GRADE Tables and Summary of Findings for the recommendations of *Rehabilitation in health systems*

REHABILITATION SERVICE DELIVERY

For the following PICO questions, Population includes any person who requires rehabilitation services and outcomes, unless stated otherwise, are aligned with those of universal health coverage – better quality, equitable access and affordability – with the subsequent outcomes of greater service use, people-centred care and better health (including rehabilitation) outcomes. Not all outcomes are applicable to each PICO question.

PICO Question A: Should rehabilitation services be integrated into the health system (I) or into the social or welfare system or equivalent (C)?

We did not find any systematic reviews or randomized controlled trial to answer this specific PICO question. We found a single non-randomized study that compared the functional outcomes of rehabilitation delivered by physiotherapists in cooperation with healthcare or welfare workers on basic activities of daily living by disable persons in rehabilitation deficient areas. This study was conducted in Japan. (Morita, 2009) The rehabilitation program in this study consisted of instructions to people with disabilities and their families about home exercises, aimed to maintain or improve physical functions and motor activities. Rehabilitation teams also instruct people with disabilities on the use of technical aids and home adaptations to allow patients exercise at home. The intervention period lasted (mean and SD) 13.1 (7.5) months, and the follow-up period was (mean and SD) 44.2 (20.4) months.

Evidence for integrated rehabilitation services:

- We did not find any study to answer this PICO question

PICO question B: Should rehabilitation services be integrated into primary, secondary and tertiary levels of the health system (I) or not integrated (C)?

Integrated disease management and rehabilitation interventions were compared to usual care without integration for patients with chronic obstructive pulmonary disease (COPD). (Kruis 2013) Twenty-six trials were included. Patients were treated in primary care (8 studies), secondary care (12 studies), tertiary care (1 study) and a combination of primary and secondary health care (5 studies). The number of healthcare providers involved in the programs ranged from two to seven. The number of components per program ranged from 2 to 8 with a mean of 4. There were 13 studies in which the main component was exercise, five studies was self-management with an exarcebation action plan; 5 studies with structured follow-up with nurse/GP; 1 study with self-management action plan and exercise; 1 study with self-management action plan and structured follow-up; and 1 study with education and follow-up. The control groups consisted of usual care in which patients visited their regular healthcare provider, in a mono-disciplinary drug-treatment optimization plan on a as needed basis.

There is “moderate quality” evidence that integrated rehabilitation is better than usual care for patients with COPD for outcomes of utilization of rehabilitation services measured with hospital admissions (OR 0.68 95% CI 0.47- 0.99); There is “low quality” that integrated rehabilitation is better than usual care for rehabilitation outcomes (6MWD); and there is “moderate quality” evidence that integrated rehabilitation is better than usual care for health outcomes (quality of life) by improving 4.22 points (95% CI 2.3 to 6.14) in the SGRQ scale where 4 points is the minimally clinically important difference. There is “very low quality” evidence that integrated rehabilitation is not different from usual care for health outcomes measured by mortality (OR 0.96 95%CI 0.52 to 1.74). (Kruis 2013)

Summary of findings:

Integrated disease management compared to Usual care for COPD (Kruis 2013)

Patient or population: COPD (Kruis 2013)
Setting: Community or hospital-based
Intervention: Integrated disease management
Comparison: Usual care

Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with Usual care	**Risk with Integrated disease management**				
Access to rehabilitation services - not measured				-	-	
Utilization of rehabilitation	271	202 per 1000	OR 0.68 (0.47 to	1470	⊕⊕⊕◯	Statistically significant difference. Moderate

Summary of findings:

Integrated disease management compared to Usual care for COPD (Kruis 2013)

Patient or population: COPD (Kruis 2013)
Setting: Community or hospital-based
Intervention: Integrated disease management
Comparison: Usual care

Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with Usual care	**Risk with Integrated disease management**				
services and continuity of care assessed with: Respiratory-related hospital admissions follow up: range 3 to 12 months	per 1000	(149 to 269)	0.99)	(7 RCTs)	MODERATE [1] [2]	effect size.
Rehabilitation outcome assessed with: 6MWD follow up: range 3 to 12 months		The mean rehabilitation outcome in the intervention group was 43.86 higher (21.83 higher to 65.89 higher)	-	871 (14 RCTs)	⊕⊕◯◯ LOW [1] [3] [4]	The minimally clinically important difference is 35 meters. There is a clinically and statistically significant difference in favour of integrated care.
Health outcome (quality of life) assessed with: St George's Respiratory Questionnaire follow up: range 3 to 12 months		The mean health outcome (quality of life) in the intervention group was 4.22 lower (6.14 lower to 2.3 lower)	-	1304 (12 RCTs)	⊕⊕⊕◯ MODERATE [1] [2]	Minimally clinically important difference is 4. Clinically and statistically significant difference in favour of integrated care.
Health outcome (mortality) follow up: range 3 to 12 months	184 per 1000	178 per 1000 (105 to 282)	OR 0.96 (0.52 to 1.74)	1113 (4 RCTs)	⊕◯◯◯ VERY LOW [1] [2] [5] [6]	No significant difference

Summary of findings:

Integrated disease management compared to Usual care for COPD (Kruis 2013)

Patient or population: COPD (Kruis 2013)
Setting: Community or hospital-based
Intervention: Integrated disease management
Comparison: Usual care

Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with Usual care	**Risk with Integrated disease management**				

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio;

The PRISMA Model provides data from the Integrated Service Delivery (ISD) network most recently implemented in Canada. Different from fully integrated models, which work in parallel with their usual health systems, the PRISMA Model is a coordination-type model of integration in which the ISD network was embedded within the health- and social care system using all the public, private, and voluntary health- and-social-services organizations involved in caring for older people in a given area.

There is “very low quality” evidence that living in a community where there is ISD network is better than living in a community without ISD network, for elders (>75 years old) with moderate level of disability and mild cognitive problems, on outcomes of utilization of rehabilitation services and continuity of care (daily hours of care and assistance) (1 observational study, 746 patients (Average number of daily hours of care and assistance related to disability: 2.07 hours (SD=1.08). Integrated-service-delivery (ISD) network reduces the number of elderly people with unmet needs and also reduces the prevalence of unmet needs), rehabilitation outcomes (unmet needs) (1 observational study, 746 patients (Decrease in percentage of unmet needs, With integrated: 68% to 35% (3 years), Without integrated: 56% to 67% (3 years), p<0.001)). (Dubuc, 2011).

Effective clinical transitions must bridge the gap between health care institutions that often function in isolation. New models of “cooperative care” that link primary care providers and local services to regionalized adult-centered specialty services may make it possible to offer a meaningful transition experience to young people with chronic conditions. There is “very low quality” evidence (2 qualitative studies) that new models of “cooperative care” that link primary care providers and local services to regionalized adult-centered specialty services may make it possible to offer a meaningful transition experience to young people with chronic conditions. The authors identified 5 key elements that support a positive transition to adult centered health care: preparation, flexible timing, care coordination, transition clinic visits, and interested adult-centered health care providers. Overall, there is limited empirical evidence related to the process and

outcomes of the transition to adult-centered health care for cerebral palsy and spina bifida patients (No estimate is provided). (Binks, 2007)

Individualized care coordination was compared to standard care delivered by pediatricians' offices for families with special healthcare needs (Lawson 2011). This cross-sectional study was conducted in Massachusetts involving parents for one year. There is "very low quality" evidence that there is no difference between the two models in terms of reducing unmet needs. However, there is "very low quality" evidence that the care coordination model is better than the standard care for utilization of rehabilitation services assessed with the use of specialist care. (Lawson 2011)

PICO Question C: Should multi-disciplinary rehabilitation be provided (I) or not (C)?

Evidence for multidisciplinary rehabilitation for older adults:

- Older adults with medical conditions: There is "moderate quality" evidence that day hospital is better than non-multidisciplinary rehabilitation in utilization of rehabilitation services and continuity of care (institutional care) (3 RCTs, 411 patients (OR: 0.52, 95%CI: 0.38-0.71)), rehabilitation outcomes (deterioration in activities of daily living) (2 RCTs, 262 patients (OR: 0.76, 95%CI: 0.56-1.05)) and health outcomes (mortality) (3 RCTs, 530 patients (OR: 0.86, 95%CI: 0.6-1.22)).(Forster, 2008)

Summary of Findings: Multidisciplinary out-patient rehabilitation compared to non-multidisciplinary rehabilitation for elderly people with disabilities. (Forster, 2008)

Outcomes	**Anticipated absolute effects** (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with non-multidisciplinary rehabilitation	**Risk with multidisciplinary out-patient rehabilitation**				
Access to rehabilitation services			not estimable	(0 Studies) [1]		
Utilization of rehabilitation services and continuity of care - Death or institutional care by the end of follow up	**Study population** elderly (usually > 60 years) medical patients		OR 0.52 (0.38 to 0.71)	814 (3 RCTs)	⊕⊕⊕◯ MODERATE [2 3 4 5 6]	Significantly 127 fewer per 1000 (from 72 fewer to 174 fewer)
	335 per 1000	**208 per 1000 (161 to 263)**				
Rehabilitation outcomes - Death or deterioration in activities of daily living - ADL	**Study population** elderly (usually > 60 years) medical patients		OR 0.76 (0.56 to 1.05)	651 (2 RCTs)	⊕⊕⊕◯ MODERATE [2 4 6 7 8]	66 fewer per 1000 (from 12 more to 134 fewer). CI includes both benefit and harm
	436 per 1000	**370 per 1000 (302 to 448)**				
Health outcomes - Death by the end of follow up	**Study population** elderly (usually > 60 years) medical patients		OR 0.86 (0.6 to 1.22)	982 (3 RCTs)	⊕⊕⊕◯ MODERATE [2 4 6 9 10]	19 fewer per 1000 (from 28 more to 57 fewer). CI includes both
	159 per 1000	**140 per 1000**				

	(102 to 188)	benefit and harm

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **OR:** Odds ratio;

1. No evidence available
2. Not serious risk of bias
3. I-square=25%; p=0.26
4. All studies were conducted in HIC. However, reproducing the intervention in LMIC is expected to be feasible and expected to give same results
5. 814 people total. The point estimate includes the null hypothesis
6. Publication bias: their search strategy was extensive and included contacting the authors of papers relating to day hospital care around the world. Many of the authors of the published papers or abstracts were able to provide additional information which has not been published previously. A funnel plot analysis (Egger 1997) did not show any major evidence of missing data.
7. I-square=0%; p=0.78
8. 651 people total. The point estimate includes the null hypothesis
9. I-square=0%; p=0.73
10. 982 people total. The point estimate includes the null hypothesis

- Older adults: There is “high quality” evidence that inpatient rehabilitation program specifically designed for geriatric patients is better than usual care for adults (older >55 years old) for measures of utilization of rehabilitation services and continuity of care (admissions to nursing homes) (13 RCTs, 4033 people (RR: 0.84, 0.72-0.99)), for rehabilitation outcomes (functional status) (12 RCTs, 4039 people(RR: 1.36, 95%CI: 1.36-1.71)), and for measures of health outcomes (mortality) (15 RCTs, 2206 people (RR: 0.87, 95%CI 0.77-0.97)). (Bachmann 2010)

Summary of findings: Specific in-patient rehabilitation compared to usual care without rehabilitation for geriatric patients with disability. (Bachmann, 2010)

1. Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with usual care without rehabilitation	Risk with specific in-patient rehabilitation				
Assess to rehabilitation services			not estimable	(0 Studies)		
Utilization of rehabilitation services:	**Study population -** geriatric patients with disability		RR 0.84 (0.72 to	4033 (13 RCTs)	⨁⨁⨁⨁ HIGH [1][2][3][4][5]	Significantly 34 fewer per 1000 (from 2

Continuity of care - admission to nursing homes	211 per 1000	**178 per 1000 (152 to 209)**	0.99)			fewer to 59 fewer) in the group with specific inpatient rehabilitation
Rehabilitation outcome: Functional Improvement assessed with Barthel Index or Katz Index at hospital discharge and at 3-12 month follow-up	**Study population -** geriatric patients with disability		OR 1.36 (1.07 to 1.71)	(12 RCTs)	⊕⊕⊕⊕ HIGH [1][3][5][6][7]	Significantly fewer in the group with specific inpatient rehabilitation. Not estimable because functional outcomes (primarily reported as means (SD) of the Barthel or Katz index) were converted to odds ratios and 95% confidence intervals by the authors of this review.
	Not estimable	Not estimable				
Health outcomes: Mortality at hospital discharge and 3-12 month follow-up	**Study population -** geriatric patients with disability		RR 0.87 (0.77 to 0.97)	4487 (15 RCTs)	⊕⊕⊕⊕ HIGH [1][3][5][8][9]	Significantly 28 fewer per 1000 (from 7 fewer to 50 fewer) in the group with specific inpatient rehabilitation.
	218 per 1000	**190 per 1000 (168 to 212)**				

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio

1. low risk of selection bias, measurement bias and attrition bias
2. I-square=22.6%: p=0.215
3. All studies were conducted in HIC. However, reproducing the intervention in LMIC is expected to be feasible and expected to give same results
4. Large sample size: Inpatient rehabilitation: 1,995, usual care: 2,038; TOTAL=4,033
5. Funnel plots and bias tests indicate little evidence of risk of publication bias
6. I-square=51.4%; p=0.020.
7. Large sample size: Inpatient rehabilitation: 1,997, usual care: 2,142; TOTAL=4,139
8. I-square=0%; p=0.601
9. Large sample size: Inpatient rehabilitation: 2,206, usual care: 2,281; TOTAL=4,487

- Older adults with hip fractures: There is “very low quality” evidence of conflicting results for coordinated multidisciplinary specialized inpatient rehabilitation for outcomes of utilization of rehabilitation services and continuity of care (length of stay) (8 RCTs, 1663 people (No estimate is provided)) for older people with hip fractures. There is

"low quality" evidence that there is no difference between coordinated multidisciplinary specialized inpatient rehabilitation compared to usual (orthopaedic care) for outcomes of utilization of rehabilitation services and continuity of care (readmission to hospital) (6 RCTs, 629 people (RR: 0.99, 95%CI: 0.82-1.19). There is "low quality" evidence of conflicting conclusions regarding rehabilitation outcomes (functional outcomes) (2 RCTs) (The results for each study is given separately: Chinese barthel index (SD) – 90.53(19.4); Modified barthel index – 95.3(9.8); Barthel scores at long term follow-up: mean difference (95% CI): 6.17 (-0.86 to 13,20); mean difference (95% CI): 6.30 (-0.53 to 13.13)). There is "low quality" evidence of not difference between coordinated multidisciplinary specialized inpatient rehabilitation and usual (orthopaedic care) for health outcomes (death or deterioration of function) (8 RCTs, 817 people (RR: 0.89, 95%CI: 0.78-1.01)). There is "low quality" evidence of no difference between coordinated multidisciplinary specialized inpatient rehabilitation and usual (orthopaedic care) for health outcome (mortality) (11 RCTs, 1143 people (RR: 0.9 (95%CI: 0.76-1.07)). (Handoll, 2009). One trial in this systematic review looked at accelerated discharge for older people with hip fracture plus multidisciplinary home-based rehabilitation and compared this to usual inpatient rehabilitation. There is "low quality" evidence that the accelerated discharge had better utilization of rehabilitation services (length of hospital stay) than the usual group (1 RCT, 66 people(No estimate is provided)). There is "low quality" evidence that accelerate discharge is similar to usual care for rehabilitation outcomes (function) (1 RCT, 56 people (No estimate is provided)), and for health outcomes (mortality) (1 RCT, 66 people (No estimate is provided)). (Handoll, 2009)

Evidence for multidisciplinary rehabilitation for populations with neurological conditions

- Adults with amyotrophic lateral sclerosis (ALS) or motor neuron disease (MND):
    - Low-intensity multidisciplinary rehabilitation compared to general neurology: There is "very low quality" evidence that low-intensity multidisciplinary rehabilitation is better than general neurology clinics for utilization of rehabilitation services and continuity of care (fewer readmissions and shorter length of stay) (2 observational studies (No estimate is provided)). There is "very low quality" evidence in favour of low-intensity rehabilitation for health outcomes (quality of life) (1 observational study) and there is "very low quality" evidence of conflicting conclusions for health outcomes (survival) (3 observational studies (No estimate is provided)). (Ng, 2011)
    - High-intensity multidisciplinary rehabilitation compared to general neurology clinic: There is "very low quality" evidence that high-intensity rehabilitation is better for rehabilitation outcomes (impairment and activity limitation) (1 observational study(No estimate is provided)). (Ng, 2011)
- Stroke patients living in the community: There is "very low quality" evidence that there is no difference in measures of rehabilitation outcomes (function) (11 RCTs) or health outcomes (quality of life) (8 RCTs) between the multidisciplinary care in the community and routine care. (Fens 2013)
- Acquired brain injury in adults of working age: There is "low" quality evidence that multidisciplinary specialized rehabilitation service is better than rehabilitation delivered at local non-specialized service or home based rehabilitation for rehabilitation outcomes (function) (1 RCT and 1 observational study (No estimate is provided)) (Turner-Stokes, 2011).

Evidence for multidisciplinary rehabilitation for populations with musculoskeletal problems

- Chronic low-back pain: There is "low quality" evidence that multidisciplinary rehabilitation is not different from non-multidisciplinary rehabilitation for outcomes of utilization of rehabilitation services and continuity of care (2 RCTs, 226 patients (SMD: 0.06 lower, 95%CI: 0.32-0.2)). There is "very low quality" evidence that multidisciplinary rehabilitation is better than non-multidisciplinary care for rehabilitation outcomes (function) in the short-term (13 RCTs, 1879 patients (SMD: 0.39 lower, 95%CI: 0.68-0.1)) and in the long-term (10 RCTs, 1169 patients (SMD 0.68 lower, 95%CI: 1.19-0.16)). There is "moderate quality" evidence that multidisciplinary rehabilitation is better than non-multidisciplinary rehabilitation for health outcomes (return-to-work) (8 RCTs, 1006 patients (OR: 1.87, 95% CI: 1.39-2.53)). (Kamper, 2014)

- Sub-acute low-back pain: There is “very low quality” evidence that multidisciplinary rehabilitation involving a graded 4-part activity program is better than traditional care for rehabilitation outcomes (subjective disability) (1 RCT, 103 patients (MD: 1.2 lower, 95%CI: 1.98-0.42), and for health outcomes (return-to-work) (1 RCT, 103 people (MD: 5.1, 95%CI: 10.59-0.39)). (Karjalainen, 2008)
- Neck and shoulder pain: There is “very low quality” evidence that multidisciplinary biopsychosocial rehabilitation (psychological coaching setting) is not better than a biopsychosocial rehabilitation with psychologist contact only for rehabilitation outcomes (disability) (1 RCT, 66 people (SMD: 0.6 higher, 95%CI:4.3-5.5)) (Karjalainen, 2010). There is “very low quality” evidence that active multidisciplinary rehabilitation is not better than traditional rehabilitation for rehabilitation outcomes (sick leave) (1 observational study, 93 people (MD 3 higher, 95% CI: 10.96-16.96)). (Karjalainen, 2003)
- Older adults with hip fractures: (see paragraph in the section above related to Handoll, 2009)

Summary of Findings: Multidisciplinary rehabilitation (including two or more professionals compared to non multidisciplinary (including only one professional - physical treatment for chronic low back pain (Kamper, 2014)

Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with non multidisciplinary (including only one professional - physical treatment	**Risk with multidisciplinary rehabilitation (including two or more professionals**				
Access to rehabilitation services - not measured				-	-	
Utilization of rehabilitation services and continuity of care assessed with: Heath care utilization (number of visits, surgery, admissions to hospital) follow up: mean 12 months		The mean utilization of rehabilitation services and continuity of care in the intervention group was 0.06 standard deviations lower (0.32 lower to 0.2 higher)	-	226 (2 RCTs)	⨁⨁◯◯ LOW [1][2][3][4][5]	Non-significant reduction in healthcare utlization. As a rule of thumb, 0.2 SD is a small difference, 0.5 is moderate, and 0.8 is large.
Rehabilitation outcomes assessed with:		The mean rehabilitation outcomes in the	-	1879 (13 RCTs)	⨁◯◯◯ VERY LOW [3][5][6][7][8]	Significant reduction in back-specific

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with non multidisciplinary (including only one professional - physical treatment	**Risk with multidisciplinary rehabilitation (including two or more professionals**				
Back-specific disability or functional status follow up: mean 3 months		intervention group was 0.39 standard deviations lower (0.68 lower to 0.1 lower)				disability at 3 months. As a rule of thumb, 0.2 SD is a small difference, 0.5 is moderate, and 0.8 is large.
Rehabilitation outcomes assessed with: back-specific disability or functional status follow up: mean 12 months		The mean rehabilitation outcomes in the intervention group was 0.68 standard deviations lower (1.19 lower to 0.16 lower)	-	1169 (10 RCTs)	⊕◯◯◯ VERY LOW [5][6][9][10]	Significant reduction in back-specific disability at 12 months. As a rule of thumb 0.2 SD is a small difference, 0.5 is moderate and 0.8 is large.
Health outcomes assessed with: work status (return to work) follow up: mean 12	659 per 1000	**783 per 1000 (729 to 830)**	**OR 1.87** (1.39 to 2.53)	1006 (8 RCTs)	⊕⊕⊕◯ MODERATE [1][3][5][11][12]	Significant improvement in work status at 12 months. 124 more people return to work per 1000 (from 70 more to 171 more)

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio;

1. High risk of performance and measurement biases
2. I-square=0%; p=0.40
3. All studies were conducted in HIC. However, reproducing the intervention in LMIC is expected to be feasible and expected to give same results
4. The total sample size is 226: multidisciplinary (n=114), single disciplinary (n=112), and the point estimate is -0.06 (95% CI: -0.32 to 0.20)

5. Funnel plots were created for comparisons with at least 10 included studies and they were inspected visually to assess the risk of publication bias.Three analyses (pain and disability in the short term and disability in the long term) in the MBR versus physical treatment comparison met this criterion. None of the plots showed substantial asymmetry aside from one outlying medium-sized study that reported very large effects in favour of MBR (Monticone 2013).
6. High risk of selection, performance, measurement and attrition biases
7. I-square=88%; p<0.00001
8. The total sample size is 1879: multidisciplinary (n=929), single (n=950), and the point estimate is -0.39 (95% CI: -0.68 to -0.10)
9. I-square=0.94%; p<0.00001
10. The total sample size is 1169 (multidisciplinary n=: 602), single n=567), but the point estimate is -0.68 (95% CI: -1.19 to -0.16)
11. I-square=0%; p=0.45
12. The total sample size is 1106 (multidisciplinary: 528; single: 478), but the point estimate is 1.87 (95% CI: -1.39 to 2.53)

PICO question D: Should rehabilitation services be available in both community and hospital settings (I) or only in the community or only in hospital (C)?

