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Chapter 31 Enhanced inpatient access to physiotherapy and occupational therapy

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31 Enhanced in-patient access to physiotherapy and/or occupational therapy

31.1 Introduction

Physiotherapy and occupational therapy are an important component in the recovery from acute illness, particularly in chest disease, injurious falls, stroke and prolonged admission or with pre-existing frailty. More intense therapy would be expected to lead to shorter hospital stays and quicker recovery from immobility caused by illness. Likewise, the risk of physical deterioration from lack of access to therapies over a weekend would be expected to extend hospital stay and increase comorbidities.

Currently, 7-day services are regularly expected in specialist services such as respiratory units, and trauma units, but less so on general medical wards.

31.2 Review question: Is enhanced access to physiotherapy and/or occupational therapy for hospital patients clinically and cost effective?

For full details see review protocol in Appendix A.

Table 1: PICO characteristics of review question

Population	Adults and young people (16 years and over) admitted to hospital with a suspected or confirmed AME. Strata: Stroke COPD Elderly Critical illness Cardiac failure Unselected/undefined.
Interventions	7 day services for enhanced therapy access. Physiotherapists. Occupational therapists.
Comparisons	Less than 7 day services (standard hours defined as 9am-5pm, Monday to Friday; anything above should be considered as enhanced, studies will define). No in-hospital physiotherapist and/or occupational therapist.
Outcomes	<ul style="list-style-type: none"> • Mortality (CRITICAL) • Quality of life (CRITICAL) • Length of stay (CRITICAL) • Discharge to normal place of residency (IMPORTANT) • Avoidable adverse events (CRITICAL) • Patient and/or carer satisfaction (CRITICAL) • Readmission up to 30 days (IMPORTANT) • Time to mobilisation (IMPORTANT)

	<ul style="list-style-type: none"> • Delayed transfers of care (IMPORTANT)
Study design	Systematic reviews (SRs) of RCTs, RCTs, observational studies only to be included if no relevant SRs or RCTs are identified.

31.3 Clinical evidence

We searched for randomised controlled trials comparing the effectiveness of enhanced (7-day a week) inpatient access to physiotherapy and/or occupational therapy versus standard 5-day inpatient access for patients hospitalised with an acute medical emergency.

Two RCTs (3 papers) were included in the review;^{23,31,50} these are summarised in Table 2 below. Evidence from these studies is summarised in the clinical evidence summary below (Table 3). See also the study selection flow chart in Appendix B, study evidence tables in Appendix D, forest plots in Appendix C, GRADE tables in Appendix F and excluded studies list in Appendix G.

Table 2: Summary of studies included in the review

Study	Intervention and comparison	Population	Outcomes	Comments
English 2015 ²³ , Hillier 2011 ³¹ RCT	Physiotherapy 7 days a week. Versus Physiotherapy 5 days a week.	n=283 Participants were people with stroke admitted to in-patient rehabilitation facilities with moderate disability (FIM total score between 40 and 80 points or motor subscale score of between 38 and 62 points).	Length of stay (narrative), health-related quality of life, adverse events.	Three-armed RCT. Only 2 arms relevant for this question (5 days a week physiotherapy and 7 days a week physiotherapy). Strata: Stroke.
Said 2012 ⁵⁰ RCT	Physiotherapy from Monday to Friday supervised by physiotherapist or physiotherapy assistant or group exercise classes + mobility activities in the late afternoons/evening and on weekends, delivered by physiotherapist or physiotherapy assistant. Versus Physiotherapy from	n=47 Age over 60 and had 'improve mobility/walking' as a goal at admission.	Mortality, readmission to acute hospital, adverse events, quality of life (mobility index), length of stay in rehabilitation (narrative).	Strata: the elderly.

Emergency and acute medical care

Study	Intervention and comparison	Population	Outcomes	Comments
	Monday to Friday supervised by physiotherapist or physiotherapy assistant or group exercise classes.			

Table 3: Clinical evidence profile: enhanced versus standard access to physio- and/or occupational therapy

Outcomes	No of Participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects	
				Risk with standard access	Risk difference with enhanced access (95% CI)
Strata: the Elderly					
Mortality (at discharge)	47 (1 study)	⊕⊕⊕⊕ HIGH	Not estimable	Moderate 0 per 1000	-
Mortality (at 3 months)	47 (1 study)	⊕⊖⊖⊖ VERY LOW ^{a,b} due to risk of bias, imprecision	RR 0.85 (0.21 to 3.4)	Moderate 160 per 1000	24 fewer per 1000 (from 126 fewer to 384 more)
Adverse events (non-injurious fall)	47 (1 study)	⊕⊕⊖⊖ LOW ^b due to imprecision	RR 1.14 (0.08 to 17.11)	Moderate 40 per 1000	6 more per 1000 (from 37 fewer to 644 more)
Readmission to acute hospital	47 (1 study)	⊕⊕⊕⊕ HIGH	Not estimable	Moderate 0 per 1000	-
Quality of life (change in mobility from baseline)	47 (1 study)	⊕⊕⊕⊖ MODERATE ^b due to imprecision		7.2	The mean quality of life (change in mobility from baseline) in the intervention groups was 2.4 higher (2.75 lower to 7.55 higher)
Strata: Stroke					
Adverse events	190 (1 study)	⊕⊕⊖⊖ LOW ^b due to imprecision	RR 1.31 (0.65 to 2.61)	Moderate 128 per 1000	40 more per 1000 (from 45 fewer to 206 more)
Length of rehabilitation stay	190 (1 study)	⊕⊕⊕⊕ HIGH		See comment ^c	The mean length of rehabilitation stay in the intervention groups was 2.9 days lower (17.9 lower to 12.1 higher)

(a) Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias.

(b) Downgraded by 1 increment if the confidence interval crossed 1 MID or by 2 increments if the confidence interval crossed both MIDs.

(c) No mean provided; only median which is reported narratively below.

Narrative findings

Length of stay

English 2015²³ reported a median length of stay of 45.0 days (IQR \pm 38.0; range 14 to 460) for the 7 day a week therapy intervention group and a median of 55.0 days (IQR \pm 49.0; range 14 to 240) for the usual care therapy.

Said 2012⁵⁰ reported a median rehabilitation stay of 16 days (IQR 11-27.5; range 8 to 49) for the enhanced access intervention group compared to a median of 15 days (IQR 13.0-22.5; range 8 to 41) for the control group.

