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

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Abstract

Objective: To examine peer-reviewed and grey literature for best practices that have been developed and/or evaluated for delayed discharge involving a hospital setting.

Design: Scoping review

Methods: Electronic databases and websites of government and healthcare organizations 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 January 1, 2004 and August 16, 2019. Data were extracted using Microsoft Excel. Following extraction, a policy framework by Doern and Phidd was adapted to organize the included initiatives into categories: (1) Information Sharing; (2) Tools and Guidelines; (3) Practice Change; (4) Infrastructure and Finance; and (5) Other.

Results: Sixty-six articles were included in this review. The majority of initiatives were categorized 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, outcomes lacked experience measures, especially among patients and families. 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.

Protocol Registration: Open Science Framework (https://osf.io/rfzgu)

Keywords

- Delayed discharge, alternate level of care, delayed transfer, best practices, scoping review, hospital

Article summary: 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 (PRISMA-ScR) Checklist was followed
- A comprehensive search of peer reviewed and grey literature was conducted
- A critical appraisal of the interventions was not performed

Introduction

A delayed hospital discharge (known as alternate level of care (ALC) in Canada and delayed transfer of care in the United Kingdom) occurs when a patient is medically approved to be discharged, but remains in hospital for nonmedical reasons (e.g. 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 overall hospital patient flow issues (e.g. 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 (e.g. medication error, exposure to infectious disease),[6 7] mortality,[8] as well as poor patient and family experiences.[9]

Patients who experience a delayed discharge in previous studies exhibited the following characteristics: female,[10] older,[10 11] physically or cognitively impaired,[4 12-15] aggressive behaviours, [16] use assistive devices,[17] psychiatric conditions,[10] neurologic disorders[15] 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 post-acute care (e.g. home care),[11 12 20-23] the lack of culturally and religiously diverse long-term care facilities,[15] limited or absent hospital services on weekends[24] and organizational delays (e.g. administrative delays, delayed assessments).[24 25] There are also 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 organizations may be focusing 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 incentivize or dis-incentivize timely hospital discharges.[26-30]

The combination of patient and system-level factors contributing to delayed discharges can also have a large financial impact on patients, families, healthcare providers and the healthcare system.[3] A recent systematic review reported that delayed discharges cost approximately £200-565 (320-900 CAD) per patient, per day.[3] Further, it was estimated that the National Health Service (England) spends £820 million (1.3 billion CAD) every year on patients who have a discharge delay.[31] Similarly, a recent report from Canada stated that three hospitals located in Ottawa, Ontario, spend approximately 250,000 CAD per day (combined) on patients occupying beds at a level of care they no longer require.[32] In addition to large costs for hospitals and healthcare systems, delayed hospital discharges can also result in out-of-pocket costs for patients and families.[33] Increased out-of-pocket costs, in addition to the others uncertainties associated with a delay, can heighten stress for patients and families, contribute to poor experiences and compromise quality of life.[9]

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 complex problem of delayed discharge. Therefore, the purpose of this scoping review was to examine peer-reviewed and grey literature 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. Furthermore, 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 identity knowledge gaps.[34]

Methods

This review followed the scoping review methodology outlined by Levac and colleagues,[35] as well as the recently developed PRISMA-ScR reporting guidelines for scoping reviews (see Supplementary Table 1).[36] A protocol for this scoping review was developed in consultation with a librarian at the University of Toronto, with continuous input from all members of the research team. The registered protocol can be found on Open Science Framework (https://osf.io/rfzgu).

Stage 1: Identifying the research question

The research question developed to lead this scoping review was: *what is known in the literature about initiatives (e.g. strategies, programs, interventions) that have been developed, implemented, and/or evaluated for delayed discharge involving a hospital setting?* The two main objectives were: (1) to review what delayed discharge initiatives entail (e.g. 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 Supplementary 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: *alternate level of care, delayed discharge, delayed transfer, bed blocking, strategy, model, intervention, program, policy.*

Electronic databases were searched for relevant articles. The following electronic databases were searched on August 16, 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 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 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 January 1, 2004 and August 16, 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 (e.g. 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 editorial) 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 January 1, 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 de-duplicated following Bramer's method.[37] The initial database searches identified 22,704 articles, which were reduced to 15,824 following de-duplication (Figure 1). The titles and abstracts of the articles were reviewed on Covidence, a software platform for systematic and scoping reviews.[38] The research team (LC, JL, KK, SJTG, KMK, JK) independently screened the titles and abstracts of 40 articles to test their agreement. The reviewers had a good percent agreement (85%), so the remaining articles were divided amongst the team and screened by single reviewers (LC, KMK, JK). All disagreements were discussed in-person by the reviewers until a consensus was reached; minor revisions were made to the eligibility criteria to ensure clarity and consistency. Following title and abstract screening, articles were reviewed at the full-text level. Thirty full-text articles were independently screened by the research team (LC, KK, SJTG, KMK, JK, 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, MA).

Figure 1. PRISMA flow diagram of included articles [insert near here]

Stage 4: Charting the data

The data were charted by two reviewers (LC, 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 percent 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, summarizing 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, KK) met in-person to discuss high level concepts and identified common themes across the included articles. When reviewing the extracted data from the articles, we found that the strategies appeared to cluster into core categories, which aligned with a conceptual framework developed by Doern and Phidd.[39] 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 (recommended initiatives and live information sharing); (2) tools and guidelines; (3) practice change; (4) infrastructure and finances

and (5) other (see Table 1 for category descriptions and examples). The categories assisted with the organization and presentation of the data.

Stage 6: Consultation

The research team presented findings of the scoping review to key stakeholders (e.g. hospital staff, patient and caregiver partners) through the planning process and analysis of results. These meetings were used to inform search terms and obtain relevant documents as previously described, obtain their feedback on the categorization/ organization of initiatives, as well as the identified knowledge gaps in order to develop targeted and actionable recommendations for future practice, policy and research.

Patient and public involvement

An Advisory Council (patient and caregiver partners), along with providers, managers and organizational 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, in which 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). Most initiatives were evaluated (n=42), with different types of evaluations such as process evaluations and outcome evaluations. The United Kingdom (n=21), United States (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 pediatric population. Specific characteristics of the study population (i.e. 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 Supplementary 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,[39] we categorized the included initiatives as: information sharing (n=19); tools and guidelines (n=19); practice change (n=36); infrastructure and finances (n=10); or other (n=3), which are described in detail below. Numerous articles used a combination of categories in their initiatives (e.g. 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 organizations.[2 40-55] The majority of information sharing initiatives included team meetings and huddles to facilitate communication through in-person interactions (between staff or staff and patients/families).[40 41 43 44 46] Information sharing was promoted between multidisciplinary teams and patients to improve length of stay and continuity of care. For example, Adlington and colleagues (2018) implemented Plan Do Study Act cycles during weekly quality improvement meetings, in which driver diagrams (visual displays) were used to share information with the multidisciplinary project team on issues affecting length of stay and hospital bed occupancy.[40] This information was used to guide practice changes aimed at improving communication during the discharge process (daily rounds, focusing on long-stay patients), bed management (nursing support to prevent deterioration) and community services (email updates and involvement of care coordinators). The majority of initiatives shared information though in-person communication; however, some used technology. Caminiti and colleagues (2013) used technology-assisted communication to develop reports and audits to motivate and hold physicians accountable,[42] as in some health systems, physicians play a key role in designating patients as having a delayed discharge. Profiles for each physician were created monthly using hospital administrative data (containing length of stay, number of patient discharged that month). All information sharing initiatives resulted in positive outcomes (e.g. reduced length of stay and a decrease in delayed discharges).

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 (e.g. 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 (2017), with the goal of preventing ALC designations and reducing ALC rates.[56 67] This framework contains 12 leading practices, with specific strategies for organizational assessment. Some of the leading practices include: providing patients and substitute decision makers with an estimated date of discharge, identifying high-risk patients of becoming ALC and implementing escalation processes for the management of ALC challenges. Additional initiatives focused on improving patient flow through criteria-led discharges (discharging patients once a pre-determined set of criteria had been met) and critical pathways/ discharge guidelines.

The majority of initiatives categorized as tools and guidelines had positive results,[47-49 54-60 62 64-66] which included 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.[50] This initiative incorporated information sharing into a computer-based program 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.[51-55 63-66 68-92] Common practice change initiatives included hospital-based nurse-led discharges and cross-sectoral transitional programs (e.g. Home First, Discharge to Assess, Hospital to Home), with most implemented by nurses and multidisciplinary teams. Nurse and criteria-led discharges often involved a pre-determined 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 and colleagues (2012) conducted a retrospective study (N=128) to compare nurse-led and doctor-led discharge (standard discharge pathway) post laparoscopic surgery.[74] 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 post-operative care, etc.). When compared to 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 and had a significantly smaller number of patients with no medical or social reason for delayed discharge.

Another unique example of a practice change initiative was the 7-Day Hospital Initiative implemented by Blecker and colleagues.[70] 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 categorized 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,[77] or had no change[68 75] or a negative impact[52] on study outcomes (increase in delayed discharges). Meehan and colleagues (2018) explored patient experiences with a program (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 (i.e. at home).[77] 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 and colleagues (2010) prospective cohort study.[52] 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 emphasized 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 finances

The infrastructure and finance category included initiatives that involved tangible structural or financial changes (e.g. 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).[55 92-100] The Community Care (Delayed Discharges) Act in the United Kingdom was an initiative identified in multiple articles.[93 96 97 100] 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[94 95] and discharge funds[98 99] 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 (e.g. medical equipment, medications, transportation, home repairs). All initiatives categorized as infrastructure and finances had positive results on study outcomes, including reductions in discharge delays, length of stay and cost.[93-98]

Other initiatives

The other initiatives category included statistical and predictive modeling of initiatives to improve delayed discharges.[101-103] These models explored the impact of increasing the supply of nursing home beds,[101] potential care pathways for the elderly and reimbursement costs[102] and discharge strategies to reduce hospital occupancy.[103] Gaughan and colleagues' (2012) 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.[101] Their models further emphasized the importance of communication between hospitals and the long-term care sector to reduce social care delayed discharges. Similarly, Katasaliaki et al. (2005) 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.[102]

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.[2 45 92 104] Sutherland and Crump (2013) outlined three key solutions for improving delayed discharges in Canada: building more acute and post-acute care beds, increasing integrated care and creating financial incentives to improve the quality, quantity and effectiveness of healthcare.[45] The authors discussed challenges and limitations to implementing each of these options and emphasized that a potential solution to addressing delayed discharges was to combine the three strategies. Another Canadian report developed recommendations for providing care to the aging population and those experiencing a delayed discharge.[2] Walker (2011) outlined recommendations for improving primary care, the care continuum and senior friendly acute care, responding to special needs populations (e.g. persons with mental health concerns, addiction and neurological conditions, on dialysis or ventilators), and implementing an "Assess and Restore" model (a program to help patients maintain or regain functional independence, transition to home, and remain in the community for as long as possible).

The NHS Improvement (United Kingdom) also released a guide in 2019 on reducing long hospital stays.[104] 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 show 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 and (3) there is a lack of important contextual information reported (e.g. 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 categorization of initiatives (n=36), followed by information sharing (n=19) and infrastructure and finance (n=19). All initiatives categorized 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 (e.g. in hospital) in comparison to cross-sectoral initiatives (e.g. 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 (i.e. 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.[105-107] 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.[50] 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 a mixed methods or qualitative approach; thus highlighting a key focus for future research.

The majority of initiatives had an intervention or follow-up period of one year, but this ranged from four months to three years. Based on the limited number initiatives with a follow-up period of longer than one 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 and colleagues' Integrated Sustainability Framework consists of five categories of factors associated with the sustainability of interventions across different contexts and settings: outer context (e.g. policies, leadership, funding), inner context (e.g. culture, mission, funding), intervention characteristics (e.g. cost, adaptability, benefit), processes (e.g. partnership, training/support, planning, capacity building) and implementer and population characteristics (e.g. implementation skills/expertise, attitudes/motivation).[108] 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 emphasizes 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 (i.e. hosting daily rounds, developing a framework, etc.). A recent systematic review (2018) conducted by Geerligs and colleagues identified implementation barriers and facilitators of patient-focused, in-hospital interventions,[109] 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 need of patients, caregivers, providers, organizations 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,[70] 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 optimizing 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.[110 111]

Finally, this review highlighted a lack of consistency in how delayed discharge is 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 and colleagues (2004), who further explained the challenges differing definitions create when

attempting to compare findings.[112] 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. Patients and family engagement is both important and recommended by healthcare and government organizations; however, they are often excluded in the development and write-up of best practice guidelines.[113] 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 (e.g. 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 (e.g. 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 January 1, 2004 and August 16, 2019 and conducted in English. Our search strategy was comprehensive and we conducted an in-depth search of grey literature to minimize 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. Although it is not a requirement for scoping reviews,[36] the interventions in this review were not critically appraised and thus, we cannot make recommendations on which interventions should be scaled up. 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.