NOTE: Summary of finding (SoF) tables are shown in this section only for reviews with "high" or "moderate" quality of the evidence (based on GRADE assessment).

All GRADE tables and SoF tables for PICO question 3.1 are available in appendix A.

Evidence for hospital at home:

- There is "moderate quality" evidence that providing services to people at home after being discharged early is associated with increased risk of readmission (5 trials, 969 people with a mix of conditions (OR: 1.35, 95%CI: 1.03-1.76); (Shepperd, 2009). Subgroup analyses demonstrated that for outcomes of death or dependency there was a significant interaction (p=0.04) for stroke severity: there was a reduced odds of death or dependency (OR 0.73 95%CI 0.57 to 0.93, p=0.01) in patients with moderate stroke severity (initial Barthel index > 9), but not in the severe subgroup (initial Barthel index 0 to 9) (OR 1.41 95%CI 0.83 to 2.41, p=0.20). For outcomes of death or institutional care, there was also a significant interaction (p=0.0002): the reduction of duration of hospital stay was much greater for the severe stroke subgroup (weighted mean difference (WMD) 28 days 95%CI 15 to 41) than the group with moderate stroke (WMD 4 days 95%CI 2 to 6). (Langhorne 2005).
- There is "low quality" evidence that providing services to people at home after being discharged early is not associated with increased risk of death or readmission (3 trials, 179 older people with stroke (OR: 1.06, 95%CI 0.47-2.38); and 4 trials, 357 older people with COPD (OR:0.83, 95% CI: 0.61-1.13)). (Shepperd, 2009)
- There is "low quality" evidence that providing services to people at home after being discharged early is not associated with poor function such as dressing or daily chores (4 RCTs, 639 older people with a mix of health conditions (SMD 0.14 higher (95%CI 0.02-0.3)). (Shepperd, 2009)
- There is "low quality" evidence that providing services to people at home after being discharged early is not associated with increased mortality in people with mix conditions (6 RCTs, 1084 people (OR: 1.12, 95%CI 0.77-1.63)), and in people with COPD (4 RCTs, 416 people (OR:0.50, 95%CI 0.23-1.09)). Patients who had a stroke or elderly patients may have less risk of being admitted to residential care if they are discharged home early with hospital at home services. (Shepperd, 2009)

Summary of findings: Community services (Hospital at home) compared to Hospital in-patient rehabilitation for elderly with a mix of health conditions (including stroke). (Shepperd, 2009)

Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with Hospital in-patient rehabilitation	**Risk with community services (Hospital at home)**				
Access to rehabilitation services - not measured				-	-	

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with Hospital in-patient rehabilitation	**Risk with community services (Hospital at home)**				
Utilization of rehabilitation services and continuity of care assessed with: Readmission to hospital at 3 months	**Study population** - older people with a mix of conditions		**RR 1.35** (1.03 to 1.76)	969 (5 RCTs)	⊕⊕⊕◯ MODERATE [1][2][3][4]	55 more per 1000 (from 5 more to 120 more). Significantly more readmissions with hospital at home.
	158 per 1000	**214 per 1000 (163 to 279)**				
Utilization of rehabilitation services and continuity of care assessed with: Readmission to hospital follow up: mean 3 months	**Study population** (older people with stroke)		**RR 1.06** (0.47 to 2.38)	179 (3 RCTs)	⊕⊕◯◯ LOW [1][5][6][7]	7 more per 1000 (from 60 fewer to 157 more). CI includes both benefit and harm
	114 per 1000	**120 per 1000 (53 to 270)**				
Utilization of rehabilitation services and continuity of care (Utilization of rehabilitation services) assessed with: Readmission to hospital at 3 months - older people with COPD	**Study population** - older people with COPD		**RR 0.83** (0.61 to 1.13)	357 (4 RCTs)	⊕⊕◯◯ LOW [1][3][8][9]	59 fewer per 1000 (from 45 more to 136 fewer). CI includes both benefit and harm
	349 per 1000	**290 per 1000 (213 to 394)**				
Rehabilitation outcomes assessed with: Functional ability: older people with a mix of health conditions follow up: mean 3		The mean rehabilitation outcomes in the intervention group was 0.14 standard deviations higher (0.02 lower to 0.3	-	639 (4 RCTs)	⊕⊕◯◯ LOW [1][6][10][11]	CI includes both benefit and harm. As a rule of thumb, 0.2 SD is a small difference, 0.5 is moderate, and 0.8 is large.

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with Hospital in-patient rehabilitation	**Risk with community services (Hospital at home)**				
months		higher)				
Health outcomes ( ) assessed with: Mortality: follow up: mean 3 months	**Study population** - older people with a mix of conditions		**RR 1.12** (0.77 to 1.63)	1084 (6 RCTs)	⊕⊕◯◯ LOW [1] [3] [12] [13]	10 more per 1000 (from 20 fewer to 54 more). CI includes both benefit and harm.
	85 per 1000	**96 per 1000 (66 to 139)**				
Health outcomes assessed with: Mortality. follow up: mean 3 months	**Study population** - older people with stroke		**RR 1.05** (0.48 to 2.34)	419 (6 RCTs)	⊕⊕◯◯ LOW [1] [6] [14] [15]	2 more per 1000 (from 25 fewer to 65 more). CI includes both benefit and harm.
	48 per 1000	**51 per 1000 (23 to 113)**				
Health outcomes assessed with: Mortality (not clear how long follow-up)	**Study population** - older people with COPD		**RR 0.5** (0.23 to 1.09)	416 (4 RCTs)	⊕⊕◯◯ LOW [1] [3] [16] [17]	34 fewer per 1000 (from 6 more to 52 fewer). CI includes both benefit and harm.
	67 per 1000	**34 per 1000 (15 to 73)**				

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio;

1. In many trials the method of randomisation and concealment of allocation was clearly described. For the remaining trials it was unclear.
2. I-square=0%; p=0.49
3. There are no randomized trials conducted in LMIC. This type of intervention is very unlikely to be reproduced in LMIC
4. The confidence interval does not includes the null hypothesis and the sample size is large (969)
5. I-square=17%; p=0.30
6. There was one randomized trial conducted in Thailand, however the sample size was very small (111 patients total). This type of intervention is very unlikely to be reproduced in LMIC
7. Because the confidence interval includes the null hypothesis and the sample size is small: 179 participants (home: 11/91; in-patients=10/88)
8. I-square=11%; p=0.34
9. Because the confidence interval includes the null hypothesis and the sample size is small: 357 participants (home: 57/208; in-patient: 52/149)
10. I-square=50%; p=0.11
11. Because the confidence interval includes the null hypothesis and the sample size is small: 639 participants (home: 359; in-patients:280)
12. I-square=0%; p=0.62

13. Because the confidence interval includes the null hypothesis and the sample size is small: 1084 participants (home: 54/580; in-patient: 43/504)
14. I-square=7%; p=0.37
15. Because the confidence interval includes the null hypothesis and the sample size is small: 419 participants (home: 11/212; in-patient: 10/207)
16. I-square=0%; p=0.62
17. Because the confidence interval includes the null hypothesis and the sample size is small: 357 participants (home: 9/208; in-patients: 14/149
18. No explanation was provided

Evidence for domiciliary rehabilitation (home intervention) provided in the patient's home:

- There is "low to moderate quality" evidence that utilization of rehabilitation services (4 RCTs, 443 people (OR: 0.87, 95%CI 0.54-1.4)), functional outcomes (4 RCTs, 443 people (OR: 1.34, 95%CI 0.9-1.99)), and health outcomes (5 RCTs, 583 people, (OR: 0.86, 95% CI 0.52-1.42)) are not different between domiciliary therapy and hospital-based rehabilitation for elderly patients and for those with stroke post inpatient rehabilitation. (Forster, 2008).
- There is "very low quality" evidence (2 observational studies, 195 patients) that outpatient rehabilitation program delivered at home for patients with acquired brain injury recently discharged from hospital is equivalent to day-hospital based outpatient rehabilitation program in terms of rehabilitation outcomes (activities of daily living) (No estimate is provided). (Doig, 2010)
- There is "very low quality" evidence that home-based cardiac rehabilitation is similar to centre-based cardiac rehabilitation for utilization of rehabilitation services (adherence to treatment) (13 RCTs, 1620 patients (RR: 1.02, 95%CI: 0.99-1.06)), rehabilitation outcomes in the short-term (prevention or slowing of the loss of function) (14 RCTs, 1557 patients (SMD 0.11 lower, 95%CI: 0.35-0.13), and health outcomes (mortality) (4 RCTs, 909 patients (RR: 1.31, 95%CI: 0.65-2.66)). There is "low quality" evidence that home-based cardiac rehabilitation is similar to centre-based for rehabilitation outcomes in the long-term (prevention or slowing of the loss of function) (3 RCTs, 1074 patients (SMD: 0.11 higher, 95%CI: 0.01-0.23)) (Taylor, 2010).

Summary of findings:

Community rehabilitation services compared to hospital/clinic or facility based rehabilitation for elderly people with disability (Forster 2008)

Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with hospital, clinic or facility based rehabilitation	**Risk with community rehabilitation services**				
Access to rehabilitation services - not measured				-	-	
Utilization of	**Study population** - elderly people with		**OR 0.87**	443	⊕⊕◯◯	23 fewer per 1000

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with hospital, clinic or facility based rehabilitation	**Risk with community rehabilitation services**				
rehabilitation services and continuity of care assessed with: death or institutional care by the end follow-up	disability		(0.54 to 1.4)	(4 RCTs)	LOW [1][2][3][4]	(from 63 more to 89 fewer). CI includes both benefit and harm.
	222 per 1000	**199 per 1000 (134 to 286)**				
Functional outcome assessed with: death or deterioration in activity of daily living	**Study population** - elderly people with disability		**OR 1.34** (0.9 to 1.99)	443 (4 RCTs)	⊕⊕⊕◯ MODERATE [2][3][4][5]	73 more per 1000 (from 26 fewer to 169 more). CI includes both benefit and harm.
	454 per 1000	**527 per 1000 (428 to 623)**				
Health outcomes (Death) assessed with: number of dead people at end of follow up	**Study population** - elderly people with disability		**OR 0.86** (0.52 to 1.42)	583 (5 RCTs)	⊕⊕⊕◯ MODERATE [2][4][6][7]	15 fewer per 1000 (from 42 more to 54 fewer). CI includes both benefit and harm.
	121 per 1000	**106 per 1000 (67 to 163)**				

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio;

