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Initiatives for improving delayed discharge from a hospital setting: a scoping review

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ABSTRACT

Objective The overarching objective of the scoping review was to examine peer reviewed and grey literature for best practices that have been developed, implemented and/or evaluated for delayed discharge involving a hospital setting. Two specific objectives were to review what the delayed discharge initiatives entailed and identify gaps in the literature in order to inform future work.

Design Scoping review.

Methods Electronic databases and websites of government and healthcare organisations were searched for eligible articles. Articles were required to include an initiative that focused on delayed discharge, involve a hospital setting and be published between 1 January 2004 and 16 August 2019. Data were extracted using Microsoft Excel. Following extraction, a policy framework by Doern and Phidd was adapted to organise the included initiatives into categories: (1) information sharing; (2) tools and guidelines; (3) practice changes; (4) infrastructure and finance and (5) other.

Results Sixty-six articles were included in this review. The majority of initiatives were categorised as practice change (n=36), followed by information sharing (n=19) and tools and guidelines (n=19). Numerous initiatives incorporated multiple categories. The majority of initiatives were implemented by multidisciplinary teams and resulted in improved outcomes such as reduced length of stay and discharge delays. However, the experiences of patients and families were rarely reported. Included initiatives also lacked important contextual information, which is essential for replicating best practices and scaling up.

Conclusions This scoping review identified a number of initiatives that have been implemented to target delayed discharges. While the majority of initiatives resulted in positive outcomes, delayed discharges remain an international problem. There are significant gaps and limitations in evidence and thus, future work is warranted to develop solutions that have a sustainable impact.

INTRODUCTION

A delayed hospital discharge (known as alternate level of care (ALC) in Canada and delayed transfer of care in the UK) occurs when a patient is medically approved to be discharged, but remains in hospital for non-medical reasons (eg, waiting for a long-term care bed to become available or to transfer home with services).1 While waiting for their next destination, patients’ level of care and activation often decrease or stop entirely. Delayed discharge can result in hospital patient flow issues (eg, emergency service backlogs, cancelled surgeries, delays in medically necessary care),2 increased healthcare costs,3 an increased risk of functional decline,4, 5 falls,6 hospital-related adverse events (eg, medication error, exposure to infectious disease),8, 9 mortality,8 as well as poor patient and family experiences.3

Patients who experienced a delayed discharge in previous studies exhibited the following characteristics: female,10 older,10 11 physically or cognitively impaired.4 12-15 Patients have also shown to exhibit aggressive behaviours,16 use assistive devices17 and have psychiatric conditions,10 neurological disorders18 and/or multimorbidity.17 In addition to these patient-level factors, there are a number of system-level factors that contribute to delayed discharges, including long wait lists for long-term care facilities,5 17-19 rehabilitation or other postacute care (eg, home care),11 12 20-23 the lack of culturally and religiously diverse long-term care facilities,15 limited or absent hospital services on weekends24 and organisational delays (eg, administrative delays, delayed assessments).24 25 There are also

Strengths and limitations of this study

► To our knowledge, this is the first scoping review to identify best practices for delayed discharges involving a hospital setting.
► The Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews Checklist was followed.
► A comprehensive search of peer reviewed and grey literature was conducted.
► A critical appraisal of the interventions was not performed.
different pressures and priorities across sectors, with little incentive to work together as a system. For example, while hospitals may be focused on efficiency and throughput, community-based organisations may be focused on empowerment, longer-term quality of life outcomes and working at a pace that works for patients and families. The funding structure of hospitals and healthcare systems can also have an impact on overall patient flow, including discharge delays. Although there is wide variation in funding structures within and across countries, there is potential for funding to either incentivise or disincentivise timely hospital discharges.

The combination of patient-level and system-level factors contributing to delayed discharges can also have a large financial impact on patients, families, healthcare providers and the healthcare system. A recent systematic review reported that delayed discharges cost approximately £200–565 (C$320–C$900) per patient, per day. Further, it was estimated that the National Health Service (NHS) (England) spends £820 million (C$1.3 billion) every year on patients who have a discharge delay. Similarly, a recent report from Canada stated that three hospitals located in Ottawa, Ontario, spend approximately C$250 000 per day (combined) on patients occupying beds at a level of care they no longer require. In addition to large costs for hospitals and healthcare systems, delayed hospital discharges can result in out-of-pocket costs for patients and families. Increased out-of-pocket costs, in addition to the other uncertainties associated with a delay, can heighten stress for patients and families, contribute to poor experiences and compromise quality of life.

Overall, delayed hospital discharges are problematic internationally, highlighting a need to identify best practices and current initiatives that are concentrating on solutions to this complex problem. To date, the majority of published literature on delayed discharge has focused on risk factors and characteristics of patients who experience delayed discharge. There has been a limited focus on initiatives that address the delayed discharge problem. Therefore, the purpose of this scoping review was to examine peer reviewed and grey literature (literature published through non-traditional means) for initiatives that have been developed and/or evaluated for delayed discharge from a hospital setting, with the goal of identifying best practices for reducing delayed discharge. A scoping review methodology was appropriate for addressing this goal, in order to identify the types of available evidence on this topic, examine key characteristics relating to initiatives for delayed discharge and to identify knowledge gaps.

METHODS

This review followed the scoping review methodology outlined by Levac et al, as well as the recently developed Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (see online supplemental table 1). A protocol for this scoping review was developed in consultation with a librarian at the University of Toronto, with continuous input from members of the research team.

Stage 1: identifying the research question

The research question developed to lead this scoping review was: what is known in the literature about initiatives (eg, strategies, programmes, interventions) that have been developed, implemented and/or evaluated for delayed discharge involving a hospital setting? The two main aims were: (1) to review what delayed discharge initiatives entail (eg, characteristics, outcomes) and (2) to identify gaps in the literature in order to inform future studies.

Stage 2: identifying relevant articles

The search strategy was developed with a librarian at the University of Toronto and through consultations with an advisory group and collaborators who have experience in clinical practice or administration (see online supplemental table 2 for Medline search strategy). Each search strategy was adapted for the specific database using appropriate command line syntax and indexing. The following are examples of keywords searched using Boolean operators, proximity operators, wild cards and truncations: ALC, delayed discharge, delayed transfer, bed blocking, strategy, model, intervention, programme, policy.

Electronic databases were searched for relevant articles. The following electronic databases were searched on 16 August 2019: MEDLINE (Ovid Interface), EMBASE (Ovid Interface), AMED (Ovid Interface), Cumulative Index to Nursing and Allied Health Literature (EBSCO Interface) and Cochrane Library. Grey literature was searched on the following databases and repositories: OpenGrey, Health Services Research Projects in Progress, UpToDate, Community Research and Development Information Services and TSpace, as well as on numerous national and international healthcare and government websites. We also reached out to key stakeholders, including members of our advisory group, to send us relevant reports and presentations.

Stage 3: study selection

For inclusion, articles (peer-reviewed and grey literature) were required to meet the following criteria: (1) focused on delayed discharge, (2) included an initiative to address delayed discharge, (3) involved a hospital setting, (4) published between 1 January 2004 and 16 August 2019 and (5) peer-reviewed or grey literature. We focused our inclusion on initiatives involving a hospital setting because this is where the problem of delayed discharges surfaces. Articles were excluded if they met any one of the following criteria: (1) focused on changing the threshold/timing of discharge (early discharge), (2) books, book chapters, opinion pieces or editorials, (3) grey literature that did not sufficiently describe the initiative implemented (eg, implementation process, location, population, impact);
(4) protocols, trial papers or chart reviews or (5) conference abstracts or articles without an accessible full text. Articles were excluded for criteria one (changing the threshold/timing of discharge) because the rationale for having an earlier discharge was often focused on other factors such as cost-savings by reducing length of stay, rather than specifically addressing a delayed discharge. Articles were excluded if they met criteria two (books, book chapters, opinion pieces or editorials) to eliminate articles with potential personal biases and summaries of peer-reviewed literature. Grey literature that did not provide sufficient details on the initiative (such as lacking a description of the components of the initiative) were excluded. Articles published more than 15 years ago, before 1 January 2004, were excluded to ensure the initiatives included in this scoping review were relevant to more current health service practices.

Articles identified from the database searches were imported into EndNote X9, a reference management software, where they were deduplicated following Brammer’s method. The initial database searches identified 22,704 articles, which were reduced to 15,824 following deduplication (figure 1). The titles and abstracts of the articles were reviewed on Covidence, a software platform for systematic and scoping reviews. The research team (LC, KK, SJTG, KMK and JK) independently screened the titles and abstracts of 40 articles to test their agreement. The remaining full-text articles were reviewed at the full-text level. Thirty full-text articles were independently screened by the research team (LC, KK, SJTG, KMK, JK and MA) to test their interrater agreement. The remaining full-text articles (peer-reviewed and grey literature) were double screened by four reviewers (LC, KMK, JK and MA).

Stage 4: charting the data
The data were charted by two reviewers (LC and KMK) using a data extraction form in Microsoft Excel. The form was developed and tested by the research team in a series of team meetings prior to the extraction of all data. We conducted spot checking of extracted data from 15% of the included articles to ensure completeness and accuracy of the extracted data. Any questions that arose during the charting process were discussed by the team. Charted data contained the following information: general information, study characteristics, population characteristics, initiative characteristics, characteristics of delayed discharge, study outcomes and conclusions.

Stage 5: collating, summarising and reporting results
Microsoft Excel was used to conduct a descriptive quantitative analysis of the included articles, as well as facilitate qualitative thematic analysis. The thematic analysis of the charted data was an inductive and iterative process, in which the team (LC, SJTG, KMK and KK) met in-person to discuss high level concepts and identified common themes across the included articles. When reviewing the extracted data, we found that the strategies appeared to cluster into core categories, which aligned with a conceptual framework developed by Doern and Phidd. This framework classifies policy instruments/tools along a continuum (from those that are least coercive like information sharing to those that are more coercive like public ownership or, in our case, new infrastructure). We deductively applied Doern and Phidd’s categories to classify our findings, with some minor adaptations. The five adapted categories were not mutually exclusive and included: (1) information sharing (live information sharing and documented recommendations); (2) tools and guidelines; (3) practice changes; (4) infrastructure and finance and (5) other (see table 1 for category descriptions and examples). The categories assisted with the organisation and presentation of the data.

Stage 6: consultation
The research team presented findings of the scoping review to key stakeholders (eg, hospital staff, patient and caregiver partners) through the planning process and analysis of results. These meetings were used to inform search terms, gather relevant documents, obtain feedback on the categorisation/organisation of initiatives, as well as identify knowledge gaps in order to develop targeted and actionable recommendations for future practice, policy and research.
Table 1  Categories, descriptions and examples of initiative categorisation

| Category name                  | Description                                                                 | Examples                                                                                   |
|-------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Information Sharing            | A—information sharing through in-person or technology-based communication  | A—rounding, team meetings, one-on-one communication                                       |
|                               | (asynchronous communication)                                                | B—examples: suggested strategies (or ‘calls to action’) which ranged from recommending investments in new long-term care beds, increasing funding for behavioural supports, audits and reports, encouraging team building |
| Tools and guidelines           | ► Tangible/concrete guides to inform practice                               | Toolkits, guidelines, escalation processes, frameworks                                     |
| Practice changes               | ► A change in how care is delivered                                          | Nurse-led discharges, roles of providers and/or composition of team are organised differently |
| Infrastructure and finance     | ► Tangible structural or financial changes                                 | Financial penalties/incentives, building more hospital, rehabilitation or long-term care beds |
| Other initiatives              | ► Different initiative that does not fit into any of the above categories   | Statistical models (predictive modelling)                                                  |

Patient and public involvement

An advisory council (patient and caregiver partners), along with providers, managers and organisational leaders identified the lack of understanding about the state of evidence around best practices for delayed discharges, which informed the research question for this scoping review. The advisory council was involved with planning meetings where they provided feedback on the search terms and analysis. Results will be disseminated to the advisory council through presentations and a lay summary.