Quality of life

English 2015²³ reported the median overall score of the Australian Quality of Life scale to be 0.2 (IQR \pm 0.40; range -0.2 to 1.0) for the intervention group and 0.24 (IQR \pm 0.47; range -0.2 to 1.0) for the usual care group.

31.4 Economic evidence

Published literature

No relevant economic evaluations were identified.

The economic article selection protocol and flow chart for the whole guideline can be found in the guideline's Appendix 41A and Appendix 41B.

New cost-effectiveness analysis

An original cost-effectiveness analysis was conducted for this topic. This is summarised in the economic evidence profile below (Table 4) and is detailed in Chapter 41.

Table 4: Economic evidence profile: Extended access to therapy

Study	Applicability	Limitations	Other comments	Incremental cost	Incremental effects	Cost effectiveness	Uncertainty
National Guideline Centre 2017 UK	Directly applicable	Potentially serious limitations ^(a)	Study design: Cohort model based on lifetables Evaluation type: Cost-utility Intervention: 7 day access to physiotherapy on medical wards versus 5 day access Population: Patients admitted to medical wards .	-£90	+0.0018 QALYs	Extended access dominates Standard access	Extended access remained dominant with more conservative treatment effects or increased staff costs
National Guideline Centre 2017 UK	Directly applicable	Potentially serious limitations ^(a)	Study design: Discrete event simulation Evaluation type: Cost-utility Intervention: 7 day access to physiotherapy on medical wards versus 5 day access Population: All patients presenting at a large DGH with an acute illness	-£7.21	+0.00085 QALYs	Extended access dominates Standard access	Extended access remained dominant with more conservative treatment effects
National Guideline Centre 2017 UK	Directly applicable	Potentially serious limitations ^(a)	Study design: Cohort model based on lifetables Intervention: 7 day access and evening access to therapy in the Emergency department (ED) versus 5 day access 9am-5pm Evaluation type: Cost minimisation Population: Patients attending the ED with an acute medical illness	+£0.72	-	Extended access dominated by Standard access	With more optimistic treatment effects, extended access was cost saving and therefore dominant
National Guideline Centre 2017	Directly applicable	Potentially serious limitations ^(a)	Study design: Discrete event simulation Intervention: 7 day access and	+£4.11	-0.00012 QALYs	Extended access dominated by Standard access	With more optimistic treatment effects, extended access was still dominated

Study	Applicability	Limitations	Other comments	Incremental cost	Incremental effects	Cost effectiveness	Uncertainty
UK			evening access to therapy in the ED versus 5 day access 9am-5pm Evaluation type: Cost-utility analysis Population: All patients presenting at a large DGH with an acute illness				

Abbreviations: CUA: cost-utility analysis; ICER: incremental cost-effectiveness ratio; MD: mean difference; n/a: not applicable.

(a) Treatment effects were elicited from experts

31.5 Evidence statements

Clinical

Older people

- One study comprising 47 people evaluated the role of enhanced access to physiotherapy for improving outcomes in secondary care in older people recovering from an AME. The evidence suggested that enhanced access to physiotherapy and/or occupational therapy may provide benefits in reduced mortality at 3 months (1 study, very low quality) and quality of life (1 study, moderate quality). However, there was no effect on readmission (1 study, high quality), adverse events expressed as non-injurious falls (1 study, low quality) and mortality at discharge (1 study, high quality).

Stroke

- One study comprising 283 people evaluated the role of enhanced access to physiotherapy for improving outcomes in secondary care in adults and young people who are recovering from a stroke. The evidence suggested that enhanced access to physiotherapy and/or occupational therapy had more adverse events - falls and other unspecified events (1 study, low quality) but did provide benefit in a reduced length of rehabilitation (1 study, high quality).

Economic

- Two original cost-utility analyses (cohort model and simulation model) found that extended access to physiotherapy and occupational therapy for people recovering from an acute medical emergency (AME) on the general medical wards was dominant, increasing QALYs and cost saving (cost difference: -£90 per patient). This analysis was assessed as directly applicable with potentially serious limitations.
- One original cost-minimisation analysis (cohort model) found that extended access to physiotherapy and occupational therapy for people presenting in the Emergency Department with a suspected AME was cost increasing (cost difference: +£0.72 per patient) . This analysis was assessed as directly applicable with potentially serious limitations.
- One original cost-utility analysis (simulation model) found that extended access to physiotherapy and occupational therapy for people recovering from an AME on the general medical wards was dominated by standard access. This analysis was assessed as directly applicable with potentially serious limitations.

31.6 Recommendations and link to evidence

Recommendations	18. Provide access to physiotherapy and occupational therapy 7 days a week for people admitted to hospital with a medical emergency.
Research recommendation	-
Relative values of different outcomes	The guideline committee chose the outcomes of mortality, patient and/or carer satisfaction, quality of life, length of stay and avoidable adverse events as critical outcomes. Discharge to normal place of residency, readmission, time to mobilisation and delayed transfers of care were selected as important outcomes.
Trade-off between benefits and harms	<p>Two RCTs were identified that compared enhanced therapy access to physiotherapy to standard access in 2 populations (stroke patients and older people). They were analysed separately.</p> <p>Older People</p> <p>One study comprising 47 people evaluated the role of enhanced access to physiotherapy in older people. The evidence suggested that enhanced access to physiotherapy may provide a benefit in reduced mortality (at 3 months) and quality of life (change in mobility from baseline). However, there was no effect on readmission, adverse events (non- injurious falls) and mortality at discharge.</p> <p>Stroke patients</p> <p>One study comprising 283 people evaluated the role of enhanced access to physiotherapy in stroke patients. The evidence suggested those with enhanced access to physiotherapy had more adverse events (falls and other unspecific events) but it did provide a benefit in a reduced length of rehabilitation stay.</p> <p>The committee considered that the reduced length of stay may coincide with an improved quality of life (for example, by enhancing mobility), but this was not measured by the study. There was some evidence to suggest more adverse events, falls in particular, in the enhanced access group. The committee noted that this might be a result of increasing rehabilitation and mobility resulting in an increased number of falls.</p> <p>No evidence was found for discharge to normal place of residency, patient and/or carer satisfaction, time to mobilisation and delayed transfers of care.</p> <p>The committee discussed that physiotherapists and occupational therapists serve 2 major functions; they can potentially avert or reduce the risk of complications (for example, DVTs, pressure ulcers, postural instability) but may also increase the speed with which patients can be discharged as early mobilisation improves function.</p> <p>Assessment by a qualified therapist is required to develop a treatment plan in order to mobilise patients early, reduce or avert secondary complications and shorten their length of stay. The committee felt that early mobilisation is crucial but noted that if patients are admitted on a Friday for example, their treatment is delayed by 2 days if no qualified therapist can assess the patient before Monday. The committee were aware that qualified therapists are also required to facilitate patient discharge. The committee felt that if a hospital already provided a 7-day service, physiotherapy and occupational therapy assessment should be provided as part of this service to facilitate discharge and improve patient flow. It also facilitates a more equitable NHS service to patients irrespective of the day of their admission. The committee considered that, once the management plan had been formed by a qualified therapist, it could be implemented by assistants or nurses, which may reduce the costs of this intervention.</p> <p>The committee highlighted that the enhanced service should be targeted for patients in need of therapy and may be unnecessary for those already mobile or bedbound.</p>

