

Evidence *in* Context

Issue: Reducing Acute Care Length of Stay
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Health research — synthesized and contextualized for use in Newfoundland & Labrador

ONLINE COMPANION DOCUMENT Reducing Acute Care Length of Stay *in* Newfoundland & Labrador

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Newfoundland & Labrador Centre for

**APPLIED
HEALTH
RESEARCH**

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Contextualized Health Research Synthesis Program*

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Annex A: Data Extraction & Synthesis

Synthesis Findings of Included Reviews

The data extraction results for each included systematic review are presented below. Systematic reviews are grouped by intervention type and the primary patient population studied.

The data extraction for each systematic review includes:

- The original reference citation and a brief description of the scope of the systematic review;
- Findings related to:
 - **LOS:** Length of Stay (primary outcome);
 - **RA:** Readmission (secondary outcome); and
 - **Cost:** (secondary outcome);
- Risk of Bias Assessment; and
- Coding:
 - This is our combined assessment of the findings in the coded form used by CHRSP to formally evaluate the body of evidence under our Evidence Rating System (see Methods in Annex C).

INTERVENTION 1 | ACTIVE MOBILIZATION – MECHANICALLY-VENTILATED PATIENTS

Li 2013

- Reference: Li, Zhiqiang, et al. "Active mobilization for mechanically ventilated patients: a systematic review." *Archives of physical medicine and rehabilitation* 94.3 (2013): 551-561. (1)
- Looked at active mobilization and patients mechanically ventilated
- SR with 17 studies including randomized controlled trials (RCTs), quasi-RCTs, or other comparative studies with or without concurrent controls, total of 1614 patients

Findings:

- **LOS:** "Seven studies included in this systematic review provided ICU/HDU and total hospital LOS data. Five of the studies indicated no significant effect from active mobilization intervention on reducing ICU/HDU and total hospital LOS. The 2 exceptions were the nonrandomized studies by Morris, Malkoc., and colleagues, which found the LOS in the ICU or hospital was significantly shorter in the mobilization group than the control group. MD or RR (95% CI) for LOS in ICU 4.9 (-0.63 to 10.43) P= .080/ -22.7 (-51.1 to 5.8) P= .100/ 0.00 (-7.34 to 7.34) P= 1.000/ -9.7 (-10.9 to -8.5) P= <.001. For LOS in hospital was not available
- **RA:** not reported
- **Cost:** "The 1 study that provided hospital cost data found no statistical difference between groups."

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: Physiotherapy Evidence Database (PEDro)

- Documentation: “The PEDro scores were lowered by a lack of insufficient randomization and allocation concealment, appropriate blinding of patients, caregivers, and/or assessors, substantial losses in follow-up, and intention-to-treat analysis. The vast majority of studies that were included to assess safety in this review were case series from single interventions with several limitations related to methodologic quality”

Table 2 Assessment of quality for comparative studies by the PEDro score

Study	Eligibility Criteria	Random Allocation	Concealed Allocation	Similarity at Baseline	Subject Blinding	Therapist Blinding	Assessor Blinding	>85% Follow-Up	ITT Analysis	Between-Group Difference Reported	Point Estimate and Variability Reported	Total (0–10)
Nava ¹⁹	Yes	Yes	No	Yes	No	No	No	No	No	Yes	Yes	4
Porta et al ²⁰	Yes	Yes	No	Yes	No	No	Yes	No	No	Yes	Yes	5
Chiang et al ²¹	Yes	No	No	Yes	No	No	Yes	No	No	Yes	Yes	4
Chen et al ²²	Yes	Yes	No	Yes	No	No	No	Yes	No	Yes	Yes	5
Chen et al ²³	Yes	Yes	Yes	No	No	No	Yes	No	No	Yes	Yes	6
Morris et al ²⁵	Yes	No	No	Yes	No	No	No	Yes	No	Yes	Yes	4
Burtin et al ²⁶	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	4
Schweickert et al ²⁷	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	8
Chang et al ²⁸	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	5
Malkoç et al ²⁹	Yes	No	No	Yes	No	No	No	Yes	No	Yes	Yes	4

Abbreviation: ITT, intention-to-treatment.

Figure 1: Li, 2013

Coding:

- Intervention X Outcome: Active Mobilization-Mechanically Ventilated Patients LOS
 - Finding: Non-Significant, Non-Quantitative
- Intervention X Outcome: Active Mobilization-Mechanically Ventilated Patients Cost
 - Finding: Non-Significant, Non-Quantitative

INTERVENTION 2 | ACUTE GERIATRIC CARE (ACE) – MIXED ELDERLY

Fox 2012

- Reference: Fox MT, Persaud M, Maimets I, O'Brien K, Brooks D, Tregunno D, Schraa E. Effectiveness of Acute Geriatric Unit Care Using Acute Care for Elders Components: A Systematic Review and Meta-Analysis. *Journal of the American Geriatrics Society*. 2012 Dec 1;60(12):2237-45. (2)
- looked at *Acute Geriatric Care units* and elderly
- Care Pathway Components included:
 - Patient-centered care
 - Frequent medical review
 - early rehabilitation
 - early discharge planning
 - prepared environment

Findings:

MA focused on acute geriatric unit care using at least one of the ACE components, 13 RCTs and 6,839 participants. (2)

- LOS:** WMD: -1.28 (-2.33 to -0.22); Z= 2.37 (p=.02); I²= 87% (p<.001) (11 studies, 6,098 participants). Significant statistical heterogeneity was observed between studies for this comparison. After removal of seven outlier studies during sensitivity analysis, the significant effect remained (WMD = -0.61, 95% CI = -1.16 to -0.05; P = .03) (4 studies, 3,956 participants).

- **RA:** no significant difference (WMD: 1.05 (0.92–1.18); Z=0.69 (p=0.49); I²= 0% (p=0.55) (5 studies, 3,983 participants)
- **Cost:** acute geriatric unit care were non-significantly less than the costs of usual care (WMD = -\$431.37, 95% CI = -\$933.15–\$70.41; P = .09) (5 studies, 4,287 participants). Heterogeneity was resolved with removal of one outlier study during sensitivity analysis; the results demonstrated that the costs of acute geriatric unit care were significantly less than those of usual care (WMD = -\$245.80, 95%CI = -\$446.23 to-\$45.38; P = .02) (4 studies, 3,983 participants).

AMSTAR:

- 55%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: Two reviewers independently assessed each study's risk of bias using six defined domains: sequence generation; allocation concealment; blinding of participants, personnel, and outcome assessors; completeness of outcome data; selective reporting; and other sources of bias.
- Documentation:

Risk of bias	High	Low	Unclear
Selection-randomization	23%	54%	23%
Selection-allocation	8%	46%	46%
Performance	23%	23%	54%
Detection	8%	8%	85%
Attrition	46%	46%	8%
Reporting	8%	38%	54%

Coding:

- Intervention X Outcome: ACE-Mixed Elderly Cost
 - Finding: Positive, Quantitative
- Intervention X Outcome: ACE-Mixed Elderly LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: ACE-Mixed Elderly RA
 - Finding: Non-Significant, Quantitative

INTERVENTION 3 | SINGLE AND MIXED CARE PATHWAYS (CP)

NOTE: This intervention category, overall, included studies of interventions that were used in combination or singularly; multi-faceted components were not always heterogeneous; some pathways were studied for their impact on outcomes for specific conditions and surgeries. This category includes:

- Clinical Pathway Interventions

- Fast Track (FT)
- Enhanced Recovery After Surgery (ERAS)
- Clinical Pathways in Multifaceted Interventions Compared to Usual Care for the following conditions/surgeries:
 - Chronic Heart Failure
 - COPD
 - Gastrointestinal Surgery, including:
 - Colorectal Surgery
 - Gastrectomy
 - Liver Surgery
 - Pancreatic Surgery
 - Gynecological Surgery, including Uterine Surgery
 - Pediatric Asthma
 - Thyroidectomy

Rotter 2010

- Reference: Rotter T, Kinsman L, James E, Machotta A, Gothe H, Willis J, Snow P, Kugler J. Clinical pathways: effects on professional practice, patient outcomes, length of stay and hospital costs. Cochrane Database Systematic Review. 2010 Jun; 3(3). (3)
- Looked at *Clinical Pathways (CPWs)*
- Care Pathway Components included:
 - Core features not identified

A. SINGLE PATHWAYS | Findings:

- **LOS:** Out of the 20 studies categorized as single pathway interventions, 15 (75%) primary studies examined the effect of CPWs on LOS, 11 showed significant reductions. Conversely, two reported reverse effects or increased LOS associated with CPWs in stroke rehabilitation that did not reach statistical significance... This led us to 14 studies reporting sufficient LOS data for statistical pooling within this subgroup of single pathway interventions. However, heterogeneity between this subgroup of studies reporting on LOS was substantial ($I^2 = 62\%$) and may refer to both the statistical inconsistency as well as to the varying CPW interventions that were included. As a result, the estimation of an overall pooled effect is not appropriate and the differences from the individual studies in LOS are depicted together with the corresponding confidence intervals without totals (Analysis 1.1). However, the order of magnitude of effects indicates that there are considerable implications on LOS associated with CPWs. (p.18)
- **RA:** Six measures were comparable in terms of hospital readmission reported for all causes, and characterized with follow up periods up to six months. None of these reported readmission rates reached statistical significance as reported in the primary investigations. Statistical heterogeneity was not present ($I^2 = 0\%$) among the studies. The pooled odds ratio for re-admission was 0.6 (95% CI: 0.32 to 1.13) was not statistically significant (Analysis 2.20). Hospital readmissions were included in the estimate of hospital charges for the Gomez study (hospital charges at 30 days) within comparison I (Gomez 1996). (p.20)
- **Cost:** 8/20 of the included studies reported on a highly varying set of cost / charge measures. 6 found significant lower hospitalization costs / charges or insurance points for pathway groups.

Within the subgroup of hospital costs calculated and reported in the primary studies, two investigations out of three reported a statistically significant decrease in hospital costs for the pathway group. On the other hand, each of the two combinable studies reporting on hospital charges (Johnson 2000; Gomez 1996) as well as both studies using surrogate cost outcomes in form of the Japanese insurance points (Aizawa 2002; Usui 2004) reported statistically significant reductions in charges and surrogates for the experimental pathway groups. Moreover, the study by Falconer 1993 reported on different median hospital charges whereas no standard deviation was reported along with the median values per study group. Un-adjusted charges per bed days were US\$14,440 for the pathway group versus US\$14,420 for the control group respectively. When prices were adjusted for the base year 2000, the charges were US\$18,320 for the pathway patients versus US\$18,295 for the control patients. Other reported charges were drugs and other services, (Table 1; Table 2). None of these differences in reported charges reached statistical significance. (p.20)

B. MIXED CARE PATHWAYS/CLINICAL PATHWAYS IN MULTIFACETED INTERVENTION COMPARED TO USUAL CARE | Findings:

- **LOS:** Out of the seven primary studies categorized as multifaceted interventions including a CPW element, only three investigations reported LOS measures for statistical comparison (Cole 2002; Kampan 2006; Philbin 2000). None of the differences reported in these studies reached statistical significance. The pooled effect for all of the three primary studies categorized as multifaceted interventions was WMD-0.86 days (95%CI -2.52 to 0.81) but not statistically significant (Analysis 3.1). The differences in LOS in the individual studies are depicted together with a total estimate (WMD). Statistical heterogeneity was not present among the three studies ($I^2 = 0\%$) and the subsequent 0% heterogeneity score supports the appropriate grouping of highly diverse CPW interventions included in the present review. (p.21)

AMSTAR:

- 82%, High

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: EPOC
- Documentation: Rotter excluded studies that were classified as high risk of bias.

Coding:

- Intervention X Outcome: CP-Mixed Cost
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Mixed LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Mixed RA
 - Finding: Non-Significant, Quantitative

Pucher 2014

- Reference: Pucher PH, Aggarwal R, Singh P, Darzi A. Enhancing surgical performance outcomes through process-driven care: a systematic review. World journal of surgery. 2014 Jun 1;38(6):1362-73. (4)
- looked at *ERAS* and gastrointestinal surgery
- Care Pathway Components:
 - preoperative counselling
 - preoperative nutrition
 - no bowel preparation
 - postop ileus prevention
 - epidural analgesia
 - no premedication
 - transverse incision in right hemicolectomy
 - avoidance of intra-abdominal drains
 - no postop nasogastric tube
 - early urinary catheter removal
 - limited intravenous fluids
 - early oral intake
 - structured mobilization program
 - standardized anaesthetic
 - regular postop antiemetic
 - standardized analgesia
 - goal-directed fluid therapy
 - routine chest physiotherapy
 - daily telephone follow-up in community

Findings:

Intervention anchored SR or **ERPs**, 2,750 patients in aggregate, report variation within ERPs which is important. (4)

- **LOS:** “Outcomes analysis (Table 3) showed a significantly reduced length of stay across 21 of the 23 studies for ERP treatment versus conventional care. Ren et al. [29] reported a nonsignificant reduction in length of stay (5.7 ± 1.6 days for ERP vs. 6.6 ± 2.4 days for conventional care) in their randomised trial of 597 patients who underwent colectomy. Similarly, van Bree et al. [30] reported a mean stay of 5.9 days with ERP versus 6 days with conventional care in their series of 35 patients following laparoscopic colectomy.”
- **RA:** “There was no difference in readmission rates, and all studies that reported total length of stay, including readmissions, found a significantly reduced length of stay for ERP patients. (p.5)”
- **Cost:** not reported

AMSTAR:

- 45%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: Jadad score-final score of 3 included and Newcastle–Ottawa scale for cohort studies-score of 7 or higher included.
- Documentation: All studies scored 3 (moderate quality) on the Jadad scale

Coding:

- Intervention X Outcome: CP-Mixed LOS
 - Finding: Positive, Non-Quantitative
- Intervention X Outcome: CP-Mixed RA
 - Finding: Non-Significant, Non-Quantitative

INTERVENTION 4 | CARE PATHWAYS – ABDOMINAL SURGERY

Rollins 2016

- Reference: Rollins, Katie E., and Dileep N. Lobo. "Intraoperative Goal-directed Fluid Therapy in Elective Major Abdominal Surgery." (2015). (5)
- Looked at intraoperative goal directed fluid therapy (IGDFT) and conventional fluid therapy and major abdominal surgery
- Meta-Analysis consisting of 23 RCT's with 8 based in colorectal surgery, 1 in upper gastrointestinal surgery, 2 in urology, 1 in abdominal vascular surgery, 1 in gynecology, and 10 in a range of abdominal procedures with 2099 patients divided into 1040 patients randomized into intraoperative GDFT and 1059 randomized into traditional intraoperative fluid management fluid therapies.
- Utilized ERAS pathways

Findings:

- **LOS Hospital:** "GDFT resulted in a significant decrease in hospital length of stay in the overall group (mean difference -1.55 days, 95% CI -2.73 to -0.36, P=0.01). If patients managed in a traditional care setting were specifically examined, GDFT again resulted in a significant reduction in overall hospital LOS (mean difference -2.14 days, 95% CI -4.15 to -0.13, P=0.04). However, there was no significant difference in hospital LOS in those managed with an ERAS pathway (mean difference -0.71 days, 95% CI -1.91 to 0.49, P=0.25)." [1043 in ERAS pathway/1014 in traditional setting]
- **LOS ICU:** "GDFT resulted in a significant reduction in intensive care LOS in all patients (mean difference -0.63 days, 95% CI -1.18 to -0.09, P=0.02) and in the 1 study in which patients were managed with an ERAS pathway (mean difference -0.63 days, 95% CI -0.94 to -0.32, P<0.0001). GDFT, however, made no significant difference to intensive care LOS in those patients managed within a traditional care setting."
- **RA:** not reported
- **Cost:** not reported

AMSTAR:

- 73%, High

Risk of Bias Assessment:

- Cochrane Risk of Bias Assessment Tool (articles excluded if not RCTs)

- Documentation: “The risk of bias in the studies included was low and, in general, study quality was high”
- Supplementary Table 1: Risk of Bias Assessment of included studies

+ = Low risk of bias ? = Risk of bias unclear	RSG	AC	BPP	BOA	IOD	SR	OB
Pestana 2014 ²⁸	+	?	?	+	+	+	+
Phan 2014 ²¹	+	+	+	+	+	+	+
Zeng 2014 ²⁹	?	?	?	+	+	?	+
Zheng 2013 ³⁰	+	+	?	+	+	+	+
Salzwedel 2013 ³¹	+	?	?	?	+	+	+
Scheeren 2013 ³²	+	?	?	+	+	+	+
Ramsingh 2013 ³³	+	?	+	+	+	?	+
Bundgaard-Nielsen 2013 ³⁴	+	?	+	+	+	?	?
McKenny 2013 ³⁵	+	?	+	+	?	+	+
Srinivasa 2013 ³⁶	+	+	+	+	+	+	+
Zakhaleva 2013 ³⁸	+	+	?	?	+	+	?
Brandstrup 2012 ³⁷	?	+	+	+	+	+	+
Challand 2012 ³⁹	+	+	+	+	+	+	+
Pillai 2011 ⁴⁰	?	?	+	?	+	+	+
Forget 2010 ⁴¹	?	?	?	+	+	+	?
Benes 2010 ⁴²	+	+	+	+	+	+	+
Buettner 2008 ⁴³	?	?	?	?	+	+	?
Lopes 2007 ⁴⁴	?	?	+	+	+	+	+
Noblett 2006 ⁶	?	?	+	+	+	+	?
Wakeling 2005 ⁴⁵	?	+	+	?	+	+	?
Conway 2002 ⁴⁶	?	?	+	?	+	+	+
Gan 2002 ⁷	+	+	?	?	+	+	+
Bonazzi 2002 ⁴⁷	+	?	?	?	+	+	+

Coding:

- Intervention X Outcome: Care Pathways – Abdominal Surgery LOS
 - Finding: Positive, Quantitative

INTERVENTION 5 | CARE PATHWAYS – CHRONIC HEART FAILURE

Kul 2012

- Reference: Kul S, Barbieri A, Milan E, Montag I, Vanhaecht K, Panella M. Effects of care pathways on the in-hospital treatment of heart failure: a systematic review. BMC cardiovascular disorders. 2012 Sep 25;12(1):81. (6)
- Looked at *Care Pathways (CPs)* and heart failure
- Care Pathway Components:
 - An explicit statement of the goals and key elements of care based on evidence, best practice, and patients’ expectations and their characteristics
 - The facilitation of communication among team members and with patients and families
 - The coordination of the care process by coordinating the roles and sequencing the activities of the multidisciplinary care team, patients and their relatives
 - The documentation, monitoring, and evaluation of variances and outcomes
 - The identification of the appropriate resources

Findings:

Intervention based SR studying CPs for heart failure, MA of 5 studies (1 RCT, 4 CCS) 7 studies, 2343 participants (1206/1137) (6)

- **LOS:** “a clinical care pathway significantly reduced hospital length of stay by 1.89 days DI -2.44 to -1.33 ($p < 0.0001$, $I^2=42\%$)” [5 studies, $n=3006$ (1508/1498)]
- **RA:** “significant reduction in readmission rates among patients who had been treated according to a clinical care pathway, with a RR of 0.81 CI 0.66 to 0.99, ($p = 0.04$ $I^2=16\%$)”, follow-up 31 days to 6 months [5 studies, $n=2095$]
- **Cost:** “the meta analysis results of the random effects model did not show any significant differences in hospitalisation costs when the CPs were compared with the non-pathway based care (WMD= (-)1.57, 95%CI = (-)3.66- 0.52, $P = 0.14$).”

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: The quality of studies was assessed by use of the Newcastle-Ottawa Scale. The quality of RCTs and CCTs was assessed by using the instrument developed by Jadad et al.
- Documentation: "only 7 studies could be considered as CPs and met our inclusion criteria."

Coding:

- Intervention X Outcome: CP-Mixed Cost
 - Finding: Non-Significant, Quantitative
- Intervention X Outcome: CP-Mixed LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Mixed RA
 - Finding: Positive, Quantitative

INTERVENTION 6 | CARE PATHWAYS – COPD

Lodewijckx 2011

- Reference: Lodewijckx C, Sermeus W, Panella M, Deneckere S, Leigh F, Decramer M, Vanhaecht K. Impact of care pathways for in-hospital management of COPD exacerbation: a systematic review. International journal of nursing studies. 2011 Nov 30;48(11):1445-56. (7)
- Looked at *Care Pathways (CPs)* and COPD
- Care Pathway Components:
 - Development and implementation of the care pathway
 - Multidisciplinary team
 - Evaluation and analysis of the current care process
 - Evaluation of medical evidence and external practices
 - Establishment of preliminary goals and measurable outcomes
 - Involvement and strong support from hospital leaders
 - Piloting of the care pathway in subsets of patients
 - Education of hospital staff

- Aimed for a well-defined group of patients
- Aimed for a well-defined period
- Multidisciplinary team
- An explicit statement of the goals and key elements of care
- The care pathway outlines time specific clinical interventions on day to day basis and nominates responsibilities by discipline
- Documentation, monitoring, and evaluation of variances and outcomes
- Identification of the appropriate resources

Findings:

Intervention anchored SR studying CPs for COPD, includes 4 studies (3 PPT, 1 nRCT) (7)

- **LOS:** “mean length of hospital stay to be reduced for those patients who received care according to a pathway compared with usual care” but rarely significant; “the studies described positive effects on length of stay”
- **RA:** “two out of the three showing a decline in readmission rates 30 days after discharge, although this was not significantly confirmed in one study. The third study measured readmission rates after 1 year and found rates to be non-significantly higher in the pathway group, although time to first readmission was longer”; “the studies described positive effects on readmission”
- **Cost:** not reported

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: none
- Documentation: "the four included trials, all conducted in a single organization, include the risk for selection bias."