Conclusions

This scoping review identified a variety of initiatives addressing delayed discharges across five categories: information sharing, tools and guidelines, practice change, 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 programs 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 (e.g.

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 (i.e. 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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Competing interests

The authors have no conflicts of interests to declare.

Author contributions

KK, SJTG, JMS, JG and TK were responsible for the conception and design of the study, as well as acquisition of funding for the study. LC, SJTG, KMK and KK led the screening of articles and the analysis and interpretation of data, but all authors contributed to the analysis and interpretation. Drafts of the manuscript were reviewed and revised by all authors. All of the authors read and approved the final manuscript.

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References

1. Bate A. Delayed transfers of care in the NHS, 2017:1-20.

2. Walker D. Caring For Our Aging Population and Addressing Alternate Level of Care: Report Submitted to the Minister of Health and Long-Term Care. Canada, 2011.

3. Rojas-García A, Turner S, Pizzo E, et al. Impact and experiences of delayed discharge: A mixed-studies systematic review. *Health Expect* 2018;21(1):41-56. doi: 10.1111/hex.12619 [published Online First: 2017/09/12]

4. Barnable A, Welsh D, Lundrigan E, et al. Analysis of the Influencing Factors Associated With Being Designated Alternate Level of Care. *Home Health Care Management & Practice* 2015;27(1):3-12. doi: 10.1177/1084822314539164

5. McCloskey R, Jarrett P, Stewart C, et al. Alternate level of care patients in hospitals: what does dementia have to do with this? *Canadian geriatrics journal : CGJ* 2014;17(3):88-94. doi: 10.5770/cgj.17.106

6. Walker H, Langton D, Thomson L. 'New to Forensic'; implementing a problem-based introductory educational programme for forensic practitioners in Scotland. *Journal of Psychiatric and Mental Health Nursing* 2011;18(10):934-42.

7. Jasinarachchi KH, Ibrahim IR, Keegan BC, et al. Delayed transfer of care from NHS secondary care to primary care in England: its determinants, effect on hospital bed days, prevalence of acute medical conditions and deaths during delay, in older adults aged 65 years and over. *BMC Geriatr* 2009;9:4-4. doi: 10.1186/1471-2318-9-4

8. Rosman M, Rachminov O, Segal O, et al. Prolonged patients' In-Hospital Waiting Period after discharge eligibility is associated with increased risk of infection, morbidity and mortality: a retrospective cohort analysis. *BMC health services research* 2015;15:246-46. doi: 10.1186/s12913-015-0929-6

9. Everall AC, Guilcher SJT, Cadel L, et al. Patient and caregiver experience with delayed discharge from a hospital setting: A scoping review. *Health Expectations* 2019;22(5):863-73. doi: 10.1111/hex.12916

10. Amy C, Zagorski B, Chan V, et al. Acute care alternate-level-of-care days due to delayed discharge for traumatic and non-traumatic brain injuries. *Healthcare policy = Politiques de sante* 2012;7(4):41-55.

11. Hwabejire JO, Kaafarani HA, Imam AM, et al. Excessively long hospital stays after trauma are not related to the severity of illness: Let's aim to the right target! *JAMA Surgery* 2013;148(10):956-61. doi: 10.1001/jamasurg.2013.2148

12. Challis D, Hughes J, Xie C, et al. An examination of factors influencing delayed discharge of older people from hospital. *International Journal of Geriatric Psychiatry* 2014;29(2):160-68. doi: 10.1002/gps.3983

13. Costa AP, Hirdes JP. Clinical Characteristics and Service Needs of Alternate-Level-of-Care Patients Waiting for Long-Term Care in Ontario Hospitals. *Healthcare policy = Politiques de sante* 2010;6(1):32-46.

14. Costa AP, Poss JW, Peirce T, et al. Acute care inpatients with long-term delayed-discharge: evidence from a Canadian health region. *BMC health services research* 2012;12(1):172.

15. Kozyrskyi A, De Coster C, St John P. Long stay patients in Winnipeg acute care hospitals. *Healthc Manage Forum* 2002;Suppl:15-20.

16. Di Lorenzo R, Formicola V, Carra E, et al. Risk factors for long-stay in an Italian acute psychiatric ward: a 7-year retrospective analysis. *Journal of Nursing Education and Practice* 2013;4(1):p68.

17. Rogers A, Clark EH, Rittenhouse K, et al. Breaking down the barriers! Factors contributing to barrier days in a mature trauma center. *Journal of Trauma and Acute Care Surgery* 2014;76(1):191-95. doi: 10.1097/TA.0b013e3182aa3d5f

18. Mitchell F. Hospital Discharge: A Descriptive Study of the Patient Journey for Frail Older People with Complex Needs. *Journal of Integrated Care* 2010;18(3):30-36. doi: 10.5042/jic.2010.0247

19. Tan WS, Chong WF, Chua KS, et al. Factors associated with delayed discharges after inpatient stroke rehabilitation in Singapore. *Annals of the Academy of Medicine, Singapore* 2010;39(6):435-41. [published Online First: 2010/07/14]

20. Landeiro F, Leal J, Gray AM. The impact of social isolation on delayed hospital discharges of older hip fracture patients and associated costs. *Osteoporos Int* 2016;27(2):737-45. doi: 10.1007/s00198-015-3293-9 [published Online First: 2015/09/05]

21. Poulos CJ, Magee C, Bashford G, et al. Determining level of care appropriateness in the patient journey from acute care to rehabilitation. *BMC health services research* 2011;11:291-91. doi: 10.1186/1472-6963-11-291

22. Zeitz KM, Carter L, Robinson C. The ebbs and flows of changing acute bed capacity delays. *Aust Health Rev* 2013;37(1):66-9. doi: 10.1071/ah11077 [published Online First: 2012/12/04]

23. Anderson ME, Glasheen JJ, Anoff D, et al. Understanding predictors of prolonged hospitalizations among general medicine patients: A guide and preliminary analysis. *J Hosp Med* 2015;10(9):623-6. doi: 10.1002/jhm.2414 [published Online First: 2015/07/02]

24. Hendy P, Patel JH, Kordbacheh T, et al. In-depth analysis of delays to patient discharge: a metropolitan teaching hospital experience. *Clin Med (Lond)* 2012;12(4):320-3. doi: 10.7861/clinmedicine.12-4-320 [published Online First: 2012/08/31]

25. Salonga-Reyes A, Scott IA. Stranded: causes and effects of discharge delays involving non-acute in-patients requiring maintenance care in a tertiary hospital general medicine service. *Aust Health Rev* 2017;41(1):54-62. doi: 10.1071/ah15204 [published Online First: 2016/03/31]

26. Sutherland JM, Repin N, Crump RT, et al. Paying for Hospital Services: A Hard Look at the Options. Toronto, Canada: CD Howe Institute, 2013:1-32.

27. Sutherland J. Hospital payment policy in Canada: Options for the future: Canadian Health Services Research Foundation, 2011.

28. Ontario Ministry of Health and Long-Term Care. Quality-Based Procedures Indicators: An Implementation Guidance Document. Ontario, Canada, 2014:1-38.

29. David G, Polsky D. Home Health Services, Economics of. In: Culyer AJ, ed. Encyclopedia of Health Economics. San Diego: Elsevier 2014:477-83.

30. HM Treasury. Spring Budget 2017. United Kingdom, 2017.

31. Knowles G, Burke MR, Carr M, et al. Independent Expert Review of Delayed Discharges: Department of Health, 2018.

32. Fagan L. 'Bed blockers' costing Ottawa hospitals millions. Glut of patients awaiting more appropriate care a 'crisis,' health workers say. Ottawa: CBC News, 2019.

33. McCloskey R, Jarrett P, Stewart C. The Untold Story of Being Designated an Alternate Level of Care Patient. *Healthcare policy = Politiques de sante* 2015;11(1):76-89.

34. Munn Z, Peters MDJ, Stern C, et al. Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medical Research Methodology* 2018;18(1):143. doi: 10.1186/s12874-018-0611-x

35. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implementation Science* 2010;5(1):69. doi: 10.1186/1748-5908-5-69

36. Tricco AC, Lillie E, Zarin W, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and ExplanationThe PRISMA-ScR Statement. *Annals of Internal Medicine* 2018;169(7):467-73. doi: 10.7326/M18-0850

37. Bramer WM, Giustini D, de Jonge GB, et al. De-duplication of database search results for systematic reviews in EndNote. *J Med Libr Assoc* 2016;104(3):240-43. doi: 10.3163/1536-5050.104.3.014

38. Babineau J. Product review: Covidence (systematic review software). *Journal of the Canadian Health Libraries Association/ Journal de l'Association des bibliothèques de la santé du Canada* 2014;35(2):68-71.

39. Hosseus D, Pal LA. Anatomy of a Policy Area: The Case of Shipping. *Canadian Public Policy / Analyse de Politiques* 1997;23(4):399-415. doi: 10.2307/3552071

40. Adlington K, Brown J, Ralph L, et al. Better care: reducing length of stay and bed occupancy on an older adult psychiatric ward. *BMJ open quality* 2018;7(4):e000149. doi: https://dx.doi.org/10.1136/bmjoq-2017-000149

41. Boyd SS. Hospital Administrators' Strategies for Reducing Delayed Hospital Discharges and Improving Profitability. *Hospital Administrators' Strategies for Reducing Delayed Hospital Discharges & Improving Profitability* 2017:1-1.

42. Caminiti C, Meschi T, Braglia L, et al. Reducing unnecessary hospital days to improve quality of care through physician accountability: a cluster randomised trial. *BMC health services research* 2013;13(1):14-14. doi: 10.1186/1472-6963-13-14

43. Patel H, Yirdaw E, Yu A, et al. Improving Early Discharge Using a Team-Based Structure for Discharge Multidisciplinary Rounds. *Professional Case Management* 2019;24(2):83-89. doi: http://dx.doi.org/10.1097/NCM.0000000000000318

44. Pirani SSA. Prevention of delay in the patient discharge process: an emphasis on nurses' role. *Journal for Nurses in Staff Development* 2010;26(4):E1-5. doi: 10.1097/NND.0b013e3181b1ba74

45. Sutherland JM, Crump RT. Alternative Level of Care: Canada's Hospital Beds, the Evidence and Options. *Healthcare Policy* 2013;9(1):26-34.

46. Anonymous. Patient flow initiatives decrease LOS, up capacity. *Hospital case management : the monthly update on hospital-based care planning and critical paths* 2010;18(8):117-24.

47. Brankline AL, Coyle CM, Jencks KA, et al. Practical innovations: technology-assisted referrals. *Social Work in Health Care* 2009;48(8):768-76. doi: 10.1080/00981380902958213

48. Henwood M. Effective partnership working: A case study of hospital discharge. *Health and Social Care in the Community* 2006;14(5):400-07. doi: http://dx.doi.org/10.1111/j.1365-2524.2006.00651.x

49. Maloney CG, Wolfe D, Gesteland PH, et al. A tool for improving patient discharge process and hospital communication practices: the "Patient Tracker". *AMIA Annual Symposium proceedings / AMIA Symposium AMIA Symposium* 2007:493-97.

50. Roberts K, Stiller K, Harling R, et al. Impacts and perceptions of a computer-based length of stay benchmarking program. *International Journal of Therapy & Rehabilitation* 2013;20(5):237-45.