1. I-square=58%, p=0.09
2. All studies were conducted in HIC. However, reproducing the intervention in LMIC is expected to be feasible and expected to give same results
3. 443 people total. The point estimate includes the null hypothesis
4. Publication bias: their search strategy was extensive and included contacting the authors of papers relating to day hospital care around the world. Many of the authors of the published papers or abstracts were able to provide additional information which has not been published previously. A funnel plot analysis (Egger 1997) did not show any major evidence of missing data.
5. I-square=40%; p=0.17
6. I-square=0%; p=0.44
7. 583 people total. The point estimate includes the null hypothesis

Evidence for Community rehabilitation services for stroke patients living in the community:

- There is “very low quality” evidence that there is no difference in measures of rehabilitation outcomes (11 RCTs) or health outcomes (8 RCTs) between the intervention and routine care (No estimate is provided). (Fens 2013)

Evidence for community-based complex interventions:

- There is “moderate quality” evidence that community-delivered complex intervention is better than usual care with minimum intervention for reducing admissions to nursing homes in elderly people after hospital discharge (RR 0.77 95% CI 0.64 to 0.91). There is “low quality” evidence of more hospital admissions with usual care (RR 0.95 95%CI 0.90 to 0.99). There is “moderate quality” evidence for more people not living at home after usual care (RR 0.90 95% CI 0.82 to 0.99). There is “low quality” evidence that there is no difference for physical function or mortality. (Beswick 2008)

Summary of findings:

Community delivered rehabilitation services compared to usual care or minimum intervention for elderly people after hospital discharge (Beswick 2008)

Patient or population: elderly people after hospital discharge (Beswick 2008)
Setting: Community services
Intervention: community delivered rehabilitation services
Comparison: usual care or minimum intervention

Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with usual care or minimum intervention	**Risk with community delivered rehabilitation services**				
Access to rehabilitation services - not reported				-	-	
Utilization of rehabilitation services and continuity of care (Utilization of rehabilitation) assessed with: admission to nursing homes at the end of intervention follow up: mean 6 months	125 per 1000	96 per 1000 (80 to 114)	**RR 0.77** (0.64 to 0.91)	3775 (14 RCTs)	⊕⊕⊕◯ MODERATE [1][2][3][4]	Significant more admissions to nursing homes with usual care.
Utilization of rehabilitation services	491 per 1000	466 per 1000	**RR 0.95** (0.90 to	6688	⊕⊕◯◯	Significant more hospital

Summary of findings:

Community delivered rehabilitation services compared to usual care or minimum intervention for elderly people after hospital discharge (Beswick 2008)

Patient or population: elderly people after hospital discharge (Beswick 2008)
Setting: Community services
Intervention: community delivered rehabilitation services
Comparison: usual care or minimum intervention

Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with usual care or minimum intervention	**Risk with community delivered rehabilitation services**				
and continuity of care (Utilization of rehabilitation) assessed with: Hospital admission after end of intervention follow up: mean 6 months		(442 to 486)	0.99)	(15 RCTs)	LOW [1 5 6 7]	admissions with usual care.
Rehabilitation outcomes (e.g., prevention or slowing of the loss of function, improvement or restoration of function, compensation for lost function) (Rehabilitation) assessed with: relative risk of not living at home after intervention (dependent living) follow up: mean 6 months	265 per 1000	239 per 1000 (217 to 262)	**RR 0.90** (0.82 to 0.99)	4699 (17 RCTs)	⊕⊕⊕◯ MODERATE [1 8 9 10]	Significantly more people not living at home after usual care.
Rehabilitation	The mean	The mean	-	1670	⊕⊕◯◯	CI includes both

Summary of findings:

Community delivered rehabilitation services compared to usual care or minimum intervention for elderly people after hospital discharge (Beswick 2008)

Patient or population: elderly people after hospital discharge (Beswick 2008)
Setting: Community services
Intervention: community delivered rehabilitation services
Comparison: usual care or minimum intervention

Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with usual care or minimum intervention	**Risk with community delivered rehabilitation services**				
outcomes (Rehabilitation outcomes) assessed with: Physical function at follow up of at least 6 months	rehabilitation outcomes in the control group was 0	rehabilitation outcomes in the intervention group was 0.05 standard deviations lower (0.15 lower to 0.04 higher)		(7 RCTs)	LOW [1] [11] [12] [13]	benefit and harm. As a rule of thumb, 0.2 SD is a small difference, 0.5 is moderate, and 0.8 is large.
Health outcomes: mortality (Health outcome) assessed with: death after end of intervention	204 per 1000	198 per 1000 (182 to 214)	**RR 0.97** (0.89 to 1.05)	8435 (20 RCTs)	⊕⊕◯◯ LOW [1] [14] [15] [16]	CI includes both benefit and harm

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio;

1. High risk of performance and detection bias
2. I-square=0%, p=0.62
3. All studies were conducted in high income countries (USA, Denmark, UK, Sweden, Italy, Germany and Australia). However, reproducing the intervention in low and middle income countries is expected to be feasible and to give same results.
4. Total number of participants=3775; community services=1908; usual care=1867. 95% CI does not include the null hypothesis.
5. I-square=57%, p=0.003

6. All studies were conducted in high income countries (USA, UK, Denmark, Sweden, Italy, Germany and Australia). However, this intervention is likely to be replicated in low and middle income countries.
7. Total number of participants=6688; community services=3370; usual care=3318
8. I-square=2.2%, p=0.43
9. All studies were conducted in high income countries (USA, UK, Denmark, Germany, Australia, Sweden, Italy and Hong Kong). However, reproducing the intervention in low and middle income countries is expected to be feasible and to give same results
10. Large sample size=4,699; community services=2367; usual care=2332
11. I-square=0%, p=0.72
12. All studies were conducted in high income countries (USA, Australia, Germany, Sweden, Hong Kong). However, reproducing the intervention in low and middle income countries is expected to be feasible and to give same results
13. Total number of participants=1670; community services=853; usual care=817. The point estimate includes the null hypothesis
14. I-square=5.2%, p=0.43
15. All studies were conducted in high income countries (USA, UK, Australia, Denmark, Germany, Sweden and Italy). However, reproducing the intervention in low and middle income countries is expected to be feasible and to give similar results
16. Confidence interval includes null hypothesis. Large total sample size=8435

Evidence for Shared care:

- There is "very low quality" evidence (1 RCT, 322 people (Intervention (mean) 1.49, Control group (mean) 1.31, No standard deviation available, Absolute difference 0.18, Relative difference 14%)) that shared care is not different from either primary or specialty care alone for a variety of chronic conditions (asthma, COPD, depression, cancer, congestive heart failure) on outcomes of access to rehabilitation services (perception of met and unmet needs). There is "very low quality" evidence (1 RCT, 135 people) that shared care is better than either primary or specialty care alone on outcomes of continuity of care (proportion of patients attending pulmonary rehabilitation recommended to them as part of the intervention (OR: 0.46, 95%CI 0.22-0.98)). There is "very low quality" evidence (6 RCTs, 1668 people) that there is conflicting results regarding outcome of utilization of rehabilitation services (hospital admissions). There is "very low quality" evidence (4 RCTs, 2877 people (No estimate is provided)) that there is conflicting results regarding rehabilitation outcomes (functional impairment and disability). There is "very low quality" evidence (5 RCTs, 2717 people (No estimate is provided)) that there is conflicting conclusions regarding health outcomes (quality of life). (Smith, 2007)

Evidence for psychological interventions in the community:

- There is "moderate quality" evidence for short-term health outcomes (6 RCTs, 647 people (SMD 0.42 lower, 95%CI, 0.59-0.26)), and "low quality evidence" for long-term health outcomes (6 RCTs, 727 people (SMD 0.3 lower, 95% CI 0.45-0.14)) that this intervention is better than usual care by general practitioner for people with major depression. (Bortolotti, 2009)

Summary of findings: Community rehabilitation services versus hospital/clinic for people with severe depression (Bortolotti, 2008)

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with hospital/ clinic or facility based rehabilitation	**Risk with Community rehabilitation services**				
Access to rehabilitation services - not measured				-	-	
Utilization of rehabilitation services and continuity of care - not measured				-	-	
Rehabilitation outcomes (e.g., prevention or slowing of the loss of function, improvement or restauration of function, compensation for lost function) - not measured				-	-	
Health outcome assessed with: Depressive symptoms, quality of life and patient satisfaction follow up: range 1 to 6 months		The mean health outcome in the intervention group was 0.42 standard deviations lower (0.59 lower to 0.26 lower)	-	647 (6 RCTs)	⨁⨁⨁◯ MODERATE [1][2][3][4][5]	Significant reduction in depressive symptoms with community rehabilitation services. As a rule of thumb, 0.2 SD is a small difference, 0.5 is moderate, and 0.8 is large.
Health outcomes assessed with:		The mean health outcomes in the	-	727	⨁⨁◯◯	Significant reduction in depressive

Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with hospital/ clinic or facility based rehabilitation	**Risk with Community rehabilitation services**				
Depressive symptoms follow up: mean 6 months		intervention group was 0.3 standard deviations lower (0.45 lower to 0.14 lower)		(6 RCTs)	LOW [1][3][5][6][7]	symptoms with community rehabilitation services. As a rule of thumb, 0.2 SD is a small difference, 0.5 is moderate, and 0.8 is large.

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio;

1. The studies" quality scores varied from 24 to 37. Three studies showed a score of < 30 due to several methodological limitations (small sample size; poor description of refusals, withdrawals and socio-demographic characteristics; and incomplete statistical analyses for dropouts)
2. I-square=0%; p=0.57
3. All studies were conducted in high income countries, however, these effects could be reproduced in LMIC
4. The total sample size is 647, but the point estimate is -0.42 (95% CI: -0.59 to -0.26)
5. No formal assessment for risk of publication bias, however, authors have no suspicion of publication bias
6. I-square=70.9%; p=0.0004
7. Total sample size is 433+294=727, but the point estimate is very low -0.3

Evidence for 24 hour residential care:

- There is "very low quality" evidence (1 trial, 22 people) that the 24-hour supportive housing improves utilization of services and continuity of care, rehabilitation outcomes and health outcomes for people with schizophrenia (No estimate is provided). (MacPherson, 2009)
-

Evidence for Intensive case management (ICM):

- There is "moderate quality" evidence that ICM improves access to services (i.e. not remaining in contact with psychiatric services by short, medium, long term and overall) (9 RCTs, 1633 people (RR: 0.43, 95%CI 0.3-0.61), and "moderate quality" evidence that ICM improves rehabilitation outcomes (Global Assessment of Functioning Scale, in the long-term assessment > 12 months) (5 RCTs, 818 people (MD 3.41 higher, 95%CI 1.66-5.16)). There is "low quality" evidence that ICM improves utilization of rehabilitation services (average number of days in hospital per month, by about 24 months) (24 RCTs, 3595 people (MD 0.86 lower, 95%CI: 1.37-0.34)). There is "low quality" evidence that there is no difference in health outcomes (mortality: all causes or suicide) (9 RCTs, 1456 people (RR: 0.84, 95%CI 0.48-1.47)). There is "low quality" evidence that ICM is better than less intensive ICM (where people receive the same package of

care but the professionals have caseloads of more than 20 people) for outcomes of access to rehabilitation services (reducing rate of loss to follow-up) (9 RCTS, 2195 people (RR:0.72 (95%CI: 0.85-0.99)) (Dieterich, 2010; Dieterich, 2011).