	<p>The committee decided to make a strong recommendation because there was high quality evidence for a reduction in length of stay and moderate/low quality evidence for benefits to mortality at 3 months and quality of life.</p> <p>There was no evidence for occupational therapy but the committee considered that the evidence for physiotherapy was likely to be applicable to occupational therapy as well.</p>
<p>Trade-off between net effects and costs</p>	<p>No economic studies were identified.</p> <p>The clinical review showed reduced length of stay and an increase in quality of life as well as a slight improvement in survival, which supports a recommendation of enhanced access to physiotherapy in terms of clinical effectiveness.</p> <p>The committee noted that the cost of the intervention could be reduced if conducted partly by a therapy assistant or as part of an exercise class where multiple people are being treated together. They also noted that physiotherapy and occupational therapy are usually delivered by a team of staff with mixed skills and therefore, it is not appropriate to evaluate the two separately.</p> <p>New cost-effectiveness analyses were conducted for 2 areas of enhancing therapy access, the ED and medical wards. A cohort model was built to assess the cost-effectiveness of enhanced therapy access. A hospital simulation model was also built to explore how the intervention's impact on hospital flow could affect its cost-effectiveness. Both models used inputs from bespoke data analysis, national data and treatment effects (primarily length of stay reduction and modest reductions in adverse events) that were informed by the above review but elicited from the committee members. The full model write up can be found in Chapter 41.</p> <p>Extended access to physiotherapy/occupational therapy in the emergency department</p> <p>The models compared extended access to therapy in the ED versus standard staffing hours. Extended access involves additional availability of physiotherapists and occupational therapists in the ED, using additional resources in terms of staff time at an incremental cost to normal care.</p> <p>The cohort model found that extended access in the ED was slightly cost increasing in the base case analysis with assumed no effect on quality of life, hence no gain in quality-adjusted life-years. With less conservative assumptions about the effect of the extended access on admission, it was cost saving. The committee noted that extended access is a costly intervention with a limited amount of time to impact on the patients. The main impact of extended access in the ED is likely to be on hospital flow, not fully taken into account by the cohort model.</p> <p>In the hospital simulation model, extended access in ED was cost increasing with no gain in quality-adjusted life-years. There were decreases in admissions, but only a small impact on four-hour breaches and hospital length of stay. However, there was no impact on other important outcomes, such as number of medical outliers and mortality.</p> <p>The committee could not conclude that extended access in the ED would be cost effective. It might have a significantly positive impact on hospital flow and patient outcomes at a cost effective level in some hospitals operating at sub-optimal levels of efficiency within the emergency department</p> <p>Extended access to physiotherapy/occupational therapy in the general medical wards</p> <p>Both models compared daily therapy on medical wards with weekday access only. Extended access involves additional availability of physiotherapists and occupational therapists in the general medical wards, using additional resources in terms of staff time at an incremental cost to normal care.</p> <p>In both models, extended access in the wards was dominant, cost saving with a gain in quality-adjusted life-years. These findings are similar to those found in a</p>

	<p>randomised trial of rehabilitation at the weekend in Australia, albeit in a mixed medical/surgical population¹⁴. The committee also noted the impact on important outcomes linked to hospital flow. There were decreases in four-hour breeches and medical outliers and a modest reduction in mortality.</p> <p>The committee concluded that extended access on medical wards could have a significantly positive impact on hospital flow and patient outcomes at a cost-effective level in hospitals. This result was robust to sensitivity analysis.</p> <p>Conclusions</p> <p>The committee concluded that extended access to therapy on medical wards was likely to be cost saving. When assessing the uncertainty in these costs, the committee also considered the increase in quality of life and improved mortality, and believed that extended access would remain cost effective even if there was a small increase in cost. The committee therefore agreed that extended access to physiotherapy and/or occupational therapy on medical wards was likely to be cost effective.</p> <p>To implement this recommendation, some Trusts will need to increase the provision of physiotherapy and occupational therapy services. This cost should be offset by cost savings from reduced length of stay.</p>
<p>Quality of evidence</p>	<p>Two RCTs were identified by the search that compared enhanced versus standard access to therapy in a relevant AME population. One study, including older patients had a small sample size. The evidence was graded high for mortality (at discharge) and readmission. The other outcomes were graded moderate to very low quality due to imprecision and risk of bias. The evidence for stroke patients was graded as high quality for length of rehabilitation stay and low quality for adverse events due to serious imprecision. The committee felt, however, that the evidence identified in stroke patients should be cautiously extrapolated to other populations, given that the needs of these patients were quite specific. All evidence identified was for physiotherapy access only but the committee considered that physiotherapy and occupational therapy services are closely linked with the former concerned with physical function and the latter focused on the application of that function. These services becoming increasingly integrated with staff frequently having a mixture of both sets of skills and the committee wanted to reflect this in its recommendation.</p> <p>The original health economic modelling was assessed to be directly applicable but still had potentially serious limitations due to the treatment effects being based on expert opinion, albeit conservative and informed by the guideline’s systematic review.</p>
<p>Other considerations</p>	<p>The committee were aware of other NICE guidelines, for example, stroke (CG68, rec 1.7.1.1), hip fracture (CG124, rec 1.7.1 and 1.7.2) and venous thromboembolism (CG92, rec 1.2.2.),³⁹⁻⁴¹ that recommend early mobilisation of patients. The committee discussed the advantages of early mobilisation to reduce morbidity and length of stay of patients with an acute medical emergency. Providing increased access to physiotherapy and occupational therapy would facilitate this and hence the committee made a strong positive recommendation.</p> <p>Bed rest was historically used therapeutically in the management of many chronic illnesses in patients admitted to hospitals. Unfortunately, the deleterious consequences of immobility predispose patients, particularly the elderly (as they have less functional reserve), to significant functional decline and reduced quality of life. Prolonged inactivity reduces the physiologic reserve of most organ systems, particularly the musculoskeletal and cardiopulmonary systems. Consequently, muscle weakness, contracture formation, postural hypotension and thrombogenic events are common in bed-bound patients. Fortunately, contemporary studies have dispelled the myth that inactivity fosters healing and have suggested techniques that may prevent immobility-induced dysfunction and ensure beneficial outcome particularly in the fragile and aging populations.</p>