51. Sobotka SA, Agrawal RK, Msall ME. Prolonged Hospital Discharge for Children with Technology Dependency: A Source of Health Care Disparities. *Pediatric Annals* 2017;46(10):e365-e70. doi: 10.3928/19382359-20170919-01

52. Williams TA, Leslie GD, Brearley L, et al. Discharge delay, room for improvement? *Australian Critical Care* 2010;23(3):141-49. doi: 10.1016/j.aucc.2010.02.003

53. Younis J, Salerno G, Fanto D, et al. Focused preoperative patient stoma education, prior to ileostomy formation after anterior resection, contributes to a reduction in delayed discharge within the enhanced recovery programme. *International journal of colorectal disease* 2011:1-5. doi: http://dx.doi.org/10.1007/s00384-011-1252-2

54. Chidwick P, Oliver J, Ball D, et al. Six Change Ideas that Significantly Minimize Alternate Level of Care (ALC) Days in Acute Care Hospitals. *Healthcare quarterly (Toronto, Ont)* 2017;20(2):37-43.

55. Baumann M, Evans S, Perkins M, et al. Organisation and features of hospital, intermediate care and social services in English sites with low rates of delayed discharge. *Health & Social Care in the Community* 2007;15(4):295-305.

56. Burr E, Dickau S. Leading Practices in Alternate Level of Care (ALC) Avoidance: A Standardized Approach. *Healthcare quarterly (Toronto, Ont)* 2017;20(2):44-47.

57. Holland DE, Pacyna JE, Gillard KL, et al. Tracking Discharge Delays: Critical First Step Toward Mitigating Process Breakdowns and Inefficiencies. *Journal of Nursing Care Quality* 2016;31(1):17-23. doi: http://dx.doi.org/10.1097/NCQ.0000000000000141

58. Lian YC, Ying SHK, Peng CC, et al. Early discharge study for premature infants: singapore general hospital. *The Permanente journal* 2008;12(4):15-18.

59. Mahant S, Peterson R, Campbell M, et al. Reducing inappropriate hospital use on a general pediatric inpatient unit. *Pediatrics* 2008;121(5):e1068-73.

60. Moeller JJ, Ma M, Hernandez P, et al. Discharge delay in patients with community-acquired pneumonia managed on a critical pathway. *Canadian Journal of Infectious Diseases and Medical Microbiology* 2006;17(2):109-13. doi: http://dx.doi.org/10.1155/2006/375645

61. Mur-Veeman I, Govers M. Buffer management to solve bed-blocking in the Netherlands 2000-2010. Cooperation from an integrated care chain perspective as a key success factor for managing patient flows. *International journal of integrated care* 2011;11(Spec 10th Anniversary Ed):e080.

62. Niemeijer GC, Trip A, Ahaus KT, et al. Quality in trauma care: improving the discharge procedure of patients by means of Lean Six Sigma. *Journal of Trauma* 2010;69(3):614-19. doi: 10.1097/TA.0b013e3181e70f90

63. Ardagh M, Tonkin G, Possenniskie C. Improving acute patient flow and resolving emergency department overcrowding in New Zealand hospitals-the major challenges and the promising initiatives. *New Zealand Medical Journal* 2011;124(1344):64-73.

64. Brown I, Jellish WS, Kleinman B, et al. Use of postanesthesia discharge criteria to reduce discharge delays for inpatients in the postanesthesia care unit. *Journal of Clinical Anesthesia* 2008;20(3):175-79. doi: http://dx.doi.org/10.1016/j.jclinane.2007.09.014

65. Gutmanis I, Speziale J, Van Bussel L, et al. The South West Local Health Integration Network Behavioural Supports Ontario Experience. *Healthcare quarterly (Toronto, Ont)* 2016;18:50-56.

66. Lees-Deutsch L, Jackson J, Balaji DA, et al. Developing a Process for Criteria-Led Discharge: Selection of Patients for Efficient and Effective Discharge (SPEED). *Journal of Nursing Care Quality* 2019 doi: http://dx.doi.org/10.1097/NCQ.0000000000000423

67. Toronto Central Community Care Access Centre. ALC Avoidance Leading Practices and Improvement Strategies for the Acute Care Sector. Ontario, Canada, 2015.

68. Arendts G, Fitzhardinge S, Pronk K, et al. Front-loading allied health intervention in the emergency department does not reduce length of stay for admitted older patients. *International Journal of Clinical Practice* 2013;67(8):807-10. doi: 10.1111/ijcp.12153

69. Béland F, Bergman H, Lebel P, et al. A system of integrated care for older persons with disabilities in Canada: results from a randomized controlled trial. *Journals of Gerontology Series A: Biological Sciences & Medical Sciences* 2006;61(4):367-73.

70. Blecker S, Goldfeld K, Park H, et al. Impact of an Intervention to Improve Weekend Hospital Care at an Academic Medical Center: An Observational Study. *JGIM: Journal of General Internal Medicine* 2015;30(11):1657-64. doi: 10.1007/s11606-015-3330-6

71. Boutette M, Hoffer A, Plant J, et al. Establishing an integrated model of subacute care for the frail elderly. *Healthcare Management Forum* 2018;31(4):133-36. doi: 10.1177/0840470418774807

72. Bowen A, Kumar R, Howard J, et al. Nurse led discharge: improving efficiency, safely. *Clinical Governance: An International Journal* 2013;19(2):110-16. doi: 10.1108/CGIJ-03-2013-0007

73. El-Eid GR, Kaddoum R, Tamim H, et al. Improving hospital discharge time: a successful implementation of Six Sigma methodology. *Medicine* 2015;94(12):e633-e33. doi: 10.1097/MD.0000000000000633

74. Graham L, Neal CP, Garcea G, et al. Evaluation of nurse-led discharge following laparoscopic surgery. *Journal of Evaluation in Clinical Practice* 2012;18(1):19-24. doi: 10.1111/j.1365-2753.2010.01510.x

75. Maessen JMC, Dejong CHC, Kessels AGH, et al. Length of stay: An inappropriate readout of the success of enhanced recovery programs. *World journal of surgery* 2008;32(6):971-75. doi: http://dx.doi.org/10.1007/s00268-007-9404-9

76. Mahto R, Venugopal H, Vibhuti VS, et al. The effectiveness of a hospital diabetes outreach service in supporting care for acutely admitted patients with diabetes. *QJM* 2009;102(3):203-07. doi: http://dx.doi.org/10.1093/qjmed/hcn174

77. Meehan L, Banarsee R, Dunn-Toroosian V, et al. Improving outcomes for patients discharged early using a home assessment scheme. *London journal of primary care* 2018;10(3):62-67. doi: http://dx.doi.org/10.1080/17571472.2018.1489467

78. Panis LJ, Verheggen FW, Pop P, et al. The impact of hospital discharge on inappropriate hospital stay. *International journal of health care quality assurance incorporating Leadership in health services* 2004;17(4-5):189-93.

79. Sampson MJ, Crowle T, Dhatariya K, et al. Trends in bed occupancy for inpatients with diabetes before and after the introduction of a diabetes inpatient specialist nurse service. *Diabetic Medicine* 2006;23(9):1008-15.

80. Starr-Hemburrow L, Parks JM, Bisaillon S. Home First: reducing ALC and achieving better outcomes for seniors through inter-organizational collaboration. *Healthcare quarterly (Toronto, Ont)* 2011;14(1):70-76.

81. Taber DJ, Pilch NA, McGillicuddy JW, et al. Improved Patient Safety and Outcomes With a Comprehensive Interdisciplinary Improvement Initiative in Kidney Transplant Recipients. *American Journal of Medical Quality* 2013;28(2):103-12. doi: http://dx.doi.org/10.1177/1062860612450309

82. Udayai K, Kumar P. Implementing six sigma to improve hospital discharge process. *International Journal of Pharmaceutical Sciences and Research* 2012;3(11):4528-32.

83. Calveley P. Doing, not talking: hospital admission avoidance. *Nursing & Residential Care* 2007;9(5):230-32.

84. Central East LHIN ALC Task Group. Alternate Level of Care Systems Issues and Recommendations. Ontario, Canada, 2008.

85. Joint Improvement Team. Home First - Ten Actions to Transform Discharge. United Kingdom, 2013.

86. Krystal A. Southlake at Home Webinar. Canada, 2019.

87. LHIN Collaborative. Sharing Best Practices: Transition Management in Ontario - Home First: Implementation Guide and Toolkit. Ontario, Canada, 2011.

88. North West Community Care Access Centre. Wait at Home Fact Sheet Ontario, Canada2011 [

89. Shah N. A New Philosophy Towards Solving The ALC Crisis (Home First). Ontario, Canada, 2010.

90. Shah N. A Call to Action on ER/ALC: Promoting Effective Care Across the Health Continuum. Ontario, Canada, 2011.

91. Starr-Hemburrow L. Home First - Optimizing Patient Flow and Patient Centred Care Canada, 2010.

92. Province of New Brunswick. Health Annual Report 2016-2017. New Brunswick, Canada, 2017.

93. Behan D. Delayed transfers of care -- an early review of progress. *Journal of Integrated Care* 2005;13(1):43-47.

94. Levin KA, Crighton E. Measuring the impact of step down intermediate care on delayed discharge: an interrupted time series analysis. *Journal of epidemiology and community health* 2019;73(7):674-79. doi: http://dx.doi.org/10.1136/jech-2018-211628

95. Manville M, Klein MC, Bainbridge L. Improved outcomes for elderly patients who received care on a transitional care unit. *Canadian Family Physician* 2014;60(5):e263-71.

96. Rae B, Busby W, Millard PH. Fast-tracking acute hospital care - from bed crisis to bed crisis. *Australian Health Review* 2007;31(1):50-62.

97. Shah A. The impact of the community care (delayed discharge) act 2003 on the length of stay and bed occupancy in old age psychiatry units in England. *International Journal of Geriatric Psychiatry* 2007;22(11):1164-65. doi: http://dx.doi.org/10.1002/gps.1808

98. Adams S, Care & Repair England. Reducing Delayed Transfer of Care through housing interventions: Evidence of Impact. United Kingdom, 2017.

99. Anonymous. Expedited discharge fund helps uninsured patients. Plan frees up beds for patients who can pay. *Hospital case management : the monthly update on hospital-based care planning and critical paths* 2008;16(5):70-75.

100. Manzano-Santaella A. Payment by Results and delayed discharges...including commentary by Allen P. *British Journal of Healthcare Management* 2009;15(9):440-43.

101. Gaughan J, Gravelle H, Siciliani L. Testing the bed-blocking hypothesis: Does nursing and care home supply reduce delayed hospital discharges? *Health Economics (United Kingdom)* 2015;24(S1):32-44. doi: http://dx.doi.org/10.1002/hec.3150

102. Katsaliaki K, Brailsford S, Browning D, et al. Mapping care pathways for the elderly. *Journal of Health, Organisation and Management* 2005;19(1):57-72. doi: http://dx.doi.org/10.1108/14777260510592130

103. Qin S, Thompson C, Bogomolov T, et al. Hospital occupancy and discharge strategies: a simulation-based study. *Internal medicine journal* 2017;47(8):894-99. doi: http://dx.doi.org/10.1111/imj.13485

104. NHS Improvement. Guide to Reducing Long Hospital Stays. United Kingdom, 2018.

105. Hamilton AB, Finley EP. Qualitative methods in implementation research: An introduction. *Psychiatry Research* 2019;280:112516. doi: https://doi.org/10.1016/j.psychres.2019.112516

106. Southam-Gerow MA, Dorsey S. Qualitative and mixed methods research in dissemination and implementation science: introduction to the special issue. *J Clin Child Adolesc Psychol* 2014;43(6):845-50. doi: 10.1080/15374416.2014.930690 [published Online First: 2014/10/29]

107. Qualitative Research in Implementation Science group. Qualitative Methods in Implementation Science. United States: National Cancer Institute: Division of Cancer Control and Population Sciences, 2019:1-31.