Summary of findings: Community based intensive case management (ICM) compared to standard outpatient psychiatric care for severely mentally ill people (Dieterich, 2010)

Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with standard outpatient psychiatric care	**Risk with community based intensive case management (ICM)**				
Access to rehabilitation services: Not remaining in contact with psychiatric services by short, medium, long term and overall	270 per 1000	**116 per 1000 (81 to 165)**	**RR 0.43** (0.3 to 0.61)	1633 (9 RCTs)	⊕⊕⊕◯ MODERATE [1][2][3][4]	Significant advantage in the ICM group, where people were less likely to be lost to psychiatric services than people in the standard care group. 154 fewer per 1000 (from 105 fewer to 189 fewer)
Utilization of rehabilitation services and continuity of care: average number of days in hospital per month follow up: mean 24 months		The mean utilization of rehabilitation services and continuity of care in the intervention group was 0.86 lower (1.37 lower to 0.34 lower)	-	3595 (24 RCTs)	⊕⊕◯◯ LOW [1][3][5][6]	Significant advantage in the ICM group. But the magnitude of the effects is very small since the outcome is "the number of days in hospital per month".
Rehabilitation outcomes Global Assessment of Functioning Scale (GAF) Scale from: 0 to 100 follow up: mean 12 months		The mean rehabilitation outcomes in the intervention group was 3.41 higher (1.66 higher to 5.16 higher)	-	818 (5 RCTs)	⊕⊕⊕◯ MODERATE [1][7][8][9]	Significant advantage in the ICM group. The magnitude of the effects were small (3.4 points on a scale that ranges from 0 to 100 points).

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with standard outpatient psychiatric care	**Risk with community based intensive case management (ICM)**				
Health outcomes Quality of Life: Client satisfaction questionnaire (CSQ). Scale from: 8 to 32 follow up: mean 12 months		The mean health outcomes in the intervention group was 3.23 higher (2.31 higher to 4.14 higher)	-	423 (2 RCTs)	⨁⨁◯◯ LOW [1] [10] [11] [12]	Significant advantage in the ICM group. The magnitude of the effects were large (3.2 points on a scale that ranges from 8 to 32 points)
Health outcomes Mortality ('all causes or suicide'). follow up: mean 6 months	38 per 1000	**32 per 1000 (18 to 56)**	**RR 0.84** (0.48 to 1.47)	1456 (9 RCTs)	⨁⨁◯◯ LOW [1] [13] [14] [15]	6 fewer deaths per 1000 (from 18 more to 20 fewer). CI includes both benefit and harm.
Health outcome assessed with: Mortality (all causes or suicide) follow up: mean 12 months	13 per 1000	**10 per 1000 (3 to 35)**	**RR 0.78** (0.23 to 2.62)	901 (6 RCTs)	⨁⨁◯◯ LOW [1] [16] [17]	3 fewer per 1000 (from 10 fewer to 22 more). CI includes both benefits and harms.

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio;

1. This meta-analysis included studies with high risk of selection bias (all were randomized, but there were problems with allocation concealment), detection bias (blinding), attrition bias (intention-to-treat) and selective reporting bias.
2. I-square = 49%; p = 0.05
3. Studies were conducted in high income countries (United States, Canada, Europe and Australia). However, this intervention is likely to be replicated in LMIC
4. Total sample size=1633; community care=822; standard care=811. 95% CI does not include the null hypothesis
5. I-square = 74%; p < 0.00001
6. Total sample size=3595; community care=1846; standard care=1749
7. I-square= 0%; p=0.60
8. Studies were conducted in high income countries (United States, Sweden, UK). However, this intervention is likely to be replicated in LMIC
9. Total number of participants=818; community care=433; standard care=385
10. I-square=0%; p=0.80
11. These studies were conducted in US and Denmark, . However, this intervention is likely to be replicated in LMIC
12. Total number of participants=423

13. I-square=0%; p=0.61
14. These studies were conducted in UK, Sweden and US However, this intervention is likely to be replicated in LMIC
15. Total sample size=1456; community care=741; standard care=715. 95% CI includes the null hypothesis.
16. I-square = 0%, p=0.54
17. Confidence interval includes null hypothesis. Total sample size = 901

Evidence for community living arrangements:

- There is "very low quality" evidence (13 observational studies, 11: cross-sectional and 2 quantitative) that semi-independent supported living arrangements improved outcomes of utilization of rehabilitation services in people with intellectual disability (No estimate is provided). There is "very low quality" evidence (7 observational studies) that resettlement from institutions to community settings was not associated with increased risk of mortality (health outcome) (No estimate is provided). However, there is "very low quality" evidence (3 observational studies, 28562 people) that the risk of mortality in community settings was greater than in institutions (health outcome) (No estimate is provided). (Dieterich, 2011). There is "very low quality" evidence (6 observational studies: 2 cross sectional and 4 quantitative) that health outcomes (quality of life) is better after moving from a long-stay hospital to community homes (No estimate is provided). (Kozma, 2009)

Evidence for community outreach program

- The randomized controlled trial by McConachie 2000 compared an outreach distance training program to minimal interventions in children with cerebral palsy in Bangladesh. The outreach distance training involved a parent training program with a pictorial manual of techniques demonstrated and then given to parents, and a regular group session with a rehabilitation worker involving children and their mothers. The control group in the rural setting was a minimal intervention of healthcare and nutritional advice. The control group in the urban setting was a centre-group where mother and child could meet with a therapist that was available daily. The authors of the trial had a hypothesis that for rural children the outreach parent training program would show greater benefits than the minimal intervention, and for the urban children the outreach parent training program would be as effective as the urban centre-based group program. There is "low quality" evidence (one trial, 45 people) that distance training is not different than the control groups in rural or urban groups on measures of health outcomes (measured with Independent Behaviour Assessment Scale – IBAS) (Mean Difference (MD) 0.22 lower (1.02 lower to 0.57 higher)).

(+) criteria met; (-) criteria not met; (?) unclear or not reported

Evidence for home activity program

- The randomized controlled trial by Tang 2011 compared the addition of a home activity program (HAP) to institutional-based therapy (IT) to IT alone. HAP are specific activities or tasks designed by therapists to help children gain specific goals in the daily livings. This study was conducted in Taiwan, where HAPs are usually used as a complementary intervention or as an alternative treatment if caregivers cannot bring children to the institution for regular treatment. There is "low quality" evidence that HAP added to IT is better for rehabilitation outcomes measured by the Comprehensive Developmental Inventory for Infant and Toddlers (CDIIT) and by the Pediatric Evaluation of Disability Inventory (PEDI) at 12 weeks. (Tang 2011)

Tang 2011

Domain	Assessment	Comment
Sequence generation	Low risk of bias	Coin toss used to make randomization table
Allocation concealment	High risk of bias	While an independent nurse performed the randomization, "the sequence of DD children were determined by the date of EI"
Blinding	High risk of bias	Therapists were not blinded, parents completed some of the assessments and they would be aware of whether intervention was institution based or at home.
Incomplete outcome data	Low risk of bias	No mention of missing data, no dropouts
Selective outcome reporting	Unclear	No protocol mentioned
Other	No other risk of bias identified.	

-study conducted in Taiwan.
-sample size n=70

PICO question E: Should rehabilitation services for people with complex needs (P) be provided in specialized hospitals and units (I) or only in general wards or non-specialized units (C)?

Specialized hospitals and units for rehabilitation for neurological conditions

Stroke unit (organized inpatient care) was characterized by: (1) coordinated multidisciplinary rehabilitation, (2) staff with a specialist interest in stroke or rehabilitation, (3) routine involvement of carers in the rehabilitation process and (4) regular program of education and training. (Stroke Unit Trialists, 2013)

A Spinal Cord Injury Unit (SCI Unit) is when every individual sustaining a SCI is admitted to an integrated, comprehensive system where expertise, facilities and equipment are focused on optimal patient care and cost effectiveness.(Wolfe, 2012)

Evidence for specialized hospitals and units for rehabilitation for neurological conditions:

- For stroke: There is "moderate quality" evidence that patients who receive organized in-patient care in a specialized rehabilitation unit are more likely to improve in health outcomes (being alive) (23 RCTs, 4591 people (OR: 0.81, 95%CI: 0.69-0.94)), rehabilitation outcomes (being independent) (20 RCTs, 3510 people (OR: 0.78, 95%CI: 0.68-0.89)) and at home (17 RCTs, 5855 people (OR: 0.78, 95%CI: 0.68-0.89)) (Stroke Unit Trialists, 2013).
- For spinal cord injuries, there is "very low quality" evidence that specialized rehabilitation units improve outcomes of utilization of rehabilitation services and continuity of care (length of hospital stay) (4 observational studies, 2743 people (No estimate is provided)). There is "very low quality" evidence that specialized rehabilitation units improves rehabilitation outcomes (functional status, including need for assistance in eating, grooming and impairment measured with the Barthel index) (2 observational studies, 1138 people (No estimate is provided)). There is "very low quality" evidence that specialized units also improve health outcomes (reducing the occurrence of secondary complications such as pressure ulcers) (1 observational study, 800 people (No estimate is provided)) (Wolfe, 2012)

Summary of Findings: Specialized hospital rehabilitation compared to non-specialized rehabilitation in general wards for people with disabilities (SUTC, 2013)

Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with non specialized rehabilitation in general wards	**Risk with specialized hospital rehabilitation**				
Access to rehabilitation services - not measured				-	-	
Utilization of rehabilitation services and continuity of care assessed with: the odds of death or institutionalized	404 per 1000	**346 per 1000 (316 to 377)**	**OR 0.78** (0.68 to 0.89)	3940 (22 RCTs)	⊕⊕⊕◯ MODERATE [1][2][3][4]	Stroke units significantly reduced the odds of death or institutionalized care: 58 fewer people per 1000 (from 28 fewer to 89 fewer)

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (Studies)	Quality of the evidence (GRADE)	Comments
	Risk with non specialized rehabilitation in general wards	**Risk with specialized hospital rehabilitation**				
care						
Rehabilitation outcomes assessed with: odds of death or dependency	615 per 1000	**558 per 1000 (521 to 590)**	**OR 0.79** (0.68 to 0.9)	3510 (20 RCTs)	⊕⊕⊕◯ MODERATE [1][3][5][6]	Stroke units significantly reduced the odds of death or dependency: 57 fewer people per 1000 (from 25 fewer to 94 fewer)
Health outcomes assessed with: odds of death recorded at final follow-up follow up: median 1 years	233 per 1000	**198 per 1000 (174 to 223)**	**OR 0.81** (0.69 to 0.94)	4591 (23 RCTs)	⊕⊕⊕◯ MODERATE [1][3][4][7]	Stroke units significantly reduced the mortality at 1 year: 36 fewer people per 1000 (from 11 fewer to 60 fewer)

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio;

1. Detection bias: no outcome assessor blinded
2. I2: 10%
3. 3 studies conducted in LMIC
4. Total sample size: 2046+1894=3940
5. I2=0%
6. Total sample size: 1829+1681=3510
7. I2=30%

Specialized hospitals and units for rehabilitation for unstable medical conditions

Exacerbations and hospitalizations in patients with Chronic Obstructive Pulmonary Disease (COPD) represent a major health burden. Acute exacerbations are the most common reason for hospital admissions and death among COPD patients. Pulmonary rehabilitation could play an important role in the management of COPD patients with repeated exacerbations. Pulmonary rehabilitation combines interventions on the respiratory system (i.e. smoking cessation, medications), psychological support (i.e. patient education, psychological and social support) and physical exercise and there is a large body of evidence showing that pulmonary re- habilitation improves exercise capacity and health-related quality of life (HRQL) as measured by the COPD-specific Chronic Respiratory Disease Questionnaire (CRQ).