RESULTS

Study characteristics

The database search identified 15,824 unique articles that were screened for eligibility; following title/abstract and full-text review, 66 articles were included in this scoping review, 49 articles from the database searches and 17 articles from the grey literature searches (figure 1). The majority of included articles were quantitative studies (n=34), with a few qualitative (n=5), mixed methods (n=6) or other designs (policy analyses, reviews, case studies and presentations; n=21). There was a large variety of study designs, with few randomised trials and prospective studies. Most initiatives were evaluated (n=42), with different types of evaluations such as process evaluations and outcome evaluations. The UK (n=21), USA (n=18) and Canada (n=17) were the most common countries where studies were conducted. Based on the year of publication, there was a fairly even distribution of peer-reviewed articles across the years of inclusion (from 2004 to 2019); however, the majority of grey literature was published in the last 10 years. Table 2 describes the characteristics of included articles.

The initiatives most commonly targeted adults and older adults; however, there were some initiatives targeting the paediatric population. Specific characteristics of the study population (ie, age, sex, gender, ethnicity/race, income level, education, marital status, household composition, employment status, comorbidities) were not reported in the majority of articles. Most peer-reviewed articles (n=31) defined a delayed discharge; however, there was a wide variety of definitions for these terms (see online supplemental table 3). The most common definition for delayed discharge was when a patient was identified as medically ready for discharge, but remained in hospital. Table 3 describes the initiative characteristics.

Based on Doern and Phidd’s adapted framework, we categorised the included initiatives as: information sharing (n=19); tools and guidelines (n=19); practice changes (n=36); infrastructure and finance (n=10); or other (n=3), which are described in detail below (see figure 2). Numerous articles used a combination of categories in their initiatives (eg, information sharing and practice change).

Information sharing

The information sharing category included initiatives that promoted communication, leadership from senior staff and information exchange within or across organisations. The majority of information sharing initiatives included team meetings and huddles to facilitate communication through in-person interactions between staff, and less often between staff and patients/families. Information sharing was promoted between multidisciplinary teams and patients to improve length of stay and continuity of care. For example, Adlington et al implemented Plan Do Study Act cycles during weekly quality improvement meetings, in which driver diagrams
| Author (year) | Country | Objective | Method | Participants | Sample size | Key conclusions |
|--------------|---------|-----------|--------|--------------|-------------|-----------------|
| Adlington (2018) | UK | Reduce length of stay, bed occupancy and delays in discharge and promote care in the appropriate setting among functional older adults on a psychiatric ward | Quantitative | Older adults (65+) on psychiatric ward | NR | Daily rounds and management focusing on long-stay patients were effective in improving length of stay and bed occupancy. Sustained improvements needed support from the quality improvement programme and community team. |
| Ardagh (2011) | New Zealand | Identify 10 common challenges and promising initiatives relating to patient flow and emergency department overcrowding | Qualitative | NR | NR | To improve patient flow and emergency department overcrowding the following are needed: a. a comprehensive, systematic approach b. changes to resource usage c. sharing of expertise and experience. |
| Arends (2013) | Australia | Determine if hospital length of stay for older patients is reduced when an allied health intervention is introduced in the emergency department (ED) | Quantitative | ED patients (65+) diagnosed with one or more of six conditions (cerebrovascular insufficiency; fractured neck of femur; cardiac failure; myocardial ischaemia; exacerbation of chronic airways disease; respiratory tract infection) | 3572 | Multidisciplinary allied health team assessment in the emergency department has no benefit in reducing hospital length of stay. |
| Baumann (2007) | UK | Identify the factors causing good discharge practice performance and organisation of services | Qualitative | Health/social services staff with managerial involvement in discharges | 42 | Future research needs to explore the impact of the identified issues on patients, families and staff. |
| Behan (2005) | UK | Explore the experience of service users across the UK during the first 6 months of the implementation of the Community Care (Delayed Discharges) Act | Qualitative | NR | NR | Fines have resulted in a reduction of delayed discharges. The act has brought health and social care together. |
| Béland (2006) | Canada | Assess the transformation of the organisation and delivery of health and social services with additional interventions for frail elderly people | Quantitative | Frail elderly | 1309 | Changing delivery of care for frail elderly persons is feasible. Integrated care can reduce hospital and nursing home use, without impacting cost. |
| Blecker (2015) | USA | Evaluate the impact of a weekend hospital intervention on care processes, clinical outcomes and length of stay | Quantitative | Non-obstetric patients hospitalised | 57 163 | Increased care on weekends may contribute to improved hospital flow, without negatively impacting clinical outcomes (30-day readmissions and mortality). |

Continued
| Author (year) | Country | Objective | Method Study design | Participants | Sample size | Key conclusions |
|--------------|---------|-----------|---------------------|--------------|-------------|-----------------|
| Boutette (2018) | Canada | Serve frail elderly patients at risk of deconditioning and/or disability, caused by prolonged hospitalisation | NR, Review/ description of programme | Frail older patients who are at risk of deconditioning and/or disability | NR | Key features of the model: proactive, restorative, collaborative and integrated, client-centred and cost-effective |
| Bowen (2014) | UK | Demonstrate that nurse-led discharges can improve efficiency on a short stay surgical ward, without impacting patients safety | Quantitative, Case study | Adult ear, nose, throat patients having routine, elective, short stay surgery | 265 | Improved efficiency around discharge of elective short-stay ear, nose, throat patients 95% of ear, nose, throat patients (for simple discharge) are discharged on time |
| Boyd (2017) | USA | Explore the leadership strategies used by hospital business administrators to reduce delayed discharges and improve profitability | Qualitative, Multiple case study | Hospital administrators | 3 | Effective leadership from hospital administrators contributes to positive outcomes for patients, staff and the economy |
| Brankline (2009) | USA | Provide the appropriate level of care and patient choice when the patient is medically ready for transfer | Quantitative, Pilot study | Medical floors with primarily elderly patients who require nursing home placement after discharge | 25 | Improved information exchange between hospitals and nursing homes |
| Brown (2008) | USA | Determine if the length of patient stay is reduced in the postanaesthesia care unit when nurses use discharge criteria | Quantitative, Prospective clinical study | Adult, ASA physical status I, II, and III patients (18+) requiring general anaesthesia | 1198 | Decreased postanaesthesia care unit length of stay and discharge delays while maintaining patient status |
| Burr (2017) | Canada | Develop a framework that would support ALC avoidance strategies across the Toronto Central Local Health Integration Network | Case study, Case study | ALC patients | 3 hospitals | ALC avoidance reduces burden on patients, families and providers Long-term solutions to improve patient flow and avoid ALC should be sustainable and align with other initiatives |
| Caminiti (2013) | Italy | Evaluate the effectiveness of a strategy aimed to reduce delayed hospital discharge | Quantitative, Cluster, parallel group, randomised trial/quality improvement | Hospital units: geriatric, medicine, long-term care | 3498 | Physician direct accountability can reduce unnecessary and avoidable hospital days, especially when delays are within staff control |
| Chidwick (2017) | Canada | Discuss concepts and ideas that led to lowest ALC days in the province | Mixed methods, Quality improvement | ALC patients | NR | Improved patient flow and reduced ALC days through the implementation of a multidimensional approach |
| El-Eid (2015) | Lebanon | Assess the effectiveness of the Six Sigma method in improving discharge processes | Quantitative, Pre and post-intervention study | NR | 17,054 | Six Sigma can have a positive and sustainable impact on patient flow and length of stay Discharge delays should be addressed through principles of Six Sigma, rather than institution-specific interventions |
Table 2

| Author (year)        | Country       | Objective                                                                 | Method          | Participants                                                                 | Sample size | Key conclusions                                                                 |
|----------------------|---------------|---------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------|-------------|--------------------------------------------------------------------------------|
| Gaughan (2015)       | England       | Investigate the reduction in hospital bed-blocking due to a greater supply of nursing home beds or reduced costs | Quantitative    | Patients waiting for hospital discharge                                       | NR          | Improved coordination between health and long-term care is essential for addressing delayed discharges |
| Graham (2012)        | UK            | Evaluate the effect of the laparoscopic nurse specialist on patient discharge | Quantitative    | Laparoscopic cholecystectomy and laparoscopic inguinal hernia repair patients | 128         | Nurse-led discharge may increase discharge postlaparoscopic surgery without impacting patient care |
| Gutmanis (2016)      | Canada        | Outline change strategies and their impact health system transformation and those living with responsive behaviours and their family members | Mixed methods   | Individuals with responsive behaviours                                       | NR          | Improved coordination and communication across sectors Provided healthcare providers with learning opportunities |
| Henwood (2006)       | UK            | Examine the partnership between health and social care by exploring issues with hospital discharges | Case study      | Inpatients                                                                   | NR          | Addressing and improving delayed discharges requires partnerships between health and social care and a whole systems-based approach |
| Holland (2016)       | USA           | Report the development and evaluation of a discharge delay tracking and reporting mechanism | Quantitative    | Inpatients                                                                   | NR          | Discharge delays can be reduced if system and process breakdowns are identified and addressed |
| Katsaliaki (2005)    | UK            | Describe a project investigating potential care pathways for elderly people after discharge from hospital | Quantitative    | Inpatients                                                                   | NR          | Simulation is a suitable methodology for recording and evaluating the new postacute packages |
| Lees-Deutsch (2019)  | UK            | Identify core characteristics of patient discharge criteria, recorded in clinical management plans or case notes | Quantitative    | Patients discharged from the acute medicine unit and short-stay units        | 50          | Criteria-led discharge may be suitable for select patients in improving timeliness of discharge |
| Levin (2019)         | Scotland      | Examine the impact of Intermediate Care and the 72-hour target on delayed hospital discharge | Quantitative    | Patients aged 75+                                                            | 107,022     | Immediate impact on days delayed, but increasing rates delayed over time suggests that Intermediate Care services may need to be adapted |
| Lian (2008)          | Singapore     | Develop methods to reduce the hospital length of stay for premature infants by 30%, within 6 months | Quantitative    | Premature infants                                                            | 78          | Discharge planning should begin on hospital admission Nurses should coach parents to prepare them to care for their infant at home |
| Maassen (2008)       | Netherlands   | Assess the effect of enhanced recovery after surgery programme on discharge delays | Quantitative    | Patients undergoing elective colorectal resection                           | 173         | Additional recovery statistics should be added as outcomes of the ERAS programme |