108. Shelton RC, Cooper BR, Stirman SW. The Sustainability of Evidence-Based Interventions and Practices in Public Health and Health Care. *Annual Review of Public Health* 2018;39(1):55-76. doi: 10.1146/annurev-publhealth-040617-014731

109. Geerligs L, Rankin NM, Shepherd HL, et al. Hospital-based interventions: a systematic review of staff-reported barriers and facilitators to implementation processes. *Implementation science : IS* 2018;13(1):36-36. doi: 10.1186/s13012-018-0726-9

110. Green LW, Glasgow RE. Evaluating the relevance, generalization, and applicability of research: issues in external validation and translation methodology. *Evaluation & the health professions* 2006;29(1):126-53. doi: 10.1177/0163278705284445 [published Online First: 2006/03/03]

111. Balasubramanian BA, Cohen DJ, Davis MM, et al. Learning Evaluation: blending quality improvement and implementation research methods to study healthcare innovations. *Implementation Science* 2015;10(1):31. doi: 10.1186/s13012-015-0219-z

112. Glasby J, Littlechild R, Pryce K. Show Me the Way to go Home: A Narrative Review of the Literature on Delayed Hospital Discharges and Older People. *The British Journal of Social Work* 2004;34(8):1189-97. doi: 10.1093/bjsw/bch136

113. Zhao G, Kennedy C, Mabaya G, et al. Patient engagement in the development of best practices for transitions from hospital to home: a scoping review. *BMJ Open* 2019;9(8):e029693. doi: 10.1136/bmjopen-2019-029693

Tables

Table 1. Categories, descriptions and examples of initiative categorization

Category Name	Description	Examples
Information Sharing A - Live Sharing B - Recommended Initiatives – Calls to Action	• A - Information sharing through in-person or technology-based communication (synchronous communication) • B - Information sharing through documents which share suggestions, recommendations or for information purposes (motivation)	• A - Rounding, team meetings, one-on-on 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 • Implemented tool/ guidance document that is being used in the healthcare system	• Toolkits, guidelines, tools, escalation processes, frameworks
Practice Change	• A change in how care is delivered	• Nurse led discharges, roles of providers and/or composition of team are organized differently
Infrastructure and Finances	• 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)

847 **Table 2. Characteristics of Included Articles**

Author (Year)	Country	Objective	Method	Study Design	Participants	Sample Size
Database Searches						
Adlington et al. (2018) [40]	United Kingdom	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	Quality Improvement	Older adults (65+) on psychiatric ward	NR
Ardagh et al. (2011) [63]	New Zealand	Identify 10 common challenges and promising initiatives relating to patient flow and emergency department overcrowding	Qualitative	NR	NR	NR
Arendts et al. (2013) [68]	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	Non-randomized prospective pragmatic study	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)	3,572
Baumann et al. (2007) [55]	United Kingdom	Identify the factors causing good discharge practice performance and organization of services	Qualitative	Descriptive	Health and social services staff who had managerial or operational involvement in discharge arrangements	42
Behan (2005) [93]	United Kingdom	Explore the experience of service users across the United Kingdom during the first 6 months of the implementation of the Community Care (Delayed Discharges) Act	Qualitative	Explorative	NR	NR

Author (Year)	Country	Objective	Method	Study Design	Participants	Sample Size
Béland et al. (2006) [69]	Canada	Assess the transformation of the organization and delivery of health and social services with additional interventions for frail elderly people	Quantitative	Randomized controlled trial	Frail elderly	1,309
Blecker et al. (2015) [70]	United States	Evaluate the impact of a weekend hospital intervention on care processes, clinical outcomes and length of stay	Quantitative	Interrupted time series observational study	Non-obstetric patients hospitalized	57,163
Boutette et al. (2018) [71]	Canada	Serve frail elderly patients at risk of deconditioning and/or disability, caused by prolonged hospitalization	NR	Review/ description of program	Frail older patients who are at risk of deconditioning and/or disability	NR
Bowen et al. (2014) [72]	United Kingdom	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
Boyd (2017) [41]	United States	Explore the leadership strategies used by hospital business administrators to reduce delayed discharges and improve profitability	Qualitative	Multiple case study	Hospital administrators	3
Brankline (2009) [47]	United States	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 dismissal from the hospital	25
Brown et al. (2008) [64]	United States	Determine if the length of patient stay is reduced in the post-anesthesia care unit when nurses use discharge criteria	Quantitative	Prospective clinical study	Adult, ASA physical status I, II, and III patients (18+) requiring general anesthesia	1,198
Burr et al. (2017) [56]	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

Author (Year)	Country	Objective	Method	Study Design	Participants	Sample Size
Caminiti et al. (2013) [42]	Italy	Evaluate the effectiveness of a strategy aimed to reduce delayed hospital discharge	Quantitative	Cluster, parallel group, randomized trial Quality improvement	Hospital units: geriatric, medicine, long-term care	3,498
Chidwick et al. (2017) [54]	Canada	Discuss concepts and ideas that led to lowest ALC days in the province	Mixed methods	Quality improvement	ALC patients	NR
El-Eid et al. (2015) [73]	Lebanon	Assess the effectiveness of the Six Sigma method in improving discharge processes	Quantitative	Pre and post-intervention study	NR	17,054
Gaughan et al. (2015) [101]	England	Investigate the reduction in hospital bed-blocking due to a greater supply of nursing home beds or reduced costs	Quantitative	Statistical modelling - Empirical analysis	Patients waiting for hospital discharge	NR
Graham et al. (2012) [74]	United Kingdom	Evaluate the effect of the laparoscopic nurse specialist on patient discharge	Quantitative	Retrospective comparison	Laparoscopic cholecystectomy and laparoscopic inguinal hernia repair patients	128
Gutmanis et al. (2016) [65]	Canada	Outline change strategies and their impact health system transformation and those living with responsive behaviors and their family members	Mixed methods	Quality improvement	Individuals with responsive behaviors	NR
Henwood (2006) [48]	United Kingdom	Examine the partnership between health and social care by exploring issues with hospital discharges	Case study	Case study	Inpatients	NR
Holland et al. (2016) [57]	United States	Report the development and evaluation of a discharge delay tracking and reporting mechanism	Quantitative	Practice improvement project	Inpatients	NR
Katsaliaki et al. (2005) [102]	United Kingdom	Describe a project investigating potential care pathways for elderly people after discharge from hospital	Quantitative	Discrete-event simulation, simulation model	Inpatients	NR
Lees-Deutsch et al. (2019) [66]	United Kingdom	Identify core characteristics of patient discharge criteria, recorded in clinical management plans or case notes	Quantitative	Systematic observational	Patients discharged from the acute	50

Author (Year)	Country	Objective	Method	Study Design	Participants	Sample Size
				retrospective review	medicine unit and short-stay units	
Levin et al. (2019) [94]	Scotland	Examine the impact of Intermediate Care and the 72-hour target on delayed hospital discharge	Quantitative	Controlled interrupted time series design	Patients aged 75+	107,022
Lian et al. (2008) [58]	Singapore	Develop methods to reduce the hospital length of stay for premature infants by 30%, within 6 months	Quantitative	Retrospective review	Premature infants	78
Maessen et al. (2008) [75]	Netherlands	Assess the effect of enhanced recovery after surgery program on discharge delays	Quantitative	Retrospective/ prospective study	Patients undergoing elective colorectal resection	173
Mahant et al. (2008) [59]	Canada	Determine if an audit-and-feedback intervention reduces delayed discharge in a general pediatric inpatient unit	Quantitative	Prospective observational study	Pediatric inpatient	3194
Mahto et al. (2009) [76]	United Kingdom	Determine the effect of a diabetes outreach service on delayed discharges and avoidable admissions	Quantitative	Cross-sectional audit	Acutely admitted patients with diabetes	137
Maloney et al. (2007) [49]	United States	Develop a web-based software application used to facilitate timely patient discharge	Quantitative	Quality improvement pilot project	Inpatients	NR
Manville et al. (2014) [95]	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
Meehan et al. (2018) [77]	United Kingdom	Explore patients' experiences of hospital discharge with the discharge to assess scheme	Qualitative	Descriptive	Patients discharged through discharge to assess	30
Moeller et al. (2006) [60]	Canada	Assess patient and physician-related barriers to discharging patients who have met objective criteria	Mixed methods	Retrospective assessment Semi-structured interviews	Patients with community-acquired pneumonia	31
Mur-Veeman et al. (2011) [61]	Netherlands	Explain the theory of buffer management and discuss related previous assumptions	NR	Review/ theoretical paper	Bed blockers	NR

Author (Year)	Country	Objective	Method	Study Design	Participants	Sample Size
Niemeijer et al. (2010) [62]	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 Observation	Trauma patients	2006:1114 2007:1124
Panis et al. (2004) [78]	Netherlands	Reduce inappropriate hospital stay by adjusting patient logistics, increasing efficiency and providing comfortable surroundings	Quantitative	Retrospective cohort study	Mothers of newborn patients	2,889 days of hospital stay of gynecology and obstetrics patients
Patel et al. (2019) [43]	United States	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
Pirani (2010) [44]	Pakistan	Emphasize the role of nurses to determine factors leading to a lack of discharge planning	NR	Review/ summary	Those experiencing delayed discharge	NR
Qin et al. (2017) [103]	Australia	Identify which barriers to discharge influence hospital occupancy when targeted by a hospital-wide policy	Quantitative	Simulation modelling	NR	NR
Rae et al. (2007) [96]	New Zealand	Illustrate how the Delayed Discharge Project solved a bed crisis and controlled expenditure	Quantitative	Continuous quality improvement project Retrospective cohort data	Acute general medical	20,034
Roberts et al. (2013) [50]	Australia	Undertake a preliminary trial of the Goal Length of Stay tool at a rehabilitation center	Quantitative	Prospective study	Inpatients in 2 units: stroke rehabilitation unit (SRU) or Brain Injury	202

Author (Year)	Country	Objective	Method	Study Design	Participants	Sample Size
					Rehabilitation Unit (BIRU)	
Sampson et al. (2006) [79]	United Kingdom	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
Shah (2007) [97]	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	Inpatient - specialties of GM and OAP services	NR
Sobotka et al. (2017) [51]	United States	Describe a hospital-to-home transitional care model	Case study	Illustrative case design/ review	Pediatric inpatient	1
Starr-Hemburrow et al. (2011) [80]	Canada	Minimize 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
Sutherland et al. (2013) [45]	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
Taber et al. (2013) [81]	United States	Test a program to improve length of stay, delayed discharges and early readmissions for kidney transplant recipients	Quantitative	Observational study	Adult kidney transplant recipients	476
Udayai et al. (2012) [82]	India	Reduce patient discharge time through a Six Sigma project	Quantitative	Time motion study	Cash patients	NR
Williams et al. (2010) [52]	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	1,123
Younis et al. (2011) [53]	United Kingdom	Compare the effect of an enhanced recovery program 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
Grey Literature						
Anonymous (2008) [99]	United States	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

Author (Year)	Country	Objective	Method	Study Design	Participants	Sample Size
Anonymous (2010) [46]	United States	Improve patient flow through initiatives that decrease length of stay and increase capacity	N/A	News Article	NR	NR
Calveley (2007) [83]	United Kingdom	Create a tier of support to reduce the unnecessary and costly occupation of hospital beds	N/A	Review	NR	NR
Manzano-Santaella (2009) [100]	United Kingdom	Analyse the relationship between Payment by Results and the Delayed Discharges Act	N/A	Policy Analysis	NR	NR
Krystal (2019) [86]	Canada	NR	Mixed methods	Continuous quality improvement and evaluation	Medically and socially complex and frail elderly	100+
Walker (2011) [2]	Canada	Develop recommendations of care for frail Canadians	N/A	N/A	NR	NR
North West Community Care Access Centre (2011) [88]	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	N/A	Seniors waiting for LTC placement	NR
Toronto Central Community Care Access Centre (2015) [67]	Canada	NR	N/A	N/A	NR	NR
Province of New Brunswick (2017) [92]	Canada	Identify priority strategic initiatives and implement community support orders across the province	N/A	Annual Report	NR	NR
NHS Improvement (2018) [104]	United Kingdom	Create a how-to guide explaining implementation approaches to reduce length of stay	N/A	Guide	NR	NR
Starr-Hemburrow (2010) [91]	Canada	Improve patient flow through the implementation of change management initiatives	Quantitative	Quality Improvement	NR	NR