Coding:

- Intervention X Outcome: CP-Mixed LOS
 - Finding: Positive, Non-Quantitative
- Intervention X Outcome: CP-Mixed RA
 - Finding: Positive, Non-Quantitative

INTERVENTION 7 | CARE PATHWAYS- GASTROINTESTINAL SURGERY

Song 2014

- Reference: Song XP, Tian JH, Cui Q, Zhang TT, Yang KH, Ding GW. Could clinical pathways improve the quality of care in patients with gastrointestinal cancer? A meta-analysis. Asian Pacific journal of cancer prevention: APJCP. 2013 Dec;15(19):8361-6. (8)

- looked at *clinical pathways (CPWs)* in patients with gastrointestinal cancer
- Care Pathway Components:
 - Core features not identified

Findings:

- **LOS:** “There was significant heterogeneity existed in included studies ($I^2=88\%$, $p<0.00001$). CPW was superior to usual care on ALOS (MD=-4.0 d, 95%CI [-5.2, -2.9], $p<0.00001$)”
- **Cost:** Aggregate overall results of six trials (Jiang et al., 2003; Kiyama et al., 2003; Jiang et al., 2004; Hu et al., 2004; Liang et al., 2008; Tian, 2011) showed that significant heterogeneity existed in included studies ($I^2=93\%$, $p<0.00001$). CPW was associated with lower inpatient expenditures [SMD=-1.5; 95%CI (-2.3, -0.7); $p=0.0001$].
- **Conclusion:** In conclusion, this meta-analysis showed that CPW could improve the quality of care in patients with gastrointestinal cancer, which was associated with a significant reduction in ALOS, a decrease in inpatient expenditures and an improvement in patient satisfaction. As an effective method to improve health quality care, CPW should be promoted in the management of gastrointestinal cancer. Further studies should pay more attention to the indicators and mechanisms within CPW.

AMSTAR:

- 73%, High

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: Jadad 7 point scale (score of 4 or more indicates a study of high quality)
- Documentation: 5 included studies assessed as low risk

Coding:

- Intervention X Outcome: CP-Gastrointestinal Surgery Cost
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Gastrointestinal Surgery LOS
 - Finding: Positive, Quantitative

INTERVENTION 8 | CARE PATHWAYS – GASTROINTESTINAL SURGERY: COLORECTAL SURGERY

Adamina 2011

- Reference: Adamina M, Kehlet H, Tomlinson GA, Senagore AJ, Delaney CP. Enhanced recovery pathways optimize health outcomes and resource utilization: a meta-analysis of randomized controlled trials in colorectal surgery. *Surgery*. 2011 Jun 30;149(6):830-40. (9)
- Looked at *Enhanced Recovery Pathways* and colorectal surgery
- Included Laparoscopic surgery

- Care Pathway Components:
 - Patient information
 - Oral and written information of patient and relatives about all aspects of perioperative care
 - Preset discharge criteria
 - Early scheduled follow-up and readmission pathway
 - Preservation of gastrointestinal function
 - Carbohydrate solution allowed until 2 hours before surgery
 - Pharmacological prophylaxis of postoperative nausea or vomiting
 - Enforced early enteral feeding
 - Liberal use of chewing gum and laxatives
 - Minimizing organ dysfunction
 - Avoidance of mechanical bowel preparation
 - Goal-directed fluid therapy; minimizing fluid overload
 - Avoidance of drains and nasogastric tube
 - Transverse abdominal incision or laparoscopy
 - Active pain control
 - Preemptive analgesia initiated before surgery
 - Opioid-sparing anesthesia and analgesia, including a thoracic epidural with local anesthetic or intravenous patient-controlled analgesia
 - Infiltration of all incisions with local anesthetic
 - Peripheral opioid antagonist, intravenous local anesthetic
 - Promotion of patient's autonomy
 - Preservation of sleep pattern by liberal use of night-time sedative
 - Enforced early ambulation
 - Breathing exercises
 - Avoidance or early removal of urinary catheter
 - Early withdrawal of intravenous fluid therapy

Findings:

Meta-analysis: Intervention anchored MA of **ERPs** to optimize resource allocation, included 6 RCTs 452 participants (226/226) Ref: (9)

- **LOS:** 2.5 days (95% CI -3.92 to -1.11) (226/226) (unclear if weighted mean)
- **RA:** RR = 0.59; 95% CrI, 0.14–1.43, (226/226)
- **Cost:** not reported

AMSTAR:

- 45%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: None
- Documentation: "Of 14 remaining studies, 6 of them 41,47,68-71 were excluded for absence of true randomization"

Coding:

- Intervention X Outcome: CP-Colorectal Surgery Cost
 - Finding: Positive, Non-Quantitative
- Intervention X Outcome: CP-Colorectal Surgery LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Colorectal Surgery RA
 - Finding: Positive, Quantitative

Eskicioglu 2009

- Reference: Eskicioglu C, Forbes SS, Aarts MA, Okrainec A, McLeod RS. Enhanced recovery after surgery (ERAS) programs for patients having colorectal surgery: a meta-analysis of randomized trials. *Journal of gastrointestinal surgery*. 2009 Dec 1;13(12):2321-9. (10)
- Looked at *Enhanced Recovery After Surgery (ERAS)* and colorectal surgery
- Care Pathway Components:
 - Preoperative interventions
 - extensive preoperative counseling
 - avoidance of mechanical bowel preparation (MBP)
 - avoidance of fasting
 - avoidance of premedication
 - administration of pre- and probiotics
 - preoperative carbohydrate loading until 2 h prior to surgery
 - Intraoperative interventions
 - strict fluid management to avoid fluid overload
 - normothermia
 - hyperoxia
 - tailored optimal analgesia
 - Postoperative components
 - Epidural anesthesia
 - early routine mobilization
 - early enteral nutrition
 - avoidance of nasogastric (NG) tubes
 - Avoidance of peritoneal drains
 - early removal of catheters

Findings:

Meta-analysis: Intervention anchored in **ERAS** for LOS, 4 studies, 198 participants, Ref: (10)

- **LOS:** Three of four included studies showed significantly shorter primary lengths of stay for patients enrolled in enhanced recovery programs
- **RA:** RR = .67, 95% CI [.20, 2.19], z=.67, p=.5; Tau² = 0.28; Chi²(2) = 2.64, p =.27; I² = 24%
- **Cost:** not reported

AMSTAR:

- 73%, High

Risk of Bias Assessment :

- Risk of Bias Assessment Tool: Funnel plots
- Documentation: "All four studies were found to have a high risk of bias"

Coding :

- Intervention X Outcome: CP-Colorectal Surgery LOS
 - Finding: Positive, Non-Quantitative
- Intervention X Outcome: CP-Colorectal Surgery RA
 - Finding: Non-Significant, Quantitative

Gouvas 2009

- Reference: Gouvas N, Tan E, Windsor A, Xynos E, Tekkis PP. Fast-track vs standard care in colorectal surgery: a meta-analysis update. International journal of colorectal disease. 2009 Oct 1;24(10):1119-31. (11)
- Looked at *Fast Track (FT)* and colorectal cancer involving segmental colonic and/or rectal resection
- Care Pathway Components:
 - Preoperative
 - Preoperative counseling
 - Preoperative feeding
 - Synbiotics
 - No bowel preparation
 - No premedication
 - Fluid restriction
 - Perioperative
 - Perioperative high O2 concentrations
 - Active prevention of hypothermia
 - Epidural analgesia
 - Minimally invasive/transverse incisions
 - Postoperative
 - No routine use of NG tubes
 - No use of drains
 - Enforced postoperative mobilization
 - Enforced postoperative oral feeding
 - No systemic morphine use
 - Standard laxatives
 - Early removal of bladder catheter

Findings:

Meta- analysis Intervention anchored in **FT**, with 11 studies N = 815 (426/389) (Ref: (11))

- **LOS:** Primary hospital stay (weighted mean difference -2.35 days, 95% confidence interval (CI) -3.24 to -1.46 days, $z=5.20$, $P<0.00001$; $\tau^2=.98$, $\text{Chi}^2(8)=31.63$, $p<.01$, $I^2=75\%$ ($n=815$))
- **RA:** $z=1.81$, $p=.07$; $\tau^2=.00$, $\text{Chi}^2(8)=7.62$, $p=.47$, $I^2=75\%$ (this comparison was n.s.)
- **Cost:** not reported

AMSTAR:

- 45%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: "The quality of case control studies was assessed by use of the Newcastle-Ottawa Scale. The quality of the randomized controlled studies was assessed by using the instrument developed by Jadad et al."
- Documentation: Table 1; max number of stars (*) five for RCTs and 11 for other studies

Coding:

- Intervention X Outcome: CP-Colorectal Surgery LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Colorectal Surgery RA
 - Finding: Non-Significant, Quantitative

Greco 2014

- Reference: Greco M, Capretti G, Beretta L, Gemma M, Pecorelli N, Braga M. Enhanced recovery program in colorectal surgery: a meta-analysis of randomized controlled trials. World journal of surgery. 2014 Jun 1; 38(6):1531-41. (12)
- Looked at ERAS after colorectal surgery
- Care Pathway Components:
 - Early feeding
 - No routine NGT
 - Early mobilization
 - No preoperative fasting
 - Epidural anesthesia
 - Low systemic morphine
 - Early removal of urinary catheter
 - No bowel preparation
 - No drains
 - Preop counseling
 - Carbohydrate loading
 - Fluid restriction
 - Prevention of hypothermia
 - Minimal invasive incision
 - PONV prophylaxis
 - Prokinetics

- No premedication
- Laparoscopy

Findings:

Intervention anchored MA studying **ERAS** for colorectal surgery, 16 RCTs (1,181 ERAS and 1,195 standard protocols, mixed OS/LPS) (12)

- **LOS:** Mean was 5.8 days in the ERAS group and 8.0 days in the control group. [WMD = -2.28 days (-3.09, -1.47), p for effect < 0.001, p for heterogeneity < 0.001, I² = 86 %], 1046/1053.
- **RA:** Readmission rate was similar in the ERAS group [33/824 (4.0 %) and in the control group 44/844 (5.2 %), RR = 0.78 (0.50, 1.20), p for effect = 0.25, p for heterogeneity = 0.69, I² = 10 %], 824/844.
- **Cost:** not reported

AMSTAR:

- 82%, High

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: Cochrane Collaboration methods
- Documentation: "Five studies were considered at high risk of bias."

Coding:

- Intervention X Outcome: CP-Colorectal Surgery LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Colorectal Surgery RA
 - Finding: Non-Significant, Quantitative

Lee 2014

- Reference: Lee L, Li C, Landry T, Latimer E, Carli F, Fried GM, Feldman LS. A systematic review of economic evaluations of enhanced recovery pathways for colorectal surgery. *Annals of surgery*. 2014 Apr 1;259(4):670-6. (13)
- Looked at *enhanced recovery pathways (ERP)*
- Care Pathway Components:
 - Multidisciplinary care pathways that integrate multiple evidence-based interventions in all perioperative phases to decrease the surgical stress response, hasten recovery, and ultimately improve outcomes
 - Core features not identified

Findings:

Intervention anchored SR of economic evaluations of ERPs that included 5 key components (patient information, preservation of GI function, minimization of organ dysfunction, active pain control, and promotion of patient autonomy), 10 studies included (8 institutional perspective, 2 societal; 2 RCTs, 2 prospective, 5 historical controlled, 1 retrospective) 1488/1675. (13)

- **LOS:** Not reported

- **RA:** Not reported
- **Cost:** “Eight of the 10 studies reported a lower cost for ERP than for CC”. “All 4 of the studies originating from the United States reported significantly lower direct medical costs associated with ERP”. “European studies were of higher quality, and the results were more equivocal.” “This discrepancy may be partly explained by the different perspective from which the economic evaluation was performed and the differences in health care systems between Europe and the United States.”

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: Consensus on Health Economic Criteria-Studies were considered “high-quality” if they scored at least 12 points (of a possible 19).
- Documentation: “All the US studies reported cost savings, but quality was poor as assessed by the CHEC instrument. European studies were of higher quality, and the results were more equivocal.”

Coding:

- Intervention X Outcome: CP-Colorectal Surgery Cost
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Gastrointestinal Surgery Cost
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Mixed Cost
 - Finding: Positive, Quantitative

Lv 2012

- Reference: Lv L, Shao YF, Zhou YB. The enhanced recovery after surgery (ERAS) pathway for patients undergoing colorectal surgery: an update of meta-analysis of randomized controlled trials. *International journal of colorectal disease*. 2012 Dec 1;27(12):1549-54. (15)
- Looked at *Enhanced Recovery After Surgery (ERAS)* and colorectal surgery
- Care Pathway Components:
 - Core features not identified

Findings:

Meta-analysis: Intervention examined **ERAS** for safety and efficacy, 7 studies, 852 participants (419/433) ((15))

LOS: (MD -1.88 days; 95 % CI -2.91 to -0.86, p=.0003) *This figure corrected for heterogeneity within the data.

RA: (RR 0.90; 95 % CI 0.52 to 1.53, p=.69) [Fig. 4].

Cost: Not reported

AMSTAR:

- 73%, High

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: Cochrane Risk of Bias
- Documentation: “All seven studies reported appropriate randomization methods (sealed envelope in four studies; random number generator in two). None of the RCTs were blinded. Due to the nature of these trials and allocation of patients to treatment groups that became self-evident following randomization, blinding of patient groups and observers was not possible. And all trials were free from selective outcome reporting, free from baseline imbalance bias, and free from early stopping bias. There were some post-randomization dropouts in all trials; however, the reasons for withdrawal and dropouts were clearly described and the incomplete outcome data were properly addressed. In total, all seven trials had moderate risk of bias, and the sample size was less than 100 patients in half of included trials.”

Coding:

- Intervention X Outcome: CP-Colorectal Surgery LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Colorectal Surgery RA
 - Finding: No Difference, Quantitative

Spanjersberg 2011

- Reference: Spanjersberg WR, Reurings J, Keus F, Van Laarhoven CJ. Fast track surgery versus conventional recovery strategies for colorectal surgery. Cochrane Database Syst Rev. 2011 Feb 16;2. (16)
- Looked at *Fast Track (FT)/ERAS* surgery for colorectal surgery
- Care Pathway Components:
 - Preoperative
 - Preoperative counselling
 - Preoperative feeding
 - Synbiotics
 - No bowel preparation
 - No premedication
 - Fluid restriction
 - Perioperative
 - Perioperative high O₂ concentrations
 - prevention of hypothermia
 - Epidural anesthesia
 - Minimal invasive incisions
 - Postoperative
 - No routine use of NG tubes
 - No use of drains
 - Early postoperative mobilization

- Early postoperative feeding
- No systemic morphine use
- Standard laxatives
- Early removal of urine catheter

Findings:

Cochrane: recovery looking at **FT**, 6 studies [(17)]

- **LOS:** (MD -2.94 days; 95% CI -3.69 to -2.19) (119/118)
- **RA:** (RR 0.87; 95% CI 0.08 to 9.39) (119/118)
- **Cost:** Not reported

AMSTAR:

- 91%, High

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: funnel plots/RevMan bias assessment tool
- Documentation: very low

Intervention X Outcome: CP-Colorectal Surgery LOS

Finding: Positive, Quantitative

Intervention X Outcome: CP-Colorectal Surgery RA

Finding: Non-Significant, Quantitative

Varadhan 2010

- Reference: Varadhan KK, Neal KR, Dejong CH, Fearon KC, Ljungqvist O, Lobo DN. The enhanced recovery after surgery (ERAS) pathway for patients undergoing major elective open colorectal surgery: a meta-analysis of randomized controlled trials. *Clinical nutrition*. 2010 Aug 31;29(4):434-40. (18)
- Looked at *Enhanced Recovery After Surgery (ERAS)* and colorectal surgery
- Care Pathway Components:
 - Preoperative
 - Preoperative counselling
 - Preoperative feeding
 - Synbiotics
 - No bowel preparation
 - No premedication
 - Fluid restriction
 - Perioperative
 - Perioperative high O2 concentrations
 - Active prevention of hypothermia
 - Epidural analgesia
 - Short/ transverse incisions

- Postoperative
 - No routine use of NG tubes
 - No routine use of drains
 - Enforced postoperative mobilization
 - Enforced postoperative oral feeding
 - No systemic morphine use
 - Standard laxatives
 - Early removal of bladder catheter

Findings:

Meta-analysis: Focused on **ERAS**, 6 studies, N=462 (226/226) [(18)]

- **LOS:** Z=4.76, p<.00001; WMD (Random, 95% CI) -2.51(-3.54, -1.47); I² = 55%, p< 0.00001]
- **RA:** RR (95% CI): 0.80 (0.32, 1.98); I² =9%; p = 0.62
- **Cost:** “Evidence from the literature, supports the view that the ERAS pathway seems to reduce the overall healthcare cost.^{25,26} From a health economics point of view, the data suggest that, with the decrease in complications and hospital stay and similar readmission rates, the cost of treatment per patient would be significantly lower for those treated within an ERAS pathway than those receiving traditional care...”

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: Jadad
- Documentation: average Jadad score of 2.83

Coding:

- Intervention X Outcome: CP-Colorectal Surgery LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Colorectal Surgery RA
 - Finding: Non-Significant, Quantitative

Walter 2009

- Reference: Walter CJ, Collin J, Dumville JC, Drew PJ, Monson JR. Enhanced recovery in colorectal resections: a systematic review and meta-analysis¹. Colorectal Disease. 2009 May 1;11(4):344-53. (19)
- Looked at *Enhanced Recovery (ER)* and colorectal resections
- Includes: R hemicolectomy, L hemicolectomy, Transverse colon resection, Sigmoidectomy, Anterior resection, Laparoscopic Sigmoidectomy, Hartmann’s, Colectomy, APR
- Care Pathway Components:
 - Preoperative elements of enhanced recovery
 - Education / counselling / assessment

- Carbohydrate loading / minimization of fasting period
- Avoidance of bowel preparation Pre- and pro-biotics
- Avoidance of premedication
- Intra-operative elements of enhanced recovery
 - Use of thoracic epidural anaesthesia
 - Attention to intravenous fluid replacement / restriction
 - Minimally invasive techniques / transverse incisions Normothermia
 - Specific avoidance of drains and lines (inc NGT)
 - local anaesthetic infiltration of wound
 - High intra- and peri-operative O2 concentrations
- Post-operative elements of enhanced recovery
 - Mobilization with walking from day
 - Early removal of drains, lines and urinary catheters
 - Immediate oral intake (liquids) and food from day 1
 - Balanced analgesia – regional anaesthesia, multimodal analgesia, low / no opioids
 - Routine anti-emetic
 - Routine pro-kinetics or laxatives

Findings:

Focused on **ER**, 4 studies, N=376, [(20)]

- **LOS:** -3.64 days, $z=5.28$ (-4.98, -2.29 $P < 0.0001$) (33/31)
- **RA:** "Analysis of four papers including 376 patients demonstrated primary and total length-of-stays n(primary + readmission length-of-stay) to be significantly reduced ($P < 0.001$) with ER programmes [weighted mean differences of)3.64 days (95% confidence interval, 95% CI)4.98 to)2.29) and)3.75 days (95% CI)5.11 to)2.40)]. Analysis of controlled clinical trial data showed morbidity rates to be reduced and readmission rates increased."
- **Cost:** Not reported

AMSTAR:

- 45%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: CONSORT statement
- Documentation: "The quality of studies included in this analysis was limited by methodological weaknesses such as lack of randomization and low study numbers from single centres"

Coding:

- Intervention X Outcome: CP-Colorectal Surgery LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Colorectal Surgery RA
 - Finding: Non-Significant, Quantitative

Wind 2006

- Reference: Wind J, Polle SW, Fung Kon Jin PH, Dejong CH, Von Meyenfeldt MF, Ubbink DT, Gouma DJ, Bemelman WA. Systematic review of enhanced recovery programmes in colonic surgery. *British journal of surgery*. 2006 Jul 1;93(7):800-9. (21)
- Looked at *Fast Track (FT)* and colonic surgery
- Care Pathway Components:
 - Preoperative counselling
 - Preoperative feeding
 - Synbiotics
 - No bowel preparation
 - No premedication
 - Fluid restriction
 - Perioperative high O2 concentrations
 - Active prevention of hypothermia
 - Epidural analgesia
 - Minimally invasive/transverse incisions
 - No routine use of NG tubes
 - No use of drains
 - Enforced postoperative mobilization
 - Enforced postoperative oral feeding
 - No systemic morphine use
 - Standard laxatives
 - Early removal of bladder catheter

Findings:

Focused on **ERP**, 6 studies N=512 [(21)]

- **LOS:** FT group was significantly lower than in the TC group ($z=2.90$, $p=.004$, weighted mean difference -1.56 days, 95 per cent c.i. -2.61 to -0.50 days) (6 studies) (230/230)
- **RA:** $z=.65$, $p=.52$, $RR=1.17$, 95 per cent c.i. 0.73 to 1.86 (6 studies) (253/259)
- **Cost:** Not reported

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: none
- Documentation: "A publication bias is possible, with all studies reporting positive results in favour of FT."