Continued
| Author (year) | Country | Objective | Method | Participants | Sample size | Key conclusions |
|--------------|---------|-----------|--------|--------------|-------------|----------------|
| Mahant (2008)<sup>69</sup> | Canada | Determine if an audit-and-feedback intervention reduces delayed discharge in a general paediatric inpatient unit | Quantitative Prospective observational study | Paediatric inpatient | 3194 | ▶ Reduced inappropriate hospital days, without impacting readmission rates  
▶ Identified processes that impact inappropriate hospital days |
| Mahto (2009)<sup>76</sup> | UK | Determine the effect of a diabetes outreach service on delayed discharges and avoidable admissions | Quantitative Cross-sectional audit | Acutely admitted patients with diabetes | 137 | ▶ The restructured hospital diabetes outreach service improved outcomes for inpatients with diabetes |
| Maloney (2007)<sup>79</sup> | USA | Develop a web-based software application used to facilitate timely patient discharge | Quantitative Quality improvement pilot project | Inpatients | NR | ▶ Healthcare information technology can facilitate bed management efficiencies  
▶ Improved coordination and overall inpatient flow |
| Manville (2014)<sup>86</sup> | Canada | Determine if providing interdisciplinary care on a transitional care unit will result in improved clinical outcomes and lower costs | Quantitative Before-and-after structured retrospective chart audit | Elderly ALC patients (70+) | 135 | ▶ Improved health functional outcomes, delivered at a lower cost |
| Meehan (2018)<sup>77</sup> | Canada | Determine if providing interdisciplinary care on a transitional care unit will result in improved clinical outcomes and lower costs | Quantitative Before-and-after structured retrospective chart audit | Elderly ALC patients (70+) | 135 | ▶ Improved health functional outcomes, delivered at a lower cost |
| Moeller (2006)<sup>86</sup> | Canada | Assess patient and physician-related barriers to discharging patients who have met objective criteria | Mixed methods Retrospective assessment | Patients with community-acquired pneumonia | 31 | ▶ Patients outcomes can be improved by standardising care through a critical pathway  
▶ Patients with poor functional capacity (using the Hierarchical Assessment of Balance and Mobility) may need additional services to improve discharge time after clinical stability |
| Mur-Veeman (2011)<sup>81</sup> | The Netherlands | Explain the theory of buffer management and discuss related previous assumptions | NR Review/ theoretical paper | Bed blockers | NR | ▶ To practically apply buffer management, current routines, principles and beliefs should shift to focus on flow between organisations rather than within one organisation |
| Niemeijer (2010)<sup>36</sup> | Netherlands | Reduce the average length of stay to create more admission capacity and reduce costs | Mixed methods Efficiency improvement project (retrospective and prospective data collection) | Trauma patients | 2006:1114 2007:1124 | ▶ Lean Six Sigma is effective in reducing length of stay and improving financial efficiency in trauma care |
| Author (year) | Country     | Objective                                                                 | Method Study design                        | Participants                                | Sample size | Key conclusions                                                                                                                                 |
|--------------|-------------|-----------------------------------------------------------------------------|--------------------------------------------|---------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Panis (2004) | Netherlands | Reduce inappropriate hospital stay by adjusting patient logistics, increasing efficiency and providing comfortable surroundings | Quantitative Retrospective cohort study    | Mothers of newborn patients                  | 2889 days of hospital stay of gynaecology and obstetrics patients |             | ► Discharge criteria can reduce inappropriate patient stays related to discharge processes  
|              |             |                                                                             |                                            |                                             |             | ► Shifting maternity care to outpatient settings can reduce hospital length of stay                                                       |
| Patel (2019) | USA        | Evaluate the impact of team-based multidisciplinary rounds on discharge planning and care efficiency | Mixed methods Quality improvement initiative | Dissatisfied patients with delayed discharge | 1584        | ► Multidisciplinary discharge rounds can improve discharge efficiency, length of stay and 30-day readmissions |
| Ali Pirani (2010) | Pakistan   | Emphasise the role of nurses to determine factors leading to a lack of discharge planning | NR Review/ summary                         | Those experiencing delayed discharge        | NR          | ► Nurses play a key role in delivering patient-centred care and can improve discharge planning processes  
|              |             |                                                                             |                                            |                                             |             | ► Nurses must have the appropriate knowledge about discharge planning and have the ability to communicate, coordinate and educate patients |
| Qin (2017)   | Australia   | Identify which barriers to discharge influence hospital occupancy when targeted by a hospital-wide policy | Quantitative Simulation modelling          | NR                                           | NR          | ► Hospital occupancy rates and overcrowding can be improved by improving discharge processes |
| Rae (2007)   | New Zealand | Illustrate how the Delayed Discharge Project solved a bed crisis and controlled expenditure | Quantitative Continuous quality improvement project | Acute general medical                       | 20034       | ► The project altered staff behaviour around patient discharge resulting in a better use of resources  
|              |             |                                                                             |                                            |                                             |             | ► The system crashed 2 years post-implementation  
|              |             |                                                                             |                                            |                                             |             | ► There is too much focus on length of stay and bed allocations leading to poor decision making |
| Roberts (2013) | Australia   | Undertake a preliminary trial of the Goal Length of Stay tool at a rehabilitation centre | Quantitative Prospective study             | Inpatients in two units: SRU or BIRU        | 202         | ► The programme did not reduce length of stay and was perceived negatively by staff |
| Sampson (2006) | UK         | Describe bed occupancy data in people with diabetes before and after the introduction of a diabetes inpatient specialist nurse service | Quantitative Retrospective study           | Diabetes inpatients                         | 152,080     | ► Diabetes inpatient specialist nurse reduced excess bed occupancy |
| Shah (2007)  | England     | Examine the impact of the Community Care (Delayed Discharge) Act on bed occupancy and length of stay in Geriatric Medicine (GM) and Old Age Psychiatry (OAP) services | Quantitative Retrospective study           | Inpatient - specialties of GM and OAP services | NR          | ► More patients were admitted to GM services and had a shorter length of stay than OAP |

Table 2 Continued
| Author (year)       | Country | Objective                                                                 | Method Study design               | Participants                        | Sample size | Key conclusions                                                                 |
|---------------------|---------|---------------------------------------------------------------------------|-----------------------------------|-------------------------------------|-------------|--------------------------------------------------------------------------------|
| Sobotka (2017)      | USA     | Describe a hospital-to-home transitional care model                      | Case study                        | Paediatric inpatient               | 1           | Transitional care programmes can improve care for vulnerable populations by reducing health and developmental differences |
| Starr-Hemburrrow (2011) | Canada | Minimise the number of post-acute patients transitioning from hospital to long-term care and develop an integrated plan for appropriate care and placement | Quantitative Quality improvement   | ALC patients                       | NR          | Inter and intra-professional collaboration is important to standardise discharge processes, build trust and respect and improve coordination of care |
| Sutherland (2013)   | Canada  | Describe structural challenges to reduce the impact of ALC patients and to propose policy alternatives that could reduce occupancy | NR Discussion and debate article | ALC patients                       | NR          | A collaborative approach combining the three strategies should be considered to address ALC |
| Taber (2013)        | USA     | Test a programme to improve length of stay, delayed discharges and early readmissions for kidney transplant recipients | Quantitative Observational study  | Adult kidney transplant recipients | 476         | Improving medication safety post kidney transplant can improve clinical outcomes (acute rejection and infection rates, readmission rates) |
| Udayai (2012)       | India   | Reduce patient discharge time through a Six Sigma project                | Quantitative Time motion study    | Cash patients                      | NR          | Improving discharge time allowed for more patients to be managed, improving revenue |
| Williams (2010)     | Australia | Examine the impact of a critical care outreach service on frequency of discharge delay from the intensive care unit | Quantitative Prospective cohort study | Patients discharged from the ICU | 1123        | The critical care outreach role did not decrease delayed discharges |
| Younis (2011)       | UK      | Compare the effect of an enhanced recovery programme with preoperative stoma education on the number of patients with prolonged hospital stay | Quantitative Prospective study    | Patients undergoing anterior resection with the formation of a loop ileostomy | 120         | Pre-operatively integrating stoma management education into an enhanced recovery programme can reduce delayed discharges |

**Grey literature**

| Anonymous (2008) | USA     | Create an expedited discharge fund to pay for goods and services inhibiting a patient’s discharge (medical equipment, medication and transportation) | N/A News article | Uninsured patients | NR | Patients can be safely discharged through support from the discharge fund |
| Anonymous (2010) | USA     | Improve patient flow through initiatives that decrease length of stay and increase capacity | N/A News article | NR | NR | NR |
| Author (year) | Country | Objective | Method | Study design | Participants | Sample size | Key conclusions |
|--------------|---------|-----------|--------|--------------|--------------|-------------|----------------|
| Calveley (2007) | UK | Create a tier of support to reduce the unnecessary and costly occupation of hospital beds | N/A | Review | NR | NR | Healthcare solutions should be developed in partnership with health and community service providers |
| Manzano-Santaella (2009) | UK | Analyse the relationship between Payment by Results and the Delayed Discharges Act | N/A | Policy analysis | NR | NR | Quantitative measures (days delayed and costs) conflict with the social aspects of overall health and well-being |
| Krystal (2019) | Canada | Create a fact sheet of the benefits of staying at home and using Wait at Home (enhanced home care services while people wait for long-term care) | N/A | Mixed methods | Medically and socially complex and frail elderly | 100+ | Staying home provides benefits for seniors including fewer risks (germs/ viruses) and a familiar setting compared with the hospital |
| Walker (2011) | Canada | Develop recommendations of care for frail Canadians | N/A | Continuous quality improvement and evaluation | NR | NR | Community supports should be increased to keep people in their home as long as possible |
| North West Community Care Access Centre (2011) | Canada | Identify priority strategic initiatives and implement community support orders across the province | N/A | Annual report | Seniors waiting for LTC placement | NR | This framework can help improve results around ALC avoidance and management |
| Toronto Central Community Care Access Centre (2015) | Canada | Help support patients in their homes for as long as possible by providing them with community supports | N/A | Implementation guide and toolkit | Patients (specifically high needs seniors) | NR | Home First should be implemented as a system-wide approach |
| NHS Improvement (2018) | UK | Create a how-to guide explaining implementation approaches to reduce length of stay | N/A | Guide | NR | NR | Clinical leadership is essential for implementing these initiatives |
| Starr-Hemburrow (2010) | Canada | Improve patient flow through the implementation of change management initiatives | Quantitative | Quality improvement | NR | NR | Culture change requires support and attention to be sustained over time |
| LHIN Collaborative (2011) | Canada | | N/A | Implementation guide and toolkit | Patients (specifically high needs seniors) | NR | | |
| Author (year)                                      | Country   | Objective                                                                 | Method Study design                  | Participants                        | Sample size | Key conclusions                                                                                       |
|--------------------------------------------------|-----------|---------------------------------------------------------------------------|--------------------------------------|-------------------------------------|-------------|------------------------------------------------------------------------------------------------------|
| Shah (2011)<sup>90</sup>                         | Canada    | Ensure the appropriate community resources are in place to support the patient on discharge | N/A Implementation guide and toolkit | High need seniors (75+)              | NR          | Key success factors included: eliminating long discharge processes, having engaged leadership, having measurable targets, monitoring performance and educating patients and providers |
| Central East LHIN ALC Task Group (2008)<sup>94</sup> | Canada    | Understand the impact of delayed discharges in the Central East regions of Ontario (reviewing data, reading reports, initiating a pilot study, developing a patient flow map) | N/A Report                           | ALC patients                        | NR          | ALC is a complex issue and requires coordination across sectors                                      |
|                                                   |           |                                                                           |                                      |                                     |             | Implementation of the recommendations will help to reduce ALC days and improve patient flow          |
| Adams, Care & Repair England (2017)<sup>96</sup>   | UK        | Assist older patients in returning home from hospital quickly and safely    | Case study                           | Older patients                      | 1           | Large savings for the health system can be generated with the implementation of this intervention |
| Shah (2010)<sup>99</sup>                         | Canada    | Describe the Home First approach, a philosophy for reducing ALC           | Quantitative Quality improvement     | Elderly patients                    | NR          | Allows patients the opportunity to regain independence and return home                               |
|                                                   |           |                                                                           |                                      |                                     |             | ALC solutions need a collaborative, cross-sectoral approach                                         |
| Joint Improvement Team (2013)<sup>95</sup>        | Scotland  | Identify 10 action items to transform discharge processes                  | N/A Quality improvement/stakeholder engagement | N/A                   | NR          | There are a number of factors to successfully reduce delays                                         |

ALC, alternate level of care; BIRU, brain injury rehabilitation unit; GM, geriatric medicine; ICU, intensive care unit; N/A, not applicable; NR, not reported; OAP, old age psychiatry; SRU, stroke rehabilitation unit.
| Database Searches | Initiative Description/content | Target population | Setting | Initiative category* | Results |
|-------------------|--------------------------------|-------------------|---------|----------------------|---------|
| Adlington^40       | Quality improvement programme  | Older adults (>65) on psychiatric ward | Hospital Mile End Hospital (Leadenhall Ward), 26 beds | Information sharing live | Length of stay was reduced from an average of 47 days to 30 days Bed occupancy was reduced from 77% to 54% |
| Ardagh^63          | 10 promising initiatives      | NR                | Hospitals | Tools and guidelines Practice changes | Identified top 10 challenges and 10 promising initiatives related to patient flow and emergency department overcrowding |
| Arends^98          | Allied health assessment       | Patients (>65) diagnosed with one or more of six predetermined conditions | Hospitals Two Australian tertiary hospitals | Practice changes | No benefit in reducing hospital length of stay |
| Baumann^55         | N/A Qualitative study to identify factors associated with low rates of delayed discharges | Health/ social services staff with managerial involvement in discharges | Hospitals (6 sites) 4 southern sites, 2 northern sites | Initiatives described touch on all categories | 6 high-performing hospital sites identified issues impacting delayed discharges (capacity, internal hospital efficiencies and interagency efficiencies Resources and teams to prevent avoidable admissions Discharge teams to support nurses' discharge planning, Systems for monitoring and communicating patients' progress, Patient choice protocols Ensure availability of responsive transportation and discharge lounges |
| Behan^93           | Community Care (Delayed Discharge) Act 2003 | NR | 7 areas across the UK | Infrastructure and finance | National decrease in delayed discharges between 2003 and 2004 |
| Béland^99          | Integrated care               | Frail elderly     | Community service centres/ organisations | Practice changes | Significant (50%) reduction in the number of patients in the integrated care group that became ALC No significant differences in utilisation or costs between groups Increased caregiver satisfaction |