Author (Year)	Country	Objective	Method	Study Design	Participants	Sample Size
LHIN Collaborative (2011) [87]	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
Shah (2011) [90]	Canada	Ensure the appropriate community resources are in place to support the patient upon discharge	N/A	Implementation Guide and Toolkit	High need seniors (75+)	NR
Central East LHIN ALC Task Group (2008) [84]	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
Adams, Care and Repair England (2017) [98]	United Kingdom	Assist older patients in returning home from hospital quickly and safely	Case Study	Case Study	Older patients	1
Shah (2010) [89]	Canada	Describe the Home First approach, a philosophy for reducing ALC	Quantitative	Quality Improvement Initiative	Elderly patients	NR
Joint Improvement Team (2013) [85]	Scotland	Identify 10 action items to transform discharge processes	N/A	Quality Improvement/ Stakeholder Engagement (Expert Group)	N/A	NR

Abbreviations: ALC = alternate level of care; ED = emergency department; SRU = stroke rehabilitation unit (SRU); BIRU = Brain Injury Rehabilitation Unit; GM = geriatric medicine; OAP = Old Age Psychiatry

Table 3. Initiative Characteristics

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
Database Searches						
Adlington et al. (2018) [40]	Quality Improvement Program • Weekly quality improvement meetings with driver diagrams to implement Plan Do Study Act cycles	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%	• 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 program and community team
Ardagh et al. (2011) [63]	10 Promising Initiatives • Special beds, hospital operations planning, discharge planning, access to imaging, responsive acute secondary services, pathways for acute patients, acute demand mitigation, enhanced ED layout, enhanced ED senior staffing, engagement of staff	NR	Hospitals	Tools and Guidelines Practice Changes	• Identified top 10 challenges and 10 promising initiatives related to patient flow and emergency department overcrowding	• To improve patient flow and emergency department overcrowding the following are needed: – a comprehensive, systematic approach – changes to resource usage – sharing of expertise and experience
Arendts et al. (2013) [68]	Allied Health Assessment • A comprehensive assessment of patients by an allied health team within hours of presentation to the hospital through the emergency department	Patients (≥65) diagnosed with one or more of six predetermined conditions	Hospitals Two Australian tertiary hospitals	Practice Change	• No benefit in reducing hospital length of stay	• Multidisciplinary allied health team assessment in the emergency department has no benefit in reducing hospital length of stay

[1] Initiative category is based on Doern and Phidd's adapted framework 39. Hosseus D, Pal LA. Anatomy of a Policy Area: The Case of Shipping. *Canadian Public Policy / Analyse de Politiques* 1997;23(4):399-415. doi: 10.2307/3552071

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
Baumann et al. (2007) [55]	N/A • Qualitative study to identify factors associated with low rates of delayed discharges		Hospitals (6 sites) Four 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	• Future research needs to explore the impact of the identified issues on patients, families and staff
Behan (2005) [93]	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	NR	7 areas across the United Kingdom	Infrastructure and Money	• National decrease in delayed discharges between 2003 and 2004	• Fines have resulted in a reduction of delayed discharges • The act has brought health and social care together
Béland et al. (2006) [69]	Integrated Care • Community-based multidisciplinary teams who provide integrated care and coordinate health and social service	Frail elderly	Community service centres/ organizations	Practice Change	• Significant (50%) reduction in the number of patients in the integrated care group that became ALC • No significant differences in utilization or costs between groups	• Changing delivery of care for frail elderly persons is feasible • Integrated care can reduce hospital and nursing home use, without impacting cost

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
					• Increased caregiver satisfaction	
Blecker et al. (2015) [70]	7-Day Hospital Initiative • Increased hospital services on the weekend (e.g. diagnostic imaging, weekend discharges, physician and care management services)	Non-obstetric hospitalized patients	Hospital Tisch Hospital, 705 beds	Practice Change	• Decreased average length of stay by 13% • Increased proportion of weekend discharges by 12% • Decreased 30-day readmissions • No changes in mortality	• Increased care on weekends may contribute to improved hospital flow, without negatively impacting clinical outcomes (30-day readmissions and mortality)
Boutette et al. (2018) [71]	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 hospitalization	Hospitals Ottawa Hospital; Perley and Rideau Veterans' Health Centre	Practice Change	• N/A	• Key features of the model: proactive, restorative, collaborative and integrated, client-centred and cost-effective
Bowen et al. (2014) [72]	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 Change	• Significant reduction in rate of delayed discharges in both audits	• 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) [41]	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	• Effective leadership from hospital administrators contributes to positive outcomes for patients, staff and the economy
Brankline (2009) [47]	Technology-Assisted Referrals • The use of technology to improve information	Elderly patients who require nursing home	Academic Medical Center	Information Sharing Live	• Decreased length of stay and improved timely discharges of patients resulted in cost savings	• Improved information exchange between hospitals and nursing homes

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
	exchange and processes, increase data accuracy and produce documents	placement after hospital discharge		Tools and Guidelines	• Increased communication within and between the hospital and nursing homes	
Brown et al. (2008) [64]	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 anesthesia	Hospital Postoperative recovery area of a large, tertiary-care, academic hospital	Tools and Guidelines Practice Change	• Decreased length of stay in the post-anesthesia care unit by 24% • Reduced discharge delays with nurse-led discharge • No change in adverse events (airway obstruction, reintubation, arrest)	• Decreased post-anesthesia care unit length of stay and discharge delays while maintaining patient status
Burr et al. (2017) [56]	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	• 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 et al. (2013) [42]	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	• Physician direct accountability can reduce unnecessary and avoidable hospital days, especially when delays are within staff control
Chidwick et al. (2017) [54]	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 Change Tools, guidelines	• Lowest ALC days in Ontario • Eliminated ethical errors, improved patient discharge experience and decreased patient confusion	• Improved patient flow and reduced ALC days through the implementation of a multi-dimensional approach

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
				Information sharing Live		
El-Eid et al. (2015) [73]	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 Center, 386 beds	Practice Change	• Significant reduction in length of stay post-intervention • Decreased discharge time (2.2 hours to 1.7 hours)	• 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
Gaughan et al. (2015) [101]	Increasing supply of nursing home beds • The use of modeling 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%	• Improved coordination between health and long-term care is essential for addressing delayed discharges
Graham et al. (2012) [74]	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 Change	• 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 post-discharge	• Nurse-led discharge may increase discharge post-laparoscopic surgery without impacting patient care
Gutmanis et al. (2016) [65]	Behavioural Supports Ontario • A quality improvement initiative for older adults with responsive behaviours through the identification of change strategies and	Individuals with responsive behaviours	South West LHIN	Practice Change Tools, guidelines	• Decreased ALC care cases among persons with behavioural needs • Improved perceptions from families and clients around patient care	• Improved coordination and communication across sectors • Provided healthcare providers with learning opportunities

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
	knowledge translation best practices					
Henwood (2006) [48]	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	• Addressing and improving delayed discharges requires partnerships between health and social care and a whole systems-based approach
Holland et al. (2016) [57]	Tracking and reporting system • Development and evaluation of a discharge delay tracking and reporting mechanism	Inpatients	Hospital (academic medical center)	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	• Discharge delays can be reduced if system and process breakdowns are identified and addressed
Katsaliaki et al. (2005) [102]	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	• Simulation is a suitable methodology for recording and evaluating the new post-acute packages
Lees-Deutsch et al. (2019) [66]	Criteria Led Discharge - Selection of Patients for Efficient and Effective Discharge (SPEED) • Patient discharge is guided by a set of clinical criteria; once the patient meets the criteria, a member of the team can facilitate discharge	Patients discharged from the AMU and both short-stay wards	Hospital (acute medicine service with 4 clinical areas)	Tools and Guidelines Practice Change	• 27 patients were suitable for CLD, 23 were not • Mean wait time for the 27 suitable patients prior to discharge was 4 hours and 51 minutes • Discharge delays were often caused by system delays	• Criteria led discharge may be suitable for select patients in improving timeliness of discharge
Levin et al. (2019) [94]	Step-up Intermediate Care Units • A bridging service between hospital and home for individuals ready for discharge from acute care;	Aged 75+	Hospital	Infrastructure and Money	• Reduced bed days delayed • Rate of days delayed increased over time	• Immediate impact on days delayed, but increasing rates days delayed over time suggests that Intermediate Care services may need to be adapted

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
	allows for recovery and regaining of independence					
Lian et al. (2008) [58]	New Discharge Guidelines for Premature Babies • Development of new discharge guidelines for premature neonates	Premature infants	Hospital Singapore General Hospital	Tools and Guidelines	• Reduced median duration of hospitalization from 58.2 days to 34.9 days • Cost savings of $6174/ infant	• Discharge planning should begin upon hospital admission • Nurses should coach parents to prepare them to care for their infant at home
Maessen et al. (2008) [75]	Enhanced Recovery After Surgery (ERAS) • Reduction in the postoperative recovery period to reduce overall hospital length of stay	Patients undergoing elective colorectal resection	Hospital	Practice Change	• No significant difference in proportion of patients with a discharge delay post-ERAS program • Approximately 90% of patients pre and post-ERAS were not discharged on the day discharge criteria/ functional recovery were met	• Additional recovery statistics should be added as outcomes of the ERAS program
Mahant et al. (2008) [59]	Medical Care Appropriateness Protocol (MCAP) - Audit and Feedback • A tool that provides information on hospital bed use (qualified and nonqualified hospital days)	Pediatric inpatients	Hospital Hospital for Sick Children	Tools and Guidelines	• Significantly lower risk of inappropriate hospital days • During the intervention, 33% of bed days were nonqualified, compared to 47% pre-intervention • No change in 48-hour readmission rate	• Reduced inappropriate hospital days, without impacting readmission rates • Identified processes that impact inappropriate hospital days
Mahto et al. (2009) [76]	Hospital Diabetes Outreach Service • A service to prevent admission through a number of strategies (improved access to services, management of medical problems, early discharge	Acutely admitted patients with diabetes	Hospital New Cross Hospital, 700 beds	Practice Change	• Reduction in bed occupancy, inappropriate admissions, delayed discharges and effective discharge planning	• The restructured hospital diabetes outreach service improved outcomes for inpatients with diabetes

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
	planning, organization of follow-up care)					
Maloney et al. (2007) [49]	Patient Tracker • A web-based application to facilitate the discharge process by enhancing communication between disciplines	Inpatients	Hospital Primary Children's Medical Center	Tools and Guidelines Information Sharing Live	• Decreased number of cancelled surgeries, median emergency department length of stay and average number of inpatient admissions	• Healthcare information technology can facilitate bed management efficiencies • Improved coordination and overall inpatient flow
Manville et al. (2014) [95]	Transitional Care Unit • A rehabilitation-style unit with enhanced nursing and rehabilitation services for elderly patients	Elderly ALC patients (70+)	Hospital St Joseph's Hospital, 22-bed transitional care unit	Infrastructure and Money	• Improved health outcomes and discharge disposition, decreased length of stay and costs per patient	• Improved health functional outcomes, delivered at a lower cost
Meehan et al. (2018) [77]	Discharge to Assess (D2A) • Patients who require care support are discharged home, or to the community, for a needs assessment in their personal environment	Patients discharged through D2A	Hospital	Practice Change	• Assists with early and effective hospital discharge • 60% of patients and caregivers reported a positive experience with D2A • Communication was noted as an issue	• Patients and caregivers reported positive and negative experiences with D2A, but it may be beneficial in improving outcomes for some patients
Moeller et al. (2006) [60]	Critical Pathway • Criteria for the management and discharge of patients admitted with community-acquired pneumonia	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 to 92% of patients without a prolonged length of stay • Hierarchical Assessment of Balance and Mobility score at clinical stability was significantly associated with	• Patients outcomes can be improved by standardizing 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

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
					physicians' and families' assessment of the patients' discharge readiness	
Mur-Veeman et al. (2011) [61]	Buffer Management • A tool that aims to balance patient flow between hospital and nursing homes by maximizing patient throughput	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	• To practically apply buffer management, current routines, principles and beliefs should shift to focus on flow between organizations rather than within one organization
Niemeijer et al. (2010) [62]	Lean Six Sigma • An initiative based on Lean Six Sigma to reduce length of stay, improve discharge procedures, create admission capacity and reduce costs	Trauma patients	Hospital University Medical Center 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	• Lean Six Sigma is effective in reducing length of stay and improving financial efficiency in trauma care
Panis et al. (2004) [78]	Dutch Evaluation Protocol • Altering discharge procedures to assess inappropriate hospital stay, efficiency and patient logistics	Mothers of newborn patients	Hospital Maternity unit of 17 beds (715 total hospital beds)	Practice Change	• Reduction in inappropriate patient stay by 6.1% • Decrease in length of stay by 0.7 days	• Discharge criteria can reduce inappropriate patient stays related to discharge processes • Shifting maternity care to outpatient settings can reduce hospital length of stay
Patel et al. (2019) [43]	Multidisciplinary Team-Based Structure for Discharge Rounds • Interventions based around multidisciplinary team-based discharge planning rounds (afternoon huddles, pilot teams for physician continuity)	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 to control	• Multidisciplinary discharge rounds can improve discharge efficiency, length of stay and 30-day readmissions