Coding:

- Intervention X Outcome: CP-Colorectal Surgery LOS
 - Finding: Positive, Quantitative

- Intervention X Outcome: CP-Colorectal Surgery RA
 - Finding: Non-Significant, Quantitative

Yin 2014

- Reference: Yin X, Zhao Y, Zhu X. Comparison of fast track protocol and standard care in patients undergoing elective open colorectal resection: a meta-analysis update. *Applied Nursing Research*. 2014 Nov 30;27(4):e20-6. (22)
- Looked at *Fast Track (FT)* and colorectal resection
- Care Pathway Components:
 - Preoperative
 - Counseling
 - Feeding
 - No bowel preparation
 - Fluid restriction
 - Perioperative
 - High O2 concentration
 - Prevention of hypothermia
 - Epidural analgesia
 - Short incisions
 - Postoperative
 - No routine use of NG tubes
 - No routine use of drain
 - Enforced mobilization
 - Oral feeding
 - No systemic morphine use
 - Standard laxatives
 - Early removal of bladder catheter

Findings:

Intervention anchored MA of **FT**, included 9 RCTs 947 patients (474/473) (22)

- **LOS:** “A significant better result was seen in FTP group with regard to total hospital stay”; $p < 0.0001$; SMD (95% CI): $-0.91 (-1.26, -0.57)$; heterogeneity $p < 0.0001$; I^2 : 756 n=947 studies: 8.
- **RA:** “5 studies for analysis, 661 patients, no significant difference was found between group FTP and SC (RR = 0.73 95% CI 0.39, 1.77). No heterogeneity was found.”
- **Cost:** Not reported

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: funnel plot/Egger's linear regression test

- Documentation: "Fig 2-blinding of patients and surgeons was not possible which might lead to researcher's expectational bias"

Coding:

- Intervention X Outcome: CP-Colorectal Surgery LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Colorectal Surgery RA
 - Finding: Non-Significant, Quantitative

INTERVENTION 9 | CARE PATHWAYS – GASTROINTESTINAL SURGERY: GASTRECTOMY

Chen 2014b

- Reference: Chen ZX, Liu AH, Cen Y. Fast-track program vs traditional care in surgery for gastric cancer. *World J Gastroenterol*. 2014 Jan 14;20(2):578-83. (23)
- Looked at *Fast-Track (FT) programs vs traditional care* (gastric cancer)
- Included Open surgery & Laparoscopic surgery
- Care Pathway Components:
 - a multidisciplinary approach, including preoperative counseling
 - no bowel reparation
 - perioperative high oxygen concentration
 - active prevention of hypothermia, and no routine use of nasogastric tubes or drains

Findings:

Intervention anchored MA studying **FTS/ERAS** for laparoscopic or open surgery for gastric cancer, 3 trials included (all RCTs) (23).

- **LOS:** FT program could significantly decrease the postoperative hospital stay (laparoscopic: WMD = -1.19, 95%CI: -1.79--0.60, P = 0.0001, 41/44; open surgery: (WMD = -1.99, 95%CI: -2.09--1.89, P = 0.0001, 66/67).
- **RA:** Not reported
- **Cost:** FT program could significantly decrease medical cost (laparoscopic: WMD = -2590, 95% CI: -4054--1126, P = 0.001, 41/44; open surgery: WMD = -3674, 95%CI: -5025--2323, P = 0.0001, 66/67).

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: Risk of Bias was not evaluated
- Documentation: "because the number of included trials in the present review was limited"

Coding:

- Intervention X Outcome: CP-Gastrointestinal Surgery Cost

- Finding: Positive, Quantitative
- Intervention X Outcome: CP-Gastrointestinal Surgery LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Gastrointestinal Surgery Cost
 - Finding: Positive, Quantitative

Chen 2015

- Reference: Chen S, Zou Z, Chen F, Huang Z, Li G. A meta-analysis of fast track surgery for patients with gastric cancer undergoing gastrectomy. The Annals of The Royal College of Surgeons of England. 2015 Jan;97(1):3-10. (24)
- Looked at *fast-track surgery (FTS)* for patients with gastric cancer undergoing gastrectomy also known as *Enhanced Recovery After Surgery (ERAS)*
- Care Pathway Components:
 - Preadmission information and counselling
 - Preoperative bowel preparation
 - Preoperative fasting and carbohydrate loading
 - Preanaesthetic medication
 - Prophylaxis against thromboembolism
 - Antimicrobial prophylaxis
 - Standard anaesthetic protocol
 - Prevention and treatment of postoperative nausea and vomiting
 - Laparoscopy assisted surgery
 - Surgical incisions
 - Nasogastric intubation
 - Prevention of intraoperative hypothermia
 - Perioperative fluid management
 - Drainage of peritoneal cavity following anastomosis
 - Urinary drainage
 - Prevention of postoperative ileus
 - Postoperative analgesia
 - Postoperative nutritional care
 - Early mobilization
 - Audit

Findings:

Intervention anchored MA studying **FTS/ERAS** for gastrectomy (open or laparoscopic) for gastric cancer, 7 studies included (all RCTs), rigorous MA methodology. (24)

- **LOS:** “Postoperative hospital stays were significantly shorter for patients receiving FTS treatment than for those receiving conventional perioperative care (WMD: -2.62 days; 95% CI: -3.59 to -1.65 days, $p < 0.00001$, 176/174), with significant heterogeneity among studies ($I^2 = 71\%$, $p = 0.009$) (see forest plot).”
- **RA:** “Readmission rates, reported in 4 studies were also comparable and no death occurred during the follow-up period in any RCT”

- **Cost:** “expenditure was significantly lower for the FTS group than for the conventional perioperative care group (WMD: -0.39 _ 104 Chinese yuan, 95% CI: -0.52--0.26 _ 104 Chinese yuan, $p < 0.00001$, 228/233), with significant heterogeneity among studies ($I^2 = 57\%$, $p = 0.03$)”

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment

- Risk of Bias Assessment: using tools provided by the Cochrane Collaboration
- Documentation: "Regarding the methodological quality of the RCTs, all seven showed low to moderate overall risks of bias"

Coding:

- Intervention X Outcome: CP-Gastrointestinal Surgery LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Gastrointestinal Surgery RA
 - Finding: Non-Significant, Quantitative

INTERVENTION 10 | CARE PATHWAYS – GASTROINTESTINAL SURGERY: LIVER SURGERY

Coolsen 2012

- Reference: Coolsen MM, Wong-Lun-Hing EM, Dam RM, Wilt AA, Slim K, Lassen K, Dejong CH. A systematic review of outcomes in patients undergoing liver surgery in an enhanced recovery after surgery pathways. *HPB*. 2013 Apr 1;15(4):245-51. (25)
- Looked at *Enhanced Recovery After Surgery (ERAS)* and liver surgery
- Includes: liver resection, including (extended) hemi-hepatectomy, metastasectomy, sectionectomy, central resection and repeat hepatectomy; all underwent laparoscopic liver resection
- Care Pathway Components:
 - No oral bowel preparation
 - Preoperative feeding: carbohydrate loading up to 2 h before surgery
 - No pre-anaesthetic medication
 - Anti-thrombotic prophylaxis
 - Single-dose antibiotics
 - Epidural analgesia
 - Prevention of postoperative nausea and vomiting
 - Avoidance of hypothermia
 - No routine drainage of peritoneal cavity
 - No postoperative nasogastric intubation
 - Good fluid balance
 - Removal of urinary catheter on day 1
 - Normal food at will after surgery from day 1
- Probably useful factors:

- Preoperative counselling
- Provision of i.v. analgesia
- Stimulation of bowel movement with laxatives
- Early and scheduled mobilization
- Audit

Findings:

Intervention anchored SR studying **ERAS** for open or laparoscopic liver surgery, 6 studies included (2 RCT, 3 CC, 1RCS) (25)

- **LOS:** Hospital LoS decreased significantly in the three comparative studies after ERAS implementation, in which median LoS was 5–7 days in the ERAS groups and 7–11 days in the traditional care groups, 130/174.
- **RA:** Lower but not significant
- **Cost:** Not Reported

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment: MINORS (methodological index for non-randomized studies)
- Documentation: "Non-comparative studies achieved MINORS scores in the range of 8–13 points (of a maximum of 16 points)."

Coding:

- Intervention X Outcome: CP-Gastrointestinal Surgery LOS
 - Finding: Positive, Non-Quantitative
- Intervention X Outcome: CP-Gastrointestinal Surgery RA
 - Finding: Non-Significant, Non-Quantitative

INTERVENTION 11 | CARE PATHWAYS – GASTROINTESTINAL SURGERY: PANCREATIC SURGERY

Coolsen 2013

- Reference: Coolsen MM, van Dam RM, van der Wilt AA, Slim K, Lassen K, Dejong CH. Systematic review and meta-analysis of enhanced recovery after pancreatic surgery with particular emphasis on pancreaticoduodenectomies. World journal of surgery. 2013 Aug 1;37(8):1909-18. (26)
- Looked at *ERAS* (Pancreatic) with Particular Emphasis on Pancreaticoduodenectomies
- Care Pathway Components:
 - Preoperative elements
 - Preoperative counseling

- No oral bowel prep
- Preoperative feeding: CHO loading up to 2 h before surgery
- Antithrombotic prophylaxis
- Intraoperative elements
 - No preanesthetic medication
 - Single-dose antibiotics
 - Prevention of postoperative nausea and vomiting (PONV)
 - Avoiding hypothermia
 - Perioperative glycemic control (10 mmol/l)
 - Epidural analgesia
 - No postoperative nasogastric intubation
 - Good fluid balance
- Postoperative elements
 - Early and scheduled mobilization
 - Normal food at will after surgery from day 1, increasing intake according to tolerance over 3–4 days
 - Removal of urinary catheter on day 1 or 2
 - Perianastomotic drain removal\72 h
 - Stimulation of bowel movement with laxatives
 - Somatostatin analogues
 - Audit

Findings:

Intervention anchored SR studying **ERAS** for pancreatic surgery, especially pancreaticoduodenectomies (PDs), 8 articles (5 CCS, 2RS, 1PS, 1,558 patients) (26)

- **LOS:** all interventions “Four out of the five comparative studies reported significant differences in length of stay in favour of ERAS. However, length of stay varied across individual studies for both ERAS and conventional care groups, ranging between 6.7 and 13.5 days in ERAS patients and between 8.0 and 16.4 days in conventional care patients. Non-comparative studies reported a length of stay of 10 days. It was unclear whether the number reported were reported as means or medians.”
- **RA:** No significant difference.
- **Cost:** “All studies reported a decrease in total hospital costs after implementing a clinical pathway, and this decrease was significant in the three studies focusing on PD”

AMSTAR:

- 73%, High

Risk of Bias Assessment:

- Risk of Bias Assessment: funnel plot and Egger’s test
- Documentation: "The calculated p value is 0.27, indicating the chance of bias in this meta-analysis, including only studies focusing on PD is low."

Coding:

- Intervention X Outcome: CP-Pancreatic Surgery Cost
 - Finding: Positive, Non-Quantitative
- Intervention X Outcome: CP-Pancreatic Surgery LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Pancreatic Surgery RA
 - Finding: Non-Significant, Quantitative

INTERVENTION 12 | CARE PATHWAYS – GYNECOLOGICAL SURGERY

De Groot 2015

- Reference: Groot, Jeanny JA, et al. "Enhanced recovery pathways in abdominal gynecologic surgery: a systematic review and meta-analysis." *Acta obstetrica et gynecologica Scandinavica* (2015). (27)
- Looked at enhanced recovery pathways in abdominal gynecologic surgery
- 1530 women included over 5 studies comparing enhanced recovery pathways with usual care
- Care pathway components:
 - Preoperative items
 - Counseling and education
 - Preoperative optimization
 - No mechanical bowel preparation
 - Oral carbohydrate loading
 - No overnight fasting
 - Avoidance of long-acting sedatives
 - Gabapentin
 - Intraoperative items
 - Antimicrobial prophylaxis
 - Mechanical thrombosis prophylaxis
 - Routine pharmaceutical anti-emetics
 - (Thoracic) epidural analgesia
 - High oxygen concentrations
 - IV fluid restriction
 - Preventing hypothermia (Forced air blanket, Warmed IV fluids)
 - Avoidance of pelvic drains
 - Wound infiltration with local anesthetic
 - Postoperative items
 - Avoidance of nasogastric tubes
 - Avoidance of ileus (Gum chewing, Routine laxatives)
 - Prevention of PONV (Multimodal protocol, Routine pharmaceutical anti-emetics)
 - Multimodal analgesia (Continuation of EA, Minimizing opioid use)
 - Early oral intake

- Nutritional supplements
- Early mobilization
- Thrombosis prophylaxis (Pharmaceutical, Mechanical, Extended)

Findings:

- **LOS:** “implementation of ERAS reduced time to discharge by 1.57 days (95% CI -2.94 to -0.20 days, $p = 0.02$, $I^2 = 91\%$) for patients with a malignancy”
- **RA:** “No statistically significant difference was found after 30 weeks of follow up (RR 1.12, 95% CI 0.74–1.71, $p = 0.59$), with no significant heterogeneity ($I^2 = 23\%$, $p = 0.27$)”
- **Cost:** not reported

AMSTAR:

- 91%, High

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: Downs and Black Checklist (categorized as: study quality, external validity, study bias, confounding, and power of the study)
- Documentation: “Due to restrictions in design and methodology, all studies were judged to have a high overall risk of bias.” And “The available evidence based on a broad range of non-randomized studies at high risk of bias suggests that enhanced recovery pathways may reduce length of postoperative hospital stay in abdominal gynecologic surgery.”

Table 2. Downs and Black risk of bias assessment.

Study	Reporting	External validity	Internal validity		Power	Overall
			Bias	Confounding		
Borendal	Low	Unclear	High	High	—	High risk
Carter	Unclear	Unclear	High	High	—	High risk
Cascales	Unclear	Unclear	High	High	—	High risk
Chowdhury	High	Unclear	High	High	—	High risk
Dickson	High	Low	High	High	Low	High risk
Eberhart	High	Unclear	High	High	High	High risk
Hansen	Low	Low	High	High	—	High risk
Kalogera	Unclear	Unclear	Unclear	High	Low	High risk
Kroon	High	Unclear	High	High	—	High risk
Marx	High	Low	Unclear	High	High	High risk
Moller	High	Low	High	High	—	High risk
Oscarsson	High	Unclear	High	High	—	High risk
Pather	High	Unclear	High	High	—	High risk
Rardin	High	Unclear	High	High	—	High risk
Sidhu	Low	Unclear	High	High	—	High risk
Wijk	Low	Low	Unclear	High	High	High risk

Figure 2: de Groot et al, 2016

Coding:

- Intervention X Outcome: CP-Gynecological Surgery LOS
 - Finding: Positive, Non-Quantitative
- Intervention X Outcome: CP-Gynecological Surgery RA

- Finding: Non-Significant, Non-Quantitative
- Intervention X Outcome: CP-Gynecological Surgery Cost
 - Finding: Non-Significant, Non-Quantitative

Lv 2010

- Reference: Lv D, Wang X, Shi G. Perioperative enhanced recovery programmes for gynaecological cancer patients. Cochrane Database Syst Rev. 2010 Jan 1;6. (14)
- Looked at *ERAS* and gynaecological cancer patients
- Cochrane review with no identified RCTs. Therefore, analysis on data could not be performed
- Care Pathway Components:
 - preoperative education of postoperative care
 - avoidance of bowel preparation
 - no routine use of prophylactic antibiotics
 - absence of preoperative fasting (carbohydrate-loaded liquids are administered two hours before surgery)
 - tailored anaesthesiology encompassing epidural anaesthesia and short-acting anaesthetics
 - perioperative high inspired (inhaled) oxygen concentrations
 - avoidance of perioperative fluid overload
 - short incisions
 - use of non-opioid analgesics
 - no routine use of drains and nasogastric tubes
 - early removal of bladder catheters
 - use of standard laxatives and prokinetics (drugs which enhance the passage of intraluminal contents of the gastrointestinal tract)
 - early/enhanced postoperative feeding and mobilization

Findings:

- **LOS:** not reported
- **RA:** not reported
- **Cost:** not reported

AMSTAR:

- 91%, High

Risk of Bias Assessment

- Risk of Bias Assessment Tool: none
- Documentation: "Since no eligible study was included, no data could be extracted"

Coding:

- Intervention X Outcome: CP-Colorectal Surgery LOS
 - Finding: Positive, Quantitative

- Intervention X Outcome: CP-Colorectal Surgery RA
 - Finding: Non-Significant, Quantitative

Xuping 2014

- Reference: Xuping S, Jinhui T, Qi C, Guowu D, Kehu Y, Peizhen Z. Effects of clinical pathways used in surgery for uterine fibroids: A meta-analysis. *Journal of cancer research and therapeutics*. 2014 Jan 1;10(1):180. (28)
- Looked at *clinical pathways (CPWs)* and uterine fibroids
- Care Pathway Components:
 - Core features not identified

Findings:

Intervention anchored MA studying **CPs** for uterine fibroids, 10 studies, 775 patients (28)

LOS: "Aggregate results showed that significant heterogeneity existed in included studies ($I^2 = 92\%$; $P < 0.00001$). CPWs was associated with significant shorter average length of stay ($MD = -1.61$; 95% CI $(-1.91, -1.31)$; $P < 0.00001$)"

RA: Not reported

Cost: "Inpatient expenditures were reported by all studies.[17-26] There was significant heterogeneity in included studies ($I^2 = 98\%$; $P < 0.00001$). CPWs was superior to usual care on inpatient expenditures ($MD = -1197.69$; 95% CI $(-1,582.04, -813.35)$; $P < 0.00001$)"

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment

Risk of Bias Assessment: Jadad 7-point-a total score of 4 or more points is high quality study

Documentation: "The bias of eight included studies was assessed as low risks."

Coding:

- Intervention X Outcome: CP-Mixed Cost
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Mixed LOS
 - Finding: Positive, Quantitative

INTERVENTION 13 | CARE PATHWAYS – LUNG SURGERY

Fiore 2016

- Reference: Fiore, Julio F., et al. "Systematic review of the influence of enhanced recovery pathways in elective lung resection." *The Journal of thoracic and cardiovascular surgery* (2015). (29)
- Looked at enhanced recovery pathways in elective lung resection

- SR with six articles (1 RCT, 1 case-control study, 2 prospective cohort studies, and 2 retrospective cohort studies) with a total of 1612 participants (821 ERP group, 791 control)
- Enhanced recovery pathway components:
 - Preoperative
 - Patient education and/or counseling
 - Shorter preoperative fasting
 - Prophylactic antibiotics
 - Intraoperative
 - Epidural anesthesia/analgesia
 - Use of single chest tube
 - Fissureless right upper lobectomy
 - Muscle sparing surgery/VATS

Findings:

- **LOS:** “The nonrandomized studies reported significantly shorter LOS in patients treated within an ERP (difference, 1.2-9.1 days). The RCT reported no differences between groups (11 days in both groups). None of the studies reported total LOS.”
- **RA:** “Rates of readmission ranged from 1% to 10%.”
- **Cost:** “In the study by Maruyama and colleagues, costs were significantly lower in patients treated within an ERP (mean, \$13,093 +/- \$280 vs control \$14,439 +/- \$430; P=.0002). Zehr and colleagues also reported significantly lower mean costs in the ERP group (\$13,432 +/- \$8056 vs control \$17,103 +/- \$13,221; P<.01). In the study by Wright and colleagues, differences in hospital costs were not statistically significant (ERP \$14,792 vs control \$16,063; P= .47; variability not reported).

AMSTAR:

- 82%, High

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: Cochrane Risk of Bias
- Documentation: “Risk of bias favoring enhanced recovery pathways was high.” “Nonrandomized studies had high risk of bias in the majority of the domains of the Cochrane Tool. The only RCT included in the review had unclear risk of bias in the majority of the domains because it lacked information on randomization sequence generation, concealment of allocation, and blinding of outcome assessors. Losses to follow-up (missing data) were reported in only 1 study, but not for all outcome measures. All the included studies had unclear risk of selective reporting because study protocols were not available a priori. Two studies used standardized criteria to define postoperative complications. None of the studies reported the use of standardized criteria to define readiness for hospital discharge. Also, none of the studies reported a sample size calculation.”