Continued
| Author       | Initiative Description/content                                                                 | Target population                                                                 | Setting                                      | Initiative category* | Results                                                                 |
|--------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------|----------------------|------------------------------------------------------------------------|
| Blecker      | 7-day hospital initiative ► Increased hospital services on the weekend (eg, diagnostic imaging, weekend discharges, physician and care management services) | Non-obstetric hospitalised patients                                               | Hospital Tisch Hospital, 705 beds           | Practice changes      | ► Decreased average length of stay by 13%                               |
|              |                                                                                                 |                                                                                     |                                              |                      | ► Increased proportion of weekend discharges by 12%                      |
|              |                                                                                                 |                                                                                     |                                              |                      | ► Decreased 30-day readmissions                                         |
|              |                                                                                                 |                                                                                     |                                              |                      | ► No changes in mortality                                              |
| Boutette     | 7-day Subacute care unit for frail elderly ► Subacute care in a restorative environment (integrated care and restoration) | Frail older patients who are at risk of deconditioning associated with a long hospitalisation | Hospitals Ottawa Hospital; Perley and Rideau Veterans’ Health Centre | Practice changes      | ► N/A                                                                  |
| Bowen        | Nurse-led discharge ► Allows nurses to facilitate discharge based on specific criteria that was developed to guide the discharge process (also allows for discharge in evenings and on weekends) | Adult ear, nose, throat patients having routine, elective, short-stay surgery      | Hospital University Hospital of South Manchester | Practice changes      | ► Significant reduction in rate of delayed discharges in both audits   |
| Boyd         | Communication and leadership ► Efficient communication and leadership from hospital administrators | NR                                                                                 | Hospitals (2) Part of a hospital conglomerate in Chicago | Information sharing live | ► Strategies for improving delayed discharges and reducing financial burden included efficient communication and effective leadership |
| Brankline    | Technology-assisted referrals ► The use of technology to improve information exchange and processes, increase data accuracy and produce documents | Elderly patients who require nursing home placement after hospital discharge        | Academic Medical Centre                      | Information sharing live | ► Decreased length of stay and improved timely discharges of patients resulted in cost savings |
|              |                                                                                                 |                                                                                     |                                              | Tools and guidelines    | ► Increased communication within and between the hospital and nursing homes |
| Brown        | Discharge criteria ► Nurse implementation of predetermined discharge criteria (activity, respirations, pulse, blood pressure, pain, etc) | Adult, ASA physical status I, II, and III patients, 18 years or older, requiring general anaesthesia | Hospital Postoperative recovery area of a large, tertiary-care, academic hospital | Tools and guidelines Practice changes | ► Decreased length of stay in the post-anaesthesia care unit by 24% |
|              |                                                                                                 |                                                                                     |                                              |                      | ► Reduced discharge delays with nurse-led discharge                      |
|              |                                                                                                 |                                                                                     |                                              |                      | ► No change in adverse events (airway obstruction, reintubation, arrest) |
| Burr         | ALC avoidance framework ► A framework of strategies to reduce ALC numbers and promote ALC avoidance | ALC patients                                                                       | Hospitals (3) 1. Michael Garron Hospital 2. Humber River Hospital 3. Toronto General Hospital | Tools and guidelines | ► (1) MGH—exceeded ALC target by 20%, reduced number of ALC patients waiting for long-term care |
|              |                                                                                                 |                                                                                     |                                              |                      | ► (2) HRH—culture shift after implementation of ALC framework recommendations |
|              |                                                                                                 |                                                                                     |                                              |                      | ► (3) TGH—improved number of ALC admission avoidance cases                |
| Caminiti     | Physician accountability ► Physician motivation and accountability through monthly reports and audits (can compare their length of stay results to other staff) | Hospital Units: geriatric, medicine, long-term care | Hospital University Hospital of Parma, 1267 beds | Information sharing live | ► Reduction in unnecessary, avoidable hospital days                      |
|              |                                                                                                 |                                                                                     |                                              |                      | ► No significant changes in 30-day readmission or mortality              |

Table 3 Continued
| Author | Initiative Description/content | Target population | Setting | Initiative category* | Results |
|--------|--------------------------------|-------------------|---------|----------------------|---------|
| Chidwick | Change ideas | Identification of change concepts, followed by the development and implementation of change ideas to promote behaviour change | ALC patients | Hospital William Osler Health System | Practice changes Tools and guidelines Information sharing live | ► Lowest ALC days in Ontario ► Eliminated ethical errors, improved patient discharge experience and decreased patient confusion |
| El-Eid | Hospital throughput project using Six Sigma Methodology | The use of Six Sigma Methodology to implement electronic patient requests, a floor clerk and a billing officer | NR | Hospital (tertiary care teaching hospital) American University of Beirut Medical Centre, 398 beds | Practice changes Information sharing live | ► Significant reduction in length of stay post-intervention ► Decreased discharge time (2.2 hours to 1.7 hours) |
| Gaugan | Increasing supply of nursing home beds | The use of modelling to explore the effect of increased supply of nursing home beds or lower prices of nursing home beds on bed blocking | Patients waiting for hospital discharge | Hospital | Other initiative | ► Increasing home care beds by 10% would decrease social care delayed discharges by 6%–9% |
| Graham | Nurse-led discharge | Nurse-led discharge following list of criteria (that each patient must meet) | Patients receiving laparoscopic cholecystectomy and laparoscopic inguinal hernia repair | Hospital Leicester Royal Infirmary | Practice changes | ► Nurse-led discharge group were significantly more likely to be discharged on the day of surgery ► No significant difference in readmission rates or patients seeking primary care postdischarge |
| Gutmanis | Behavioural Supports Ontario | A quality improvement initiative for older adults with responsive behaviours through the identification of change strategies and knowledge translation best practices | Individuals with responsive behaviours | South West LHIN | Practice changes Tools and guidelines | ► Decreased ALC care cases among persons with behavioural needs ► Improved perceptions from families and clients around patient care |
| Henwood | Change Agent Team | A team partnership between health and social care to explore the issues around delayed discharges | Inpatients | Information sharing live Tools and guidelines | | ► The Change Agent Team helped support implementation of contingency arrangements at the local level |
| Holland | Tracking and reporting system | Development and evaluation of a discharge delay tracking and reporting mechanism | Inpatients | Hospital (academic medical centre) | Tools and guidelines | ► Individual patient discharges may be improved by tracking factors that cause delays ► Nurses took the time to provide comments regarding patient delays |
| Katsaliaki | Intermediate care services | Statistical simulations to investigate potential care pathways and associated costs | Inpatients | Hampshire Social Services | Other initiative | ► 500 new places will help to balance the demand and capacity for intermediate care services by avoiding a deterioration of delay times |
### Table 3  Continued

| Author                | Initiative Description/content                                                                 | Target population                                      | Setting                                           | Initiative category*             | Results                                                                                   |
|-----------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------|
| Lees-Deutsch66        | Criteria led discharge - Selection of Patients for Efficient and Effective Discharge            | Patients discharged from the AMU and both short-stay wards | Hospital (acute medicine service with four clinical areas) | Tools and guidelines Practice changes | ▶ 27 patients were suitable for criteria led discharge, 23 were not                        |
|                       | ▶ Patient discharge is guided by a set of clinical criteria; once the patient meets the criteria, a member of the team can facilitate discharge |                                                        |                                                  |                                  | ▶ Mean wait time for the 27 suitable patients prior to discharge was 4 hours and 51 min |
|                       | ▶ Discharge delays were often caused by system delays                                           |                                                        |                                                  |                                  | ▶ Discharge delays were often caused by system delays                                     |
| Levin94               | Step-up intermediate care units                                                                 | Aged 75+                                               | Hospital                                         | Infrastructure and finance        | ▶ Reduced bed days delayed                                                               |
|                       | ▶ A bridging service between hospital and home for individuals ready for discharge from acute care; allows for recovery and regaining of independence |                                                        |                                                  |                                  | ▶ Rate of days delayed increased over time                                                |
| Lian58                | New discharge guidelines for premature babies                                                  | Premature infants                                      | Hospital Singapore General Hospital              | Tools and guidelines              | ▶ Reduced median duration of hospitalisation from 58.2 days to 34.9 days                  |
|                       | ▶ Development of new discharge guidelines for premature neonates                                |                                                        |                                                  |                                  | ▶ Cost savings of $6174/infant                                                        |
| Maessen76             | Enhanced recovery after surgery                                                                | Patients undergoing elective colorectal resection       | Hospital                                         | Practice changes                  | ▶ No significant difference in proportion of patients with a discharge delay post-ERAS programme |
|                       | ▶ Reduction in the postoperative recovery period to reduce overall hospital length of stay     |                                                        |                                                  |                                  | ▶ Approximately 90% of patients pre and post-ERAS were not discharged on the day discharge criteria/ functional recovery were met |
| Mahant (2008)59       | Medical Care Appropriateness Protocol-audit and feedback                                        | Paediatric inpatients                                  | Hospital Hospital for Sick Children               | Tools and guidelines              | ▶ Significantly lower risk of inappropriate hospital days                                |
|                       | ▶ A tool that provides information on hospital bed use (qualified and nonqualified hospital days) |                                                        |                                                  |                                  | ▶ During the intervention, 33% of bed days were nonqualified, compared with 47% pre-intervention |
|                       | ▶ Early discharge planning, organisation of follow-up care                                      |                                                        |                                                  |                                  | ▶ No change in 48-hour readmission rate                                                  |
| Mahto76               | Hospital diabetes outreach service                                                             | Acutely admitted patients with diabetes                | Hospital New Cross Hospital, 700 beds            | Practice changes                  | ▶ Reduction in bed occupancy, inappropriate admissions, delayed discharges and effective discharge planning |
|                       | ▶ A service to prevent admission through a number of strategies (improved access to services, management of medical problems, early discharge planning, organisation of follow-up care) |                                                        |                                                  |                                  |                                                                                           |
| Maloney49             | Patient tracker                                                                                 | Inpatients                                             | Hospital Primary Children’s Medical Centre       | Tools and guidelines Information sharing live | ▶ Decreased number of cancelled surgeries, median emergency department length of stay and average number of inpatient admissions |
|                       | ▶ A web-based application to facilitate the discharge process by enhancing communication between disciplines |                                                        |                                                  |                                  |                                                                                           |
| Manville96            | Transitional care unit                                                                          | Elderly ALC patients (70+)                              | Hospital St Joseph’s Hospital, 22-bed transitional care unit | Infrastructure and finance        | ▶ Improved health outcomes and discharge disposition, decreased length of stay and costs per patient |
|                       | ▶ A rehabilitation-style unit with enhanced nursing and rehabilitation services for elderly patients |                                                        |                                                  |                                  |                                                                                           |