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- 51 Salisbury LG, Merriweather JL, Walsh TS. The development and feasibility of a ward-based physiotherapy and nutritional rehabilitation package for people experiencing critical illness. *Clinical Rehabilitation*. 2010; 24(6):489-500
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- 55 Silva JM, Rotta BP, Padovani C, Ramos M, Fu C, Tanaka C. 24-hour of physiotherapy assistance does not reduce frequency of postoperative pulmonary complications. *European Respiratory Journal*. 2013; 42:P1324
- 56 Somerville L, Morarty J. Prioritising and managing workload demands in an acute occupational therapy service... *Occupational Therapy Australia, 24th National Conference and Exhibition, 29 June - 1 July 2011. Australian Occupational Therapy Journal*. 2011; 58:49

- 57 Ta'eed G, Skilbeck C, Slatyer M. Service utilisation in a public post-acute rehabilitation unit following traumatic brain injury. *Neuropsychological Rehabilitation*. 2015; 25(6):841-863
- 58 Taylor L, Goodman K, Soares D, Carr H, Peixoto G, Fox P. Accuracy of assignment of orthopedic inpatients to receive weekend physical therapy services in an acute care hospital. *Physiotherapy Canada*. 2006; 58(3):221-232
- 59 Taylor NF, Brusco NK, Watts JJ, Shields N, Peiris C, Sullivan N et al. A study protocol of a randomised controlled trial incorporating a health economic analysis to investigate if additional allied health services for rehabilitation reduce length of stay without compromising patient outcomes. *BMC Health Services Research*. 2010; 10:308
- 60 Wheat AL. Interdisciplinary team with extended therapy team working model demonstrates functional gains and short length of stay on Acute Stroke Unit. *Cerebrovascular Diseases*. 2013; 35:210

Appendices

Appendix A: Review protocol

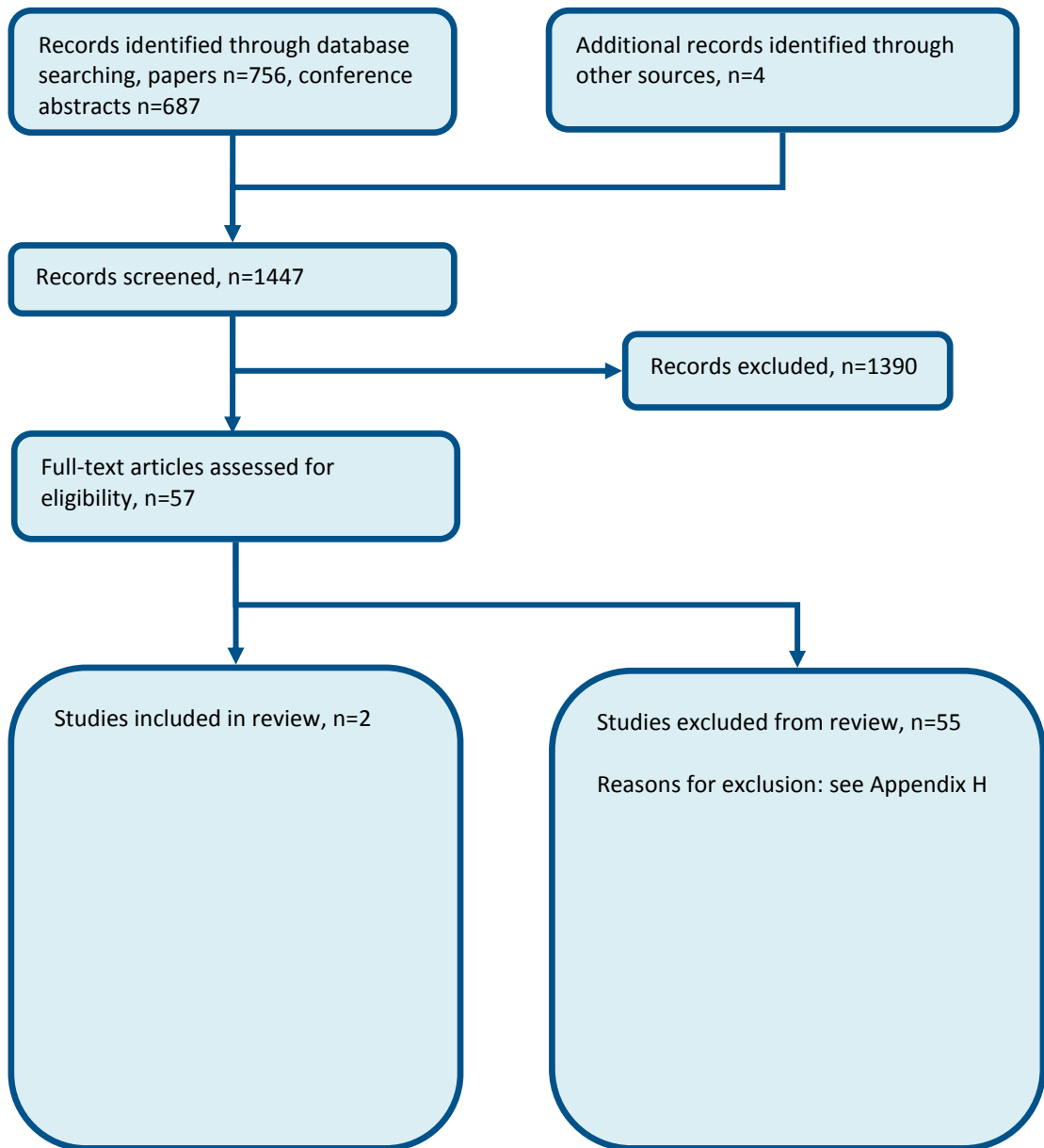
Table 5: Review protocol: Enhanced access to physiotherapy and/or occupational therapy