TABLE 1. Study design and quality assessment

Study	Design	Sample size		Quality assessment according to Cochrane Collaboration tool						
		ERP	Control	Random sequence generation	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessment	Incomplete outcome data	Selective reporting	Other bias
Salati, 2012	Case-control	232	232	(-)	(-)	(-)	(?)	(?)	(?)	(-)
Numan, 2012	Prospective cohort	75	94	(-)	(-)	(-)	(?)	(?)	(?)	(-)
Muehling, 2008	Randomized controlled trial	30	28	(?)	(?)	(-)	(?)	(?)	(?)	(-)
Maruyama, 2006	Retrospective cohort	113	105	(-)	(-)	(-)	(?)	(?)	(?)	(-)
Zehr, 1998	Prospective cohort	241	185	(-)	(-)	(-)	(?)	(?)	(?)	(-)
Wright, 1997	Retrospective cohort	130	147	(-)	(-)	(-)	(?)	(?)	(?)	(-)

ERP, Enhanced recovery pathway; (-), high risk of bias; (+), low risk of bias; (?), unclear risk of bias.

Figure 3: Fiore et al, 2016

Coding:

- Intervention X Outcome: CP-Lung Surgery RA
 - Finding: Non-Significant, Non-Quantitative
- Intervention X Outcome: CP-Lung Surgery Cost
 - Finding: Non-Significant, Non-Quantitative
- Intervention X Outcome: CP-Lung Surgery LOS
 - Finding: Positive, Non-Quantitative

INTERVENTION 14 | CARE PATHWAYS – PEDIATRIC ASTHMA

Sylvester 2013

- Reference: Sylvester AM, George M. Effect of a clinical pathway on length of stay and cost of pediatric inpatient asthma admissions: an integrative review. Clinical nursing research. 2013 May 15:1054773813487373. (30)
- Looked at *Clinical Pathways* in asthma patients
- Care Pathway Components:
 - Core features not identified

Findings:

Intervention anchored SR studying CPs for childhood asthma, 9 studies (30)

- LOS:** “eight studies found a decrease in LOS when comparing the use of a clinical pathway in the treatment of pediatric asthma admissions versus traditional methods of treatment”
- RA:** Not reported
- Cost:** “Five of the studies found that costs in the experimental group treated with the asthma pathway were lower than that of the costs in the control group”

AMSTAR:

- 45%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: none
- Documentation: "After applying inclusion and exclusion criteria, nine studies (1996-2008) were retained. One reviewer initially conducted all searches and reviews."

Coding:

- Intervention X Outcome: CP-Pediatric Asthma Cost
 - Finding: Positive, Non-Quantitative
- Intervention X Outcome: CP-Pediatric Asthma LOS
 - Finding: Positive, Non-Quantitative

INTERVENTION 15 | CARE PATHWAYS – THYROIDECTOMY

Yang 2014

- Reference: Yang Y, Hu X, Zhang Q, Cao H, Li J, Wang J, Shao Y, Xin S. Effect of clinical nursing pathway for endoscopic thyroidectomy in Chinese patients: A meta-analysis. International journal of nursing practice. 2014 Aug 1. (31)
- Looked at "Clinical Nursing Pathways" and endoscopic thyroidectomy
- CNP: Standard nursing protocol based on admission guidance, admission diagnosis, examination, medication, treatment, nursing, diet guidance, health education and discharge planning
- Care Pathway Components:
 - Admission day
 - Introduce the duty physicians and nurses; patient education and assessment
 - Complete the inspection items, including chest X ray, B type echocardiography, electrocardiogram, vocal cords examination; instruct for fasting blood and abdominal B Ultrasound check
 - Grade II care; regular diet
 - Pre-operative (2-3) day
 - Liver and kidney function test, electrolyte, blood routine test, four projects of blood coagulation, five indexes before transfusion, thyroid function, blood glucose, urine routine test, and abdominal B Ultrasound
 - Psychological nursing before operation; introduce the method of operation and anesthesia, solve the patient's doubt, and introduce the successful case in order to eliminate the patient anxiety
 - Antimicrobial agents for skin test, skin preparation before the operation, instructing head back practice
 - Fasting for 12 h, forbidden to drink 6h before operation
 - Operative Day
 - Assessment of vital signs; injection of atropine and phenobarbital pre- operation 30 min; accompany patient to operation room
 - Monitoring of vital signs, wound bleeding, dyspnea, and other complications; keeping the drainage; preparation tracheotomy package

- Introduce postoperative care, the correct posture, pain control methods
 - Grade I care; semi-liquid diet for 6 h
- Post-operative day 1
 - Wound bleeding observation; voice and tone changes; etc
 - Psychological nursing care
 - Observe and record sleeping condition
- Post-operative (4-6) day
 - Observation of changes in condition, continue health education
- Discharge
 - Discharge instructions and inform the reexamination time
 - Telephone follow-up on post-operative day 10

Findings:

Intervention anchored MA on **Nursing CPs**, 6 trials (31)

- **LOS** : “Clinical nursing pathway reduced hospital stays by 1.56 days (95% CI –2.08 to –1.04 days) compared with usual care. Neither Begg’s rank correlation test ($P = 0.260$) nor Egger’s linear regression test ($P = 0.304$) showed any evidence of publication bias.”; “there was obvious heterogeneity ($I^2 = 85\%$, $P < 0.00001$) among the six trials, so we used the random-effect model”
- **RA**: Not reported
- **Cost**: “the use of a clinical nursing pathway reduced hospital charges by 1200 yuan (95% CI –2000 to –500 Yuan) compared with usual care in a random-effect model. There was obvious heterogeneity among the included trials ($I^2 = 100\%$, $P < 0.00001$). Neither Begg’s rank correlation test ($P = 0.707$) nor Egger’s linear regression test ($P = 0.598$) showed any evidence of publication bias.”

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment: assessed in accordance with the guidelines in the Cochrane reviewers’ handbook
- Documentation: "All of the included trials were classified as having moderate or high risk of bias by the methodological quality assessment."

Coding:

- Intervention X Outcome: CP-Mixed Cost
 - Finding: Positive, Quantitative
- Intervention X Outcome: CP-Mixed LOS
 - Finding: Positive, Quantitative

INTERVENTION 16 | CASE MANAGEMENT (CM) – MIXED ELDERLY

Kim 2005

- Reference: Kim YJ, Soeken KL. A Meta-Analysis of the Effect of Hospital-Based Case Management on Hospital Length-of-Stay and Readmission. Nursing Research. 2005 Jul 1;54(4):255-64. (32)
- Care Pathway Components:
 - assessment (of the patient and family's social, physical, and psychological functioning),
 - education (quality information that will prevent future disease-related episodes)
 - collaboration (collaborative multidisciplinary practice)
 - discharge planning (Early discharge planning, defined as beginning within 48 hours of admission to the hospital is associated with the process of assessing the unmet needs of patients and developing a coordinated care plan)
 - linkage (Nurse case managers are required to plan and coordinate healthcare services that respond to the individualized needs of patients and families)
 - monitoring (to assess the suitability of provisions made to sustain patients in the place where they are discharged. It can be done through telephoning, visiting, or having the patient phone the case manager)

Findings:

Intervention anchored MA studying case management, based on 12RCTs (32):

- **LOS:** 10 trials, not significant WMD: 0.094 (95% CI -0.032 to 0.220) for all participants, heart failure is significant, WMD: 0.24, (95% CI 0.012 to 0.470), non-significant reduction seen for frail older people (effect size 0.13, 95% CI -0.073 to 0.324), non-significant increase in length of stay for stroke patients (effect size -0.23, 95% CI -0.542 to 0.089)
- **RA:** 10 trials, not significant "OR of 0.87 (95% CI 0.69 to 1.04); this reduction was equivalent to a 6% decrease in the readmission rate. Again the effect was stronger for the case management for patients with heart failure (OR 0.75, 95% CI 0.45 to 1.05), but small for frail older people; data for stroke were not reported"
- **Cost:** Inconsistent

AMSTAR:

- 55%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: Jadad Scale + authors' scale of intervention quality (comprehensiveness), range 0-11 (low: 0-3; moderate: 4-7; high: 8-11)
- Documentation: Overall, the studies were of moderate to high quality, with 6 of 12 studies receiving more than 8 of 11 points. No study was assigned a low-quality rating.

Coding:

- Intervention X Outcome: Case Management (CM) LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: Case Management (CM) RA
 - Finding: Non-Significant, Quantitative

INTERVENTION 17 | COMPREHENSIVE GERIATRIC ASSESSMENT (CBA) – MIXED ELDERLY

Conroy 2011

- Reference: Conroy SP, Stevens T, Parker SG, Gladman JR. A systematic review of comprehensive geriatric assessment to improve outcomes for frail older people being rapidly discharged from acute hospital: 'interface geriatrics'. *Age and Ageing*. 2011 May 26;42(3):333-340.
- Looked at *comprehensive geriatric assessments (CGA)* and elderly
- SR with 5 studies (4 RCTs, 1 pseudo-RCT)
- Care Pathway Components:
 - Usually defined as a 'multidimensional diagnostic process focused on determining a frail older person's medical, psychological and functional capability in order to develop a coordinated and integrated plan for treatment and follow-up'

Findings:

- **LOS:** not reported
- **RA:** not reported
- **Cost:** "Over the full follow-up period for each the five trials (n = 2,474), there was no significant difference in readmissions comparing control to intervention groups [risk ratio 0.95 (95% CI 0.83–1.08)]"

AMSTAR:

- 45%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment: Van Tulder scale, with scores ranging from 0 (lowest quality) to 19 (highest quality), with the mean score from the two reviewers calculated for each paper; this tool has been used in other similar systematic reviews concerning interventions for frail older people)
- Documentation: Trials scoring less than a mean of 9/19 on the van Tulder critical appraisal score excluded (1/7 excluded, average score 11.8/19 for remaining

Coding:

- Intervention X Outcome: Comprehensive Geriatric Assessment (CBA) – Mixed Elderly RA
 - Finding: Non-Significant, Quantitative

INTERVENTION 18 | DISCHARGE PLANNING (DP)-MIXED

Gonçalves 2016

- Reference: Gonçalves-Bradley, Daniela C., et al. "Discharge planning from hospital." *The Cochrane Library* (2016). (34)
- Looked at discharge planning from hospital

- Included all patients in the hospital (acute, rehabilitation or community) irrespective of age, gender or condition.
- Cochrane review with 30 trials and 11,964 participants

Findings:

- **LOS:** “There was a small reduction in hospital length of stay for those allocated to discharge planning in trials recruiting older people following a medical admission (mean difference (MD) – 0.73, 95% confidence interval (CI) – 1.33 to – 0.12. Two trials recruiting participants recovering from surgery reported a difference of – 0.06 day (95% CI – 1.23 to 1.11) and two trials recruiting a combination of participants recovering from surgery and those with a medical condition a mean difference of – 0.60 (95% CI – 2.38 to 1.18).”
- **RA:** “For elderly participants with a medical condition, there was a lower readmission rate in the discharge planning group at three months of discharge (RR 0.87, 95% CI 0.79 to 0.97. It is uncertain whether discharge planning reduces readmission rates for participants admitted to hospital following a fall (RR 1.36, 95% CI 0.46 to 4.01.”
- **Cost:** “It is uncertain whether there is any difference in hospital care cost when discharge planning is implemented with patients with a medical condition (very low certainty evidence, five trials). It is uncertain if discharge planning impacts on primary and community care costs.”

AMSTAR:

- 82%, High

Risk of Bias Assessment:

- Risk of Bias Assessment: Cochrane Risk of Bias Tool
- Documentation: “All studies included in this review were randomised controlled trials, and we considered most of them to have a low risk of bias. There was consistency among trials recruiting patients with a medical condition for the main outcomes of readmission and length of stay, and a moderate level of certainty for these outcomes.”

Figure 2. Methodological quality summary: review authors' judgements about each methodological quality item for each included study.

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding (performance bias and detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Baseline data
Balaban 2008	?	?	?	?	?	?
Bolas 2004	?	?	?	?	?	?
Eggink 2010	?	?	?	?	?	?
Evans 1993	?	?	?	?	?	?
Farris 2014	?	?	?	?	?	?
Gilliespie 2009	?	?	?	?	?	?
Goldman 2014	?	?	?	?	?	?
Harrison 2002	?	?	?	?	?	?
Hendricksen 1980	?	?	?	?	?	?
Jack 2009	?	?	?	?	?	?
Kennedy 1987	?	?	?	?	?	?
Kripalani 2012	?	?	?	?	?	?
Lainscak 2013	?	?	?	?	?	?
Laramie 2003	?	?	?	?	?	?
Legrain 2011	?	?	?	?	?	?
Lin 2009	?	?	?	?	?	?
Lindpaintner 2013	?	?	?	?	?	?
Moher 1992	?	?	?	?	?	?
Naji 1999	?	?	?	?	?	?
Naughton 1994	?	?	?	?	?	?
Naylor 1994	?	?	?	?	?	?
Nazareth 2001	?	?	?	?	?	?
Pardessus 2002	?	?	?	?	?	?
Partley 1994	?	?	?	?	?	?
Preen 2005	?	?	?	?	?	?
Rich 1993a	?	?	?	?	?	?
Rich 1995a	?	?	?	?	?	?
Shaw 2008	?	?	?	?	?	?
Sulch 2000	?	?	?	?	?	?
Weinberger 1996	?	?	?	?	?	?

Figure 4: Gonçalves et al, 2016

Coding:

- Intervention X Outcome: DP-Mixed LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: DP-Mixed RA
 - Finding: Non-Significant, Quantitative
- Intervention X Outcome: DP-Mixed Cost
 - Finding: Non-Significant, Quantitative

Preyde 2009

- Reference: Preyde M, Macaulay C, Dingwall T. Discharge planning from hospital to home for elderly patients: a meta-analysis. Journal of evidence-based social work. 2009 May 4;6(2):198-216. (35)
- Looked at *Discharge Planning (DP)* and elderly
- MA with 25 included RCT and quasi-experimental studies
- Care Pathway Components:

- Core features not identified

Findings:

- **LOS:** “Nineteen trials assessed length of stay (LOS), nine of which did not report significant differences. Eight studies reported significantly shortened overall LOS in the intervention groups.”
- **RA:** “In nearly all of these trials, the maximum follow-up was six months, and, for the most part, no significant differences in readmission rates were reported. Thus, if discharge planning interventions do affect readmission rates, they may only do so in the short term.”
- **Cost:** “Five studies reported intervention group savings. Three trials did not observe any significant differences in costs”

AMSTAR:

- 45%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment: QAR
- Documentation: mean score was 3.12

Coding:

- Intervention X Outcome: DP-Mixed LOS
 - Finding: Non-Significant, Non-Quantitative

Shepperd 2013

- Reference: Shepperd S, Lannin NA, Clemson LM, McCluskey A, Cameron ID, Barras SL. Discharge planning from hospital to home. *Cochrane Database Syst Rev.* 2013 Jan 1;1. (36)
- Looked at *Discharge Planning (DP)*
- Cochrane review with 24 RCTs and 8098 participants
- Care Pathway Components:
 - Discharge planning is the development of an individualized discharge plan for a patient prior to them leaving hospital for home.
 - The discharge plan can be a standalone intervention or may be embedded within another intervention, for example, it is a component of stroke unit care, and forms part of the process of comprehensive geriatric assessment.

Findings:

- **LOS:** “Hospital length of stay and readmissions to hospital were statistically significantly reduced for patients admitted to hospital with a medical diagnosis and who were allocated to discharge planning (mean difference length of stay -0.91, 95% CI -1.55 to -0.27, 10 trials; readmission rates RR 0.82, 95% CI 0.73 to 0.92, 12 trials).

- **RA:** “Hospital length of stay and readmissions to hospital were statistically significantly reduced for patients admitted to hospital with a medical diagnosis and who were allocated to discharge planning (mean difference length of stay -0.91, 95% CI -1.55 to -0.27, 10 trials; readmission rates RR 0.82, 95% CI 0.73 to 0.92, 12 trials).
- **Cost:** “There was little evidence on overall healthcare costs.”

AMSTAR:

- 82%, High

Risk of Bias Assessment:

- Risk of Bias Assessment: Risk of bias' (Cochrane Handbook)
- Documentation: 17 trials were assessed as low risk of bias for measurement of the primary outcomes

Coding:

- Intervention X Outcome: DP-Mixed LOS
 - Finding: Positive, Non-Quantitative

Zhu 2015

- Reference: Zhu QM, Liu J, Hu HY, Wang S. Effectiveness of nurse-led early discharge planning programs for hospital inpatients with chronic disease or rehabilitation needs: a systematic review and meta-analysis. *Journal of clinical nursing*. 2015 Oct 1;24(19-20):2993-3005. (37)
- Looked at nurse led early *discharge programs (DP)*
- SR with ten RCTs and 3438 participants
- Care Pathway Components:
 - Initial nurse visit within 48 hours of hospital admission
 - predischage assessment
 - structured home visits
 - telephone follow-ups after discharge

Findings:

- **LOS:** “no significant difference in this outcome measure between hospital inpatients who received DPPs and those who received standard care only (SMD = 0.03, 95% CI -0.06 to 0.12, p = 0.540, I² = 0%)”
- **RA:** “compared with a control group, hospital inpatients, who received DPPs experienced no significant difference in readmission rates at one month (RR = 0.73, 95% CI 0.46–1.15, p = 0.170, I² = 75%) or three months (RR = 0.64, 95% CI 0.33– 1.27, p = 0.200, I² = 61%), but did have significantly fewer hospital readmissions when the interval for readmission was extended to six months (RR = 0.48, 95% CI 0.37–0.63, p < 0.001, I² = 0%) or 12 months (RR = 0.76, 95% CI 0.65–0.88, p < 0.001, I² = 0%). Significantly fewer hospital readmissions were identified in patients aged 65 or older (RR = 0.74, 95% CI 0.57–0.96, p = 0.020, I² = 73%) and in those under 65 years of age (RR = 0.69, 95% CI 0.51–0.92, p = 0.010, I² = 0%), when DPPs were implemented.”

- **Cost:** “Narrative analysis suggested that discharge planning may reduce total and readmission costs.”

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment: Cochrane Collaboration Handbook for Systematic Reviews of Interventions
- Documentation: "The risk of selection bias resulting from inadequate random sequence generation was low in all 10 studies"

Coding:

- Intervention X Outcome: DP-Mixed LOS
 - Finding: Non-Significant, Quantitative

INTERVENTION 19 | EMERGENCY DEPARTMENT SHORT STAY UNITS – MIXED

Galipeau 2015

- Reference: Galipeau, James, et al. "Effectiveness and Safety of Short-stay Units in the Emergency Department: A Systematic Review." *Academic Emergency Medicine* 22.8 (2015): 893-907. (38)
- Looked at short stay units compared to usual emergency department care
- SR with ten reports of five studies
- Short-Stay Units defined as:
 - General-purpose units, beyond a simple extension of beds, designed to treat and/or observe any ED patients with expected lengths of stay (LOS) of 72 hours or less.

Findings:

- **LOS:** “Three studies reported median LOS for short-stay unit patients (range = 10.1 to 25.7 hours) and usual care (range = 25.2 to 29.9 hours), with two of the three studies reporting significant differences ($p < 0.001$). The fourth study also reported a significant difference ($p < 0.01$) in the mean (+/-standard deviation [SD]) LOS between short-stay unit patients and usual care, at 33.1 (+/-28.4) hours (95% CI = 27.0 to 39.2 hours) and 44.8 (+/-31.8) hours (95% CI = 38.0 to 51.6 hours), respectively.”
- **RA:** one study “reported a significantly lower hospital re-admission rate for short-stay unit patients compared to inpatient care.”
- **Cost:** one study reported “that the short-stay unit incurred a significantly lower median hospital cost of \$1,102 ($p < 0.05$) and lower mean cardiac-related health care cost of \$2,927 ($p = 0.004$) compared to inpatient care. There were no differences between the two settings in total revenue ($p > 0.05$).