Continued
| Author          | Initiative Description/content                              | Target population                      | Setting                                | Initiative category* | Results                                                                 |
|-----------------|-------------------------------------------------------------|----------------------------------------|----------------------------------------|----------------------|--------------------------------------------------------------------------|
| Meehan77        | Discharge to Assess                                         | Patients discharged through D2A        | Hospital                               | Practice changes      | ▶ Assists with early and effective hospital discharge                    |
|                 |                                                              |                                        |                                        |                      | ▶ 60% of patients and caregivers reported a positive experience with D2A |
|                 |                                                              |                                        |                                        |                      | ▶ Communication was noted as an issue                                    |
| Moeller 60      | Critical pathway                                            | Patients with community-acquired pneumonia | Hospital Queen Elizabeth II Health Sciences Centre, 637 beds | Tools and guidelines  | ▶ 58% of patients with a prolonged length of stay felt they were ready to go home once reaching clinical stability, compared with 92% of patients without a prolonged length of stay |
|                 |                                                              |                                        |                                        |                      | ▶ Hierarchical Assessment of Balance and Mobility score at clinical stability was significantly associated with physicians’ and families’ assessment of the patients’ discharge readiness |
| Mur-Veeman61    | Buffer management                                           | Bed blockers                           | Hospital to nursing home (intermediate care department) | Tools and guidelines  | ▶ The lack of cooperation is an inhibitor of buffer management           |
|                 |                                                              |                                        |                                        |                      | ▶ Efforts should focus on improving cooperation between providers        |
| Niemeijer62     | Lean Six Sigma                                              | Trauma patients                        | Hospital University Medical Centre Groningen, 1339 beds | Tools and guidelines  | ▶ Average length of stay of all patients (surgical and trauma) decreased by 2.9 days post-intervention |
|                 |                                                              |                                        |                                        |                      | ▶ Average length of stay of trauma patients decreased by 3.3 days       |
| Panis78         | Dutch evaluation protocol                                   | Mothers of newborn patients            | Hospital Maternity unit of 17 beds (715 total hospital beds) | Practice changes      | ▶ Reduction in inappropriate patient stay by 6.1%                        |
|                 |                                                              |                                        |                                        |                      | ▶ Decrease in length of stay by 0.7 days                                 |
| Patel43         | Multidisciplinary team-based structure for discharge rounds | Dissatisfied patients with delayed discharge | Hospital University of Colorado Hospital, 673 beds | Information sharing live | ▶ Higher proportion of patients discharged before noon, lower length of stay and 30-day readmission rate in pilot team compared with control |
| Pirani44        | Nurse participation and patient and family involvement      | Those experiencing delayed discharge   | NR                                     | Information sharing live | ▶ Enhancing nurse involvement in the discharge planning process can improve delayed discharges |
| Qin103          | Simulation modelling                                         | Varies based on model                  | Hospital Flinders Medical Centre (FMC)  | Other initiative      | ▶ Hospital occupancy can be significantly reduced, with a reduction from 281.5 to 22.8 days in the best scenario (instantaneous discharge for 24 hours) |
| Author             | Initiative Description/content                                                                 | Target population                              | Setting                                    | Initiative category*                              | Results                                                                                                                                                     |
|--------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------|--------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rae                | Delayed discharge project ► Local authorities are financially responsible (payments) to acute hospital when patients remain in hospital because community care arrangements have not been made | Acute general medical patients                  | Hospital Dunedin hospital                  | Infrastructure and finance                      | ► Mean length of stay decreased by 2.6 days (from 6.5 to 3.9 days)  
► Decreased costs of service delivery by $2.4 million  
► Bed numbers decreased by 24 (from 56 to 32)  
► No change in readmission rates |
| Roberts            | Royal Rehabilitation Centre, Sydney, goal length of stay tool ► A tool that reports the length of stay benchmark figures on an individual patient basis | Inpatients in two units: SRU (stroke rehabilitation unit) or BIRU (Brain Injury Rehabilitation Unit) | Hospital Hampstead Rehabilitation Centre, 128 beds | Tools and guidelines Information sharing live    | ► Total discharge delays from the 2 units totaled 6311 days  
► Length of stay was not decreased  
► Negative perceptions of the programme from staff |
| Sampson            | Diabetes inpatient specialist nurse ► Diabetes management, based on structured group education, for all diabetes inpatients | Diabetes inpatients                             | Hospital Norfolk and Norwich University Hospital NHS Trust, 989 beds | Practice changes                               | ► Decreased mean excess bed days by 0.7 days (from 1.9 to 1.2) |
| Shah               | Community Care (Delayed Discharge) Act 2003 ► Local authorities are financially responsible (payments) to acute hospital when patients remain in hospital because community care arrangements have not been made | Inpatient - specialties of Geriatric Medicine (GM) and Old Age Psychiatry (OAP) services | Hospitals                                   | Infrastructure and finance                      | GM:  
► Decreased median and mean length of stay  
► Increased number of finished episodes (inpatient discharges)  
► No relationship with number of bed days  
OAP:  
► Increased median and mean length of stay  
► Decreased number of finished episodes (inpatient discharges)  
► Increased number of bed days |
| Sobotka            | Hospital-to-home transitional care programme at AHK ► A programme to support and educate families on providing care for medically stable children at home | Paediatric inpatient                            | Transitional and Respite Centre Almost Home Kids | Practice changes Information sharing live       | ► 2 months following support at AHK, the patient transitioned home to be cared for by his mother and home care team |
| Starr-Hemburrrow   | Home First ► A programme designed to help keep patients in their homes (with community supports) for as long as possible; focusing on providing access to needed services | ALC patients                                    | Hospitals                                   | Practice changes                                | ► Rate of ALC patients decreased by at least 50% across the region of study |
| Sutherland         | Build more; Integrated care; and Financial incentives ► Three strategies to improve ALC impact on hospitals (build more beds, integrated care, financial incentives for post-acute providers) | ALC patients                                    | Hospitals                                   | Information sharing recommendation document     | ► N/A                                                                                                                                                     |

Table 3 Continued
**Table 3 Continued**

| Author       | Initiative description/content                                                                 | Target population                      | Setting                                           | Initiative category* | Results                                                                                                                                 |
|--------------|------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Taber⁵¹      | Comprehensive interdisciplinary improvement initiative  ► A programme implemented by a multidisciplinary team to improve length of stay, delayed discharges and early readmissions through key initiatives | Adult kidney transplant recipients      | Hospital Medical University of South Carolina    | Practice changes     | ► Delayed discharges decreased by 14%  ► Readmission rate (7 day) decreased by 50%  ► Acute rejection and infection rates decreased |
| Udaya⁵²     | Improvement in discharge process - Six Sigma  ► The implementation of strategies using Six Sigma to improve discharge processes (billing hour, patient audits, office executive, priority for discharge, ward boys, discharge process flow) | NR                                      | Hospital                                         | Practice changes     | ► Discharge time was decreased by 21% (from 247 to 195 min)  ► Patients had improved satisfaction with the discharge process |
| Williams⁵²  | Critical care outreach role  ► The implementation of a critical care outreach role to facilitate communication between ICU and ward staff | Patients discharged from the ICU        | Hospital Royal Perth Hospital, 22-bed ICU (570 total beds) | Practice changes Information sharing live | ► Delayed discharges increased by 4% (from 27% to 31%)                                                                                   |
| Younis⁵³    | Enhanced recovery programme  ► A programme post-colorectal surgery to improve stoma management and expedite discharge time | Patients undergoing anterior resection with the formation of a loop ileostomy | Hospital Single district general hospital        | Practice change Information sharing live | ► Average length of stay decreased by 6 days  ► Significant decrease in percent of patients experiencing delayed discharge due to independent stoma management |

**Grey literature**

| Author       | Initiative description/content                                                                 | Target population                      | Setting                                           | Initiative category | Results                                                                                                                                 |
|--------------|------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Anonymous⁵⁹ | Expedited discharge fund  ► A hospital fund to pay for services that are holding up a patient's discharge (medical equipment, pharmaceuticals, physical and occupational therapy, transportation, etc.) | Uninsured patients                     | Hospital Iowa City, University of Iowa Hospital, 700 beds | Infrastructure and finance | ► A patient from a rural area was provided with $40/week for medications and gas to travel to a hospital that provided specialised wound care  ► A social worker found a group home for people with a mental health diagnosis for a patient who had no social support or funding |
| Anonymous⁶⁰ | Meetings  ► Daily and weekly meetings to discuss issues with patient throughput and strategies for eliminating barriers | NR                                      | Hospital University of Cincinnati Health University Hospital, 693 beds | Information sharing live | ► Decreased average length of stay by 5.34 hours  ► Increased accuracy of predicting next day discharges from the medical/surgical units by 40% |
| Calveley⁶¹  | Tiered community-based services  ► Three tiers of services to allow for people to be cared for in their own homes or residential units, instead of in hospital | NR                                      | Hospital Four Seasons Healthcare, 18000 beds      | Practice changes     | ► NR                                                                                                                                 |

Continued
| Author                          | Initiative Description/content                                                                 | Target population | Setting                                      | Initiative category*                  | Results                                                                 |
|--------------------------------|-------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------|---------------------------------------|--------------------------------------------------------------------------|
| Manzano-Santaea                | Payment by Results and Delayed Discharges Act  
  ▶ Payment by Results pays providers a fixed price for each individual case, while with the Delayed Discharges Act, local authorities are financially responsible when patients remain in hospital because community care has not been arranged | NR                | NR                                           | Infrastructure and finance          | ▶ Payment by Results and the Delayed Discharges Act are related policies |
| Krystal                        | Southlake@Home  
  ▶ A team designed to meet the patients care needs through partnerships with community and primary care (integrates primary care, hospital care and home and community care to develop a personalised care plan) | Medically and socially complex and frail elderly | Hospital Southlake Regional Health Centre | Practice changes                     | ▶ Reduction in ALC days (average of 10.6 days)  
  ▶ 1088 ALC days avoided  
  ▶ Positive patient and provider experiences |
| Walker                         | Recommendations for improving care for the ageing population  
  ▶ Numerous recommendations to improve ALC in acute and community care ranging from proactively identifying patients at risk of decline in primary care to making hospitals more ‘senior friendly.’ | NR                | NR                                           | Information sharing recommendation document | ▶ NR |
| North West Community Care Access Centre | Wait at home  
  ▶ Allows seniors to get their healthcare needs from their home through a variety of services for a up to 90 days | Seniors waiting for LTC placement | NR                                           | Practice changes                     | ▶ NR |
| Toronto Central Community Care Access Centre | ALC avoidance framework  
  ▶ To create a standardised approach to avoid delayed discharges through 12 leading practices and associated strategies (identifying a date of discharge, engaging with substitute decision makers, etc) | NR                | NR                                           | Tools and guidelines                 | ▶ NR |
| Province of New Brunswick      | ALC collaborative committee  
  ▶ A committee developed to identify and implement priority strategic initiatives | NR                | NR                                           | Information sharing live  
  Practice changes  
  Infrastructure and finance | ▶ Reduction in percentage of acute hospital days used by patients waiting for discharge from 19.6% to 17.5% |
| Author | Initiative Description/content | Target population | Setting | Initiative category* | Results |
|--------|--------------------------------|------------------|--------|----------------------|---------|
| NHS Improvement [104] | SAFER patient flow bundle ► A tool to reduce delays for patients on inpatient wards | NR | NR | Information sharing recommendation document | ► Most effective when used with Red2Green days  
► Supports decision making by allowing staff to visualise plans |
| Red2Green days | ► A tool to reduce unnecessary waiting by patients | NR | NR | | ► A board (electronic or white) should act as a focal point for rounds |
| Long-stay patient reviews | ► Weekly reviews of long-stay patients (>20 days), to help address obstacles that are delaying discharge | NR | NR | | ► Weekly long-stay patient reviews can reduce the number of inpatients with a length of stay >20 days by up to 50% |
| Multiagency Discharge Event | ► Review of individual patient journeys by bringing together senior staff from health and social care | NR | NR | | ► Greatest impact on patients with a length of stay >6 days |
| Central East LHIN ALC Task Group [84] | Home First ► A programme designed to help keep patients in their homes (with community supports) for as long as possible by connecting patients to their needed resources | NR | Hospital Halton Health Services, 459 beds | Practice changes | ► Percent of ALC (acute) reduced from 22%–28% to 4%–6% |
| Adams, Care and Repair England [98] | Home First ► A programme designed to help keep high needs seniors in their homes (with community supports) for as long as possible and involve the family in care | Patients (specifically high needs seniors) | NR | Practice changes | ► NR |
| Shah [99] | Home First ► A programme designed to help keep patients in their homes (with enhanced home care supports) as they wait for long-term care | High need seniors (75+) | Trillium Health Partners, various community and long-term care organisations | Practice changes | ► 2-fold reduction in monthly average of ALC patients  
► 30.5% reduction in number of ALC to LTC hospital referrals |
| Joint Improvement Team [85] | NR | ALC patients | 9 community hospital corporations, 14 hospital sites and a mental health centre in one Ontario region 1642 beds across the facilities | Practice changes | ► Expected to reduced ALC days by 30% over the next 3 years |
| Adams, Care and Repair England [98] | West of England care and repair ► Enables older patients to return home from hospital quickly and safely by organising and repairing home (cleaning, clearing clutter, small adaptations) | Older patients | West of England Care and Repair | Infrastructure and finance | ► Substantial cost savings in hospital bed days, housing interventions and hospital staff time |

*Note: ALC = Acute Length of Stay; LTC = Long-Term Care; NR = Not reported; NR = Not reported.
Tools and guidelines

The tools and guidelines category included initiatives with actionable, concrete steps or processes in the form of tools, guidelines and models to inform practice.47–50 54–67 Physicians and multidisciplinary teams (eg, nurses, social workers, discharge planners) frequently implemented tool and guideline initiatives. A promising initiative within this category included the ALC Avoidance Framework, developed by Burr and colleagues, with the goal of preventing ALC designations and reducing ALC rates.56 67 This framework contains 12 leading practices, with specific strategies for organisational assessment. Some of the leading practices include: providing patients and substitute decision makers with an estimated date of discharge, identifying high-risk patients, focusing on achieving safe, timely and person-centred care, and having an estimated date of discharge when patients are transferred or discharged.