Review question: Is enhanced access to physiotherapy and/or occupational therapy for hospital patients clinically and cost effective?	
Rationale	A hospital is a health care institution providing patient treatment with specialised staff and equipment. For the hospital to function properly the individual wards must function efficiently. To enable this to happen each individual ward should be viewed as an individual unit and thus must have the relevant resources to function. Staffing is a resource of major importance and having the appropriate skill mix to function efficiently is crucial. Therapists play a crucial role in the acute management and rehabilitation of patients; therefore having adequate therapy presence should have a beneficial effect on patient outcomes. The presence of ward based AHPs was noted to be very important in influencing ward based outcomes.
Population	Adults and young people (16 years and over) admitted to hospital with a suspected or confirmed AME. Strata: <ul style="list-style-type: none"> • Stroke • COPD • Elderly • Critical illness • Cardiac failure • Unselected/undefined.
Intervention and comparators	Presence of inpatient physiotherapists and/or occupational therapists: Intervention. 7 day services. Comparison. Less than 7 day services (standard hours defined as 9am-5pm, Monday to Friday; anything above should be considered as enhanced, studies will define). No in hospital physiotherapist and/or occupational therapist.
Outcomes	Mortality (CRITICAL) Avoidable adverse events (CRITICAL) Quality of life (CRITICAL) Patient and/or carer satisfaction (CRITICAL) Length of stay (CRITICAL) Readmission up to 30 days (IMPORTANT) Discharge to normal place of residency (IMPORTANT) Time to mobilisation (IMPORTANT) Delayed transfers of care (IMPORTANT)
Exclusion	Exclude studies from non-OECD countries.

Review question: Is enhanced access to physiotherapy and/or occupational therapy for hospital patients clinically and cost effective?	
Search criteria	The databases to be searched are: Medline, Embase, the Cochrane Library, and CINAHL. Date limits for search: 2005. Language: English only.
The review strategy	Systematic reviews (SR) of RCTs, RCTs, observational studies only to be included if no relevant SRs or RCTs are identified.
Analysis	Data synthesis of RCT data. Meta-analysis where appropriate will be conducted. Studies in the following subgroup populations will be included: <ul style="list-style-type: none"> • Frail elderly • Therapist contact time • Location (ward, ED and specialist units). <p>In addition, if studies have pre-specified in their protocols that results for any of these subgroup populations will be analysed separately, then they will be included. The methodological quality of each study will be assessed using the Evibase checklist and GRADE.</p>
Key papers	None identified
Search terms	Assistant Practitioners (APs), who in our hospital serve the role of both OT & and physio.

Appendix B: Clinical article selection

Figure 1: Flow chart of clinical article selection for the review of enhanced therapy access



Appendix C: Forest plots

C.1 Enhanced access to therapy – Strata: the Elderly

Figure 2: In-hospital mortality

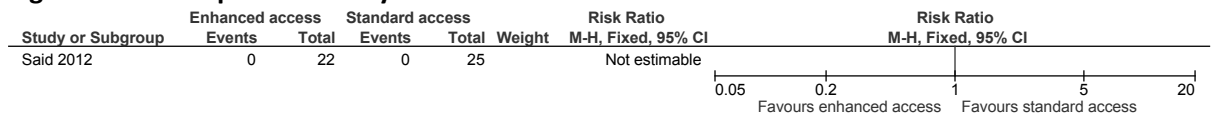


Figure 3: Mortality at 3 months follow-up

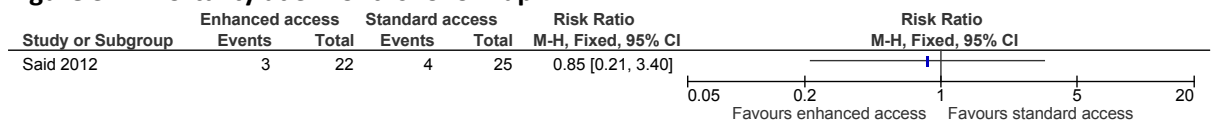


Figure 4: Adverse events (non-injurious falls)

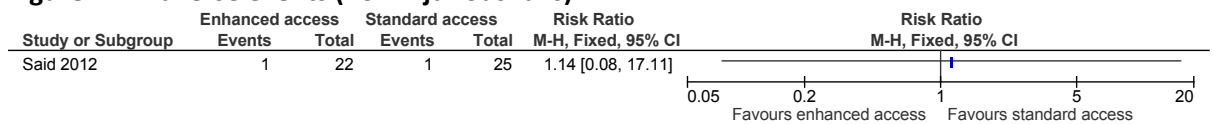


Figure 5: Readmission to acute hospital

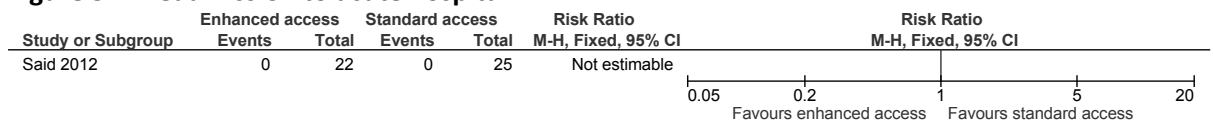
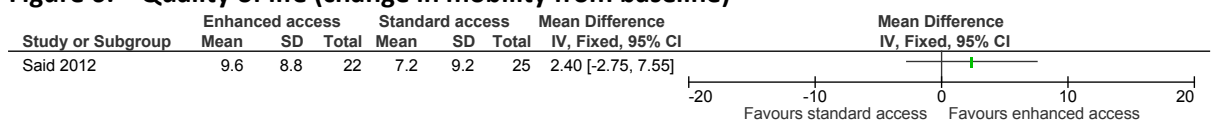


Figure 6: Quality of life (change in mobility from baseline)