AMSTAR:

- 91%, High

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: Cochrane Risk of Bias Tool
- Documentation: “Studies had small sample sizes and were collectively at a moderate risk of bias”, “The evidence for each outcome is rated as one of four qualities: high, moderate, low, or very low”

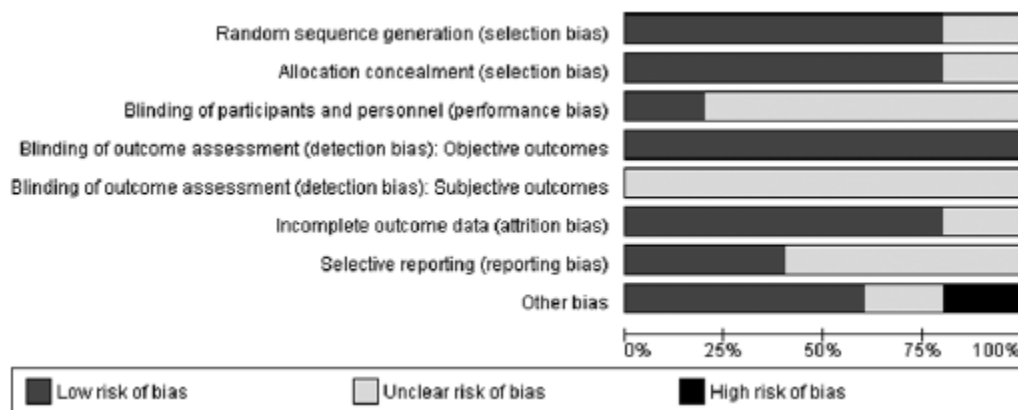


Figure 5: Galipeau et al, 2015

Coding:

- Intervention X Outcome: ED Short Stay Unit-Mixed LOS
 - Finding: Positive, Non-Quantitative
- Intervention X Outcome: ED Short Stay Unit-Mixed RA
 - Finding: Non-Significant, Non-Quantitative
- Intervention X Outcome: ED Short Stay Unit-Mixed Cost
 - Finding: Positive, Non-Quantitative

INTERVENTION 20 | EARLY SUPPORTED DISCHARGE (ESD) - MIXED ELDERLY

Fox 2013

- Reference: Fox MT, Sidani S, Persaud M, Tregunno D, Maimets I, Brooks D, O'Brien K. Acute care for elders components of acute geriatric unit care: systematic descriptive review. Journal of the American Geriatrics Society. 2013 Jun 1;61(6):939-46. (39)
- Looked at *Early Supported Discharge (ESD)* and elderly patients
- Care Pathway Components:
 - assessing the needs of older adults for discharge home with a focus on functional needs
 - providing education to older adults and where available, to their families or caregivers
 - reviewing and adjusting medications
 - transferring information to successive in-hospital healthcare providers or coordinating care with community healthcare providers
 - following-up with one or more home visits and/or telephone calls after index hospital discharge

Findings:

Intervention anchored MA studying **ED** for older patients admitted for a hip fracture, and presented with other co-morbidities including hypertension, diabetes mellitus, cancer and pulmonary diseases, 9 studies included (7 RCTs, 1 pseudo-RCT, 1 Quasi-Exp). (39)

- **LOS:** “no significant differences in older adults who received early discharge planning compared with those who received usual care”, -0.41 [-1.19, 0.36], $p=0.30$, not heterogeneous 399/3.90.
- **RA:** “older adults who received early discharge planning experienced significantly fewer hospital readmissions within one or twelve months of index hospital discharge... a reduction of 22% in hospital readmissions”, 0.78 [0.69, 0.90], $P = 0.0003$, not heterogeneous, 760/765. Readmission LOS: -2.47 [-4.13, -0.81], $P = 0.004$, not heterogeneous, 323/296.
- **Cost:** Not reported

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment

- Risk of Bias Assessment: The Cochrane Collaboration’s risk of bias tool
- Documentation:

	High	Low	Unclear
Selection- randomization	0%	78%	22%
Selection-allocation	0%	56%	44%
Performance	11%	11%	78%
Detection	0%	44%	56%
Attrition	22%	67%	11%
Reporting	11%	89%	0%

Coding:

- Intervention X Outcome: Early Supported Discharge (ESD) - Mixed Elderly LOS
 - Finding: Non-Significant, Quantitative
- Intervention X Outcome: Early Supported Discharge (ESD) - Mixed Elderly RA
 - Finding: Positive, Quantitative

Langhorne 2007 / Updated in 2003

- Reference: Langhorne P, Widen-Holmqvist L. Early supported discharge after stroke. Journal of Rehabilitation Medicine. 2007 Mar 5;39(2):103-8. (40) (41–43)
- Looked at *Early Supported Discharge* and stroke patients
- Care Pathway Components:
 - Hospital admission
 - Identify ESD team key worker
 - Key worker contact with patient/carer
 - Home assessment

- Plan discharge home
- Agree rehabilitation goals
- Discharge home
- Agree/develop rehabilitation goals
- Implement rehabilitation plan
- Access relevant services
- Multidisciplinary team review of progress
- Negotiate withdrawal of ESD service
- Late review of needs/problems
- Discharge from ESD team

Findings:

- **LOS:** “Across all trials and within each subgroup of trials, there was a significant reduction ($P < 0.0001$) in the length of hospital stay, which is approximately equivalent to seven days.” ESD TCD: -6.84 [-11.20, -2.49] $P = 0.0021$, 573/576, heterogeneous; ESD TC: -10.36 [-15.39, -5.33] $P = 0.000054$, 233/231, not heterogeneous; No ESD T: -7.00 [-8.61, -5.39] $P < 0.00001$, 52/50, single test. COMBINED: -7.10 [-10.03, -4.17] $P < 0.00001$, 858/837, heterogeneous.
- **RA:** “Readmission rates during scheduled follow up (31% versus 28%) were very similar between the ESD service and conventional care groups”. ESD TCD: 1.26 [0.94, 1.67] $P = 0.12$, 463/455, not heterogeneous.
- **Cost:** “Estimated costs ranged from 23% less to 15% greater for the ESD group in comparison to controls. These estimates were reported to be stable in sensitivity analyses.”

AMSTAR:

- 73%, High

INTERVENTION 21 | EARLY SUPPORTED DISCHARGE (ESD) - STROKE

Fearon 2012

- Reference: Fearon P, Langhorne P. Early Supported Discharge Trialists. Services for reducing duration of hospital care for acute stroke patients. Cochrane Database Syst Rev. 2012;9. (44)
- Looked at *Early Supported Discharge (ESD)* and stroke
- ESD programs are categorized by their services:
 - ESD Team Coordination and Delivery: “service comprised a multidisciplinary team which co-ordinated discharge from hospital, post discharge care and provided rehabilitation and patient care at home. The multidisciplinary team met on a regular basis to plan patient care.
 - ESD Team Coordination: “discharge home and the immediate post-discharge care was planned and supervised by a co-ordinated multidisciplinary team. However, care was subsequently handed over to existing community-based agencies who provided continuing rehabilitation and support at home. These community-based agencies did not usually

provide coordinated multidisciplinary team care (i.e. input from a multidisciplinary team which met on a regular basis to plan patient care).”

- No ESD Team: “patients had access to multidisciplinary team care in hospital but this ended at hospital discharge. Their subsequent care was provided by a range of community stroke services which were not planned or provided by a co-ordinated team [] or were provided by trained healthcare volunteers”
- Care Pathway Features:
 - Core features not identified

Findings:

Cochrane Review of **ESD** for stroke patients with LOS as the primary outcome, 14 trials (not publications) (44).

- **LOS:** “Across all trials and within each subgroup of trials, there was a significant reduction ($P < 0.0001$) in the length of hospital stay, which is approximately equivalent to seven days.” ESD TCD: -6.84 [-11.20, -2.49] $P = 0.0021$, 573/576, heterogeneous; ESD TC: -10.36 [-15.39, -5.33] $P = 0.000054$, 233/231, not heterogeneous; No ESD T: -7.00 [-8.61, -5.39] $P < 0.00001$, 52/50, single test. COMBINED: -7.10 [-10.03, -4.17] $P < 0.00001$, 858/837, heterogeneous.
- **RA:** “Readmission rates during scheduled follow up (31% versus 28%) were very similar between the ESD service and conventional care groups”. ESD TCD: 1.26 [0.94, 1.67] $P = 0.12$, 463/455, not heterogeneous.
- **Cost:** “Estimated costs ranged from 23% less to 15% greater for the ESD group in comparison to controls. These estimates were reported to be stable in sensitivity analyses.”

AMSTAR:

- 73%, High

Risk of Bias Assessment:

- Risk of Bias Assessment: The Cochrane Collaboration’s risk of bias tool
- Documentation: Figures 2,3, and 4

Coding:

- Intervention X Outcome: ESD-Stroke LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: ESD-Stroke RA
 - Finding: Non-Significant, Quantitative

Olson 2011

- Reference: Olson DM, Bettger JP, Alexander KP, Kendrick AS, Irvine JR, Wing L, Coeytaux RR, Dolor RJ, Duncan PW, Graffagnino C. Transition of Care for Acute Stroke and Myocardial Infarction Patients. (45)
- Care Pathway Features:

- *Intervention type 1:* the process of transitioning the care of a patient from the hospital to the community and began in the hospital as part of the discharge planning process. This phase included interventions such as predetermined integrated-care pathways, early supported discharge, extended stroke unit services, and rehabilitation coordination with community services. Referral for subsequent subspecialty care follow-up was also included as part of intervention type 1 if it was part of the discharge planning.
- *Intervention type 2:* Education of the patient and family prior discharge was initiated during the acute hospitalization. Educational programs varied from those that provided information packages to direct teaching by subspecialty trained nurses.
- *Intervention type 3:* Following hospital discharge, community-based support of the patient and family could be provided through advanced practice nurse care managers, primary care and specialty-based medical practitioners, and multidisciplinary care teams (including doctors; nurses; social workers; and physical, occupational, and speech therapists). This support could be provided in person at the patient's home, by telephone, or at a clinical practice setting (physician's office, outpatient rehabilitation setting or common meeting place for support groups). Ongoing patient and family education could also be maintained at the community level, such as the provision of medical-focused manuals, rehabilitation and lifestyle information, videotapes, and telephone-based educational programs.

Findings:

Health condition anchored HTA looking at coordinated transition of care services for post-acute care of patients with stroke/MI. Interventions were grouped into four categories, and only the first is relevant to this project: "hospital-initiated support for discharge was the initial stage in the transition process". Search found 53 articles from 40 studies on 15,216 patients (4,416 stroke, 11,070 MI) (45)

- **LOS:** ESD, most commonly studied for stroke, was shown to be effective in reducing the total number of days spent in hospital while at the same time demonstrating that patient-related outcomes such as mortality, disability, and quality of life were no different than among patients treated with standard medical care. Early supported discharge after stroke was associated with increased patient and caregiver satisfaction. (p.57).
- **RA:** No increase in Readmission. Only single study with MI, did not show benefits.
- **Cost:** Not reported

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment: none
- Documentation: "summary ratings of good, fair, or poor"

Coding:

- Intervention X Outcome: ESD-Stroke LOS

- Finding: Positive, Non-Quantitative

INTERVENTION 22 | EXERCISE ALONE - MIXED ELDERLY

English 2010

- Reference: English C, Hillier SL. Circuit class therapy for improving mobility after stroke. Cochrane Database Syst Rev. 2010 Sep 8;7(7). (46)
- Looked at *circuit class therapy (CCT)* and stroke patients
- Care Pathway Components:
 - model of therapy delivery that utilizes active exercises and activities which are task specific (practicing the functional task itself or part thereof) and provided in an intensive manner
 - provided in a group setting with more than two participants per therapist
 - a focus on repetitive practice of functional tasks and continual progression of exercises
 - differs from physiological exercise programs, which aim to effect improvements in strength or aerobic fitness. While many of the activities and exercises may have a strength or fitness component, the primary focus is on repetitive practice of task-specific training of everyday motor tasks

Findings:

Intervention anchored SR, 2 studies focused on circuit class therapy for stroke in-patients (2 RCTs) (46):

- **LOS:** “significant reduction in length of stay, with a mean difference of –19.7 days (95% CI –35.43 to –4.04 days)”, results from randomized study only: “(mean difference –33.0 days, 95% CI –64.11 to –1.89 days)”, $p=0.014$, $I^2=0\%$
- **RA:** Not reported
- **Cost:** Not reported

AMSTAR:

- 91%, High

Risk of Bias Assessment:

- Risk of Bias Assessment: The Cochrane Collaboration’s risk of bias tool
- Documentation: Figures 1 and 2

Coding:

- Intervention X Outcome: Exercise Alone - Stroke LOS
 - Finding: Positive, Quantitative

INTERVENTION 23 | GERIATRIC CONSULTATION TEAMS (GCT)

Deschodt 2013

- Reference: Deschodt M, Flamaing J, Haentjens P, Boonen S, Milisen K. Impact of geriatric consultation teams on clinical outcome in acute hospitals: a systematic review and meta-analysis. BMC medicine. 2013 Feb 22;11(1):1. (47)
- Looked at *comprehensive geriatric assessments* and elderly
- Care Pathway Components:
 - Comprehensive Geriatric Assessment:
 - a multidimensional interdisciplinary diagnostic process focused on determining a frail older person's medical, psychological and functional capability in order to develop a coordinated and integrated plan for treatment and long term follow up
 - older patients are being admitted to a specialized ward where they are under the constant supervision of a specialized multidisciplinary team with geriatric expertise and experience
 - It includes the following four components: a specialized environment, patient-centered care, medical review, and interdisciplinary care
 - CGA team model/Inpatient geriatric consultation team (IGCT):
 - frail older patients are hospitalized on a nongeriatric ward - based on the patient's main medical reason for admission - and evaluated by 'a multidisciplinary team which assesses, discusses, and recommends a plan of treatment for frail older inpatients

Findings:

MA focused on in-patient, mobile geriatric consultation teams administering CGA in acute care units of the hospital (compared to a dedicated geriatric unit), includes 12 studies and 4,546 patients (47)

- **LOS:** WMD: -0.35 (-1.24 to 0.55), $p=0.45$; heterogeneity: $p=0.75$ $I^2 0\%$; publication bias: number of studies trimmed = 1, adjusted pooled estimate -0.34 (-1.24 to 0.56), number of studies 9. Results of the meta-analysis also showed that IGCT intervention was not associated with a difference in length of stay. None of the trials reported statistically significant differences between the length of stay of the intervention and control groups (10 trials or 2,061).
- **RA:** The random-effects pooled estimates for readmission were very consistent over time showing a non-effect of the IGCT intervention (8 trials or 3,599 participants).
- **Cost:** Not reported

AMSTAR:

- 73%, High

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: Methodological Index for Non-Randomized Studies- score ranges from 0 (low quality) to 26 (high quality)
- Documentation: "The total quality scores of the included studies ranged from 19 'moderate' to 25 'excellent'"

Coding:

- Intervention X Outcome: GCT-Mixed Elderly LOS
 - Finding: Non-Significant, Quantitative

- Intervention X Outcome: GCT-Mixed Elderly RA
 - Finding: Non-Significant, Quantitative

INTERVENTION 24 | HOSPITALIST-MIXED

White 2011

- Reference: White HL, Glazier RH. Do hospitalist physicians improve the quality of inpatient care delivery? A systematic review of process, efficiency and outcome measures. BMC medicine. 2011 May 18;9(1):1. (37)
- Looked at *hospitalists* and inpatient care
- Care Pathway Components:
 - Hospitalists, defined as physicians who specialize in delivering comprehensive medical care to hospitalized patients
 - Under the hospitalist model, unattached patients and patients whose primary care physicians do not provide inpatient services are transferred to the care of a hospitalist upon admission to a given institution
 - Acting as the case manager, the hospitalist's role is to coordinate and integrate care for their assigned patients, which includes generating and reviewing clinical data; making decisions regarding necessary tests, treatments and procedures; and facilitating access to subspecialty and post-acute services
 - The hospitalist movement represents a shift toward generalized hospital-based care whereby hospitalists provide attention to all routine medical needs throughout the course of hospitalization, but maintain minimal responsibility for outpatient or follow-up care once a patient is discharged

Findings:

Intervention focused qualitative SR studying hospitalists to improve inpatient care delivery, included "65 comparative evaluations" (1 RCT, 8 qRCT, 1 ITS, 2 ProspCoh, 35 retro, 18 before/after) (37)

- **LOS:** 53/58 studies showed improvement with hospitalists across all hospital models
- **RA:** Not reported
- **Cost:** 30/43 (27 "significant") studies showed improvement with hospitalists

AMSTAR:

- 45%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment: none
- Documentation: "The median quality score of the studies that we reviewed was 15 of a possible score of 32"

Coding:

- Intervention X Outcome: Hospitalist-Mixed Cost
 - Finding: Positive, Non-Quantitative
- Intervention X Outcome: Hospitalist-Mixed LOS
 - Finding: Positive, Non-Quantitative
- Intervention X Outcome: Hospitalist-Mixed RA
 - Finding: Non-Significant, Non-Quantitative

INTERVENTION 25 | INTERDISCIPLINARY ROUNDS – MIXED

Bhamidipati 2016

- Reference: Bhamidipati, V. Surekha, et al. "Structure and outcomes of interdisciplinary rounds in hospitalized medicine patients: A systematic review and suggested taxonomy." *Journal of Hospital Medicine* (2016). (48)
- Looked at impact of interdisciplinary rounds on measures of efficiency, quality, safety, and satisfaction.
- 22 articles included; RCT, quasi-experimental, and observational studies
- Team members include:
 - Attending Physician
 - Resident
 - Physician Leader
 - Nurse
 - Pharmacist
 - Case Manager
 - Social Worker
 - Physical Therapist
 - Rounds Manager
 - Patient
 - Medical Student

Findings:

- **LOS:** "Overall, the results from the high-quality studies point to larger teams, discharge planners, and team training as notable features possibly linked to LOS reduction."
- **RA:** not reported
- **Cost:** "Two (13%) of the 15 studies^{24,27} reported a decrease in cost per case"

AMSTAR:

- 55%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: Downs and Black (modified)

- Documentation: “We categorized studies with scores 0 to 5 as low, 6 to 10 as medium, and 11 to 15 as high-quality studies”, 22 included articles: 3 low, 10 medium, 9 high.

Coding:

- Intervention X Outcome: Interdisciplinary Rounds-Mixed LOS
 - Finding: Positive, Non-Quantitative
- Intervention X Outcome: Interdisciplinary Rounds-Mixed Cost
 - Finding: Positive, Non-Quantitative

INTERVENTION 26 | INTERPROFESSIONAL COLLABORATION (IPC) - MIXED

Zwarenstein 2009

- Reference: Zwarenstein M, Goldman J, Reeves S. Interprofessional collaboration: effects of practice-based interventions on professional practice and healthcare outcomes. Cochrane Database Syst Rev. 2009 Jul 8;3(3). (49)
- Looked at interprofessional collaboration
- Care Pathway Components:
 - The involvement of numerous participants in care coordination, the necessity of coordination, the importance of participants having knowledge of one’s own and others’ roles, and the importance of information exchange
 - Interprofessional rounds, interprofessional meetings, and externally facilitated interprofessional audit

Findings:

Intervention anchored SR (Cochrane Review) studying IPC, namely interprofessional practice (IPP) or practice-based IPC, includes 5 studies (2 studied IP rounds, 2 studied IP meetings, 1 studied externally facilitated IP audit). (49) IPP: the deployment in the workplace of a tool or routine to improve IPC; examples include communication tools, interprofessional meetings, and checklists.

- **LOS:** IP rounds: 5.46 d vs. 6.06 days (P = 0.006) | (3.2 + 2.7 days) vs (3.2 + 3.2 days) (P= 0.90).
- **RA:** Not reported
- **Cost:** IP rounds: \$6,681 and \$8,090 (P = 0.002)
- **Conclusions:** “The review suggests that practice-based IPC interventions can improve healthcare processes and outcomes, but due to the limitations in terms of the small number of studies, sample sizes, problems with conceptualising and measuring collaboration, and heterogeneity of interventions and settings, it is difficult to draw generalisable inferences about the key elements of IPC and its effectiveness.”

AMSTAR:

- 82%, High

Risk of Bias Assessment

- Risk of Bias Assessment Tool: The Cochrane Collaboration’s risk of bias tool

- Documentation: Of the five studies, we have rated one study as 'high quality' and four studies as 'moderate quality'

Coding:

- Intervention X Outcome: Interprofessional Collaboration (IPC) – Mixed LOS
 - Finding: Non-Significant, Non-Quantitative

INTERVENTION 27 | MULTI-DISCIPLINARY REHABILITATION (MDR)-HIP FRACTURE REHAB

Handoll 2009

- Reference: Handoll HH, Cameron ID, Mak JC, Finnegan TP. Multidisciplinary rehabilitation for older people with hip fractures. Cochrane Database Syst Rev. 2009 Jan 1;4. (50)
- Care Pathway Components:
 - Looked at multi-disciplinary rehabilitation and elderly
 - Services provided by a multidisciplinary team with the goal of reducing disability by improving task-oriented behaviour, for example, walking and dressing.

Findings:

Intervention anchored SR studying MD rehab for older people with hip fractures. (Cochrane Review, 2009)(50) , 8 studies (in-patient setting) found:

- **LOS:** results varied from “a reduction of 19.0 days (95% CI –35.9 to –2.12 days) to an increase of 25.3 days (95% CI 17.5 to 33.1 days); owing to heterogeneity among studies as the authors did not attempt to combine data”.
- **RA:** "no evidence of a significant effect of multidisciplinary rehabilitation (RR 0.99, 95% CI 0.82 to 1.19)"
- **Cost:** “results varied”

AMSTAR:

- 91%, High

Risk of Bias Assessment:

- Risk of Bias Assessment: independently assessed
- Documentation: "we have drawn particular attention to imbalances in key patient characteristics (e.g. gender, mental health) that could have influenced trial results of five trials."