Table 3

| Author | Initiative Description/content | Target population | Setting | Initiative category* | Results |
|--------|--------------------------------|--------------------|---------|----------------------|---------|
| Shah* | Home First ► A programme designed to help keep patients in their homes (with community supports) | Elderly patients | Hospital/ community in Mississauga Halton Local Health Integration Network | Practice changes | ► The equivalent of 35 acute care beds have been saved over 2 years ► 250 people have been diverted from LTC placement |
| Joint Improvement Team* | Home First – 10 actions to transform discharge ► Actions to improve the pathway from hospital to home focusing on achieving safe, timely and person-centred care | NR | NR | Practice changes | ► Factors in reducing delays include: identifying estimated dates of discharge, using a framework for admissions, transfers and discharges, and appointing a provider for coordinating the patient’s discharge plan, screening for frailty, using transitional and intermediate care services, adopting a home first culture |

*Initiative category is based on Doern and Phidd’s adapted framework Hosseus and Pal.39

AHK, almost home kids; ALC, alternate level of care; D2A, discharge to assess; ED, emergency department; ERAS, enhanced recovery after surgery; GM, geriatric medicine; HRH, Humber River Hospital; ICU, intensive care unit; LHIN, local health integration network; LTC, long-term care; MGH, Michael Garron Hospital; N/A, not available; NR, not reported; OAP, old age psychiatry; TGH, Toronto General Hospital.

Figure 2

Categories of initiatives for improving delayed hospital discharges.
A nurse-led approach to discharge is implemented by nurses and multidisciplinary teams. This approach has been shown to reduce hospital days and length of stay, with one initiative, the Goal Length of Stay Tool, achieving such results. For example, Graham et al conducted a retrospective study 

Example: Graham conducted a retrospective study

... led to a reduction in hospital days and length of stay. However, one initiative, the Goal Length of Stay Tool, did not have positive outcomes on length of stay. This initiative incorporated information sharing into a computer-based programme to identify patients whose length of stay exceeded their benchmark figure. It had no change on length of stay and was perceived negatively by staff because they did not believe the benchmark figure was an accurate representation of a patient’s current functional status and readiness for discharge.

**Practice changes**

This category included initiatives that altered how usual care was delivered. Common practice change initiatives included hospital-based, nurse-led discharges and cross-sectoral transitional programmes (e.g., Home First, Discharge to Assess, Hospital to Home). Most were implemented by nurses and multidisciplinary teams. Nurse-led and criteria-led discharges often involved a predetermined list of criteria (clinical parameters) that a patient was required to meet in order to be discharged from hospital by a member of the discharge team. For example, Graham et al conducted a retrospective study (N=128) to compare nurse-led and doctor-led discharge (standard discharge pathway) postlaparoscopic surgery. For nurse-led discharge, the patient had to meet 13 pre-established criteria (stable vital signs and comparable to baseline on admission; achieved optimal mobility; minimal nausea, vomiting and dizziness; adequate pain control; received written and verbal instructions about postoperative care, etc.). When compared with the doctor-led discharge group (n=64), patients in the nurse-led group (n=64) were significantly more likely to be discharged on the day of surgery. Incomparing reasons for the success of the nurse-led model, the authors did not tie it to patient factors but rather the ready availability of the nurse specialist who was able to implement the clearly outlined discharge criteria (specific for nurse-led discharge) much more quickly than the doctor-led group (who did not use such criteria).

Another unique example of a practice change initiative was the 7-day Hospital Initiative implemented by Blecker et al. The purpose of this observational study was to evaluate the impact of increasing weekend staff (hospitalists, care managers, social workers) and services on length of stay, percent of patients discharged on weekends, 30-day readmission rate and in-hospital mortality rate. This multifaceted intervention resulted in a decreased average length of stay, an increased proportion of weekend discharges and no impact on readmission rates or mortality.

The majority of initiatives categorised as a practice change resulted in positive outcomes on length of stay and rate of discharge delays. However, there were several initiatives that were perceived negatively by patients, or had no change or a negative impact on study outcomes (increase in delayed discharges). Meehan et al explored patient experiences with a programme (Discharge to Assess) that discharged patients who were clinically ready but still required support, in order for their needs to be assessed in their own environment (ie, at home). Negative experiences were described by participants (patients and caregivers) who indicated feeling ignored, had poor communication with their healthcare providers and were not involved in the decision-making process. Negative outcomes were also identified in Williams et al prospective cohort study. This study evaluated the impact of a critical care outreach role on delays in discharge and identified that discharge delays from the intensive care unit increased over the study period with the implementation of this role. The authors emphasised the importance of a multifaceted and collaborative approach (involving multiple stakeholders/ team members), focusing on patient flow throughout the hospital in order to address the numerous factors impacting delays.

**Infrastructure and finance**

The infrastructure and finance category included initiatives that involved tangible structural or financial changes (eg, building more long-term care beds to facilitate the transition of patients out of hospital, financial penalties for remaining in hospital after being medically ready for discharge). The Community Care (Delayed Discharges) Act in the UK was an initiative identified in multiple articles. This initiative required local authorities to make payments to acute hospitals when patients could not be discharged because appropriate community care arrangements had not been made. Although this measure was not necessarily enforced, it created incentive for the hospital and community to work together more collaboratively. Additionally, transitional care units and discharge funds were common initiatives implemented to address delayed discharges among elderly patients. Transitional care units focused on rehabilitation to promote recovery and the regaining of independence, while discharge funds paid for services that were preventing the patient from being discharged or returning home (eg, medical equipment, medications, transportation, home repairs). All initiatives categorised as infrastructure and finance had positive results on study outcomes, including reductions in discharge delays, length of stay and cost.

**Other initiatives**

The other initiatives category included statistical and predictive modelling of initiatives to improve delayed discharges. These models explored the impact of
increasing the supply of nursing home beds, potential care pathways for the elderly and reimbursement costs, and discharge strategies to reduce hospital occupancy. Gaughan et al's modelling and empirical analysis identified that increasing the supply of long-term care beds can decrease delayed discharges caused by a lack of social care. Their models further emphasised the importance of communication between hospitals and the long-term care sector to reduce social care delayed discharges. Similarly, Katsaliaki et al used discrete-event simulations to determine care pathways and associated costs, in which they identified that adding new beds in hospital or intermediate care could reduce delay times.

**Recommended initiatives: calls to action**

Several articles were not evaluations but reports or reviews consisting of recommended initiatives to address delayed hospital discharges, which often combined a number of the categories illustrated above. Sutherland and Crump outlined three key solutions for improving delayed discharges in Canada: building more acute and postacute care beds, increasing integrated care and creating financial incentives to improve the quality, quantity and effectiveness of healthcare. The authors discussed challenges and limitations to implementing each of these options and emphasised that a potential solution to addressing delayed discharges was to combine the three strategies. Another Canadian report developed recommendations for providing care to the ageing population and those experiencing a delayed discharge. Walker outlined recommendations for improving primary care, the care continuum and senior friendly acute care, responding to special needs populations (eg, persons with mental health concerns, addiction and neurological conditions, on dialysis or ventilators), and implementing an ‘Assess and Restore’ model (a programme to help patients maintain or regain functional independence, transition to home and remain in the community for as long as possible).

The NHS improvement (UK) also released a guide in 2019 on reducing long hospital stays. This guide contained several recommendations for tackling delayed discharges including: a patient flow bundle (a tool to reduce delays for patients on inpatient wards), Red2Green Days (a visual tool to reduce unnecessary waiting by patients by supporting the rounding process), long-stay patient reviews (weekly reviews of long-stay patients (>20 days), to help tackle obstacles that are delaying discharge) and multiagency discharge events (review of individual patient journeys by bringing together senior staff from the local health and social care system).

**DISCUSSION**

The purpose of this scoping review was to identify best practices for reducing delayed discharges, examine the characteristics of identified initiatives and develop recommendations for future work. Based on the 66 included articles, our findings showed that: (1) initiatives are focused on quantitative outcomes, with limited assessment of the impact on patient, caregiver and provider experiences; (2) the sustainability of initiatives overtime is not measured (3) there is a lack of important contextual information reported (eg, population characteristics, setting, implementation processes) and (4) there are inconsistencies in how delayed discharges are defined.

This review highlighted where the majority of efforts around addressing delayed discharges have been placed. Practice change was the most common categorisation of initiatives (n=36), followed by information sharing (n=19) and infrastructure and finance (n=19). All initiatives categorised as information sharing and infrastructure and finance reported positive outcomes. Despite reporting positive outcomes, many information sharing initiatives promoted communication between staff, with a limited number targeting communication with patients and families. Additionally, there were more initiatives implemented in a single sector (eg, in hospital) in comparison to cross-sectoral initiatives (eg, hospital and home care).

Length of stay was the most common outcome measured in this scoping review, with a limited number of articles exploring patient, caregiver and provider experiences. For example, could it be considered a success if an initiative does not result in a reduced length of stay, but allows patients to obtain broader goals related to their care (ie, being able to return home) or enhance their care experience? Qualitative methods, including the capturing of patient, caregiver and provider experiences, would allow for a deeper exploration and understanding of success from the perspectives of different stakeholders involved in the initiative.

Experiential evidence on whether an intervention is working is required. As noted in our review, a tool developed to better understand delayed discharge was deemed irrelevant by care providers who felt that the tool captured the wrong information. Therefore, capturing providers’ experiences and perspectives are essential in understanding effectiveness of strategies as well as uptake. Most articles included in this scoping review used a quantitative study design, with limited articles using mixed methods or qualitative approaches; thus highlighting a key focus for future research.

The majority of initiatives had an intervention or follow-up period of 1 year, but this ranged from 4 months to 3 years. Based on the limited number initiatives with a follow-up period of longer than 1 year (n=8), there is a need for more formal evaluations with longer follow-up periods to measure the sustainability of initiatives over time. For example, Shelton et al's Integrated Sustainability Framework consists of five categories of factors associated with the sustainability of interventions across different contexts and settings: outer context (eg, policies, leadership, funding), inner context (eg, culture, mission, funding), intervention characteristics (eg, cost, adaptability, benefit), processes (eg, partnership, training/support, planning, capacity building) and implementer and population characteristics (eg, implementation skills/expertise, attitudes/motivation).
Shelton et al recommended prospective, multi-level and mixed methods study designs for studying the impact and sustainability of interventions. Overall, the initiatives included in this scoping review had positive short-term impacts, but it is unclear if these outcomes are maintained over time. This emphasises the need to design and implement interventions with sustainability in mind.