C.2 Enhanced access to therapy – Strata: Stroke

Figure 7: All adverse events

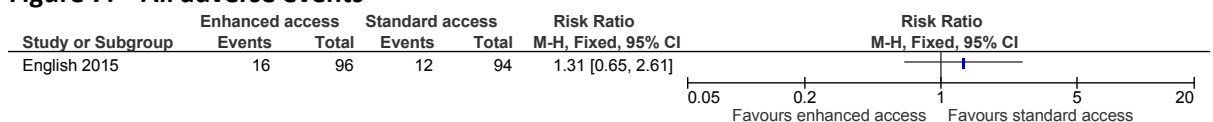
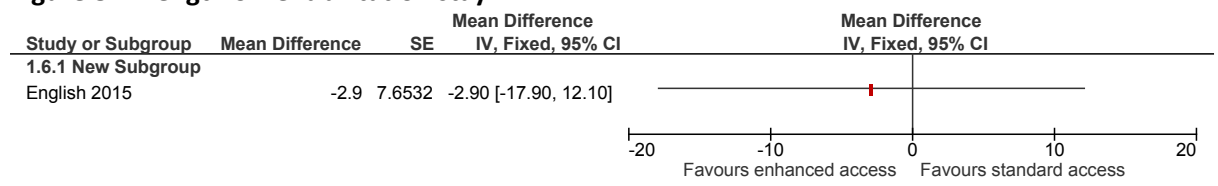


Figure 8: Length of rehabilitation stay



Appendix D: Clinical evidence tables

Study (subsidiary papers)	Circuit class therapy or seven-day therapy trial: English 2015 ²³ (Hillier 2011 ³¹)
Study type	RCT (Patient randomised; Parallel).
Number of studies (number of participants)	1 (n=283).
Countries and setting	Conducted in Australia, unknown, unknown multicentre; setting: participants were recruited from 1 of 5 stroke rehabilitation centres in 3 states within Australia.
Line of therapy	1st line.
Duration of study	Intervention + follow up: inpatient stay + 4 weeks after randomisation.
Method of assessment of guideline condition	Adequate method of assessment/diagnosis.
Stratum	Overall.
Subgroup analysis within study	Not applicable.
Inclusion criteria	People with stroke admitted to inpatient rehabilitation facilities with moderate disability (FIM total score between 40 and 80 points or motor subscale score of between 38 and 62 points). Stroke survivors with moderate disability (defined by these FIM score ranges) show the greatest degree of functional recovery and are most likely to benefit from increasing the dose of activity-based therapy. Either participants provided informed consent themselves or proxy consent was obtained from an appropriate third party.
Exclusion criteria	People who are not able to walk independently before their stroke for any reason (prior use of a walking aid is acceptable).
Recruitment/selection of patients	Participants were recruited from 1 of 5 stroke rehabilitation centres in 3 states within Australia.
Age, gender and ethnicity	Age - Mean (SD): 69.9 (12.7). Gender (M:F): 3/2. Ethnicity: n/a.
Further population details	Elderly patients recovering from a stroke.
Indirectness of population	No indirectness.
Interventions	(n=96) Intervention 1: Presence of inpatient physiotherapists and/or occupational therapists - 7 day services. Seven-day week therapy: participants randomised to receive 7 day a week therapy received physiotherapy on both Saturday and Sunday for the duration of their inpatient stay, in addition to the usual 5 days of the working week. The duration of therapy sessions provided on the weekend was matched to that during the preceding week. Additional staffing was required to deliver the 7-day week therapy. Duration: as long as inpatient. Concurrent medication/care: usual care

	<p>therapy according to local site standard practice. For 3 of the 5 sites, this was individual sessions provided 5 days a week. At 2 of the recruitment sites usual care involved a combination of daily individual sessions augmented for some people by group physiotherapy provided between 1 and 4 times a week. In 2 of the 5 sites, usual care therapy included weekend therapy for some, but not all patients.</p> <p>Further details: 1. Therapists contact time: participants randomised to receive 7 day a week therapy received physiotherapy on both Saturday and Sunday for the duration of their inpatient stay, in addition to the usual 5 days of the working week.</p> <p>(n=94) Intervention 2: Presence of inpatient physiotherapists and/or occupational therapists - less than 7 day services (standard hours defined as 9am-5pm, Monday to Friday; anything above should be considered as enhanced). Usual care therapy: according to local site standard practice. For 3 of the 5 sites, this was individual sessions provided 5 days a week. at 2 of the recruitment sites usual care involved a combination of daily individual sessions augmented for some people by group physiotherapy provided between 1 and 4 times a week. In 2 of the 5 sites, usual care therapy included weekend therapy for some, but not all patients. Duration: as long as inpatient. Concurrent medication/care: n/a.</p> <p>Further details: 1. Therapists contact time: participants in the control group received therapy on the usual 5 days of the working week.</p> <p>Comments: usual care varied between sites. Some centres gave additional sessions with groups and some others provided some individuals with additional weekend therapy.</p>
Funding	Academic or government funding.
<p>RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: 7 DAY SERVICES versus LESS THAN 7 DAY SERVICES (STANDARD HOURS DEFINED AS 9AM-5PM, MONDAY TO FRIDAY; ANYTHING ABOVE SHOULD BE CONSIDERED AS ENHANCED).</p> <p>Protocol outcome 1: Quality of life. - Actual outcome for Stroke: Australian Quality of life at 4 weeks; Risk of bias: All domain - High, Selection - Low, Blinding - Low, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 8; Group 2 Number missing: 6</p> <p>Protocol outcome 2: Avoidable adverse events - Actual outcome for Stroke: all adverse events at discharge; Group 1: 16/96, Group 2: 12/94; Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0</p> <p>Protocol outcome 3: Length of hospital stay. - Actual outcome for Stroke: length of stay in rehabilitation facility at discharge; Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data</p>	

- Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 8; Group 2 Number missing: 6	
Protocol outcomes not reported by the study	Patient and/or carer satisfaction; Re-admission; Discharge to normal place; Time to mobilisation; Delayed transfers of care; Mortality.