Evidence for specialized hospitals and units for rehabilitation for unstable medical conditions

- There is “low quality” evidence that pulmonary rehabilitation is an effective and safe intervention for outcomes of utilization of rehabilitation services and continuity of care (reduce hospital admissions) (5 RCTs, 250 people (OR: 0.22, 95%CI: 0.08-0.58)), health outcomes (mortality) (3 RCTs, 110 patients (OR: 0.28, 95%CI 0.1-0.84)) and another health outcome (quality of life) (5 RCTs, 259 patients (MD: 0.97 higher, 95%CI: 0.35-1.58)) in patients who have recently suffered an exacerbation of COPD. (Puhan, 2011)

REHABILITATION FINANCING

PICO question A: Should financial resources be allocated to rehabilitation (I) or not (C)?

Author(s): Bendixen RM, Levy CE, Olive ES, Kobb RF, Mann WC
Brusco NK, Taylor NF, Watts JJ, Shields N
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Outcomes	Impact	№ of participants (Studies)	Quality of the evidence (GRADE)
Access to rehabilitation services - not reported		-	-
Utilization of rehabilitation services assessed with: Use of community rehabilitation services at follow-up	Harvey et al. (1998) measured resource utilization by rehabilitation length of stay (LOS) and mean hospital charge per day (CPD) in 945 stroke patients consecutively admitted for acute inpatient rehabilitation. Severe impairment and motor disability are the main predictors of longer LOS; motor disability and medical comorbidities predict higher CPD. Jaeger et al. (2006) examined vocational, service use and relative cost impact for schizophrenia or schizoaffective disorder of an innovative community-based vocational rehabilitation program. Months in paid work increased after enrolment, while earned income did not (most work was low wage and/or part-time). Annual inpatient days decreased precipitously, a change which could not be explained by hospitalization trends during the same period. Average relative cost units, based on charges for mental health services used, dropped over 70% following enrolment.	1021 (0 RCTs)	⨁◯◯◯ VERY LOW [1,2,3,4]
Socio-economic outcomes of the individuals/caregivers not reported		-	-
Rehabilitation outcomes (e.g., prevention or slowing of the loss of function, improvement or restoration of function, compensation for lost function) assessed with: Functional measures at end of intervention or follow-up	Brusco et al (2014) conducted a meta-analysis consisting of 29 trials with 6746 participants. There was high-quality evidence that cost was significantly reduced for rehabilitation in the home versus inpatient rehabilitation in a meta-analysis of 732 patients poststroke (pooled SMD [d]Z_.28; 95% confidence interval [CI], _.47 to _.09), without compromise to patient outcomes. In evaluating outcomes following a community-based vocational rehabilitation intervention, Jaeger (2006) found that most patients did not work during their first year in the program (1.1 months, SD = 2.8), but the period thereafter showed a statistically significant increase in annual months worked to 5.97 (SD = 4.80), an increase which was sustained	6822 (29 RCTs, reviewed in meta-analysis)	⨁◯◯◯ VERY LOW [2,3,4,5]

Outcomes	Impact	№ of participants (Studies)	Quality of the evidence (GRADE)
	among the 36 and 24 patients, respectively, included for the subsequent 2 years.		
Efficiency (e.g., per unit cost, staffing ratio) assessed with: mean cost per patient at end of intervention or follow-up	In a meta-analysis, Brusco et al (2014) found moderate quality evidence that cost was significantly reduced for inpatient rehabilitation (stroke unit) versus general acute care in a meta-analysis of 463 patients poststroke (dZ.31; 95% CI, .15e.48), with improvement to patient outcomes. These results were not replicated in 2 individual trials with a geriatric and a mixed cohort, where costs did not differ between general acute care and inpatient rehabilitation. Three of the 4 individual trials, inclusive of a stroke or orthopedic population, reported less cost for an intensive inpatient rehabilitation program compared with usual inpatient rehabilitation. Harvey et al (1998) found cortical stroke, longer interval from stroke onset to rehabilitation admission, and presence of a feeding tube to 15.5% of the variance in length of hospital stay in stroke survivors (F3,826 = 5 1.8, p < .001). Motor FIM instrument measure, tracheostomy, feeding tube, and a history of pneumonia, coronary artery disease, or renal failure predicted higher cost per day (F6820 = 90.2,p < .001). Jaeger et al (2006) found a significant decrease in inpatient hospital days following enrolment in a community-based vocational rehabilitation intervention. Annual charges for combined mental health services fell from means of $30 144 (SD = 36 317) and $29 715 (SD = 34 962) during the first two pre-admission years to $6968 (SD = 6057), $9128 (SD = 9970), $16 401 (SD = 29 977) and $13 415 (SD = 22 011) for subsequent years.	8097 (29 RCTs, reviewed in meta-analysis)	⨁◯◯◯ VERY LOW [2,3,6,7]
Effectiveness (e.g., cost-effectiveness) assessed with: meta-analysis; in-patient costs were combined with the costs of other services at end of intervention and follow-up	Based on Brusco and colleague's systematic review and meta-analyses, a single rehabilitation service may not provide health economic benefits for all patient groups and situations. For some patients, inpatient rehabilitation may be the most cost-effective method of providing rehabilitation; yet, for other patients, rehabilitation in the home or community may be the most cost-effective model of care. Jaeger et al (2006) found average relative cost units, based on charges for mental health services used, dropped over 70% following enrolment following a community-based vocational rehabilitation intervention. Bendixen (2009) examined the effects of a VA telerehabilitation program on healthcare costs. The intervention group received adaptive equipment and environmental modifications, which focused on self-care and safety within the home. Care Coordinators remotely monitored their patient's vital signs and provided education and self-management strategies for decreasing the effects of chronic illnesses and functional decline. The matched comparison group received standard VA care. Healthcare costs 12 months pre-enrollment and 12 months post-enrollment were examined through a difference-in-differences multivariable model. Using actual costs totaled for these analyses, no significant differences were detected in post-enrollment costs between intervention and the comparison group. For intervention patients, the provision of adaptive equipment and environmental modifications, plus intensive in-home monitoring of patients, led to increases in clinic visits post-intervention with decreases in hospital and nursing home stays. Quinlivan (1997) examined effectiveness of community-based care of 100 individuals with mental illness. After one year, the cost of care for this group was reduced by 69 percent, conservatorship was terminated for ten clients, and several clients became actively engaged in rehabilitation and vocational activities. Inpatient expenditures were reduced by 40 percent.	7152 (29 RCTs, reviewed in meta-analysis)	⨁◯◯◯ VERY LOW [1,2,3,7]

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the __relative effect__ of the intervention (and its 95% CI).

CI: Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio;

GRADE Working Group grades of evidence
High quality: We are very confident that the true effect lies close to that of the estimate of the effect

Outcomes	Impact	№ of participants (Studies)	Quality of the evidence (GRADE)

Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

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1. Low to moderate risk of selection, attrition reporting bias. Unclear risk of performance bias. Moderate risk of detection bias.
2. Large variability in populations, outcomes, and interventions used.
3. All studies were conducted in high-income countries (US). Reproducing the intervention in low and middle income countries is neither expected to be feasible nor expected to give the same results
4. Small sample size for community-based study. No point estimate available from individual studies.
5. Moderate risk of selection, detection, attrition reporting bias. Studies did not specifically evaluate the effect of reallocation of resources on outcomes.
6. Low risk of selection, attrition, performance and reporting bias.
7. Studies did not specifically evaluate the effect of reallocation of resources on outcomes.

Quality assessment table

Author(s): Bendixen RM, Levy CE, Olive ES, Kobb RF, Mann WC
Brusco NK, Taylor NF, Watts JJ, Shields N
Harvey, Richard L., Elliot J. Roth, and Allen W. Heinemann
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Bibliography: Bendixen RM, Levy CE, Olive ES, Kobb RF, Mann WC. Cost effectiveness of a telerehabilitation program to support chronically ill and disabled elders in their homes. Telemed J E Health. 2009 Jan;15(1):31-8. doi: 10.1089/tmj.2008.0046. PubMed PMID: 19199845; Brusco NK, Taylor NF, Watts JJ, Shields N. Economic evaluation of adult rehabilitation: a systematic review and meta-analysis of randomized controlled trials in a variety of settings. Arch Phys Med Rehabil. 2014 Jan;95(1):94-116.e4. doi: 10.1016/j.apmr.2013.03.017. Epub 2013 Apr 3. Review. PubMed PMI; Harvey, Richard L., Elliot J. Roth, and Allen W. Heinemann. "Stroke Rehabilitation: Clinical Predictors of Resource Utilization." Archives of Physical Medicine and Rehabilitation, 1998. Web.; Jaeger, Judith. Kane, John. "Community-based Vocational Rehabilitation: Effectiveness and Cost Impact of a Proposed Program Model." Australian and New Zealand Journal of Psychiatry 40.5 (2006): 452-61. Web; Quinlivan, R. (1997). Cost savings and rehabilitation: compatible goals in for-profit care for persons with serious mental illness?. Psychiatric Services (Washington, D.C.), 48(10), 1269-1271.

Quality assessment							№ of patients		Impact	Quality	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	community rehabilitation services	hospital/clinic-based rehabilitation			
Access to rehabilitation services - not measured											
-	-	-	-	-	-	-	-	-		-	
Utilization of rehabilitation services (assessed with: Use of community rehabilitation services at follow-up)											
2	Observational studies	not serious [1]	serious [2]	serious [3]	serious [4]	none	-/76	-/945	Harvey et al. (1998) measured resource utilization by rehabilitation length of stay (LOS) and mean hospital charge per day (CPD) in 945 stroke patients consecutively admitted for acute inpatient rehabilitation. Severe impairment and motor disability are the main predictors of longer LOS; motor disability and medical comorbidities predict higher CPD. Jaeger et al. (2006) examined vocational, service use and relative cost impact for schizophrenia or schizoaffective disorder of an innovative community-based vocational rehabilitation program. Months in paid work increased after enrolment, while	⊕◯◯◯ VERY LOW	