The majority of categories of initiatives resulted in positive outcomes; however, initiatives classified as practice change had the most mixed outcomes (positive, negative and no change). Practice changes often require a greater number of resources and are more complex to implement than static solutions (ie, hosting daily rounds, developing a framework, etc). A recent systematic review (2018) conducted by Geerlgs et al identified implementation barriers and facilitators of patient-focused, in-hospital interventions, highlighting the complex interplay of factors that can impact implementation. Three domains, with the potential to impact the implementation process, were identified: system (environmental context, culture, communication processes and external requirements), staff (commitment and attitudes, understanding and awareness, role identity and skills, ability and confidence) and intervention (ease of integration, face validity, safety and legality and supportive components). Thus, it is important for interventions to be nimble and adaptable to support the changing needs of patients, caregivers, providers, organisations and policy contexts over time.

It was also unclear if some initiatives moved problems from one sector to another. For example, adding more intermediate care beds may alleviate pressures in acute care in the short-term but eventually also be at full capacity if community resources are not available. The 7-day hospital discharge initiative highlighted in this review, improved hospital throughput but had no impact on re-admissions, suggesting that thinking beyond one sector is required. It is encouraging that most practice change initiatives resulted in improved outcomes, but more clarity is needed to understand what the trade-offs were, as well as how to scale-up the successful initiatives.

Health systems also need to consider their broader goals around delayed hospital discharge—should it only be about reducing delays or should we place an equal focus on optimising patient and caregiver experiences and outcomes? The health system context, including the funding environment, will ultimately shape what interventions get implemented and how they are sustained over time. Some interventions may be considered low value in some countries and contexts and high value in others. Additionally, certain initiatives may be more effective in different environments, as variations in the number of hospital and long-term care beds per capita, infrastructure financing and degree of integration across sectors may impact the outcomes of an initiative. Future research needs to better understand why some strategies may thrive in some environments and not others.

Another key finding identified in the scoping review was the lack of information and details on the implementation strategy (how strategies were implemented, over what time period, how implementation challenges were dealt with), setting (where was it implemented) and population characteristics (who was it implemented for). The implementation of initiatives can be impacted by differences in healthcare system structure and funding. Further, this contextual information is essential for both understanding outcomes, scaling-up and sustainability of interventions because it is not only important to know if the intervention was effective, but also for whom and in what context it was effective.

Finally, this review highlighted a lack of consistency in how delayed discharge was defined, both within and across countries. While there was one definition that was used more frequently (a patient was identified as medically ready/fit for discharge, but remained in hospital), there can be different interpretations of when a patient is considered ‘medically fit’ and who makes this decision. Inconsistent definitions can lead to variations in the reported rates of delayed discharge, which can further impact the perceived applicability and effectiveness of an intervention. Our finding was echoed in a narrative review conducted by Glasby et al, who further explained the challenges differing definitions create when attempting to compare findings. In order to mitigate these challenges, it is critical to be more consistent around how delayed discharges are defined.

Future work
From this review, we have identified areas for future research. First, patient, family and provider needs and experiences should be explored during the development and implementation of initiatives aimed at improving delayed discharges. Patient and family engagement is both important and recommended by healthcare and government organisations; however, they are often excluded in the development and write-up of best practice guidelines. Second, evaluation studies that track outcomes over a longer period of time should be conducted to study the sustainability of initiatives over time, how they are adapted (developmental evaluations), as well as their impact on other sectors (eg, primary and community care). Third, initiatives should be implemented and integrated across sectors (hospital, primary care and home and community care) to help get at the root of the problem and ensure the implementation of an initiative in one setting does not simply shift the problem to another. Fourth, a review should be conducted to assess the state of knowledge around initiatives that are more upstream in nature (eg, hospital admission avoidance, emergency department diversion and delivery models that proactively address the health and social care needs of individuals in community settings). Finally, there is an opportunity for future research to consider a realist review of the literature on delayed hospital discharge to understand the context, mechanisms of impact, outcomes and theories of change, given that addressing a delayed discharge is a complex problem. As a first step, we sought to include
interventions that included hospitals, and this revealed a single sector and reactive approach to addressing delayed discharge.

Limitations
There are a few limitations of this review that should be noted. It is possible that some relevant articles were missed because the search was limited from 1 January 2004 and 16 August 2019 and conducted in English. Our search strategy was comprehensive and we conducted an in-depth search of grey literature to minimise the potential of missed articles. While we did not limit the inclusion of articles to the English language, our search strategy was in English, so there is a possibility that articles published in different languages were not identified. We excluded studies that changed the threshold/timing of discharge (early discharge), as they often focused on cost-savings. We acknowledge that some of these initiatives may have transferable lessons to address discharge delays, and thus, note their exclusion as a potential limitation of this review. Although it is not a requirement for scoping reviews, the interventions in this review were not critically appraised, and thus, we cannot make recommendations on which interventions should be scaled up. Given concerns with regression toward the mean, especially for quality improvement projects, any positive results need to be interpreted with caution. Health systems are complex, evolving environments, where various iterations of strategies are regularly implemented, but not necessarily formally reported or published. Future work by our team will include a process evaluation on how strategies are actually implemented in different health system contexts, as well as why they work or do not work.

Ethical considerations
There are a few ethical concerns associated with scoping reviews to be noted. These concerns include authorship, transparency and plagiarism. All authors met the International Committee of Medical Journal Editors’ recommended criteria for authorship and author order was based on overall contribution to the review. We clearly outlined our methods at each stage of the scoping review to ensure transparency and replicability. We also acknowledged individuals who contributed to the review, but who did not warrant authorship. Lastly, when reporting the results of individual studies, we wrote them in our own words and cited appropriately to avoid plagiarism.

Conclusions
This scoping review identified a variety of initiatives addressing delayed discharges across five categories: information sharing, tools and guidelines, practice changes, infrastructure and finance and other. The majority of initiatives were focused on practice changes and many incorporated more than one category. Initiatives were often implemented in a single sector, rather than across sectors. It appears that many strategies implemented in hospitals including communication huddles, nurse-led discharges, home first programmes and building more infrastructure had positive short-term impacts. Many initiatives that led to positive outcomes were implemented by a multidisciplinary team and included a number of components (eg, monthly reports and education). The success of these initiatives is based on a service-led definition of success (effective use of hospital resources), rather than success from the patient and family perspective. This highlights the need to shift to a more patient-centred approach that focuses on improving outcomes and experiences, rather than system and hospital outcomes (ie, length of stay and hospital occupancy) alone. Despite the number of unique initiatives aimed at addressing delayed discharges, current strategies may not be getting at the root of the problem (initiatives/intervention prior to hospital admission) and there is a need for solutions to this problem that have a long-term and sustainable impact.

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## Supplementary material

**Supplementary Table 1. Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist**

| SECTION         | ITEM | PRISMA-ScR CHECKLIST ITEM                                                                 | REPORTED ON PAGE # |
|-----------------|------|------------------------------------------------------------------------------------------|--------------------|
| **TITLE**       |      |                                                                                          |                    |
| Title           | 1    | Identify the report as a scoping review.                                                  | Page 1             |
| **ABSTRACT**    |      |                                                                                          |                    |
| Structured summary | 2   | Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives. | Pages 2-3          |
| **INTRODUCTION**|      |                                                                                          |                    |
| Rationale       | 3    | Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach. | Pages 4-6          |
| Objectives      | 4    | Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives. | Page 6             |
| **METHODS**     |      |                                                                                          |                    |
| Protocol and registration | 5  | Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number. | Page 6             |
| Eligibility criteria | 6  | Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale. | Pages 7-8          |
| Information sources* | 7  | Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed. | Page 7             |
| Search          | 8    | Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated. | Supplementary Table 2 |
| Selection of sources of evidence† | 9  | State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review. | Pages 7-8          |
| Data charting process‡ | 10 | Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators. | Page 9             |
| Data items      | 11   | List and define all variables for which data were sought and any assumptions and simplifications made. | Page 9             |
| SECTION                        | ITEM | PRISMA-ScR CHECKLIST ITEM                                                                 | REPORTED ON PAGE # |
|--------------------------------|------|-------------------------------------------------------------------------------------------|-------------------|
| Critical appraisal of individual sources of evidence§ | 12   | If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate). | Not applicable    |
| Synthesis of results          | 13   | Describe the methods of handling and summarizing the data that were charted.                 | Pages 9-10        |
| RESULTS                       |      |                                                                                           |                   |
| Selection of sources of evidence | 14   | Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram. | Page 11, Flow diagram in figure 1 |
| Characteristics of sources of evidence | 15   | For each source of evidence, present characteristics for which data were charted and provide the citations. | Pages 10-11       |
| Critical appraisal within sources of evidence | 16   | If done, present data on critical appraisal of included sources of evidence (see item 12). | Not applicable    |
| Results of individual sources of evidence | 17   | For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives. | Pages 37-62 (tables) |
| Synthesis of results          | 18   | Summarize and/or present the charting results as they relate to the review questions and objectives. | Pages 11-17       |
| DISCUSSION                    |      |                                                                                           |                   |
| Summary of evidence           | 19   | Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups. | Pages 18-21       |
| Limitations                   | 20   | Discuss the limitations of the scoping review process.                                     | Page 23           |
| Conclusions                   | 21   | Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps. | Page 24           |
| FUNDING                       |      |                                                                                           |                   |
| Funding                       | 22   | Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review. | Page 25           |

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where sources of evidence (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with information sources (see first footnote).

‡ The frameworks by Arksey and O’Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O’Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.
Supplementary Table 2. Medline Search Strategy

| #  | Search Term                                                                 | Results (# of articles) |
|----|-----------------------------------------------------------------------------|-------------------------|
| 1  | (alternat* level* adj2 care).tw,kf                                         | 74                      |
| 2  | (bed adj2 (block* or occup* or delay* or capac* or over?crowd*)).tw,kf      | 1756                    |
| 3  | Bed Occupancy/                                                             | 2468                    |
| 4  | ((delay* or late* or defer* or post?pon*) adj2 (discharg* or transfer* or handoff* or handover* or releas*)).tw,kf | 10642                   |
| 5  | (delay* or late* or defer* or post?pon*).tw,kf                             | 1759017                 |
| 6  | Patient Discharge/                                                         | 27462                   |
| 7  | 5 and 6                                                                    | 1847                    |
| 8  | (stranded patient).tw,kf                                                   | 2                       |
| 9  | 1 or 2 or 3 or 4 or 7 or 8                                                 | 15908                   |
| 10 | Health Plan Implementation/ or delivery of health care/ or health care reform/ or patient care management/ or critical pathways/ or guideline/ or practice guideline/ or health policy/ | 215111                   |
| 11 | (strateg* or intervention* or program* or service* or model* or initiative* or polic* or plan* or re?design* or design* or tool* or system* or guideline* or practice guideline* or best practice*).tw,kf | 9434922                   |
| 12 | ("health plan implementation" or "health?care delivery" or "health?care reform*" or "patient care management" or "critical pathway*").tw,kf | 8472                      |
| 13 | 10 or 11 or 12                                                             | 9526394                 |
| 14 | 9 and 13                                                                   | 8141                    |
| 15 | Limit 14 to (case reports or comment or editorial or letter)               | 238                     |
| 16 | 14 not 15                                                                  | 7903                    |
| 17 | limit 16 to yr="2004-Current"                                              | 5519                    |
### Supplementary Table 3. Definitions and Characteristics of Delayed Discharges from Database Searches