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
Pirani (2010) [44]	Nurse Participation and Patient and Family Involvement • Communication between the nurse and patient/ family to promote continuity of care and coordination of services	Those experiencing delayed discharge	NR	Information Sharing Live	• Enhancing nurse involvement in the discharge planning process can improve delayed discharges	• 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 et al. (2017) [103]	Simulation Modelling • Statistical simulations to explore patient flow and different discharge strategies that could reduce hospital occupancy	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)	• Hospital occupancy rates and overcrowding can be improved by improving discharge processes
Rae et al. (2007) [96]	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 Money	• 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	• 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 et al. (2013) [50]	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 2 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 program from staff	• The program did not reduce length of stay and was perceived negatively by staff

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
Sampson et al. (2006) [79]	Diabetes inpatient specialist nurse (DISN) • Diabetes management, based on structured group education, for all diabetes inpatients	Diabetes inpatients	Hospital Norfolk and Norwich University Hospital NHS Trust, 989 beds	Practice Change	• Decreased mean excess bed days by 0.7 days (from 1.9 to 1.2)	• Diabetes inpatient specialist nurse reduced excess bed occupancy
Shah (2007) [97]	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 Money	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	• More patients were admitted to GM services and had a shorter length of stay than OAP
Sobotka et al. (2017) [51]	The Hospital-to-Home Transitional Care Program at AHK (Almost Home Kids) • A program to support and educate families on providing care for medically stable children at home	Pediatric inpatient	Transitional and Respite Centre Almost Home Kids	Practice Change Information Sharing Live	• 2 months following support at AHK, the patient transitioned home to be cared for by his mother and home care team	• Transitional care programs can improve care for vulnerable populations by reducing health and developmental differences
Starr-Hemburrow et al. (2011) [80]	Home First • A program designed to help keep patients in their homes (with community supports) for as long as possible;	ALC patients	Hospitals	Practice Change	• Rate of ALC patients decreased by at least 50% across the region of study	• Inter and intra-professional collaboration is important to standardize discharge processes, build trust and respect and

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
	focusing on providing access to needed services					improve coordination of care
Sutherland et al. (2013) [45]	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	• A collaborative approach combining the three strategies should be considered to address ALC
Taber et al. (2013) [81]	Comprehensive Interdisciplinary Improvement Initiative • A program 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 Change	• Delayed discharges decreased by 14% • Readmission rate (7-day) decreased by 50% • Acute rejection and infection rates decreased	• Improving medication safety post kidney transplant can improve clinical outcomes (acute rejection and infection rates, readmission rates)
Udayai et al. (2012) [82]	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 Change	• Discharge time was decreased by 21% (from 247 to 195 minutes) • Patients had improved satisfaction with the discharge process	• Improving discharge time allowed for more patients to be managed, improving revenue • Leadership support and employee participation were essential for success
Williams et al. (2010) [52]	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 Change Information Sharing Live	• Delayed discharges increased by 4% (from 27% to 31%)	• The critical care outreach role did not decrease delayed discharges • Reducing delays requires a collaborative approach focusing on hospital flow, rather than just the discharge process

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
Younis et al. (2011) [53]	Enhanced Recovery Program • A program 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	• Pre-operatively integrating stoma management education into an enhanced recovery program can reduce delayed discharges
Grey Literature						
Anonymous (2008) [99]	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 specialized 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	• Patients can be safely discharged through support from the discharge fund
Anonymous (2010) [46]	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%	• NR
Calveley (2007) [83]	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 Health Care, 18000 beds	Practice Change	• NR	• Healthcare solutions should be developed in partnership with health and community service providers

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
Manzano-Santaella (2009) [100]	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	• Quantitative measures (days delayed and costs) conflict with the social aspects of overall health and well-being
Krystal (2019) [86]	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 personalized care plan)	Medically and socially complex and frail elderly	Hospital Southlake Regional Health Centre	Practice Change	• Reduction in ALC days (average of 10.6 days) • 1088 ALC days avoided • Positive patient and provider experiences	• Engaging partners early in the conception of the program was critical to its success
Walker (2011) [2]	Recommendations for Improving Care for the Aging 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	• Community supports should be increased to keep people in their home as long as possible • Programs and services should be aimed at restoration and reactivation
North West Community Care Access	Wait at Home • Allows seniors to get their healthcare needs from their	Seniors waiting for	NR	Practice Change	• NR	• Staying home provides benefits for seniors including fewer risks

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
Centre (2011) [88]	home through a variety of services for a up to 90 days	LTC placement				(germs/ viruses) and a familiar setting compared to the hospital
Toronto Central Community Care Access Centre (2015) [67]	ALC Avoidance Framework • To create a standardized approach to avoid delayed discharges through 12 leadings practices and associated strategies (identifying a date of discharge, engaging with substitute decision makers, etc.)	NR	NR	Tools and Guidelines	• NR	• This framework can help improve results around ALC avoidance and management
Province of New Brunswick (2017) [92]	ALC Collaborative Committee • A committee developed to identify and implement priority strategic initiatives	NR	NR	Information Sharing Live Practice Change Infrastructure and Finance	• Reduction in percentage of acute hospital days used by patients waiting for discharge from 19.6% to 17.5%	• NR
NHS Improvement (2018) [104] Starr-Hemburrow (2010) [91] LHIN Collaborative (2011) [87] Shah (2011) [90]	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 visualize plans	• Clinical leadership is essential for implementing these initiatives
	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%	

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
	Multiagency Discharge Event (MADE) • 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 (2008) [84]	Home First • A program 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 Change	• Percent of ALC (acute) reduced from 22-28% to 4-6%	• Culture change requires support and attention to be sustained over time
Adams, Care and Repair England (2017) [98]	Home First • A program 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 Change	• NR	• Home First should be implemented as a system-wide approach
Shah (2010) [89]	Home First • A program 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 organizations	Practice Change	• 2-fold reduction in monthly average of ALC patients • 30.5% reduction in number of ALC to LTC hospital referrals	• Key success factors included: eliminating long discharge processes, having engaged leadership, having measurable targets, monitoring performance and educating patients and providers
Joint Improvement Team (2013) [85]	• NR	ALC patients	Nine community hospital corporations, 14 hospital sites and a mental health	Practice Change	• Expected to reduced ALC days by 30% over the next three years	• ALC is a complex issue and requires coordination across sectors • Implementation of the recommendations will help to reduce ALC days and improve patient flow

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results	Key conclusions
			centre in one Ontario region Total of 1642 beds across the facilities			
Adams, Care and Repair England (2017) [98]	West of England Care and Repair • Enables older patients to return home from hospital quickly and safely by organizing 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	• Large savings for the health system can be generated with the implementation of this intervention
Shah (2010) [89]	Home First • A program designed to help keep patients in their homes (with community supports)	Elderly patients	Hospital/ community in Mississauga Halton Local Health Integration Network	Practice Change	• The equivalent of 35 acute care beds have been saved over 2 years • 250 people have been diverted from LTC placement	• Allows patients the opportunity to regain independence and return home • ALC solutions need a collaborative, cross-sectoral approach
Joint Improvement Team (2013) [85]	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 Change	• Factors in reducing delays include: identifying estimated date of discharge, using a framework for admissions, transfers and discharges, appointing a provider for coordinating the patients discharge plan, screening for frailty, using transitional and intermediate care services, adopting a home first culture	• There are a number of factors to successfully reduce delays

Abbreviations: ALC = alternate level of care; ERAS = Enhanced Recovery After Surgery; GM = geriatric medicine; OAP = Old Age Psychiatry; AHK = almost home kids

Figures

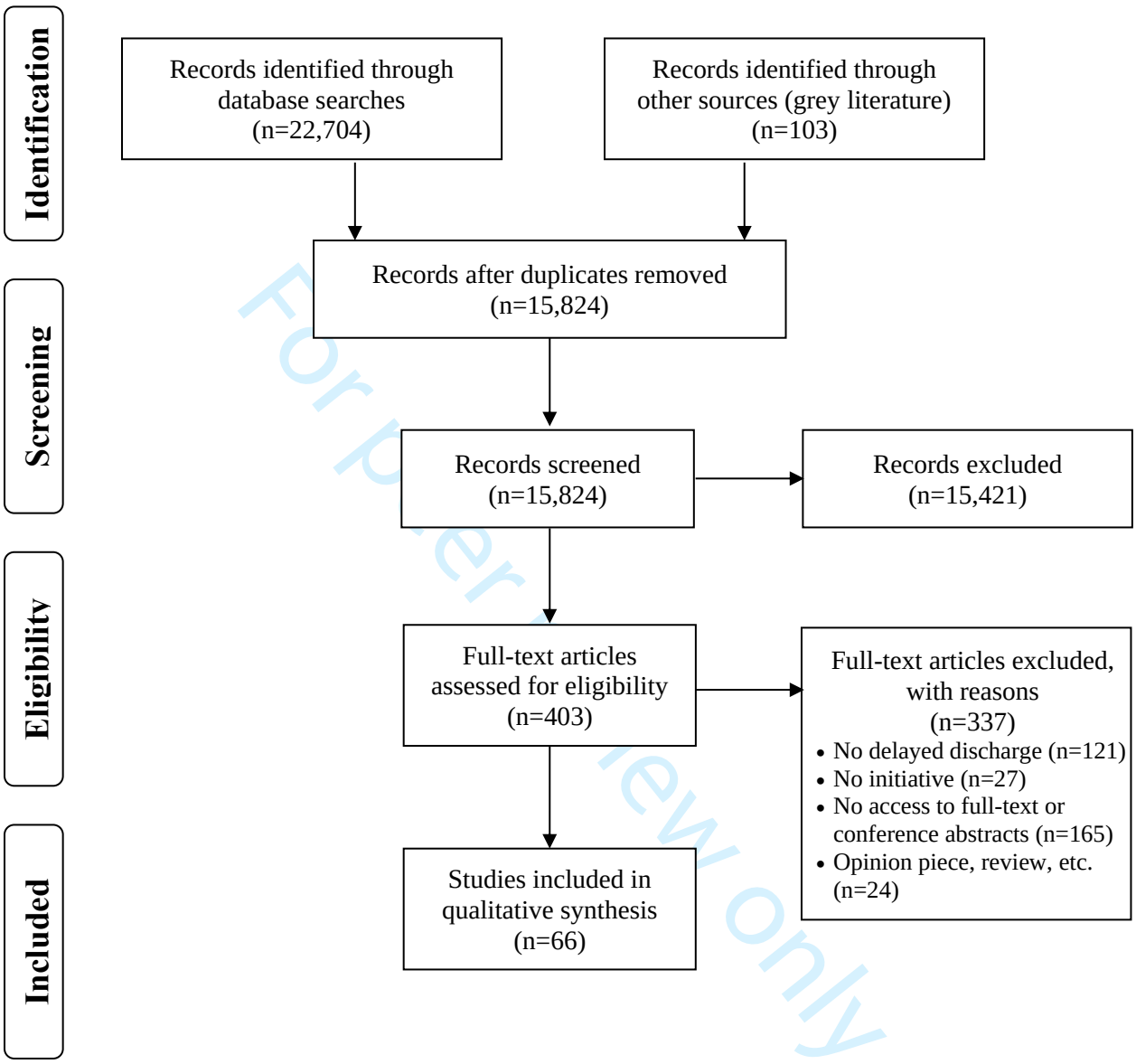

Figure 1. PRISMA flow diagram of included articles

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.	Page 7
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.	Pages 8-9
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
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 35-59 (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 17-21
Limitations	20	Discuss the limitations of the scoping review process.	Page 22
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 23
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 24

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 and acknowledge 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 (PRISMAScR): 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 capacit* 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
Béland 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	NR	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 • Patients with afternoon operations who were not discharged within 24 hours	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
			too busy to discharge all patients, adverse events, miscommunication across disciplines, too many patients on staffs' care, not all conditions dealt with, IV medications not transferred to oral, lack of diagnosis, waiting for rehabilitation services/ consultations, waiting for bed	
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

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.	Page 7
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.	Pages 8-9
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Page 9
Critical appraisal of individual	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe	Not applicable

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
sources of evidence§		the methods used and how this information was used in any data synthesis (if appropriate).	
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
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 35-59 (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 17-21
Limitations	20	Discuss the limitations of the scoping review process.	Page 22
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 23
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 24

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 and acknowledge 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 (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.