Quality assessment							№ of patients		Impact	Quality	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	community rehabilitation services	hospital/clinic-based rehabilitation			
									earned income did not (most work was low wage and/or part-time). Annual inpatient days decreased precipitously, a change which could not be explained by hospitalization trends during the same period. Average relative cost units, based on charges for mental health services used, dropped over 70% following enrolment.		
Socio-economic outcomes of the individuals/caregivers (assessed with: Cost of informal care after intervention or follow-up)											
-	-	-	-	-	-	-	-	-		-	
Rehabilitation outcomes (e.g., prevention or slowing of the loss of function, improvement or restoration of function, compensation for lost function) (assessed with: Functional measures at end of intervention or follow-up)											
2	Observational studies	serious [5]	serious [2]	serious [3]	serious [4]	See Brusco et al (2014) for breakdown of samples across community and hospital settings.	-/76	-	Brusco et al (2014) conducted a meta-analysis consisting of 29 trials with 6746 participants. There was high-quality evidence that cost was significantly reduced for rehabilitation in the home versus inpatient rehabilitation in a meta-analysis of 732 patients poststroke (pooled SMD [d]Z_.28; 95% confidence interval [CI], _.47 to _.09), without compromise to patient outcomes. In evaluating outcomes following a community-based vocational rehabilitation intervention, Jaeger (2006) found that most patients did not work during their first year in the program (1.1 months, SD = 2.8), but the period thereafter showed a statistically significant increase in annual months worked to 5.97 (SD = 4.80), an increase which was sustained among the 36 and 24 patients, respectively, included for the subsequent 2 years.	⨁◯◯◯ VERY LOW	
Efficiency (e.g., per unit cost, staffing ratio) (assessed with: mean cost per patient at end of intervention or follow-up)											
5	Observational studies	Not serious [6]	serious [2]	serious [3]	serious [7]	See Brusco et al (2014) for breakdown of samples across community and hospital settings.	-/176	-/	In a meta-analysis, Brusco et al (2014) found moderate quality evidence that cost was significantly reduced for inpatient rehabilitation (stroke unit) versus general acute care in a meta-analysis of 463 patients poststroke (dZ.31; 95% CI, .15e.48), with improvement to patient outcomes. These results were not replicated in 2 individual trials with a geriatric and a mixed cohort, where costs did not differ between general acute care and inpatient rehabilitation. Three of the 4 individual trials, inclusive of a stroke or orthopedic population, reported less cost for an intensive inpatient rehabilitation program compared with usual inpatient rehabilitation. Harvey et al (1998) found cortical stroke, longer interval from stroke onset to rehabilitation admission, and presence of a feeding tube to 15.5% of the variance in length of hospital stay in stroke	⨁◯◯◯ VERY LOW	

Quality assessment							№ of patients		Impact	Quality	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	community rehabilitation services	hospital/clinic-based rehabilitation			
									survivors (F3,826 = 5 1.8, p < .001). Motor FIM instrument measure, tracheostomy, feeding tube, and a history of pneumonia, coronary artery disease, or renal failure predicted higher cost per day (F6820 = 90.2,p < .001). Jaeger et al (2006) found a significant decrease in inpatient hospital days following enrolment in a community-based vocational rehabilitation intervention. Annual charges for combined mental health services fell from means of $30 144 (SD = 36 317) and $29 715 (SD = 34 962) during the first two pre-admission years to $6968 (SD = 6057), $9128 (SD = 9970), $16 401 (SD = 29 977) and $13 415 (SD = 22 011) for subsequent years.		
Effectiveness (e.g., cost-effectiveness) (assessed with: in-patient costs were combined with the costs of other services at end of intervention and follow-up (18 months))											
4	Observational studies	Not serious [1]	serious [2]	serious [3]	serious [7]	See Brusco et al (2014) for breakdown of samples across community and hospital settings.	-/176	-/	Based on Brusco and colleague's systematic review and meta-analyses, a single rehabilitation service may not provide health economic benefits for all patient groups and situations. For some patients, inpatient rehabilitation may be the most cost-effective method of providing rehabilitation; yet, for other patients, rehabilitation in the home or community may be the most cost-effective model of care. Jaeger et al (2006) found average relative cost units, based on charges for mental health services used, dropped over 70% following enrolment following a community-based vocational rehabilitation intervention. Bendixen (2009) examined the effects of a VA telerehabilitation program on healthcare costs. The intervention group received adaptive equipment and environmental modifications, which focused on self-care and safety within the home. Care Coordinators remotely monitored their patient's vital signs and provided education and self-management strategies for decreasing the effects of chronic illnesses and functional decline. The matched comparison group received standard VA care. Healthcare costs 12 months pre-enrollment and 12 months post-enrollment were examined through a difference-in-differences multivariable model. Using actual costs totaled for these analyses, no significant differences were detected in post-enrollment costs between intervention and the comparison group. For intervention patients, the provision of adaptive equipment and environmental modifications, plus intensive in-home monitoring of patients, led to increases in clinic visits post-intervention with decreases in hospital and nursing home stays. Quinlivan (1997) examined effectiveness of community-based care of 100 individuals with mental illness. After one year, the cost of care for this group was reduced by 69 percent, conservatorship was terminated for ten clients, and several clients became actively engaged in rehabilitation and vocational activities. Inpatient expenditures were reduced by 40 percent.	⨁◯◯◯ VERY LOW	

1. Low to moderate risk of selection, attrition reporting bias. Unclear risk of performance bias. Moderate risk of detection bias.

2. Large variability in populations, outcomes, and interventions used.
3. All studies were conducted in high-income countries (US). Reproducing the intervention in low and middle income countries is neither expected to be feasible nor expected to give the same results
4. Small sample size for community-based study. No point estimate available from individual studies.
5. Moderate risk of selection, detection, attrition reporting bias. Studies did not specifically evaluate the effect of reallocation of resources on outcomes.
6. Low risk of selection, attrition, performance and reporting bias.
7. Studies did not specifically evaluate the effect of reallocation of resources on outcomes.

TABLE OF CHARACTERISTICS OF INCLUDED STUDIES: 29 RCTs AND ONE OBSERVATIONAL STUDY

Study Year	Study type Country Setting Follow-up	Participants	Interventions	Outcome	Risk of Bias	Main Findings
Harvey 1998	STUDY DESIGN: Observational study: statistical analysis of data prospectively collected from stroke rehabilitation patients COUNTRY: USA SETTING: large, urban, academic rehabilitation facility DURATION:	945 people with stroke consecutively admitted for in-patient rehabilitation	Stroke rehabilitation	Predictors of resource utilization: - rehabilitation length of stay - mean hospital charge per day	High risk of selection, detection and measurement bias	Severe impairment and motor disability are main predictors of longer length of stroke rehabilitation. Motor disability and medical comorbidities (tracheostomy, feeding tube, history of pneumonia, coronary artery disease and renal failure) predict higher mean hospital charge per day. resource utilization by for stroke rehabilitation. Medical history, physical examination and functional assessment will inform and anticipate resource needs for stroke rehabilitation.
Jaeger 2006	STUDY DESIGN: observational study: retrospective naturalistic time series study COUNTRY: USA SETTING: community delivered vocational rehabilitation combined with in-patient rehabilitation DURATION: January 1988 to July 1993	197 people with schizophrenia	INTERVENTION: N=76 Innovative community delivered psychiatric rehabilitation combined with in-patient care: patient-driven; individually tailored to personal interest and abilities; using state of the art equipment and technologies; vocational rehabilitation linked to competitive industry; supported employment outcomes	- Vocational functioning: annual number of months of salaried work (part-time or full time; mainstream or non-mainstream) and earned income. - Number of in-patient days - Relative mental health cost units (services provided)	High risk of selection, detection, attrition and measurement bias	Reduction in the number of in-patient days ($p<0.02$) in the vocational rehabilitation group. Reduction of the relative mental health cost units by 70% in the first year: derived from reduction of hospitalizations and utilization of most costly services.

			CONTROL N=121 People excluded from entering the programme			
Brusco 2014	STUDY DESIGN: Meta-Analysis (29 RCTs, with 6746 participants from a variety of settings COUNTRY: Multiple High Income Countries DURATION: from the earliest possible date until May 2011	**Inclusion criteria:** People admitted to health care rehabilitation programme >18 years old **Exclusion criteria:** Patients admitted to a health service program for the acute phase of health management, or for primary reasons of health promotion or health prevention Rehabilitation primarily related with: - substance abuse/addiction - mental health issues - obstetrics - paediatrics - pain management - dental - pharmaceutic/supplement intervention -vision and hearing -introduction of technologic equipment	INTERVENTION: Adult in-patient rehabilitation CONTROL Alternative care	ASSESSMENTS OF COSTS: - Full prospective economic evaluation comparing two or more programme alternatives, examining both the costs and consequences. Costs can be measures as: - Cost-minimization analysis - Cost-effectiveness analysis - Cost-utility analysis, inclusive of economic modelling - Cost-benefit analysis - Economic modelling OTHER ASSESSMENTS:	Twenty-one trials achieved at least 50% low-risk scores for the 6 criteria in the risk of bias assessment. The criteria of baseline comparability and complete data reporting were fulfilled by 27 and 18 trials, respectively. The criteria of blinding of outcome assessment and allocation concealment were fulfilled by 8 and 13 trials, respectively, representing the highest risk of bias. One trial had a low risk of bias for all 6 criteria.48 Twenty-six trials achieved at least 50% yes scores for applicable criteria in the Drummond checklist for the quality of the economic evaluation. There were 7 criteria fulfilled by all trials, and 14 criteria were fulfilled by <50% of the trials	Results were synthesized using standardized mean differences (SMDs) and meta-analyses for the primary outcome of cost. The Grading of Recommendations Assessment, Development, and Evaluation was applied to assess for risk of bias across studies for meta-analyses. There was high-quality evidence that cost was significantly reduced for rehabilitation in the home versus inpatient rehabilitation in a meta-analysis of 732 patients poststroke (pooled SMD [d]Z_.28; 95% confidence interval [CI], _.47 to _.09), without compromise to patient outcomes. Results of individual trials in other patient groups (orthopedic, rheumatoid arthritis, and geriatric) receiving rehabilitation in the home or community were generally consistent with the meta-analysis. There was moderate quality evidence that cost was significantly reduced for inpatient rehabilitation (stroke unit) versus general acute care in a meta-analysis of 463 patients poststroke (dZ.31; 95% CI, .15e.48), with improvement to patient outcomes. These results were not replicated in 2 individual trials with a geriatric and a mixed cohort, where costs did not differ between general acute care and inpatient rehabilitation. Three of the 4 individual trials, inclusive of a stroke or orthopedic population, reported less cost for an intensive inpatient rehabilitation program compared with usual inpatient rehabilitation. Sensitivity analysis included a health service perspective and varied inflation rates with no change to the significant findings of the meta-analyses. Conclusions: Based on this systematic review and meta-analyses, a single rehabilitation service may not provide health economic benefits for all patient groups and situations. For some patients, inpatient rehabilitation may be the most cost-effective method of providing rehabilitation; yet, for other patients, rehabilitation in the home or community may be the most cost-effective model of care. To achieve cost-effective outcomes, the ideal combination of rehabilitation services and patient inclusion criteria, as well as further data for non-stroke populations, warrants further research.
Chen	STUDY DESIGN:	Stroke	INTERVENTION	Cost effectiveness analysis	- Unclear risk of selection bias	Abstract not available