| Author                  | Definition of ALC/ Delayed Discharge | Reason for Hospitalization | Reason for Delayed Discharge | Length of Delayed Discharge |
|-------------------------|--------------------------------------|----------------------------|------------------------------|-----------------------------|
| Adlington et al. (2018) [40] | • NR                                 | Psychiatric condition      | NR                           | NR                          |
| Ardagh et al. (2011) [41]    | • NR                                 | NR                         | Limited access to aged care beds | NR                          |
| Arendts et al. (2013) [42]   | • NR                                 | Cerebrovascular insufficiency, fractured neck of femur, cardiac failure, myocardial ischaemia, respiratory tract infection, chronic airway disease exacerbation | NR                           | NR                          |
| Baumann et al. (2007) [43]    | • Waiting longer in hospital than necessary | NR                         | NR                           | NR                          |
| Behan (2005) [44]           | • Staying in hospital because community care arrangements have not been made | NR                         | No arrangements for community care | NR                          |
| Bélard et al. (2006) [45]    | • Waiting in hospital for a nursing home placement • Referred to as bed-blockers | NR                         | NR                           | NR                          |
| Blecker et al. (2015) [46]   | • NR                                 | Medical, surgical or other services | Delays in care on the weekend | NR                          |
| Boutette et al. (2018) [47]  | • Patients who are medically stable or stabilizing and are no longer acutely ill | NR                         | NR                           | NR                          |
| Bowen et al. (2014) [48]     | • Remaining in hospital after the patient was considered ready for discharge | NR                         | Not completing take home prescriptions on time | NR                          |
| Boyd (2017) [49]            | • Increasing length of stay because hospital staff does not discharge patient when once they are identified as medically ready for discharge | NR                         | Lack of coordination and communication between physicians and other staff | NR                          |
| Brankline (2009) [50]       | • NR                                 | NR                         | Social workers were without access to the patients’ chart, nurses were not available, fax was not received by the care facility | NR                          |
| Author                        | Definition of ALC/ Delayed Discharge                                      | Reason for Hospitalization                                                                 | Reason for Delayed Discharge                                                                 | Length of Delayed Discharge |
|-------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|----------------------------|
| Brown et al. (2008) [51]      | • NR                                                                      | NR                                                                                       | Doctor's order delay, nurse unavailable, bed unavailable, transportation unavailable, waiting for radiography, medical, inadequate pain management, uncontrolled nausea/vomiting, other | NR                        |
| Burr et al. (2017) [52]       | • Occupying an acute hospital bed, but not requiring the level of resources or services provided in the acute setting | NR                                                                                       | NR                                                                                        | NR                        |
| Caminiti et al. (2013) [53]   | • Patients who had an unnecessary hospital stay (so signs, symptoms or diagnoses) | NR                                                                                       | Waiting for tests, lab results, consultations, surgery, transfer to another unit, IV antibiotic treatment not completed, home care services not arranged, lack of transportation, other | NR                        |
| Chidwick et al. (2017) [54]   | • Occupying a hospital bed when acute care treatment has completed or the patient no longer requires the intensity of hospital resources | NR                                                                                       | NR                                                                                        | NR                        |
| El-Eid et al. (2015) [55]     | • NR                                                                      | NR                                                                                       | Unclear                                                                                  | NR                        |
| Gaughan et al. (2015) [56]    | • Occurring when a patient is medically ready for hospital discharge to be cared for in an alternative setting | NR                                                                                       | Unclear                                                                                  | Days of delay over 5 years (monthly average) = 784.9 Delayed patients over 5 years (monthly average) = 28.4 |
| Graham et al. (2012) [57]     | • Patients with morning operations who were not discharged the same day   | Laparoscopic cholecystectomy or laparoscopic inguinal hernia repair                        | Post-operative nausea and vomiting, pain, difficulty voiding, urinary retention, wound haematoma, post-operative hypotension and social reasons | NR                        |
| Author                        | Definition of ALC/ Delayed Discharge                                                                 | Reason for Hospitalization                  | Reason for Delayed Discharge                                                                 | Length of Delayed Discharge |
|-------------------------------|------------------------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------|
| Gutmanis et al. (2016) [58]   | • NR                                                                                                 | NR                                        | Responsive behaviours                                                                       | NR                          |
| Henwood (2006) [59]           | • Delayed discharges (still often referred to by the pejorative term 'bed blocking')                  | NR                                        | NR                                                                                         | NR                          |
| Holland et al. (2016) [60]    | • Discharge occurring beyond the time determined by the provider and patient                          | NR                                        | Incomplete dismissal summary, unavailability of discharge prescriptions and miscommunication among team members about discharge plans | Delay time = 23.6 days     |
| Katsaliaki et al. (2005) [61] | • NR                                                                                                 | NR                                        | NR                                                                                         | NR                          |
| Lees-Deutsch et al. (2019) [62]| • NR                                                                                                 | NR                                        | Delays in medications being prescribed, outstanding investigations, transportation delays, general practitioner note | Mean = 4 hours 51 minutes  |
|                               |                                                                                                      |                                            | Range = 50 minutes to 10 hours 22 minutes                                                   |                              |
| Levin et al. (2019) [63]      | • Remaining in hospital after the patient was considered medically ready for discharge                 | NR                                        | Lack of appropriate community care or support                                               | Intervention: 2013 = 8262 days; 2016 = 3499 days |
|                               |                                                                                                      |                                            |                                                                                           | Control: 2013 = 1354 days; 2016 = 993 days        |
| Lian et al. (2008) [64]       | • Delaying discharge for a reason that is not related to the infant’s illness following discharge clearance from the medical team | Premature infant                           | Minimum weight not achieved, delayed planning or delivery of discharge plan to parents, lack of ownership over discharge planning | 257 discharge delay days, mean = 7 days/infant |
| Maessen et al. (2008) [65]    | • Meeting all discharge criteria (tolerance to food, good pain control, defecation and independence in activities of daily living to preoperative level), but not being discharged at the moment the patient was ready | Elective colorectal resection               | Additional wound care, symptoms of an anastomotic leakage                                  | Pre: Median = 2, range = 0–17 days |
|                               |                                                                                                      |                                            |                                                                                            | Post: median = 1, range = 0–9 days                  |
| Author                        | Definition of ALC/ Delayed Discharge                                                                 | Reason for Hospitalization                          | Reason for Delayed Discharge                                                                 | Length of Delayed Discharge               |
|------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------|
| Mahant et al. (2008) [66]    | • Non-qualified hospital days occur when the Medical Care Appropriateness Protocol tool is applied to a patient and the criteria has not been met | NR - general pediatric inpatient unit              | Waiting for tests, IV antibiotics not completed, receiving nutrition, still under observation/investigation, waiting for rehabilitation/long-term care bed, treatment tapering not complete, needs education, psychosocial/economic, administrative delays/documents not complete, waiting for consult | Non-qualified days: Preintervention – 3859 of 8228 days Intervention – 2413 of 7246 days |
| Mahto et al. (2009) [67]     | • Involving the diabetes team late, resulting in a prolonged length of stay                          | Diabetes or other general medicine admission       | NR                                                                                         | NR                                       |
| Maloney et al. (2007) [68]   | • NR                                                                                                 | NR                                                 | NR                                                                                         | NR                                       |
| Manville et al. (2014) [69]  | • Needing more supports before discharge or delayed recovery of elderly hospitalized patients        | Dementia, delirium, confusion, fall, fracture, injury, frailty or failure to thrive, infection, cardiac condition, psychiatric or neurological condition | Dementia, immobility, falls or fractures post-rehabilitation, fragility, caregiver burden, cancer | NR                                       |
| Meehan et al. (2018) [70]    | • Requiring additional supports for care needs after patients are identified as ‘clinically optimized’ | NR                                                 | NR                                                                                         | NR                                       |
| Moeller et al. (2006) [71]   | • Discharge that occurs after a patient has been identified as ready for discharge (normalized vital signs, baseline status of lung function and oxygenation, negative blood culture, appropriate blood cell count, stabilization of comorbid illnesses) | Community acquired pneumonia                      | Additional tests required, patients felt unready for discharge, delay in acquiring home support, nausea, concerns with treatment compliance | Discharged at time of stability: mean LoS = 6.7 days median LoS = 5.5 Increased LoS: mean LoS = 7.9 days median LoS = 7.5 |
| Author | Definition of ALC/ Delayed Discharge | Reason for Hospitalization | Reason for Delayed Discharge | Length of Delayed Discharge |
|--------|-------------------------------------|---------------------------|----------------------------|-----------------------------|
| Mur-Veeman et al. (2011) [72] | Waiting to be admitted to next care setting (nursing home or home care) after completing treatment in current setting | NR | NR | NR |
| Niemeijer et al. (2010) [73] | NR | Trauma, surgery, other | Waiting for rehabilitation facility or nursing home, delays in discharge planning, waiting for an operation or diagnostic result, other factors | NR |
| Panis et al. (2004) [74] | Occurring from inappropriate hospital stays (when there is no medical indication for a hospital stay to continue) | Childbirth | Insurance companies not covering maternity care at home | Inappropriate days of stay: 2000: 72 (13.3%) 2001: 64 (14.7%) 2002: 30 (7.2%) |
| Patel et al. (2019) [75] | Discharging patients when it is medically safe to do so | NR | Lack of communication between the multidisciplinary team members, incomplete discharge plans | NR |
| Pirani (2010) [76] | Waiting for discharge process after identified as medically and physically ready for discharge | NR | Individual factors (personal choice, age, emotional disposition, support from family/ friends), medical factors (new medical problems), organizational factors (lack of home support, unavailability of nursing or rehabilitation facilities) | NR |
| Qin et al. (2017) [77] | Occupying a hospital bed for non-medical reasons after being identified as medically stable | NR | NR | NR |
| Rae et al. (2007) [78] | NR | NR – acute general medicine | Lack of early family consultation, family refusal to take patient home, inadequate discharge planning, no discharge on Fridays or the weekend, staff | NR |
| Author                        | Definition of ALC/ Delayed Discharge                                                                 | Reason for Hospitalization                                                                 | Reason for Delayed Discharge                                                                 | Length of Delayed Discharge                                                                 |
|-------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Roberts et al. (2013) [79]    | • NR                                                                                                 | Stroke, brain dysfunction, major multiple trauma, spinal cord dysfunction, other neurological condition or impairment | Cognitive/ psychological issues, waiting for home modifications, waiting for community services, lack of accommodation, waiting for nursing home placement, waiting for additional medication or surgical procedure | Stroke Unit: Total additional days = 1821, range = 1-330 Brain Injury Unit: Total additional days = 4490, range = 1-673 |
| Sampson et al. (2006) [80]    | • NR                                                                                                 | NR                                                                                       | NR                                                                                       | NR                                                                                       |
| Shah (2007) [81]              | • NR                                                                                                 | NR                                                                                       | Community services not arranged, patient’s needs not assessed                             | NR                                                                                       |
| Sobotka et al. (2017) [82]    | • Remaining in hospital after reaching medical stability because of social or resource complications | Ventilator and tracheostomy management                                                    | NR                                                                                       | NR                                                                                       |
| Starr-Hemburrow et al. (2011) [83] | • Waiting in a care setting for the appropriate level of care                                         | NR                                                                                       | NR                                                                                       | NR                                                                                       |
| Sutherland et al. (2013) [84] | • Waiting for the appropriate post-acute care setting after being identified as ready for discharge | NR                                                                                       | NR                                                                                       | NR                                                                                       |
| Taber et al. (2013) [85]      | • NR                                                                                                 | Kidney transplant                                                                        | Lack of medication education                                                             | NR                                                                                       |
| Author                        | Definition of ALC/ Delayed Discharge | Reason for Hospitalization | Reason for Delayed Discharge                                                                 | Length of Delayed Discharge |
|------------------------------|--------------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------|-----------------------------|
| Udayai et al. (2012) [86]    | • NR                                 | NR                          | Lack of nurses or housekeepers, delayed manual delivery of papers, communication barriers, unavailability of wheelchairs | NR                          |
| Williams et al. (2010) [87]  | • Relocating the patient after 8 hours of being identified as ready for discharge from the ICU | Cardiac surgery, trauma, sepsis, other medical condition or surgery | No available bed, medical concern, lack of suitable accommodation, staff shortage, poor skill mix | 2001: median delay time = 29 hours (max=26 days)  
2008: median delay time = 25 hours (max=8 days) |
| Younis et al. (2011) [88]    | • Remaining in hospital for longer than 5 days | Stoma formation following colorectal surgery | Delayed independent management of ileostomy | Greater than 5 days |