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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 and/or evaluated for delayed discharge involving a hospital setting. Two specific objectives were to review what 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 organizations 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 January 1, 2004 and August 16, 2019. Data were extracted using Microsoft Excel. Following extraction, a policy framework by Doern and Phidd was adapted to organize the included initiatives into categories: (1) Information Sharing; (2) Tools and Guidelines; (3) Practice Change; (4) Infrastructure and Finance; and (5) Other.

Results: Sixty-six articles were included in this review. The majority of initiatives were categorized 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, outcomes lacked experience measures, especially among patients and families. 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.

Protocol Registration: Open Science Framework (https://osf.io/rfzgu)

Keywords

- Delayed discharge, alternate level of care, delayed transfer, best practices, scoping review, hospitals, patient discharge, patient transfer, practice guidelines, literature review

Article summary: 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 (PRISMA-ScR) Checklist was followed
- A comprehensive search of peer reviewed and grey literature was conducted
- A critical appraisal of the interventions was not performed

Introduction

A delayed hospital discharge (known as alternate level of care (ALC) in Canada and delayed transfer of care in the United Kingdom) occurs when a patient is medically approved to be discharged, but remains in hospital for nonmedical reasons (e.g. 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 (e.g. 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 (e.g. medication error, exposure to infectious disease),[6,7] mortality,[8] as well as poor patient and family experiences.[9]

Patients who experience a delayed discharge in previous studies exhibited the following characteristics: female,[10] older,[10,11] physically or cognitively impaired,[4,12-15] aggressive behaviours, [16] use assistive devices,[17] psychiatric conditions,[10] neurologic disorders[15] 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 post-acute care (e.g. home care),[11,12,20-23] the lack of culturally and religiously diverse long-term care facilities,[15] limited or absent hospital services on weekends[24] and organizational delays (e.g. administrative delays, delayed assessments).[24,25] There are also 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 organizations 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 incentivize or dis-incentivize timely hospital discharges.[26-30]

The combination of patient and system-level factors contributing to delayed discharges can also have a large financial impact on patients, families, healthcare providers and the healthcare system.[3] A recent systematic review reported that delayed discharges cost approximately £200-565 (320-900 CAD) per patient, per day.[3] Further, it was estimated that the National Health Service (England) spends £820 million (1.3 billion CAD) every year on patients who have a discharge delay.[31] Similarly, a recent report from Canada stated that three hospitals located in Ottawa, Ontario, spend approximately 250,000 CAD per day (combined) on patients occupying beds at a level of care they no longer require.[32] In addition to large costs for hospitals and healthcare systems, delayed hospital discharges can result in out-of-pocket costs for patients and families.[33] Increased out-of-pocket costs, in addition to the others uncertainties associated with a delay, can heighten stress for patients and families, contribute to poor experiences and compromise quality of life.[9]

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 identity knowledge gaps.[34]

Methods

This review followed the scoping review methodology outlined by Levac and colleagues,[35] as well as the recently developed PRISMA-ScR reporting guidelines for scoping reviews (see Supplementary Table 1).[36] 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. The registered protocol can be found on Open Science Framework (https://osf.io/rfzgu).

Stage 1: Identifying the research question

The research question developed to lead this scoping review was: *what is known in the literature about initiatives (e.g. strategies, programs, 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 (e.g. 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 Supplementary 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: *alternate level of care, delayed discharge, delayed transfer, bed blocking, strategy, model, intervention, program, policy.*

Electronic databases were searched for relevant articles. The following electronic databases were searched on August 16, 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 January 1, 2004 and August 16, 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 (e.g. 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 editorial) 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 January 1, 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 de-duplicated following Bramer's method.[37] The initial database searches identified 22,704 articles, which were reduced to 15,824 following de-duplication (Figure 1). The titles and abstracts of the articles were reviewed on Covidence, a software platform for systematic and scoping reviews.[38] The research team (LC, JL, KK, SJTG, KMK, JK) independently screened the titles and abstracts of 40 articles to test their agreement. The reviewers had a good percent agreement (85%), so the remaining articles were divided amongst the team and screened by single reviewers (LC, KMK, JK). All disagreements were discussed in-person by the reviewers until a consensus was reached; minor revisions were made to the eligibility criteria to ensure clarity and consistency. Following title and abstract screening, articles were reviewed at the full-text level. Thirty full-text articles were independently screened by the research team (LC, KK, SJTG, KMK, JK, 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, MA).

Figure 1. PRISMA flow diagram of included articles [insert near here]

Stage 4: Charting the data

The data were charted by two reviewers (LC, 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 percent 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, summarizing 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, 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.[39] 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 (recommended initiatives and live information sharing); (2) tools and guidelines; (3) practice change; (4) infrastructure and finances and (5) other (see

Table 1 for category descriptions and examples). The categories assisted with the organization and presentation of the data.

Stage 6: Consultation

The research team presented findings of the scoping review to key stakeholders (e.g. 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 their feedback on the categorization/ organization of initiatives, as well as the identify knowledge gaps in order to develop targeted and actionable recommendations for future practice, policy and research.

Patient and public involvement

An Advisory Council (patient and caregiver partners), along with providers, managers and organizational 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 randomized trials and prospective studies. Most initiatives were evaluated (n=42), with different types of evaluations such as process evaluations and outcome evaluations. The United Kingdom (n=21), United States (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 pediatric population. Specific characteristics of the study population (i.e. 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 Supplementary 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,[39] we categorized the included initiatives as: information sharing (n=19); tools and guidelines (n=19); practice change (n=36); infrastructure and finances (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 (e.g. information sharing and practice change).

Figure 2. Categories of initiatives for improving delayed hospital discharges [insert near here]

Information sharing

The information sharing category included initiatives that promoted communication, leadership from senior staff and information exchange within or across organizations.[2,40-55] The majority of information sharing initiatives included team meetings and huddles to facilitate communication through in-person interactions (between staff or staff and patients/families).[40,41,43,44,46] Information sharing was promoted between multidisciplinary teams and patients to improve length of stay and continuity of care. For example, Adlington and colleagues (2018) implemented Plan Do Study Act cycles during weekly quality improvement meetings, in which driver diagrams (visual displays) were used to share information with the multidisciplinary project team on issues affecting length of stay and hospital bed occupancy.[40] This information was used to guide practice changes aimed at improving communication during the discharge process (daily rounds, focusing on long-stay patients), bed management (nursing support to prevent deterioration) and community services (email updates and involvement of care coordinators). The majority of initiatives shared information though in-person communication; however, some used technology. Caminiti and colleagues (2013) used technology-assisted communication to develop reports and audits to motivate and hold physicians accountable,[42] as in some health systems, physicians play a key role in designating patients as having a delayed discharge. Profiles for each physician were created monthly using hospital administrative data (containing length of stay, number of patient discharged that month). All information sharing initiatives resulted in positive outcomes (e.g. reduced length of stay and a decrease in delayed discharges).

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 (e.g. 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 (2017), with the goal of preventing ALC designations and reducing ALC rates.[56,67] This framework contains 12 leading practices, with specific strategies for organizational assessment. Some of the leading practices include: providing patients and substitute decision makers with an estimated date of discharge, identifying high-risk patients of becoming ALC and implementing escalation processes for the management of ALC challenges. Additional initiatives focused on improving patient flow through criteria-led discharges (discharging patients once a pre-determined set of criteria had been met) and critical pathways/ discharge guidelines.

The majority of initiatives categorized as tools and guidelines had positive results,[47-49,54-60,62,64-66] which included 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.[50] This initiative incorporated information sharing into a computer-based program 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.[51-55,63-66,68-92] Common practice change initiatives included hospital-based, nurse-led discharges and cross-sectoral transitional programs (e.g. Home First, Discharge to Assess, Hospital to Home). Most were implemented by nurses and multidisciplinary teams. Nurse and criteria-led discharges often involved a pre-determined 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 and colleagues (2012) conducted a retrospective study (N=128) to compare nurse-led and doctor-led discharge (standard discharge pathway) post laparoscopic surgery.[74] 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 post-operative care, etc.). When compared to 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 and had a significantly smaller number of patients with no medical or social reason for delayed discharge.

Another unique example of a practice change initiative was the 7-Day Hospital Initiative implemented by Blecker and colleagues.[70] 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 categorized 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,[77] or had no change[68,75] or a negative impact[52] on study outcomes (increase in delayed discharges). Meehan and colleagues (2018) explored patient experiences with a program (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 (i.e. at home).[77] 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 and colleagues (2010) prospective cohort study.[52] 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 emphasized 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 finances

The infrastructure and finance category included initiatives that involved tangible structural or financial changes (e.g. 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).[55,92-100] The Community Care (Delayed Discharges) Act in the United Kingdom was an initiative identified in multiple articles.[93,96,97,100] 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[94,95] and discharge funds[98,99] 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 (e.g. medical equipment, medications, transportation, home repairs). All initiatives categorized as infrastructure and finances had positive results on study outcomes, including reductions in discharge delays, length of stay and cost.[93-98]

Other initiatives

The other initiatives category included statistical and predictive modeling of initiatives to improve delayed discharges.[101-103] These models explored the impact of increasing the supply of nursing home beds,[101] potential care pathways for the elderly and reimbursement costs[102] and discharge strategies to reduce hospital occupancy.[103] Gaughan and colleagues' (2012) 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.[101] Their models further emphasized the importance of communication between hospitals and the long-term care sector to reduce social care delayed discharges. Similarly, Katasaliaki et al. (2005) 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.[102]

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.[2,45,92,104] Sutherland and Crump (2013) outlined three key solutions for improving delayed discharges in Canada: building more acute and post-acute care beds, increasing integrated care and creating financial incentives to improve the quality, quantity and effectiveness of healthcare.[45] The authors discussed challenges and limitations to implementing each of these options and emphasized that a potential solution to addressing delayed discharges was to combine the three strategies. Another Canadian report developed recommendations for providing care to the aging population and those experiencing a delayed discharge.[2] Walker (2011) outlined recommendations for improving primary care, the care continuum and senior friendly acute care, responding to special needs populations (e.g. persons with mental health concerns, addiction and neurological conditions, on dialysis or ventilators), and implementing an "Assess and Restore" model (a program to help patients maintain or regain functional independence, transition to home, and remain in the community for as long as possible).

The NHS Improvement (United Kingdom) also released a guide in 2019 on reducing long hospital stays.[104] 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 and (3) there is a lack of important contextual information reported (e.g. 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 categorization of initiatives (n=36), followed by information sharing (n=19) and infrastructure and finance (n=19). All initiatives categorized 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 (e.g. in hospital) in comparison to cross-sectoral initiatives (e.g. 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 (i.e. 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.[105-107] 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.[50] 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 a mixed methods or qualitative approach; thus highlighting a key focus for future research.

The majority of initiatives had an intervention or follow-up period of one year, but this ranged from four months to three years. Based on the limited number initiatives with a follow-up period of longer than one 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 and colleagues' Integrated Sustainability Framework consists of five categories of factors associated with the sustainability of interventions across different contexts and settings: outer context (e.g. policies, leadership, funding), inner context (e.g. culture, mission, funding), intervention characteristics (e.g. cost, adaptability, benefit), processes (e.g. partnership, training/support, planning, capacity building) and implementer and population characteristics (e.g. implementation skills/expertise, attitudes/motivation).[108] 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 emphasizes 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 (i.e. hosting daily rounds, developing a framework, etc.). A recent systematic review (2018) conducted by Geerligs and colleagues identified implementation barriers and facilitators of patient-focused, in-hospital interventions,[109] 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 need of patients, caregivers, providers, organizations 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,[70] 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 optimizing 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.[110,111]

Finally, this review highlighted a lack of consistency in how delayed discharge is 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 and colleagues (2004), who further explained the challenges differing definitions create when

attempting to compare findings.[112] 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. Patients and family engagement is both important and recommended by healthcare and government organizations; however, they are often excluded in the development and write-up of best practice guidelines.[113] 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 (e.g. 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 (e.g. 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 January 1, 2004 and August 16, 2019 and conducted in English. Our search strategy was comprehensive and we conducted an in-depth search of grey literature to minimize 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,[36] 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 concern 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 change, 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 programs 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 (e.g. 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 (i.e. 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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Competing interests

The authors have no conflicts of interests to declare.