Coding:

- Intervention X Outcome: MDR-Hip Fracture Rehab Cost
 - Finding: Non-Significant, Non-Quantitative
- Intervention X Outcome: MDR-Hip Fracture Rehab LOS
 - Finding: Positive, Non-Quantitative
- Intervention X Outcome: MDR-Hip Fracture Rehab RA
 - Finding: Non-Significant, Quantitative

INTERVENTION 28 | MDR – CHANGE TO EXERCISE CATEGORY THROUGHOUT

deMorton 2007

- Reference: de Morton NA, Keating JL, Jeffs K. The effect of exercise on outcomes for older acute medical inpatients compared with control or alternative treatments: a systematic review of randomized controlled trials. *Clinical Rehabilitation*. 2007 Jan 1;21(1):3-16. (51)
- Looked at *exercise* and elderly patients
- Care Pathway Components:
 - Barthel Index & Timed Up and Go Test

Findings:

Intervention anchored SR studying multi-disciplinary interventions including exercise for any older acute care inpatients, including 9 articles (7 RCTs, 2 pRCTs). (52)

- **LOS:** WMD = -1.08 days; 95% CI -1.93 to -0.22), $p=0.08$, $I^2=49.9\%$, $n=3,478$. Exercise alone had no effect.
- **RA:** Not reported
- **Cost:** WMD = -US\$280; 95% CI -\$493 to -\$65, $\chi^2=1.35$, $p=0.08$, $I^2=0\%$

AMSTAR:

- 73%, High

Risk of Bias Assessment:

- Risk of Bias Assessment Tool: PEDro Scale-- The PEDro scale items include random allocation, concealed allocation, similarity at baseline, subject blinding, therapist blinding, assessor blinding, greater than 85% follow-up for at least one key outcome, intention-to-treat analysis, between-group statistical analysis for at least one key outcome and point estimates of variability for at least one key outcome.
- Documentation: Study quality ranged from 4 to 8 with a mean score of 6.1/10.

Coding:

- Intervention X Outcome: Exercise MDR – Mixed Elderly Cost
 - Finding: Positive, Quantitative
- Intervention X Outcome: Exercise Alone – Mixed Elderly LOS (Alone)
 - Finding: Non-Significant, Quantitative
- Intervention X Outcome: Exercise MDR – Mixed Elderly LOS
 - Finding: Positive, Quantitative

INTERVENTION 29 | NURSING LED UNITS (NLU)-MIXED

Griffiths 2007

- Reference: Griffiths PD, Edwards MH, Forbes A, Harris RL, Ritchie G. Effectiveness of intermediate care in nursing-led in-patient units. *Cochrane Database Syst Rev.* 2007 Apr;2. (53)
- Looked at *nursing led inpatient units (NLU)* and elderly
- Care Pathway Components:
 - “Nurses have replaced the care management function of hospital doctors and nursing is identified as the lead therapy”

Findings:

Cochrane Review focused on intermediate care of NLIP (53)

- **LOS:** to first discharge from hospital:
 - combined (weaker/stronger studies) WMD: 7.37 days [2.86, 11.88], Z = 3.20 (P = 0.0014), Heterogeneity: (P = 0.00013); I² =76% (9 studies, 955/714)
 - stronger studies only: WMD: 13.41 [8.54, 18.29], Z = 5.40 (P < 0.00001), Heterogeneity: (P = 0.67); I² =0.0% (4 studies, 312/295)
- **LOS:** to first discharge home
 - combined WMD: 5.13 [-0.50, 10.76], Z = 1.79 (P = 0.074), Heterogeneity: (P = 0.02); I² =59% (8 studies, 859/619)
 - stronger studies only: WMD: 8.78 [2.93, 14.63], Z = 2.94 (P = 0.0032), Heterogeneity: (P = 0.35); I² =8% (4 studies, 312/295)
- **RA:** within 30 days
 - combined Odds Ratio: 0.52 [0.34, 0.80], Z = 3.00 (P = 0.0027), (P = 0.69); I² =0.0% (5 studies, 668/458) (Favors treatment)
 - stronger studies only Odds Ratio: 0.63 [0.36, 1.12], Z = 1.57 (P = 0.12), (P = 0.70); I² =0.0% (3 studies, 261/232)
- **Cost:** In most studies, daily cost of care (average cost bed stay / average length of stay) was lower for the NLU group.
 - daily use of laboratory tests and investigations and other therapies (including medicine) was generally lower for the NLU
 - physiotherapy higher for NLU
 - use of medically qualified staff was reduced
 - nurse staffing was generally equivalent in terms of overall numbers where reported
 - composition of the nursing team varied

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment: assessed using the criteria described by the EPOC group
- Documentation: The quality of studies was variable

Coding:

- Intervention X Outcome: NLU-Mixed Elderly Cost
 - Finding: Positive, Non-Quantitative
- Intervention X Outcome: NLU-Mixed Elderly LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: NLU-Mixed Elderly RA
 - Finding: Positive, Quantitative

INTERVENTION 30 | NUTRITIONAL THERAPY

Bally 2016

- Reference: Bally, Martina R., et al. "Nutritional Support and Outcomes in Malnourished Medical Inpatients: A Systematic Review and Meta-analysis." *JAMA internal medicine* 176.1 (2016): 43-53. (54)
- SR and MA looking at nutritional therapy for malnourished or patient at risk of being malnourished
- 22 RCTS with 3736 participants
- Interventions:
 - dietary advice (changes in the organization of nutritional care [eg, support of dieticians or health care assistants, training in nutritional care for medical personnel, implementation of nutritional care pathways or protocols, and feeding assistance])
 - food fortification (snacks between meals and increased caloric and protein intake)
 - oral feeding in addition to meals (any type of oral nutritional supplement)
 - enteral feeding (any type of total or partial enteral [tube] feeding).

Findings:

- **LOS:** "the length of hospital stay was not significantly shorter in intervention group patients compared with control group patients (13.0 vs 10.8 days; difference, -0.42 days; 95%CI, -1.09 to 0.24 day)."
- **RA:** "The readmission rate was significantly lower in intervention group patients compared with control group patients (20.5% vs 29.6%; risk ratio, 0.71; 95%CI,0.57-0.87),with overall low heterogeneity among trials ($I^2 = 0\%$)."
- **Cost:** not reported

AMSTAR:

- 82%, High

Risk of Bias Assessment

- Risk of Bias Assessment Tool: Cochrane Risk of Bias Tool
- Documentation: "We found considerable heterogeneity across trials for the type of intervention and control group, as well as the clinical setting, and mostly low study quality, with often unclear risk of bias."

“Appropriate random sequence generation and randomization concealment were used in less than half of all trials, with many trials not reporting procedural details. There was a low or unclear risk of bias in most trials except for performance bias because masking of participants and personnel to the nutritional interventions was not done in most studies. Also, attrition bias was high or unclear because of incomplete outcome reporting in many studies. The quality of the evidence according to the GRADE method to assess the effects of nutritional support on mortality was low and was low to very low for all other outcomes.”

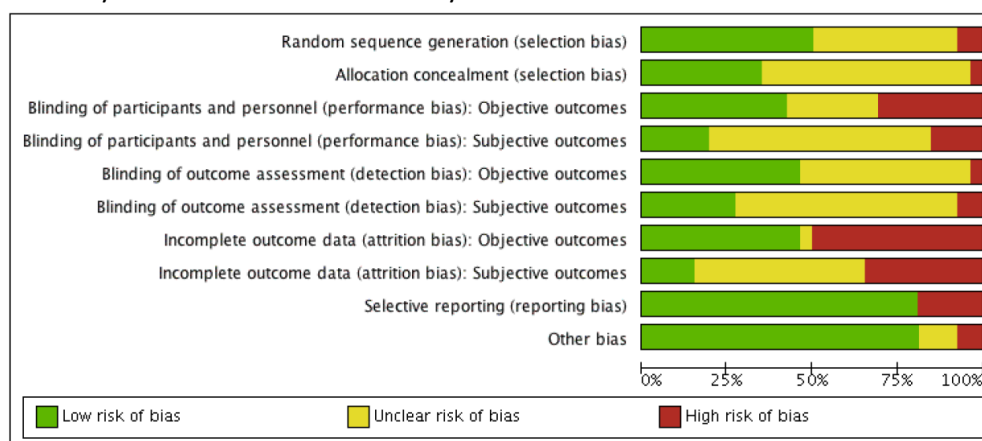


Figure 6: Bally et al, 2016

Coding:

- Intervention X Outcome: Nutritional Therapy-Mixed LOS
 - Finding: Non-Significant, Quantitative
- Intervention X Outcome: Nutritional Therapy-Mixed RA
 - Finding: Positive, Quantitative

Marik 2016

- Reference: Marik, Paul E., and Michael H. Hooper. "Normocaloric versus hypocaloric feeding on the outcomes of ICU patients: a systematic review and meta-analysis." *Intensive care medicine* (2015): 1-8. (55)
- Looked at normocaloric versus hypocaloric feeding in ICU patients

Findings:

SR and MA with six RCT studies and 2517 participants

- **LOS:** “no overall difference between the intentional hypocaloric and normocaloric groups (mean difference 0.05 days; 95 % CI 1.33–1.44 days; I² = 37 %)”
- **RA:** not reported
- **Cost:** not reported

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment

- Risk of Bias Assessment Tool: Cochrane Risk of Bias Tool
- Documentation:

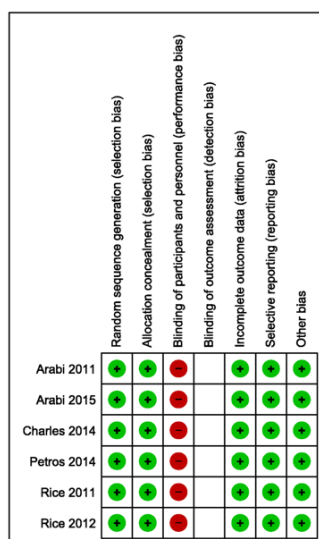


Figure 7: Marik and Hooper, 2016

Coding:

- Intervention X Outcome: Nutritional Therapy-Mixed LOS
 - Finding: Non-Significant, Quantitative

INTERVENTION 31 | PHYSIOTHERAPY - MIXED

Brusco 2006

- Reference: Brusco NK, Paratz J. The effect of additional physiotherapy to hospital inpatients outside of regular business hours: a systematic review. *Physiotherapy theory and practice*. 2006 Jan 1;22(6):291-307. (56)
- Looked at physiotherapy *Outside Business Hours (OBH)* and mixed
- Looked at patients in: critical care; orthopedics; neurology; Rheumatology; Postcardiac surgery
- SR with 9 included papers (3 RCTs, 2 quasi-RCTs, 3 historical cohort studies, and one case control studies)
- Care Pathway Components:
 - offering physiotherapy in normal business hours, with additional weekend, evening, and 24 hour physiotherapy services

Findings:

- **LOS:** “In the acute area, overnight physiotherapy affected ICULOS significantly (d= -1.38 95% CI - 2.55, -0.22). For neurology patients, studies investigating weekend coverage reported a reduced LOS for acute nonsurgical neurology patients when comparing 5 versus 7 days physiotherapy (d= -0.77; -

1.22, -0.30), but not in rehabilitation neurology (stroke) patients when comparing 6 versus 7 days of physiotherapy”

- **RA:** not reported
- **Cost:** “A cost benefit of additional physiotherapy services outside of regular business hours was found in three studies.”

AMSTAR:

- 55%, Moderate

Risk of Bias Assessment:

- Risk of Bias Assessment: PEDro Scale—and quality scale developed by the authors based on Khan et al (2004) article.
- Documentation: Quality of the RCTs and QRCT as assessed by the PEDro score (Table 1) ranged from 3 to 8=9 (median 5). The main concerns were with lack of random allocation, lack of blinding of subjects and assessors, and lack of similarity at baseline... The case control study and historical cohort studies scored from 5 to 9=9 (median 8).

Coding:

- Intervention X Outcome: Outside Business Hours (OBH) for Physiotherapy – Mixed LOS
 - Finding: Positive, Non-Quantitative

Kayambu 2013

- Reference: Kayambu, Geetha, Robert Boots, and Jennifer Paratz. "Physical Therapy for the Critically Ill in the ICU: A Systematic Review and Meta-Analysis*." *Critical care medicine* 41.6 (2013): 1543-1554. (57)
- SR and MA looking at physical therapy impacts on the critically ill

Findings:

10 studies, including SRs and RCTs with 790 participants

- **LOS:** “There was a small reduction in the length of hospital stay with exercises for the critically ill while in the ICU (pooled Hedges $g = -0.34$; 95% CI $-0.53, -0.15$; $n = 441$ [226, 215]). All studies found a small reduction in ICU length of stay and reported a significant small effect (pooled Hedges $g = -0.34$; 95% CI $-0.51, -0.18$; $n = 597$ [285, 312]).”
- **RA:** not reported
- **Cost:** not reported

AMSTAR:

- 64%, Moderate

Risk of Bias Assessment

- Risk of Bias Assessment: Physiotherapy Evidence Database (PEDro)

- Documentation: “The Kappa level of agreement between reviewers on PEDro quality scoring was 0.89. A mean PEDro score of 5.4 (median 5, range of 4–8) was obtained for the ten RCTs evaluated (Table 1). All ten trials indicated random allocation to treatment group except one trial (30) that did not perform true random allocation (90%). All trials reported between group statistical comparison and point measures and measures of variability (100%). Only four trials reported concealed allocation (40%). Four trials performed intention-to-treat analysis (40%), three trials reported assessor blinding (30%), and one trial reported subject blinding (10%). The difficult problem of therapist blinding was apparent as this was not reported in the methodology of all the included trials.”

“Lastly, the RCTs included in these analyses were not large and had a number of methodological shortcomings and reduced quality scoring that were not taken into account in the overall analysis. Biases within individual studies (e.g., dropouts) were acknowledged but not addressed in the actual aggregation of data as a sensitivity analysis could not be performed due to insufficient information from the trials.

Coding:

- Intervention X Outcome: PT-ICU LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: PT-Total Hospital LOS
 - Finding: Positive, Quantitative
- Intervention X Outcome: PT-Total Hospital LOS
 - Finding: Positive, Quantitative

INTERVENTION 32 | STROKE UNIT CARE (SUC)-STROKE

Langhorne 2013

- Reference: Trialists’ Collaboration, Stroke Unit. “Organised inpatient (stroke unit) care for stroke.” *Cochrane Database Syst Rev* 9 (2013). (41)
- Looked at *stroke unit care* with stroke patients
- Cochrane review with 28 RCTs and 5855 participants
- Care Pathway Components:
 - Organized inpatient (stroke unit) care was characterized by:
 - coordinated multidisciplinary rehabilitation,
 - staff with a specialist interest in stroke or rehabilitation,
 - routine involvement of carers in the rehabilitation process and
 - regular programmes of education and training.
- The core characteristics that were invariably included in the stroke unit setting were:
 - multidisciplinary staffing - that is medical, nursing and therapy staff (usually including physiotherapy, occupational therapy, speech therapy, social work); and
 - co-ordinated multidisciplinary team care incorporating meetings at least once per week.

Figure 8: Langhorne et al, 2013

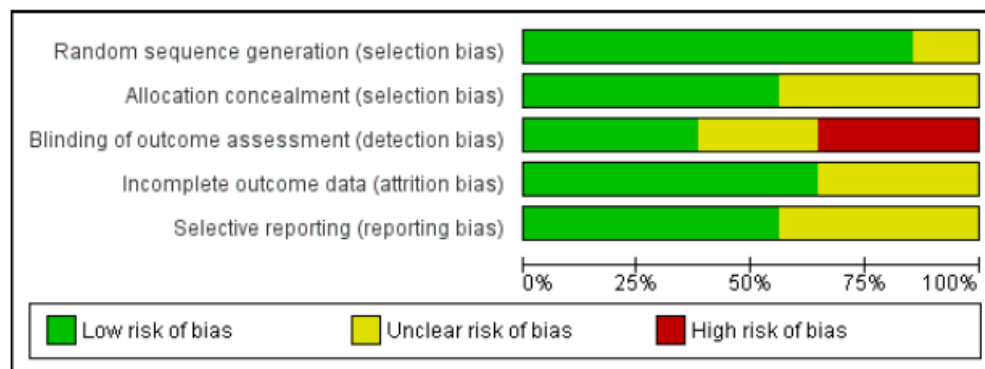


Figure 9: Langhorne et al, 2013

Coding:

- Intervention X Outcome: SUC-Stroke LOS
 - Finding: Non-Significant, Quantitative

Annex B: Critical Appraisal

AMSTAR Results

Lead Author	Year	Cochrane	Kappa	AMSTAR Score	AMSTAR Category
Adamina	2011	No	0.50	45.45	Moderate
Alghzawi	2012	No	0.93	27.27	Low
Allen	2014	No	0.71	36.36	Low
Bally	2016	No	0.57	81.82	High
Bhamidipati	2016	No	0.86	54.55	Moderate
Bravo	2011	No	0.93	18.18	Low
Brusco	2006	No	0.64	54.55	Moderate
Cassel	2010	No	0.79	36.36	Low
Chen	2014a	No	0.86	36.36	Low
Chen	2014b	No	1.00	63.64	Moderate
Chen	2015	No	0.93	63.64	Moderate
Chiu	2007	No	0.79	18.18	Low
Connolly	2015	Yes	0.71	100.00	High
Conroy	2011	No	0.71	45.45	Moderate
Coolsen	2013	No	0.86	72.73	High
Coolsen	2012	No	0.57	63.64	Moderate
de Groot	2015	No	0.50	90.91	High
de Morton	2007	No	0.71	72.73	High
Deschodt	2013	No	0.86	72.73	High
English	2010	Yes	1.00	90.91	High
Eskicioglu	2009	No	0.86	72.73	High
Fearon	2012	Yes	1.00	72.73	High
Fiore	2016	No	0.43	81.82	High
Foley	2006	No	0.43	27.27	Low
Fox	2012	No	0.86	54.55	Moderate
Fox	2013	No	0.93	63.64	Moderate
Galipeau	2015	No	0.64	90.91	High
Goncalves	2016	Yes	0.29	81.82	High
Gouvas	2009	No	0.71	45.45	Moderate
Govindan	2015	No	0.71	18.18	Low
Greco	2014	No	0.64	81.82	High
Griffiths	2007	Yes	0.71	63.64	Moderate
Hall	2012	No	0.86	18.18	Low
Handoll	2009	Yes	1.00	90.91	High

Lead Author	Year	Cochrane	Kappa	AMSTAR Score	AMSTAR Category
Hickman	2015	No	0.79	36.36	Low
Kagedan	2015	No	0.64	36.36	Low
Kayambu	2013	No	0.64	63.64	Moderate
Kim	2005	No	0.86	54.55	Moderate
Kolber	2013	No	0.57	36.36	Low
Kul	2012	No	0.93	63.64	Moderate
Langhorne	2013	Yes	0.86	72.73	High
Larsen	2006	No	0.86	18.18	Low
Lee	2014	No	0.79	63.64	Moderate
Lemmens	2009	No	0.64	18.18	Low
Li	2013	No	0.86	63.64	Moderate
Lodewijckx	2011	No	0.93	63.64	Moderate
Lopes	2008	No	1.00	9.09	Low
Lv	2012	No	0.71	72.73	High
Lv	2010	Yes	1.00	90.91	High
Marik	2016	No	0.43	63.64	Moderate
Markar	2014	No	0.71	36.36	Low
McMartin	2013	No	0.57	54.55	Moderate
Olson	2011	No	0.86	63.64	Moderate
Paton	2014a	No	0.71	36.36	Low
Paton	2014b	No	0.71	63.64	Moderate
Preyde	2009	No	0.93	45.45	Moderate
Pucher	2014	No	0.71	45.45	Moderate
Rawlinson	2011	No	0.71	9.09	Low
Rollins	2016	No	0.79	72.73	High
Rotter	2010	Yes	0.86	81.82	High
Shepperd	2013	Yes	1.00	81.82	High
Song	2014	No	0.93	72.73	High
Spanjersberg	2011	Yes	1.00	90.91	High
Stiller	2013	No	0.79	18.18	Low
Stowers	2015	No	0.71	36.36	Low
Sylvester	2013	No	0.79	45.45	Moderate
Thompson	2015	No	1.00	27.27	Low
Varadhan	2010	No	0.43	63.64	Moderate
Walter	2009	No	0.79	45.45	Moderate
White	2011	No	0.79	45.45	Moderate
Wind	2006	No	0.50	63.64	Moderate
Xuping	2014	No	0.86	63.64	Moderate
Yang	2014	No	0.64	63.64	Moderate

Lead Author	Year	Cochrane	Kappa	AMSTAR Score	AMSTAR Category
Yin	2014	No	0.64	63.64	Moderate
Zhu	2015	No	0.86	63.64	Moderate
Zwarenstein	2009	Yes	0.86	81.82	High

Summary of AMSTAR Scores

CATEGORY	Count
Low (will be excluded)	21
Moderate	32
High	23
Usable SRs	55
Total SRs	76
% Included	72%

Average Kappa (Inter-Rater Reliability)	Average AMSTAR
0.77 (high)	56.22 (moderate)

Annex C: Methods

To be included: the ERS methodology, search strings and results, flow of articles through selection procedure, eligibility criteria, AMSTAR and any other instruments that we have used.

