess, P. O., The Psychosis Project: outcome and cost-effectiveness of a psychoeducational treatment programme for schizophrenic adolescents, Acta Psychiatrica ScandinavicaActa Psychiatr Scand, 89, 211-8, 1994	Not an economic evaluation. Cost effectiveness discussed in narrative only, with a few short sentences.
Sacristan, J A, Gomez, J C, Salvador-Carulla, L, Cost effectiveness analysis of olanzapine versus haloperidol in the treatment of schizophrenia in Spain (Structured abstract), Actas Luso-espanolas de Neurologia, Psiquiatria y Ciencias Afines, 25, 225-234, 1997	Available as abstract only.
Torres-Carbajo, A, Olivares, J M, Merino, H, Vazquez, H, Diaz, A, Cruz, E, Efficacy and effectiveness of an exercise program as community support for schizophrenic patients (Structured abstract), American Journal of Recreation Therapy, 4, 41-47, 2005	Available as abstract only
Wang, P S, Ganz, D A, Benner, J S, Glynn, R J, Avorn, J, Should clozapine continue to be restricted to third-line status for schizophrenia: a decision-analytic model (Structured abstract), Journal of Mental Health Policy and Economics, 7, 77-85, 2004	Available as abstract only.
Yang, Y K, Tarn, Y H, Wang, T Y, Liu, C Y, Laio, Y C, Chou, Y H, Lee, S M, Chen, C C, Pharmacoeconomic evaluation of schizophrenia in Taiwan: model comparison of long-acting risperidone versus olanzapine versus depot haloperidol based on estimated costs (Structured abstract), Psychiatry and Clinical Neurosciences, 59, 385-394, 2005	Taiwan is not an OECD country.
Zhu, B., Ascher-Svanum, H., Faries, D. E., Peng, X., Salkever, D., Slade, E. P., Costs of treating patients with schizophrenia who have illness-related crisis events, BMC Psychiatry, 8, 2008	USA costing analysis. The structure of the US health system means that costs do not translate well into a UK context.

Appendix L – Research recommendations

Research recommendations for review question: What is the effectiveness of rehabilitation services compared with standard care?

Research question

What is the efficacy and cost effectiveness of rehabilitation services compared with treatment as usual for people with complex psychosis with residual disability who are leaving early intervention services?

Why this is important

As many as one in five people leaving early intervention services for psychosis will have a complex psychosis, with significant residual disability in terms of persisting symptoms and functional impairment. These people go on to have repeated hospitalisations and to accumulate problems with daily living. On average, it is over ten years before they are referred to a specialist mental health rehabilitation service. Earlier access to these services may have important clinical and economic benefits.

Table 19: Research recommendation rationale

Research question	What is the efficacy and cost effectiveness of receiving rehabilitation services compared with treatment as usual for people with complex psychosis with residual disability leaving early intervention services?
Why is this needed	
Importance to 'patients' or the population	The continued accumulation of impairments associated with inadequately treated severe mental illness is a sizeable burden for patients, their families and society more widely. Many of these patients end up with repeated, increasingly lengthy hospitalisations, with little hope for the future or expectations that treatment could be effective. Ensuring earlier 'best practice' treatments could bring substantial health gains
Relevance to NICE guidance	Ability to determine optimal period of intervention
Relevance to the NHS	Potentially substantial reductions in repeated hospitalisation and accumulation of disability with significant health service cost savings
National priorities	Reduce variation in treatment Extend the early intervention paradigm
Current evidence base	No relevant clinical trials were identified.
Equality	Applies to all patients who are leaving early intervention for psychosis services
Feasibility	Recruitment should be straightforward. Provider rehabilitation services will need to adjust referral/acceptance criteria to access this early intervention population
Other comments	None

NICE: National Institute for Health and Care Excellence; NHS: National Health Service;

Table 20: Research recommendation modified PICO table

Criterion	Explanation
Population	Adults 18 or over with a primary diagnosis of schizophrenia, bipolar disorder or related spectrum disorder leaving early intervention for psychosis services with residual disability
Intervention	Care provided by a specialist rehabilitation service
Comparator	Treatment as usual

Outcomes	**Critical**
	• Social functioning (including management of own mental + physical health)
	• Out of area treatments (OATs)
	• Reduction in amount of support needed:
	  ○ for inpatients - discharge to a sustained community placement (Successful community living/ accommodation instability / placement breakdown)
	  ○ for those in community placement – sustained move to a less supported placement
	Important
	• Contact with criminal justice system.
	• Achievement of personal recovery goals.
	• Attendances at Accident and Emergency.
	• Number of days as inpatient.
	• Activities of daily living.
	• Quality of life

Study design	Randomised Controlled Trial
Timeframe	Three years
Additional information	None

PICO: population intervention comparator outcomes