Study	Said 2012 ⁵⁰
Study type	RCT (Patient randomised; Parallel).
Number of studies (number of participants)	1 (n=47).
Countries and setting	Conducted in Australia; setting: recruited from 2 aged care rehabilitation wards within a tertiary hospital. Most admissions to the wards were from an acute hospital.
Line of therapy	1st line.
Duration of study	Intervention + follow up: until discharge + 3 months follow-up.
Method of assessment of guideline condition	Adequate method of assessment/diagnosis.
Stratum	Overall.
Subgroup analysis within study	Not applicable.
Inclusion criteria	Aged 60 years and over and had 'improve mobility/walking' as a goal at admission.
Exclusion criteria	If primary reason for admission was to await residential care placement, they did not require physiotherapy or if there were medical restrictions on mobilisation (for example, non-weight bearing).
Recruitment/selection of patients	Aged 60 years and over and had 'improve mobility/walking' as a goal at admission. Consent was obtained from the participant within 48 hours of admission.
Age, gender and ethnicity	Age - Mean (SD): control: 81.6 (6.5); intervention: 80.8 (4.6). Gender (M:F): 1/1. Ethnicity: n/a.
Further population details	1. Frail elderly: Age - Mean (SD): control: 81.6 (6.5); intervention: 80.8 (4.6).
Extra comments	As no funding for interpreters to assist with the trial was available, people who could not speak English could only be recruited if next of kin were available to assist with consent. If the participant was unable to provide consent due to cognitive impairment, consent was obtained from the 'person responsible'.
Indirectness of population	No indirectness.
Interventions	(n=25) Intervention 1: Presence of inpatient physiotherapists and/or occupational therapists - less than 7 day services (standard hours defined as 9am-5pm, Monday to Friday; anything above should be considered as enhanced). Usual care included therapy provided by a multidisciplinary team. All participants routinely received 1 to 2 sessions of physiotherapy from Monday to Friday. These sessions were either individual sessions supervised by a physiotherapist/physio assistant or group exercise classes designed to improve lower limb strength or balance, depending on participants' functional status and goals. Duration: until discharge + 3 month follow-up. Concurrent medication/care: n/a. Further details: 1. Therapists contact time: all participants routinely received 1 to 2 sessions of physiotherapy from Monday to Friday.

	<p>(n=22) Intervention 2: Presence of inpatient physiotherapists and/or occupational therapists - 7 day services. Intervention: additional programme of enhanced physical activity. This programme focused on increasing the time participants spent performing mobility activities in the late afternoons/evening and on weekends, as activity levels at these times have been shown to be low. The aim was to double the previously reported time spent performing standing and walking activities in the late afternoon and evening on weekdays. On weekends, the aim was to increase the time spent performing standing and walking activities so that activity levels were the same as activity levels on weekdays (with usual care). The intervention was individually tailored for each patient according to functional level, and delivered by a physio or physio assistant. Progress was monitored in each session and the intervention was modified as the patient's function improved. Duration: until discharge + 3 months follow-up. Concurrent medication/care: usual care included therapy provided by a multidisciplinary team. All participants routinely received 1 to 2 sessions of physiotherapy from Monday to Friday. These sessions were either individual sessions supervised by a physiotherapist/physio assistant or group exercise classes designed to improve lower limb strength or balance, depending on participants' functional status and goals.</p> <p>Further details: 1. Therapists contact time: all participants routinely received 1 to 2 sessions of physiotherapy from Monday to Friday; additional therapy in the evenings on weekdays, plus extra therapy on Saturdays.</p> <p>Comments: enhanced: additional therapy in the evenings on weekdays, plus extra therapy on Saturdays.</p>
Funding	Academic or government funding.
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: 7 DAY SERVICES versus LESS THAN 7 DAY SERVICES (STANDARD HOURS DEFINED AS 9AM-5PM, MONDAY TO FRIDAY; ANYTHING ABOVE SHOULD BE CONSIDERED AS ENHANCED).	
<p>Protocol outcome 1: Quality of life.</p> <p>- Actual outcome for Elderly: de Morton mobility index (DEMMI) at discharge; Group 1: mean 9.6 (SD 8.8); n=22, Group 2: mean 7.2 (SD 9.2); n=25; de Morton Mobility Index 0-100 Top=High is good outcome; Ri Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0</p>	
<p>Protocol outcome 2: Mortality</p> <p>- Actual outcome for Elderly: mortality at 3 month follow-up; Group 1: 3/22, Group 2: 4/25; Risk of bias: High; Indirectness of outcome: No indirectness.</p> <p>- Actual outcome for Elderly: mortality at during hospital stay; Group 1: 0/22, Group 2: 0/25; Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness</p>	
<p>Protocol outcome 3: Avoidable adverse events</p> <p>- Actual outcome for Elderly: non-injurious fall at until discharge; Group 1: 1/22, Group 2: 1/25; Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0</p>	

Protocol outcome 4: Re-admission

- Actual outcome for Elderly: readmission to acute hospital at during hospital (rehabilitation) stay; Group 1: 0/22, Group 2: 0/25; Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0

Protocol outcomes not reported by the study

Length of hospital stay; Discharge to normal place; Time to mobilisation; Delayed transfers of care; Patient and/or carer satisfaction.

Appendix E: Economic evidence tables

No relevant economic evidence was identified.

Appendix F: GRADE tables

Table 6: Clinical evidence profile: enhanced versus standard access to physio- and/or occupational therapy

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Weekend access	Standard access	Relative (95% CI)	Absolute		
STRATA: Older people												
Mortality (at discharge)												
1	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	no serious imprecision	none	0/22 (0%)	0%	-	-	⊕⊕⊕⊕ HIGH	CRITICAL
Mortality (at 3 months)												
1	randomised trials	serious ¹	no serious inconsistency	no serious indirectness	very serious ²	none	3/22 (13.6%)	16%	RR 0.85 (0.21 to 3.4)	24 fewer per 1000 (from 126 fewer to 384 more)	⊕○○○ VERY LOW	CRITICAL
Adverse events (non-injurious fall)												
1	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	very serious ²	none	1/22 (4.5%)	4%	RR 1.14 (0.08 to 17.11)	6 more per 1000 (from 37 fewer to 644 more)	⊕⊕○○ LOW	CRITICAL
Readmission to acute hospital												
1	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	no serious imprecision	none	0/22 (0%)	0%	-	-	⊕⊕⊕⊕ HIGH	IMPORTANT
Quality of life (change in mobility from baseline) - Better indicated by higher values												
1	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	serious ²	none	22	25	-	MD 2.4 higher (2.75 lower to 7.55 higher)	⊕⊕⊕○ MODERATE	CRITICAL

STRATA: Stroke												
Adverse events - Strata: Stroke												
1	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	very serious ²	none	16/96 (16.7%)	12.8%	RR 1.31 (0.65 to 2.61)	40 more per 1000 (from 45 fewer to 206 more)	⊕⊕⊕⊕ LOW	CRITICAL
Length of rehabilitation stay (Better indicated by lower values)												
1	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	no serious imprecision	none	0	-	-	MD 2.9 lower (17.9 lower to 12.1 higher)	⊕⊕⊕⊕ HIGH	CRITICAL

¹ Downgraded by 1 increment if the majority of the evidence was at high risk of bias, and downgraded by 2 increments if the majority of the evidence was at very high risk of bias.