Systematic Review Search Strategies

PubMed (Medline)

Intervention:

{patient discharge} OR {interprofessional collaboration} OR {staffing} OR {rounds} OR {care mapping} OR {documentation}

Patient discharge (based on Shepperd et al. 2013)

patient discharge[Mesh] OR ((patient discharge[Title/Abstract] OR hospital discharge[Title/Abstract] OR hospital discharges[Title/Abstract] OR discharge plan[Title/Abstract] OR discharge plans[Title/Abstract] OR discharge service [Title/Abstract] OR discharge services [Title/Abstract] OR discharge program[Title/Abstract] OR discharge programs[Title/Abstract] OR discharge programme[Title/Abstract] OR discharge programmes[Title/Abstract] OR discharge procedure [Title/Abstract] OR discharge procedures [Title/Abstract] OR discharge intervention[Title/Abstract] OR discharge interventions[Title/Abstract]) NOT medline[sb])

Interprofessional collaboration (based on Zwarenstein, Goldman, and Reeves 2009)

interprofessional relations[Mesh] OR ((multidisciplinary team[Title/Abstract] OR multidisciplinary teams[Title/Abstract] OR multi disciplinary team[Title/Abstract] OR multi disciplinary teams[Title/Abstract] OR interdisciplinary team[Title/Abstract] OR interdisciplinary teams[Title/Abstract] OR inter disciplinary team[Title/Abstract] OR inter disciplinary teams[Title/Abstract] OR ((doctor[Title/Abstract] OR doctors[Title/Abstract] OR physician[Title/Abstract] OR physicians[Title/Abstract]) AND (nurse[Title/Abstract] OR nurses[Title/Abstract]) AND (collaboration[Title/Abstract] OR collaborate[Title/Abstract] OR collaborated[Title/Abstract] OR collaborating[Title/Abstract]))) NOT medline[sb])

Staffing (based on White and Glazier 2011)

hospitalists[Mesh] OR ((hospitalist[Title/Abstract] OR hospitalists[Title/Abstract]) NOT medline[sb]) OR ((patient care team/organization and administration[Majr] OR social work/methods[Majr] OR social work/organization and administration[Majr]) AND (hospitalization[Mesh] OR ((in-patient[Title/Abstract] OR hospital[Title/Abstract] OR hospitals[Title/Abstract] OR acutely ill patient[Title/Abstract] OR acutely ill patients[Title/Abstract] OR in-hospital[Title/Abstract]) NOT medline[sb]) OR emergency service, hospital[Mesh]))

Rounds

discharge rounds[Title/Abstract] OR daily rounds[Title/Abstract] OR board rounds[Title/Abstract] OR intentional rounding[Title/Abstract] OR proactive rounding[Title/Abstract] OR productive ward[Title/Abstract] OR discharge round[Title/Abstract] OR discharge rounding[Title/Abstract] OR bullet round[Title/Abstract] OR bullet rounds[Title/Abstract] OR bullet rounding[Title/Abstract] OR daily round[Title/Abstract] OR daily rounding[Title/Abstract] OR board round[Title/Abstract] OR board rounding [Title/Abstract] OR intentional round[Title/Abstract] OR intentional rounds[Title/Abstract] OR proactive round[Title/Abstract] OR proactive rounds[Title/Abstract] OR productive wards[Title/Abstract] (greyed terms yielded no results)

Care mapping (based on Rotter et al. 2010)

(critical pathways[Mesh] OR ((clinical[Title/Abstract] OR critical[Title/Abstract] OR care[Title/Abstract]) AND (path[Title/Abstract] OR paths[Title/Abstract] OR pathway[Title/Abstract] OR pathways[Title/Abstract])) OR (care[Title/Abstract] AND (map[Title/Abstract] OR maps[Title/Abstract] OR mapping[Title/Abstract] OR mapped[Title/Abstract] OR plan[Title/Abstract] OR plans[Title/Abstract] OR planning[Title/Abstract]) NOT medline[sb]) OR guideline[Mesh] OR guideline adherence[Mesh] OR ((health planning guidelines[Title/Abstract] OR (compliance[Title/Abstract] AND (protocol[Title/Abstract] OR protocols[Title/Abstract] OR policy[Title/Abstract] OR policies[Title/Abstract] OR guideline[Title/Abstract] OR guidelines[Title/Abstract])) OR nursing protocol[Title/Abstract] OR professional standard[Title/Abstract] OR professional

standards[Title/Abstract] OR practice guideline[Title/Abstract] OR practice guidelines[Title/Abstract]
OR practice protocol[Title/Abstract] OR practice protocols[Title/Abstract] OR clinical practice
guideline[Title/Abstract] OR clinical practice guidelines[Title/Abstract]) NOT medline[sb])
AND
(hospitalization[Mesh] OR hospital units[Mesh] OR emergency service, hospital[Mesh] OR ((in-
patient[Title/Abstract] OR hospital[Title/Abstract] OR hospitals[Title/Abstract] OR acutely ill
patient[Title/Abstract] OR acutely ill patients[Title/Abstract] OR in-hospital[Title/Abstract]) NOT
medline[sb])))

Documentation

medical records[Majr] OR checklist[Majr]

Outcome

{patient outcomes}

patient readmission[Mesh] OR length of stay[Mesh] OR continuity of patient care[Mesh] OR
((readmission[Title/Abstract] OR readmitted[Title/Abstract] OR re-admission[Title/Abstract] OR re-
admitted[Title/Abstract] OR re hospitalisation[Title/Abstract] OR re hospitalisations[Title/Abstract]
OR re hospitalised[Title/Abstract] OR re hospitalization[Title/Abstract] OR re
hospitalized[Title/Abstract] OR re hospitalizing[Title/Abstract] OR rehospitalisation[Title/Abstract]
OR rehospitalisations[Title/Abstract] OR rehospitalised[Title/Abstract] OR
rehospitalization[Title/Abstract] OR rehospitalized[Title/Abstract] OR rehospitalizing[Title/Abstract]
OR length of stay[Title/Abstract] OR length of hospital stay[Title/Abstract] OR
((coordination[Title/Abstract] OR coordinate[Title/Abstract] OR coordinated[Title/Abstract] OR
coordinating[Title/Abstract] OR continuity[Title/Abstract] OR continuing[Title/Abstract] OR
continuum[Title/Abstract] OR integration[Title/Abstract] OR integrating[Title/Abstract] OR
integrate[Title/Abstract] OR handoff[Title/Abstract] OR handover[Title/Abstract] OR
transfer[Title/Abstract] OR transition[Title/Abstract] OR transitioned[Title/Abstract]) AND
care[Title/Abstract] AND patient[Title/Abstract]) NOT medline[sb])

Limits

{systematic review}

meta-analysis[ptyp] OR systematic[sb] OR (systematic review[Title/Abstract] NOT medline[sb]) OR (meta-
analysis[Title/Abstract] NOT medline[sb])

{dates}

("2005/01/01"[PDat] : "2016/05/01"[PDat])

CINAHL

Intervention:

{patient discharge} OR {interprofessional collaboration} OR {staffing} OR {rounds} OR {care mapping} OR
{documentation}

Patient discharge (based on Shepperd et al. 2013)

(TI (discharge and (plan* or service? or program* or intervention?))) OR (MH "Discharge Planning")
OR ((MM "Patient Discharge Education") OR (MM "Patient Discharge") OR (MM "Early Patient
Discharge")) OR TI patient* n2 discharge* OR AB patient* n2 discharge* OR TI hospital n2 discharge*
OR AB hospital n2 discharge* OR TI discharge* n2 plan* OR AB discharge* n2 plan* OR TI discharge
program* OR AB discharge program* OR TI discharge procedure* OR AB discharge procedure*

Interprofessional collaboration (based on Zwarenstein, Goldman, and Reeves 2009)

((MH "Interprofessional Relations+") OR (MH "Multidisciplinary Care Team+")) AND (TI (collaborat\$
or team\$) OR AB (collaborat* or team*)) OR (TI (((interprofession* or inter-profession*) n
(collaborat* or team*)) OR ((interdisciplin* or inter-disciplin*) n (collaborat* or team*)) OR
((interoccupation* or inter-occupation*) n (collaborat* or team*)) OR ((multiprofession* or multi-
profession*) n (collaborat* or team*)) OR ((multidisciplin* or multi-disciplin*) n (collaborat* or
team*)) OR ((multioccupation* or multi-occupation*) n (collaborat* or team*)) OR ((transdisciplin* or
trans-disciplin*) n (collaborat* or team*)) OR (team* n collaborat*)) OR AB (((interprofession* or
inter-profession*) n (collaborat* or team*)) OR ((interdisciplin* or inter-disciplin*) n (collaborat*
or team*)) OR ((interoccupation* or inter-occupation*) n (collaborat* or team*)) OR ((multiprofession*
or multi-profession*) n (collaborat* or team*)) OR ((multidisciplin* or multi-disciplin*) n
(collaborat* or team*)) OR ((multioccupation* or multi-occupation*) n (collaborat* or team*)) OR
((transdisciplin* or trans-disciplin*) n (collaborat* or team*)) OR (team* n collaborat*))

Staffing (based on White and Glazier 2011)

((MH "Hospitalists+" OR MH "Hospital Medicine+") OR (TI hospitalist OR AB hospitalist) OR (MH
"Multidisciplinary Care Team+/AM/MT/UT") OR (MH "Social Work+/AM/MT/UT")) AND ((MH
"Hospitalization+") OR (MH "Emergency Service+") OR (TI (in-patient OR hospital OR hospitals OR

acutely ill patient OR acutely ill patients OR in-hospital) OR AB (in-patient OR hospital OR hospitals OR acutely ill patient OR acutely ill patients OR in-hospital))

Rounds

(MH "Patient Rounds+")

Care mapping (based on Rotter et al. 2010)

(MH "Critical Path+" OR MH "Decision Support Systems, Clinical+")

Documentation

(MH "Medical Records+" OR MH "Checklists")

Outcome

{patient outcomes} (44,076 hits, date: 10/03/15)

(MH "Readmission" OR MH "Length of Stay" OR MH "Continuity of Patient Care" OR (TI (readmission OR readmissions OR length of stay OR length of hospital stay OR length of stay in hospital OR continuity of care OR continuity of patient care) OR AB (readmission OR readmissions OR length of stay OR length of hospital stay OR length of stay in hospital OR continuity of care OR continuity of patient care)))

Limits

{systematic review}

(MH "Meta Analysis" OR PT "Systematic Review") OR (TI meta analy* OR AB meta analy*) OR (TI systematic review OR AB systematic review)

{limiters}

From Advanced Search page: 2005/01/01-, Abstract Available, Exclude MEDLINE records

Embase

Intervention:

{patient discharge} OR {interprofessional collaboration} OR {staffing} OR {rounds} OR {care mapping} OR {documentation}

Patient discharge (based on Shepperd et al. 2013)

```
discharge:ti
program*:ti OR intervention*:ti
plan*:ti or service*:ti
#1 AND (#2 OR #3)
'patient discharge'/mj
(patient* NEXT/2 discharge*):ab,ti
(hospital NEXT/2 discharge*):ab,ti
(discharge NEXT/2 plan*):ab,ti
(discharge NEXT/1 service*):ab,ti
(discharge NEXT/1 program*):ab,ti
(discharge NEXT/1 procedure*):ab,ti
#4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11
```

Interprofessional collaboration (based on Zwarenstein, Goldman, and Reeves 2009)

```
'Interprofessional collaboration'/de
'multidisciplinary team'/de
#1 OR #2
```

Staffing (based on White and Glazier 2011)

```
'medical staff'/de
'hospital patient'/de
#1 AND #2
```

Rounds

Discharge rounds:ab,ti

Care mapping (based on Rotter et al. 2010)

```
'clinical pathways'/de
'hospitalization'/de
#1 AND #2
```

Documentation

```
'checklist'/de
'medical record'/de
#1 OR #2
```

Outcome

{patient outcomes}

```
'continuity of patient care'/mj
'length of stay'/mj
'patient readmission'/de
readmission:ab,ti
're admission*':ab,ti
'readmitted':ab,ti
're-admitted':ab,ti
rehospitali*:ab,ti
're hospitalised':ab,ti
're hospitalized':ab,ti
length:ab,ti AND of:ab,ti AND hospital:ab,ti AND stay:ab,ti
length:ab,ti AND of:ab,ti AND stay:ab,ti
((hospital OR hospitalised OR hospitalized OR bed) NEXT/2 days):ab,ti
#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13
```

Limits

{systematic review}

```
'meta-analysis'/de OR 'systematic review'/de
```

{dates}

```
(2005:py OR 2006:py OR 2007:py OR 2008:py OR 2009:py OR 2010:py OR 2011:py OR 2012:py OR 2013:py OR
2014:py OR 2015:py OR 2016:py)
```

Primary Research Search Strategies

PubMed (Medline)

1. First run a search for Outcomes AND Limits
2. Run separate searches for Interventions (see search syntax above)
3. Combine searches (AND) for each intervention separately

Outcomes AND Limits

{patient outcomes}

```
patient readmission[Mesh] OR length of stay[Mesh] OR continuity of patient care[Mesh] OR
((readmission[Title/Abstract] OR readmitted[Title/Abstract] OR re-admission[Title/Abstract] OR re-
admitted[Title/Abstract] OR re hospitalisation[Title/Abstract] OR re hospitalisations[Title/Abstract]
OR re hospitalised[Title/Abstract] OR re hospitalization[Title/Abstract] OR re
hospitalized[Title/Abstract] OR re hospitalizing[Title/Abstract] OR rehospitallisation[Title/Abstract]
OR rehospitallisations[Title/Abstract] OR rehospitallised[Title/Abstract] OR
rehospitalization[Title/Abstract] OR rehospitallized[Title/Abstract] OR rehospitallizing[Title/Abstract]
OR length of stay[Title/Abstract] OR length of hospital stay[Title/Abstract] OR
((coordination[Title/Abstract] OR coordinate[Title/Abstract] OR coordinated[Title/Abstract] OR
coordinating[Title/Abstract] OR continuity[Title/Abstract] OR continuing[Title/Abstract] OR
continuum[Title/Abstract] OR integration[Title/Abstract] OR integrating[Title/Abstract] OR
integrate[Title/Abstract] OR handoff[Title/Abstract] OR handover[Title/Abstract] OR
transfer[Title/Abstract] OR transition[Title/Abstract] OR transitioned[Title/Abstract]) AND
care[Title/Abstract] AND patient[Title/Abstract]) NOT medline[sb])
```

{controlled trials only}

```
(Controlled Clinical Trial[ptyp] OR Randomized Controlled Trial[ptyp]) OR ((controlled[Title/Abstract]
AND trial[Title/Abstract])NOT medline[sb])
```

CINAHL

1. First run a search for Outcomes AND Limits
2. Run separate searches for Interventions (see search syntax above)
3. Combine searches (AND) for each intervention separately

Outcome

{patient outcomes}

```
(MH "Readmission" OR MH "Length of Stay" OR MH "Continuity of Patient Care" OR (TI (readmission OR
readmissions OR length of stay OR length of hospital stay OR length of stay in hospital OR continuity
of care OR continuity of patient care ) OR AB ( readmission OR readmissions OR length of stay OR
length of hospital stay OR length of stay in hospital OR continuity of care OR continuity of patient
care )))
```

Limits

{controlled trials only}

(MM "Clinical Trials+") OR (TI randomized clinical trial* OR AB randomized clinical trial*) OR (TI controlled clinical trial* OR AB controlled clinical trial*)

Embase

1. First run a search for Outcomes AND Limits
2. Run separate searches for Interventions (see search syntax above)
3. Combine searches (AND) for each intervention separately

Outcome

{patient outcomes}

'continuity of patient care'/mj
'length of stay'/mj
'patient readmission'/de
readmission:ab,ti
're admission':ab,ti
'readmitted':ab,ti
're-admitted':ab,ti
rehospitali*:ab,ti
're hospitalised':ab,ti
're hospitalized':ab,ti
length:ab,ti AND of:ab,ti AND hospital:ab,ti AND stay:ab,ti
length:ab,ti AND of:ab,ti AND stay:ab,ti
((hospital OR hospitalised OR hospitalized OR bed) NEXT/2 days):ab,ti
#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13

Limits

{controlled trials}

'controlled clinical trial (topic)'/exp

{dates}

(2014:py OR 2016:py)