2006	RCT COUNTRY: China FOLLOW-UP: 6 months		N=35 In-patient rehabilitation over three stages CONTROL N=35 General acute care	- Currency: Chinese Yuan - Year of costing: 2003 **Economic Evaluation:** DURING REHABILITATION - Direct medical fees - Direct nonmedical fees - Indirect fees DURING FOLLOW-UP PERIOD - Direct medical fees - Direct nonmedical fees - Indirect fees	(random sequence generation, - High risk of selection bias (allocation concealment) - Low risk of detection bias (blinding of all outcome assessments) - High risk of attrition bias (incomplete data for all outcomes) - Unclear risk of reporting bias (selective reporting) - Low risk of selection bias (from imbalances at baseline)	
Claesson 2000	STUDY DESIGN: RCT COUNTRY: Sweden FOLLOW-UP: 12 months	Stroke	INTERVENTION N=166 In-patient stroke unit (acute and sub-acute) CONTROL N=83 General acute care	Cost minimization analysis: - Currency: Swedish krona - Year of costing: 1996 **Economic Evaluation:** DURING REHABILITATION - Initial hospitalization for index stroke DURING FOLLOW-UP PERIOD - Acute hospitalization from discharge to 12months - Non acute hospitalization from discharge to 12 months - Institutionalized living from discharge to 12 months - Outpatient care from discharge to 12 months Different kinds of support from discharge to 12 months - Other costs from discharge to 12 months	- Low risk of selection bias (random sequence generation, - Uncertain risk of selection bias (allocation concealment) - Low risk of detection bias (blinding of all outcome assessments) - Low risk of attrition bias (incomplete data for all outcomes) - Low risk of reporting bias (selective reporting) - Low risk of selection bias (from imbalances at baseline)	Mean annual cost per patient was 170 000 Swedish crowns (SEK) (equivalent to $25 373) and 191 000 SEK ($28 507) in the stroke unit and the general medical ward groups, respectively (p=0.811). Seventy percent of the total cost was for inpatient care, and 30% was for outpatient and informal care. For patients with mild, moderate, and severe stroke, the mean annual costs per patient were 107 000 SEK ($15 970), 263 000 SEK ($39 254), and 220 000 SEK ($32 836), respectively (p<0.001). There was no statistical difference in age or nonstroke diagnosis.
Xue 2004	STUDY DESIGN: RCT COUNTRY: China FOLLOW-UP: in-patient discharge	Stroke	INTERVENTION N=78 In-patient stroke unit (acute and sub-acute) CONTROL N=72 General acute care	Cost effectiveness analysis - Currency: Chinese Yuan - Year of costing: 2004 **Economic Evaluation:** DURING REHABILITATION Stroke unit costs DURING FOLLOW-UP PERIOD	- High risk of selection bias (random sequence generation, allocation concealment) - Low risk of detection bias (blinding of all outcome assessments) - High risk of attrition bias (incomplete data for all	Abstract not available

				Not measured	outcomes) - Unclear risk of reporting bias (selective reporting) - Low risk of selection bias (from imbalances at baseline)	
Bendixen 2009	Retrospective matched comparison COUNTRY: USA Veterans Health Administration and participants homes Follow-up: 12 months	Chronically ill and disabled elders registered in the Veterans Health Administration	INTERVENTION: N=115 Tele rehabilitation home-based rehabilitation integrated to hospital care CONTROL N=115 Veterans Health Administration standard care	- Healthcare costs incurred by inpatient hospital bed days of care (hospitalizations) - Outpatient clinic visits, emergency room visits - Nursing home care unit Costs presented exclude costs of contract medical services provided at non-VA facilities.	High risk of selection and detection bias	No difference between the two groups. Pre and post analysis of home tele-rehabilitation demonstrate reduction in hospital length of stay and reduction of nursing home stay.
Quinlivan 1997	Report of the 1995 San Diego County Mental Health Services experience	100 individuals with mental illness	Rehabilitation focused services for in-patient care	- Resource use - Clinical outomes		After one year of programme: cost of care reduced by 69%

RCT=randomized controlled trial

REFERENCES TO STUDIES

Bendixen 2009

Bendixen RM, Levy CE, Olive ES, Kobb RF, Mann WC. Cost effectiveness of a telerehabilitation program to support chronically ill and disabled elders in their homes. Telemed J E Health. 2009 Jan;15(1):31-8. doi: 10.1089/tmj.2008.0046. PubMed PMID: 19199845.

Brusco 2014

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Harvey 1998

Harvey, Richard L., Elliot J. Roth, and Allen W. Heinemann. "Stroke Rehabilitation: Clinical Predictors of Resource Utilization." Archives of Physical Medicine and Rehabilitation, 1998. Web.

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Quinlivan 1997

Quinlivan, R. (1997). Cost savings and rehabilitation: compatible goals in for-profit care for persons with serious mental illness?. Psychiatric Services (Washington, D.C.), 48(10), 1269-1271.

Xue 2004

Xue J, Xu J, Guo Q, Bai L, Yang C, Long Y. [Economic health evaluation for stroke team mode] [Chinese]. Chin Clin Rehabil 2004; 8:7622-4.

PICO question B: Should health insurance cover rehabilitation services (I) or not (C)?

Summary of findings and GRADE tables

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Kogan MD, Newacheck PW, Blumberg SJ, Ghandour RM, Singh GK, Strickland BB, van Dyck PC
Skinner AC, Mayer ML

Bibliography: Iezzoni LI, Frakt AB, Pizer SD. Uninsured persons with disability confront substantial barriers to health care services. Disabil Health J. 2011 Oct;4(4):238-44. doi: 10.1016/j.dhjo.2011.06.001. Epub 2011 Sep 6. PubMed PMID: 22014671. Kogan MD, Newacheck PW, Blumberg SJ, Ghandour RM, Singh GK, Strickland BB, van Dyck PC. Underinsurance among children in the United States. N Engl J Med. 2010 Aug 26;363(9):841-51. doi: 10.1056/NEJMsa0909994. PubMed PMID: 20818845. Skinner AC, Mayer ML. Effects of insurance status on children's access to specialty care: a systematic review of the literature. BMC Health Serv Res. 2007 Nov 28;7:194. Review. PubMed PMID: 18045482; PubMed Central PMCID: PMC2222624.

Outcomes	**Anticipated absolute effects*** (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Quality of the evidence (GRADE)	Comments
	Risk with health insurance not cover rehabilitation	**Risk with health insurance cover rehabilitation**				
Access to health service assessed with: 2007 National Survey of Children's Health	**Study population**		**OR 2.53** (1.98 to 3.24)	51620000 (1 observational study)	⊕◯◯◯ VERY LOW[1]	Children without insurance are significantly more likely to be without usual source of care, personal doctor or nurse, referrals for needed care, coordinated care and family-centred care.
	0 per 1000	**0 per 1000** (0 to 0)				
Utilization of health system assessed with: 2007 National Survey of Children's Health	**Study population**		**OR 4.49** (3.30 to 6.11)	51620000 (1 observational study)	⊕◯◯◯ VERY LOW[1]	Children without insurance coverage are at increased risk of delayed or forgone care, difficulty in obtaining specialist care (OR 1.57, 95% CI: 0.92-2.68)
	0 per 1000	**0 per 1000** (0 to 0)				
Access to	**Study population**		**OR 1.19**	109703	⊕◯◯◯	Reporting of access

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Quality of the evidence (GRADE)	Comments
	Risk with health insurance not cover rehabilitation	**Risk with health insurance cover rehabilitation**				
health service assessed with: access barrier	0 per 1000	**0 per 1000** (0 to 0)	(1.12 to 1.27)	(1 observational study)	VERY LOW[1]	barriers is higher in people without insurance
Utilization of health care assessed with: use of specialized care	**Study population**		not estimable	44221 (5 observational studies)	⨁◯◯◯ VERY LOW[1]	Consistent negative association between no insurance and access to specialty care.
	0 per 1000	**0 per 1000** (0 to 0)				

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio;

GRADE Working Group grades of evidence
High quality: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

1. Study was conducted in high income country (USA). Indirect evidence for health care in general

Quality assessment tables

Author(s): Iezzoni LI, Frakt AB, Pizer SD
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Quality assessment							№ of patients		Effect		Quality	Importance
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**health insurance cover rehabilitation**	**health insurance not cover rehabilitation**	**Relative (95% CI)**	**Absolute (95% CI)**		
Access to health service (assessed with: 2007 National Survey of Children's Health)												
1	cross-sectional studies	not serious	not serious	serious [1]	not serious	none	-/48202000	-/3418000	**OR 2.53** (1.98 to 3.24)	0 fewer per 1000 (from 0 fewer to 0 fewer)	⊕◯◯◯ VERY LOW[1]	
Utilization of health system (assessed with: 2007 National Survey of Children's Health)												

Quality assessment							№ of patients		Effect		Quality	Importance
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**health insurance cover rehabilitation**	**health insurance not cover rehabilitation**	**Relative (95% CI)**	**Absolute (95% CI)**		
1	cross-sectional studies	not serious	not serious	serious [1]	not serious	none	-/48202000	-/3418000	**OR 4.49** (3.30 to 6.11)	0 fewer per 1000 (from 0 fewer to 0 fewer)	⨁◯◯◯ VERY LOW[1]	
Access to health service (assessed with: access barrier)												
1	cross-sectional studies	not serious	not serious	serious [1]	not serious	none	-/87104	-/22599	**OR 1.19** (1.12 to 1.27)	0 fewer per 1000 (from 0 fewer to 0 fewer)	⨁◯◯◯ VERY LOW[1]	
Utilization of health care (assessed with: use of specialized care)												
5	other design	not serious	not serious	serious [1]	not serious	none	-/44221		not estimable		⨁◯◯◯ VERY LOW[1]	

MD – mean difference, RR – relative risk

1. Study was conducted in high income country (USA). Indirect evidence for health care in general.

TABLE OF CHARACTERISTICS OF INCLUDED STUDIES: 2 OBSERVATIONAL STUDIES AND 1 SYSTEMATIC REVIEW IN TOTAL

Study Year	Study type Country Setting Follow-up	Participants	Interventions	Outcome	Risk of Bias	Main Findings
Iezzoni 2011	STUDY DESIGN: Observational study: The Medical Expenditure Panel Survey COUNTRY: USA SETTING: National Survey DURATION: 2000 to 2006 FOLLOW-UP: no follow ups	109,703 people with disabilities	NO INTERVENTION	- Insurance coverage - disability status - demographic characteristics	Low risk of selection, detection and reporting bias. Uncertain risk of measurement bias.	Reporting access barriers is higher in people without insurance.
Kogan 2010	STUDY DESIGN: Observational study: data from the 2007 National Survey on Children's Health (sample size: 91,642 children), with random-digit-dial survey	Children under 18 years old (n=91,642)	NO INTERVENTION	Percentage of children's insurance coverage during the past year's categories: - never insured - sometimes insured - continuously insured, but inadequately covered (underinsured) - continuously insured and adequately covered	Low risk of selection, detection and reporting bias. Uncertain risk of measurement bias.	Children without health insurance coverage are more likely to have problems with health care access and quality (be without care, personal doctors and nurses, referrals for needed care, coordinated care and family-centred care). Children without health insurance coverage are at increased risk of

	COUNTRY: USA SETTING: Telephone survey DURATION: April 2007 to July 2008 FOLLOW-UP: no follow ups			Association of above categories with: - access to health care service - utilization of the health system: delayed or forgone care - access to specialized care		delayed or forgone care and difficulty in obtaining specialized care.
Skinner 2007	STUDY DESIGN: Systematic review COUNTRY: USA SETTING: Telephone survey DURATION: 1 January 1992 to 31 July 2006	44221 (five observational studies)	NO INTERVENTION	Effects of health insurance status on access to specialized care (defined as care delivered by non-primary care physicians)		Insurance coverage influences access to specialized care: there is a negative association between un insurance and access to specialty care for children (less usage and delayed services). The ideal structure is still to be identified.

REFERENCES TO STUDIES

Iezzoni 2011

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Kogan 2010

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Skinner 2007

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