² Downgraded by 1 increment if the confidence interval crossed 1 MID or by 2 increments if the confidence interval crossed both MIDs.

Appendix G: Excluded clinical studies

Table 7: Studies excluded from the clinical review

Study	Exclusion reason
Allen 2013 ²	Study design and methodology paper of a RCT
Anon 2012 ¹	Study protocol
Archer 2008 ³	Dissertation. Incorrect study design. Inappropriate comparison. Incorrect interventions
Arnold 2015 ⁴	RCT but not relevant comparison. Looking at early mobilisation of stroke patients. Not comparing access to enhanced versus standard therapy
Artz 2013 ⁵	Incorrect interventions. Telephone survey of current physiotherapy services offered to patients with Total hip and knee replacement in NHS hospitals in England and Wales. Incorrect study design
Babu 2010 ⁶	Inappropriate comparison. The study compares regular physical therapy with on-call physical therapy.
Baggaley 2011 ⁷	Conference abstract
Bernhardt 2008 ⁸	Inappropriate comparison. The study compares standard rehab with very early mobilisation (VEM) for stroke patients. VEM was defined as first mobilisation within 24 hours of stroke symptom onset.
Bethel 2005 ⁹	Critical appraisal of papers on the role of physiotherapists.
Borrows 2013 ¹⁰	Incorrect interventions. The study assessed the effectiveness of occupational therapy from an independent living centre compared to routine community occupational therapy service - does not look at enhanced occupational therapy compared to standard occupational therapy as stated in the protocol
Brandstater 2011 ¹¹	Article
Brusco 2007 ¹³	RCT but unsure how many of the participants were orthopaedic patients. Not review population
Brusco 2014 ¹²	RCT but mainly orthopaedic patients. Not review population
Brusco 2015 ¹⁴	RCT but mainly orthopaedic patients. Not review population
Caldwell 2009 ¹⁵	Conference abstract
Campbell 2009 ¹⁶	Cross-sectional survey. The study describes the provision of weekend physiotherapy services in tertiary care hospitals in Canada.
Campbell 2010 ¹⁷	Cross-sectional survey via telephone interview. The aim of the study was to describe the provision of weekend physiotherapy services in a tertiary care hospital in Canada.
Connelly 2007 ¹⁸	Article
Connolly 2015 ¹⁹	incorrect comparison (SR comparing exercise programmes versus usual care without exercise)
Curtis 2011 ²⁰	Conference abstract
Deane 2006 ²¹	Methodology paper on reporting of RCTs
Duncan 2015 ²²	No extractable outcomes
English 2016 ²⁴	Meta-analysis – relevant references noted
Gawned 2013 ²⁵	Conference abstract
Gawned 2013A ²⁶	Conference abstract
Gräsel 2005 ²⁷	Wrong comparison (comparison of educational programme (that includes home treatment) versus usual care)

Study	Exclusion reason
Gurr 2015 ²⁸	Incorrect study design
Haines 2015 ²⁹	A protocol for studies examining the effectiveness of current weekend allied health services and a new model for surgical/medical patients versus no weekend allied health services.
Hill 2010A ³⁰	The study reports of findings from 2 focus group meetings with physiotherapists at 3 tertiary hospitals in Canada. The study aimed to describe the cardiorespiratory physiotherapy weekend service and also to compare staff burden among the clinical service areas in 1 of the hospitals that had a programme-based management structure.
Kalsi 2014 ³²	Conference abstract
Kersten 2007 ³³	Systematic review- relevant references noted.
Kolber 2013 ³⁴	Inappropriate comparison. Incorrect interventions. Systematic review. Evaluates the evidence relating to the effects of frequency of physical therapy visits on acute care length of stay following knee arthroplasty.
Lay 2010 ³⁵	Conference abstract
Lim 2008 ³⁶	Retrospective record review. The study aimed to describe the after-hour physiotherapy services in a tertiary general hospital.
Maidment 2014 ³⁷	No comparison. Incorrect study design. Retrospective analysis of a clinical database of patients who received either total knee or hip replacement. The study aimed to investigate a change in physiotherapy provision from a 5 to 7 days a week service.
Mcclellan 2006 ³⁸	Qualitative study. Study evaluates the effect of an extended scope physiotherapy service on patient satisfaction.
Ottensmeyer 2012 ⁴²	A survey about physiotherapy staffing patterns at different hospitals across Canada. No relevant comparison.
Paradza 2011 ⁴³	Conference abstract
Peiris 2012 ⁴⁶	Not review population. only orthopaedic patients
Peiris 2012A ⁴⁴	Conference abstract
Peiris 2013 ⁴⁵	mainly orthopaedic patients. Not review population
Reid 2010 ⁴⁷	Conference abstract
Roberts 2013 ⁴⁸	Cross-sectional survey. No comparison. The study evaluated the musculoskeletal outpatient physiotherapy service in a NHS hospital.
Robinson 2014 ⁴⁹	This is a practice analysis that discusses therapy provision within the acute healthcare setting of an Emergency Assessment Unit (EAU) for medical and surgical admissions.
Salisbury 2010 ⁵¹	Incorrect interventions. Inappropriate comparison. The study compares standard physiotherapy with enhanced physiotherapy. Enhanced physiotherapy included additional interventions such as supervised passive, active and strengthening exercises, facilitation of additional transfers and mobility practice, balance exercises and advice.
Saxon 2014 ⁵²	incorrect comparison (SR about roles of AHCP rather than extended working hours)
Scrivener 2015 ⁵³	Systematic review. Relevant references noted.
Shaw 2013 ⁵⁴	Cross-sectional survey. A national survey of physiotherapy services provided outside of business hours in Australian hospitals.
Silva 2013 ⁵⁵	Conference abstract
Somerville 2011 ⁵⁶	Conference abstract
Ta'eed 2015 ⁵⁷	Incorrect comparison
Taylor 2006 ⁵⁸	Incorrect study design. No comparison. This is a retrospective chart

Study	Exclusion reason
	review of patients assigned to weekend physical therapy while staying in an inpatient orthopaedic unit.
Taylor 2010 ⁵⁹	Study protocol of RCT by Pereis 2012, 2013, Brusco 2007, 2014 which has been excluded because of mainly orthopaedic patient population
Wheat 2013 ⁶⁰	Conference abstract

Appendix H: Excluded economic studies

No relevant economic evidence was identified.