{not index in PubMed}

under the "Sources" tab, select Embase ONLY

Grey Literature Search Strategies

<p style="text-align: center;">CADTH</p> <p>Grey Literature Checklist</p> <p>Use the drop-down boxes that appear beside each web site in the checklist to indicate one of the following:</p> <ul style="list-style-type: none"> searched; nothing found not searched; not relevant searched; results found results may be of peripheral interest. <p>Include the search terms that were used in your search: #</p> <p>Health Technology Assessment (HTA) Agencies</p> <p>CANADA</p> <p>searched; nothing found The Alberta College of Family Physicians (ACFP). Tools for Practice http://www.acfp.ca/WhatWeDo/ToolsforPractice.aspx In keyword box must click "SEARCH" button NOT the "ENTER" key for keyword search to work properly. (Language: English) discharge planning, patient discharge, transitional care</p> <p>searched; nothing found Alberta Health and Wellness. Decision Process provincial reviews – ongoing and complete http://www.health.alberta.ca/initiatives/ADTP-reviews.html Scroll down to view list of completed reports or use the keyword search box in top right corner. (Language: English) Discharge planning, patient discharge, transitional care</p>	<p style="text-align: center;">CADTH</p> <p>searched; results found Canadian Agency for Drugs and Technologies in Health (CADTH). Advanced search http://www.cadth.ca/en/search/?q= Can limit by product type by selecting the "Products" menu bar in the top right hand corner and selecting the desired product type. (Languages: English, French) Discharge planning, transitional care, discharge planning review</p> <p>searched; nothing found Canadian Agency for Drugs and Technologies in Health (CADTH). Projects in progress http://www.cadth.ca/en/products/projects-in-progress (Languages: English, French) Discharge plan</p> <p>PLEASE SELECT Health Quality Council of Alberta (HQCA). http://www.hqca.ca/index.php?id=115 Browse by year using the dates in the left margin or click the "archives" button for older reports. (Language: English) Broken link</p> <p>searched; results found Health Quality Ontario (HQP). Publications and OHTAC Recommendations http://www.hqo.org/ontario.ca/evidence/publications-and-ohtac-recommendations Search all publications by entering keyword in the top right-hand search box or browse each of the different report types linked to in the left-hand menu (i.e. "OHTAS reports and OHTAC recommendations," "Rapid Reviews," etc.) separately. (Language: English) discharge plan, transitional care, patient discharge</p> <p>searched; nothing found The Institut national d'excellence en santé et en services sociaux (INESSS). INESSS le savoir prend forme (Barnes). ACTMIS http://www.INESSS.qc.ca/index.php?id=4564_1 To browse projects in progress click on link in left-hand menu (Language: French, English) Discharge, discharge plan, patient discharge, transitional care</p>
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<p style="text-align: center;">CADTH</p> <p>searched; nothing found</p> <p>Institute of Health Economics (IHE), Publications Library http://www.ihe.ca/publications/library/ Browse by year of publication in left-hand menu or use site search engine (caution search engine searches the whole site) (Language: English) Discharge plan, patient discharge, transitional care</p> <p>searched; nothing found</p> <p>Manitoba Centre for Health Policy (MCHP), Deliverables http://mhcappcpe.umanitoba.ca/deliverables/at.html For publications in progress, see also the "Upcoming MCHP reports" link in the left menu (Language: English) Discharge planning, patient discharge, transitional care</p> <p>searched; nothing found</p> <p>McGill University Health Centre (MUHC), Technology Assessment Unit http://www.mcgill.ca/ta/publications/ Search by date or using search box. See "work in progress" tab in left-hand menu for ongoing reports. (Language: English) Discharge planning, patient discharge, transitional care</p> <p>searched; nothing found</p> <p>NLCAHR - Newfoundland and Labrador Centre for Applied Health Research (CHRSF), Completed CHRSF projects http://www.nlcahr.mun.ca/CHRSF/CompletedCHRSF.php (Language: English) Discharge planning, patient discharge, transitional care</p> <p>searched; nothing found</p> <p>Ottawa Hospital Research Institute (OHRI), Knowledge Synthesis Group http://www.ohri.ca/ohri/publications.asp Formerly known as Chalmers Research Group, no longer being updated. (Language: English) Discharge planning, patient discharge, transitional care</p> <p style="text-align: right;">5</p>	<p style="text-align: center;">CADTH</p> <p>not searched; not relevant</p> <p>Program for Assessment of Technology in Health (Canada) (PATH), Reports http://www.path.ca/Publications-Presentations/Publications/Reports.aspx To browse, search by year in the right-hand side of the screen. May also use the Google Advanced Search option to search keywords by limiting to the following domain "http://www.path.ca/publications-presentations/publications/reports." Some overlap with OHTAC and CADTH reports (also on checklist). (Language: English)</p> <p>searched; nothing found</p> <p>Saskatchewan Health Quality Council (HQCC), Publications & Reports http://hqcc.sk.ca/resources/publications-reports/ (Language: English) Discharge plan, transitional care</p> <p>not searched; not relevant</p> <p>Therapeutics Initiative, Therapeutics Letter http://www.ti.ubc.ca/therapeuticsletter For more evidence-based drug information, click on the "Drug Assessments" tab in the top menu (drug assessments section has not been updated since 2010). (Language: English)</p> <p>PLEASE SELECT</p> <p>University of British Columbia, Centre for Health Services and Policy Research http://chsp.ubc.ca/pubs/pub-search This site has a health policy orientation. To search scroll down and look at the right-hand menu to find the search box exclusively for publications. (Language: English) Searched, nothing found</p> <p style="text-align: right;">6</p>
<p style="text-align: center;">CADTH</p> <p>INTERNATIONAL</p> <p>results may be of potential interest</p> <p>EuroScan Secretariat, International Information Network on New and Emerging Health Technologies (EUROSCAN) http://www.euroscan.org.uk/ It is possible to search this site with or without a membership using the search box on the left-hand menu. Use the advanced search option to refine search results. (Language: English) Discharge plan, transitional care</p> <p>searched; nothing found</p> <p>INAHITA Secretariat, International Network of Agencies for Health Technology Assessment (INAHITA) http://www.inahita.org/ Click on the magnifying glass beside the top-middle search box and checkmark the "Search publications" box, in order to limit to publications, language, date and condition. This site includes summaries of INAHITA member reports and links to the original publications. (Language: English) Discharge plan, transitional care, patient discharge</p> <p>searched; results found</p> <p>World Health Organization Regional Office for Europe, Health Evidence Network (WHO HEN) http://www.euro.who.int/en/what-we-do/data-and-evidence/health-evidence-network-hen/publications-by-keyword In site search box, phrases may be searched using quotes "" (Language: English, French, German, Russian) Discharge planning, patient discharge, transitional care</p> <p>AUSTRALIA</p> <p>searched; nothing found</p> <p>Australian Government, Department of Health and Ageing, Australia and New Zealand horizon scanning network (ANZHSN) http://www.horizonscanning.gov.au/internet/horizon/publishing.nsf/Content/technologies-assessed-3-2 Search box can be used to search horizon scanning sites only or all Australian Government websites. If browsing is preferable, scroll</p> <p style="text-align: right;">7</p>	<p style="text-align: center;">CADTH</p> <p>down page and click on each report type (i.e. Horizon scanning, Drafting summaries, and Emerging Technology Bulletins). Completed and in-progress Medical Services Advisory Committee applications are separate sites to search in this checklist, but do not need to be searched again if the "Search all Australian Government websites" keyword option was used</p> <p>searched; nothing found</p> <p>Australian Government Department of Health and Ageing, Medical Services Advisory Committee (MSAC), Completed Assessments and Reviews http://www.msac.gov.au/internet/msac/publishing.nsf/Content/comp-finished-assessments Search box can be used to search MSAC sites only or all Australian Government websites. If browsing is preferable scroll down page and click on each MSAC Assessment application link as well as the MSAC References links. Contains two years only, for older items scroll down and click on "Historical Resources." Horizon scanning (ANZHSN) and in-progress applications are separate sites to search in this checklist, but do not need to be searched again if the "Search all Australian Government websites" keyword option was used. (Language: English) Discharge planning, patient discharge, transitional care</p> <p>searched; nothing found</p> <p>Australian Government Department of Health and Ageing, Medical Services Advisory Committee (MSAC), Medical Services Advisory Committee current applications at appraisal stage http://www.msac.gov.au/internet/msac/publishing.nsf/Content/cum-rf-assessments Scroll down page to see MSAC assessments in progress. Horizon scanning and completed applications are separate sites to search in this checklist. (Language: English) Discharge planning, patient discharge, transitional care</p> <p style="text-align: right;">8</p>

<p style="text-align: center;">CADTH</p> <p>results may be of peripheral interest Joanna Briggs Institute (JBI). The Joanna Briggs Institute EBP Database http://ovidsp.ovid.com/ Subscription required for full-text database, available through OVID interface. Able to limit by subject area and publication type. Language: English Couldn't access articles</p> <p>searched; nothing found Monash Health, Centre for Clinical Effectiveness (CCE). Current Evidence Reviews http://www.monashhealth.org/page/Health_Professionals/CCE/Evidence_reviews/Current/ If older reports are desired, click the link to "Archived evidence reviews" found at the top of the page or in the left sidebar. Evidence-based clinical practice guidelines are also searched separately in the "Guidelines" section of this checklist. Language: English Discharge planning, patient discharge, transitional care</p> <p>searched; results found National Prescribing Service, NPS RADAR (RADAR) http://www.nps.org.au/health_professionals/publications/radar For drug searches only, use Ctrl-F to search keywords on this page Language: English discharge plan, patient discharge, transitional care</p> <p>searched; nothing found Queensland Government (Australia). Health Policy Advisory Committee on Technology (HealthPACT) http://www.health.qld.gov.au/healthpact/html/tech-evaluated.asp Language: English discharge plan, discharge planning, patient discharge, transitional</p> <p>CAN</p> <p>searched; nothing found Royal Australian College of Surgeons. Australian Safety and Efficacy Register of New Interventional Procedures - Surgical (ASERNIP - S) http://www.surgeons.org/for-health-professionals/audits-and-surgical-research/asernip-a-systematic-review-and-technology-overview/ Language: English discharge plan, patient discharge, transitional care</p> <p>Grey Matters: A Practical Search Tool for Evidence-Based Medicine 9</p>		<p style="text-align: center;">CADTH</p> <p>IRELAND</p> <p>results may be of peripheral interest Health Information and Quality Authority. Health Technology Assessments http://www.higa.ie/healthcare/health-technology-assessment/assessments Language: English Discharge planning, patient discharge, transitional care</p> <p>searched; nothing found Health Services Executive. Irish Health Repository (Lenus) http://www.lenus.ie/jsp/ Language: English Discharge planning, patient discharge, transitional care</p> <p>THE NETHERLANDS</p> <p>PLEASE SELECT College voor zorgverzekeringen (CVZ). Health Care Insurance Board http://www.cvz.nl/publications/n+in+english Language: Dutch</p> <p>PLEASE SELECT De Gezondheidsraad (GR). Health Council of the Netherlands http://www.gezondheidsraad.nl/en Scroll to bottom of page to browse publications by areas of activity or use search box in upper-right corner to search the entire site. Most articles in Dutch with English summaries. Language: Dutch, English</p> <p>Grey Matters: A Practical Search Tool for Evidence-Based Medicine 12</p>	
<p style="text-align: center;">CADTH</p> <p>SWITZERLAND</p> <p>PLEASE SELECT Swiss Federal Office of Public Health. Swiss Network for Health Technology Assessment (SNHTA) http://www.snhta.ch/resources/overview.html May need membership to search Language: English</p> <p>UK</p> <p>PLEASE SELECT Clean, Safe Care, UK Department of Health. Showcase Hospitals Evaluation Reports (NHS) http://nhschoicestraining.spinninglock.com/index.php?pid=84 Language: English Broken link</p> <p>searched; nothing found Healthcare Improvement Scotland http://www.healthcareimprovementscotland.org Browse page by subject in right-hand "All clinical topics" box, or use 3rd search box under "Access our reports, publications and tools" to enter keywords. Some overlap with NICE reports (also on checklist). Language: English Discharge planning, patient discharge, transitional care</p> <p>PLEASE SELECT National Health Service for Wales. ATTRACT http://www.attract.wales.nhs.uk/ Language: English Searched, nothing found</p> <p>Grey Matters: A Practical Search Tool for Evidence-Based Medicine 14</p>		<p style="text-align: center;">CADTH</p> <p>searched; nothing found National Institute for Health and Clinical Excellence (NICE). NHS National Institute for Health and Clinical Excellence http://www.nice.org.uk/ To browse select "Find guidance" tab, then choose "Conditions and diseases". Use keywords and top-right search box for most recent reports and to search for specific terms. Discharge planning, patient discharge, transitional care</p> <p>searched; nothing found National Institute for Health and Clinical Excellence (NICE). Published evidence summaries, new medicines http://www.nice.org.uk/mpc/evidencesummaries/newmedicines/home.jsp New product line for NICE, use find feature (ctrl f) and search by drug name. Language: English Discharge planning, patient discharge, transitional care</p> <p>searched; nothing found National Institute of Health Research, Horizon Scanning Centre (NHSC). Outputs by Specialty http://www.nhs.uk/health/horizon-scanning-centre/outputs/specialties/ Browse by selecting the specialty of interest or use the search box for keyword searching. Language: English Discharge planning, patient discharge, transitional care</p> <p>searched; nothing found NHS Purchasing and Supply Agency. Centre for Evidence-based Purchasing (CEP) http://nhscep.usconnect.co.uk/CEPProducts/Catalogue.aspx As of March 31, 2010, the Center has been decommissioned but older reports still found at the Department of Health (UK) website. Language: English discharge planning, patient discharge, transitional care</p> <p>Grey Matters: A Practical Search Tool for Evidence-Based Medicine 15</p>	

<p style="text-align: center;">CADTH</p> <p>searched, nothing found</p> <p>NHR Evaluation, Trials and Studies Coordinating Centre (NETSCC) Project Portfolio http://www.netsc.org.uk/projects?collection=netsc&meta_P_sanid=Project Use general search box in right-hand menu for keyword searching, both phrase and boolean searches are supported. Unpublished reports can be searched separately via the "Research in progress" tab but are also included in general search engine results [Language: English] discharge plan, patient discharge, transitional care</p> <p>US</p> <p>searched, nothing found</p> <p>Agency for Healthcare Research and Quality (AHRQ)</p> <ul style="list-style-type: none"> Technology Assessments http://www.ahrq.gov/research/technology/ Use Ctrl-F to search keywords on this page or use top right-hand search box for less common keywords in order to search the whole site. If older reports (1990-2007) are needed scroll down to the bottom of the screen and click on the "Technology assessment archive." Evidence-based Practice http://www.ahrq.gov/line/epc/epcquick.htm EPC Topics in Process http://www.ahrq.gov/line/epc/epcprogress.htm Effective Health Care Reports http://effectivehealthcare.ahrq.gov/index.cfm?search-for-guides-reviews-and-reports/ Browse using "Search by health condition" topics or use the top right-hand search box for keyword searching [Language: English, Spanish] discharge planning, patient discharge, transitional care <p style="text-align: right;">16</p>	<p style="text-align: center;">CADTH</p> <p>not searched, not relevant</p> <p>Blue Cross and Blue Shield Association, Technology Evaluation Center (TEC) http://www.bcsa.com/resources/tec/topic.html Best for devices and procedures but does have pharmaceutical reports as well. See also unpublished reports by clicking on both "TEC assessments in progress" and "TEC assessments in press" [Language: English]</p> <p>not searched, not relevant</p> <p>California Technology Assessment Forum (CTAF) Assessments http://www.ctaf.org/assessments/ Does not include pharmaceutical technologies [Language: English]</p> <p>not searched, not relevant</p> <p>Centers for Medicare & Medicaid Services (CMS), Technology Assessments http://www.cms.gov/medicare-coverage-database/indexes/technology-assessments-index.aspx?TAN=55&lc=AA&JAAAAAAAAA Some duplication with AHRQ site [Language: English]</p> <p>searched, nothing found</p> <p>Institute for Clinical and Economic Review (ICER) http://www.icer-review.org/index.php/table/tpp/analysis/ Search both "completed and ongoing" approvals [Language: English] Discharge planning, patient discharge, transitional care</p> <p style="text-align: right;">17</p>
<p style="text-align: center;">CADTH</p> <p>searched, nothing found</p> <p>Washington State Health Care Authority, Health Technology Assessment Findings http://www.hca.wa.gov/hta/Pages/Forms/HTA_Findings.aspx [Language: English] discharge planning, patient discharge, transitional care</p> <p>Health Economics</p> <p>CANADA</p> <p>searched, nothing found</p> <p>Hospital for Sick Children (Toronto), Paediatric Economic Database Evaluation (PEDE) http://pede.sickkids.ca/pede/search.asp This database contains over 2000 citations of full economic evaluations [Language: English] Discharge planning, patient discharge, transitional care</p> <p>PLEASE SELECT</p> <p>Institute of Health Economics, Publications Library (IHE) See above section "Health Technology Assessment (HTA) Agencies, Canada" for IHE linking information [Language: English]</p> <p>searched, nothing found</p> <p>McMaster University, Centre for Health Economics and Policy Analysis, Publications database (CHEPA) http://www.chcpa.org/research-products Click on "Working papers" in the left-hand menu for reports not in traditional journal literature [Language: English] discharge planning, patient discharge, transitional care</p> <p style="text-align: right;">18</p>	<p style="text-align: center;">CADTH</p> <p>PLEASE SELECT</p> <p>Ontario Ministry of Health and Long-Term Care, Ontario Case Costing Initiative (OCCI) http://www.occi.com/ontario/Pages/htp See "Costing Analysis (CAT) Tool" in left-hand menu for obtaining hospital costing information from hospitals currently participating in the Ontario Case Costing Initiative [Language: English]</p> <p>searched, nothing found</p> <p>Public Health Agency of Canada, Economic Burden of Illness in Canada 1996 (PHAC) http://www.phac.aspc.gc.ca/eibc/ebc/index-eng.php Search only if burden of illness statistics required. Download the pdf document and perform a keyword search within. [Language: English, French] discharge planning, patient discharge</p> <p>not searched, not relevant</p> <p>Toronto Health Economics and Technology Assessment Collaborative (THETA), THETA Publications and Knowledge Translation to Policy (KT) Activities http://theta.toronto.ca/content.php?path=411961&path=3372336 To search this site click on the following three sections: "Publications," "Reports," "Working Papers," and browse each page. [Language: English]</p> <p>INTERNATIONAL</p> <p>PLEASE SELECT</p> <p>Agency for Healthcare Research and Quality, National Quality Measures Clearinghouse, National quality measures clearinghouse (AHRQ) http://www.qualitymeasures.ahrq.gov/ Contains information on specific evidence-based health care quality measures and measure sets [Language: English]</p> <p style="text-align: right;">19</p>

<div data-bbox="548 212 623 237">CADTH</div> <div data-bbox="256 264 594 642"> <p>searched, nothing found</p> <p>Australian Government Department of Health and Ageing, Pharmaceuticals Benefits Scheme - Browse by Medicine Listing (PBS) http://www.pbs.gov.au/browse/medicine-listing Browse alphabetical list for drug pricing (Language: English) Discharge planning</p> <p>searched, nothing found</p> <p>Federal Reserve Bank of St. Louis, Economic Research Division, Ideas database (IDEAS) http://ideas.repec.org To search click the "Advanced" search button in the top right-hand menu, and limit the search to "Papers," "Chapters" and "Books" (Articles are already captured in database searches). NEED TO SCROLL DOWN the page to see search results. (Language: English) Discharge planning</p> <p>not searched, not relevant</p> <p>International Society for Pharmacoeconomics and Outcomes Research (ISPOR), Value in Health: Journal of the International Society for Pharmacoeconomics and Outcomes Research http://www.valueinhealthjournal.com/issues Subscription required: select year to search and type in appropriate keyword in top menu. Includes abstracts from ISPOR's annual conferences. Duplication with EMBASE database which also indexes these conference abstracts. (Language: English)</p> <p>searched, nothing found</p> <p>John Wiley & Sons, Inc. Health Economic Evaluations Database (HEED) http://onlinebrary.wiley.com/book/10.1002/9780470510933 Paid subscription required (Language: English) Discharge planning</p> </div>	<div data-bbox="1166 212 1240 237">CADTH</div> <div data-bbox="873 264 1211 506"> <p>not searched, not relevant</p> <p>National Centre for Pharmacoeconomics (Ireland), Pharmacoeconomic Evaluations (NCE) http://www.ncpe.ie/pharmacoeconomic-evaluations/ Select the technology type of interest (i.e. Drugs) and browse using the alphabetical listing. (Language: English)</p> <p>not searched, not relevant</p> <p>NHS EED, economic evaluations of health care interventions Searchable as part of the University of York NHS EED databases See the databases section. (Language: English)</p> <p>searched, nothing found</p> <p>University of Aberdeen, Health Economics Research Unit (HERU) http://www.abdn.ac.uk/heru/publications/publications/ Select publication types "HERU Briefing Papers" and "Reports" and browse by year within each category. Full text links are not available for all reports. (Language: English) discharge planning</p> </div>
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Evidence Review System

DRAFT:

The CHRSP research approach requires that all relevant literature be evaluated and categorized systematically. An evidence rating system (ERS) was created through an iterative consulting process with CHRSP staff. This ERS allows for CHRSP staff to rate the overall strength of evidence for a given topic. This ERS focused on several key areas in order to rank evidence in a meaningful manner.

1. Assessing the Methodological Quality of Systematic Reviews (AMSTAR) is a validated process that assesses secondary literature. AMSTAR identifies eleven key indicators of quality and requires CHRSP researchers to determine whether or not these indicators of quality are present in a systematic review. Systematic reviews that scored below 40% on AMSTAR were not used because their conclusions, although potentially accurate, were not deemed trustworthy. Systematic reviews that scores between 40% and 70% were described as "Moderate" quality. Systematic reviews that scored above 70% were described as "High" quality.
2. The number of systematic reviews is an important element in determining the strength of evidence. The more systematic reviews on a given topic, the better. In the ERS there are three quantities of systematic reviews: 1, 2, and 3+.
3. Primary Literature, or the number of primary studies covered, is assessed for each systematic review. Systematic reviews are, functionally, summaries of the existing primary literature. Generally, the more primary literature assessed the better. For the ERS there were three levels of primary literature (>8, 8-15, 15+). The reason for assessing the amount of primary literature is important because when only a small number of studies exist on a given topic, it is difficult to determine if a given intervention is effective. In these cases CHRSP is unable to make substantive conclusions about an intervention.
 - a. Also, some systematic reviews show considerable overlap amongst studies for primary literature that was assessed. This may artificially inflate the total number of primary studies addressing a topic. In this case, CHRSP researchers use AMSTAR rankings to determine which systematic review gets "credit" for using a primary study. If a high

quality systematic review and a moderate quality systematic review both used the same 15 studies (and only those 15 studies), then the high quality systematic review would be given credit for all 15 studies, while the moderate quality systematic review would be credited for zero studies.

4. Convergence is also an important element of the ERS. A body of systematic reviews that does not agree amongst itself about the effects of an intervention is very problematic. The tolerance for disagreement is 1 dissenting study for every 5 assenting studies (1/6).
5. Recent primary literature is a check that CHRSP researchers will perform to ensure that there is not new evidence suggesting that an intervention has a different effect than what was suggested by the body of systematic reviews.

Overall, five evidence rating categories are possible: Very strong, strong, moderate, weak, and very weak.

AMSTAR	# SRs	Amount of Primary Literature	Do SRs Agree?	Does Primary Literature	Evidence Rating
High	3+	15+	Yes	Yes	Very strong evidence
High	3+	8 to 14	Yes	Yes	Strong evidence
High	3+	<=7	Yes	Yes	Moderate evidence
Moderate	3+	15+	Yes	Yes	Strong evidence
Moderate	3+	8 to 14	Yes	Yes	Moderate evidence
Moderate	3+	<=7	Yes	Yes	Weak evidence
High	2	15+	Yes	Yes	Strong Evidence
High	2	8 to 14	Yes	Yes	Strong Evidence
High	2	<=7	Yes	Yes	Weak evidence
Moderate	2	15+	Yes	Yes	Moderate evidence
Moderate	2	8 to 14	Yes	Yes	Moderate evidence
Moderate	2	<=7	Yes	Yes	Weak evidence
High	1	15+	Yes	Yes	Moderate evidence
High	1	8 to 14	Yes	Yes	Moderate evidence
High	1	<=7	Yes	Yes	Weak evidence
Moderate	1	15+	Yes	Yes	Moderate evidence
Moderate	1	8 to 14	Yes	Yes	Weak evidence
Moderate	1	<=7	Yes	Yes	Weak evidence

NB. Any combination that is not represented within this table would be considered “Very weak” evidence.