Author contributions

KK, SJTG, JMS, JG and TK were responsible for the conception and design of the study, as well as acquisition of funding for the study. LC, SJTG, KMK and KK led the screening of articles and the analysis and interpretation of data, but all authors contributed to the analysis and

interpretation. Drafts of the manuscript were reviewed and revised by all authors. All of the authors read and approved the final manuscript.

Data Availability

All data relevant to the study are included in the article or uploaded as supplementary information.

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References

1. Bate A. Delayed transfers of care in the NHS, 2017:1-20.

2. Walker D. Caring For Our Aging Population and Addressing Alternate Level of Care: Report Submitted to the Minister of Health and Long-Term Care. Canada, 2011.

3. Rojas-García A, Turner S, Pizzo E, et al. Impact and experiences of delayed discharge: A mixed-studies systematic review. *Health Expect* 2018;21(1):41-56. doi: 10.1111/hex.12619 [published Online First: 2017/09/12]

4. Barnable A, Welsh D, Lundrigan E, et al. Analysis of the Influencing Factors Associated With Being Designated Alternate Level of Care. *Home Health Care Manag Pract* 2015;27(1):3-12. doi: 10.1177/1084822314539164

5. McCloskey R, Jarrett P, Stewart C, et al. Alternate level of care patients in hospitals: what does dementia have to do with this? *Canadian geriatrics journal : CGJ* 2014;17(3):88-94. doi: 10.5770/cgj.17.106

6. Walker H, Langton D, Thomson L. 'New to Forensic'; implementing a problem-based introductory educational programme for forensic practitioners in Scotland. *J Psychiatr Ment Health Nurs* 2011;18(10):934-42. doi: 10.1111/j.1365-2850.2011.01778.x

7. Jasinarachchi KH, Ibrahim IR, Keegan BC, et al. Delayed transfer of care from NHS secondary care to primary care in England: its determinants, effect on hospital bed days, prevalence of acute medical conditions and deaths during delay, in older adults aged 65 years and over. *BMC Geriatr* 2009;9:4-4. doi: 10.1186/1471-2318-9-4

8. Rosman M, Rachminov O, Segal O, et al. Prolonged patients' In-Hospital Waiting Period after discharge eligibility is associated with increased risk of infection, morbidity and mortality: a retrospective cohort analysis. *BMC Health Serv Res* 2015;15:246-46. doi: 10.1186/s12913-015-0929-6

9. Everall AC, Guilcher SJT, Cadel L, et al. Patient and caregiver experience with delayed discharge from a hospital setting: A scoping review. *Health Expect* 2019;22(5):863-73. doi: 10.1111/hex.12916

10. Amy C, Zagorski B, Chan V, et al. Acute care alternate-level-of-care days due to delayed discharge for traumatic and non-traumatic brain injuries. *Healthcare policy = Politiques de sante* 2012;7(4):41-55.

11. Hwabejire JO, Kaafarani HA, Imam AM, et al. Excessively long hospital stays after trauma are not related to the severity of illness: Let's aim to the right target! *JAMA Surgery* 2013;148(10):956-61. doi: 10.1001/jamasurg.2013.2148

12. Challis D, Hughes J, Xie C, et al. An examination of factors influencing delayed discharge of older people from hospital. *Int J Geriatr Psychiatry* 2014;29(2):160-68. doi: 10.1002/gps.3983

13. Costa AP, Hirdes JP. Clinical Characteristics and Service Needs of Alternate-Level-of-Care Patients Waiting for Long-Term Care in Ontario Hospitals. *Healthcare policy = Politiques de sante* 2010;6(1):32-46.

14. Costa AP, Poss JW, Peirce T, et al. Acute care inpatients with long-term delayed-discharge: evidence from a Canadian health region. *BMC Health Serv Res* 2012;12(1):172. doi: 10.1186/1472-6963-12-172

15. Kozyrskyi A, De Coster C, St John P. Long stay patients in Winnipeg acute care hospitals. *Healthc Manage Forum* 2002;Suppl:15-20.

16. Di Lorenzo R, Formicola V, Carra E, et al. Risk factors for long-stay in an Italian acute psychiatric ward: a 7-year retrospective analysis. *J Nurs Educ* 2013;4(1):p68. doi: https://doi.org/10.5430/jnep.v4n1p68

17. Rogers A, Clark EH, Rittenhouse K, et al. Breaking down the barriers! Factors contributing to barrier days in a mature trauma center. *J Trauma Acute Care Surg* 2014;76(1):191-95. doi: 10.1097/TA.0b013e3182aa3d5f

18. Mitchell F. Hospital Discharge: A Descriptive Study of the Patient Journey for Frail Older People with Complex Needs. *J Integr Care* 2010;18(3):30-36. doi: 10.5042/jic.2010.0247

19. Tan WS, Chong WF, Chua KS, et al. Factors associated with delayed discharges after inpatient stroke rehabilitation in Singapore. *Annals of the Academy of Medicine, Singapore* 2010;39(6):435-41. [published Online First: 2010/07/14]

20. Landeiro F, Leal J, Gray AM. The impact of social isolation on delayed hospital discharges of older hip fracture patients and associated costs. *Osteoporos Int* 2016;27(2):737-45. doi: 10.1007/s00198-015-3293-9 [published Online First: 2015/09/05]

21. Poulos CJ, Magee C, Bashford G, et al. Determining level of care appropriateness in the patient journey from acute care to rehabilitation. *BMC Health Serv Res* 2011;11:291-91. doi: 10.1186/1472-6963-11-291

22. Zeitz KM, Carter L, Robinson C. The ebbs and flows of changing acute bed capacity delays. *Aust Health Rev* 2013;37(1):66-9. doi: 10.1071/ah11077 [published Online First: 2012/12/04]

23. Anderson ME, Glasheen JJ, Anoff D, et al. Understanding predictors of prolonged hospitalizations among general medicine patients: A guide and preliminary analysis. *J Hosp Med* 2015;10(9):623-6. doi: 10.1002/jhm.2414 [published Online First: 2015/07/02]

24. Hendy P, Patel JH, Kordbacheh T, et al. In-depth analysis of delays to patient discharge: a metropolitan teaching hospital experience. *Clin Med (Lond)* 2012;12(4):320-3. doi: 10.7861/clinmedicine.12-4-320 [published Online First: 2012/08/31]

25. Salonga-Reyes A, Scott IA. Stranded: causes and effects of discharge delays involving non-acute in-patients requiring maintenance care in a tertiary hospital general medicine service. *Aust Health Rev* 2017;41(1):54-62. doi: 10.1071/ah15204 [published Online First: 2016/03/31]

26. Sutherland JM, Repin N, Crump RT, et al. Paying for Hospital Services: A Hard Look at the Options. Toronto, Canada: CD Howe Institute, 2013:1-32.

27. Sutherland J. Hospital payment policy in Canada: Options for the future: Canadian Health Services Research Foundation, 2011.

28. Ontario Ministry of Health and Long-Term Care. Quality-Based Procedures Indicators: An Implementation Guidance Document. Ontario, Canada, 2014:1-38.

29. David G, Polsky D. Home Health Services, Economics of. In: Culyer AJ, ed. Encyclopedia of Health Economics. San Diego: Elsevier 2014:477-83.

30. HM Treasury. Spring Budget 2017. United Kingdom, 2017.

31. Knowles G, Burke MR, Carr M, et al. Independent Expert Review of Delayed Discharges: Department of Health, 2018.

32. Fagan L. 'Bed blockers' costing Ottawa hospitals millions. Glut of patients awaiting more appropriate care a 'crisis,' health workers say. Ottawa: CBC News, 2019.

33. McCloskey R, Jarrett P, Stewart C. The Untold Story of Being Designated an Alternate Level of Care Patient. *Healthcare policy = Politiques de sante* 2015;11(1):76-89.

34. Munn Z, Peters MDJ, Stern C, et al. Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Med Res Methodol* 2018;18(1):143. doi: 10.1186/s12874-018-0611-x

35. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implementation Science* 2010;5(1):69. doi: 10.1186/1748-5908-5-69

36. Tricco AC, Lillie E, Zarin W, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and ExplanationThe PRISMA-ScR Statement. *Ann Intern Med* 2018;169(7):467-73. doi: 10.7326/M18-0850

37. Bramer WM, Giustini D, de Jonge GB, et al. De-duplication of database search results for systematic reviews in EndNote. *J Med Libr Assoc* 2016;104(3):240-43. doi: 10.3163/1536-5050.104.3.014

38. Babineau J. Product review: Covidence (systematic review software). *JCHLA / JABSC* 2014;35(2):68-71. doi: https://doi.org/10.5596/c14-016

39. Hosseus D, Pal LA. Anatomy of a Policy Area: The Case of Shipping. *Can Public Policy* 1997;23(4):399-415. doi: 10.2307/3552071

40. Adlington K, Brown J, Ralph L, et al. Better care: reducing length of stay and bed occupancy on an older adult psychiatric ward. *BMJ Open Qual* 2018;7(4):e000149. doi: https://dx.doi.org/10.1136/bmjoq-2017-000149

41. Boyd SS. Hospital Administrators' Strategies for Reducing Delayed Hospital Discharges and Improving Profitability. *Walden Dissertations and Doctoral Studies* 2017:1-1.

42. Caminiti C, Meschi T, Braglia L, et al. Reducing unnecessary hospital days to improve quality of care through physician accountability: a cluster randomised trial. *BMC Health Serv Res* 2013;13(1):14-14. doi: 10.1186/1472-6963-13-14

43. Patel H, Yirdaw E, Yu A, et al. Improving Early Discharge Using a Team-Based Structure for Discharge Multidisciplinary Rounds. *Prof Case Manag* 2019;24(2):83-89. doi: http://dx.doi.org/10.1097/NCM.0000000000000318

44. Pirani SSA. Prevention of delay in the patient discharge process: an emphasis on nurses' role. *Journal for Nurses in Staff Development* 2010;26(4):E1-5. doi: 10.1097/NND.0b013e3181b1ba74

45. Sutherland JM, Crump RT. Alternative Level of Care: Canada's Hospital Beds, the Evidence and Options. *Healthcare policy = Politiques de sante* 2013;9(1):26-34.

46. Anonymous. Patient flow initiatives decrease LOS, up capacity. *Hosp Case Manag* 2010;18(8):117-24.

47. Brankline AL, Coyle CM, Jencks KA, et al. Practical innovations: technology-assisted referrals. *Soc Work Health Care* 2009;48(8):768-76. doi: 10.1080/00981380902958213

48. Henwood M. Effective partnership working: A case study of hospital discharge. *Health Soc Care Community* 2006;14(5):400-07. doi: http://dx.doi.org/10.1111/j.1365-2524.2006.00651.x

49. Maloney CG, Wolfe D, Gesteland PH, et al. A tool for improving patient discharge process and hospital communication practices: the "Patient Tracker". *AMIA Annu Symp Proc* 2007:493-97.

50. Roberts K, Stiller K, Harling R, et al. Impacts and perceptions of a computer-based length of stay benchmarking program. *Int J Ther Rehabil* 2013;20(5):237-45. doi: https://doi.org/10.12968/ijtr.2013.20.5.237

51. Sobotka SA, Agrawal RK, Msall ME. Prolonged Hospital Discharge for Children with Technology Dependency: A Source of Health Care Disparities. *Pediatr Ann* 2017;46(10):e365-e70. doi: 10.3928/19382359-20170919-01

52. Williams TA, Leslie GD, Brearley L, et al. Discharge delay, room for improvement? *Aust Crit Care* 2010;23(3):141-49. doi: 10.1016/j.aucc.2010.02.003

53. Younis J, Salerno G, Fanto D, et al. Focused preoperative patient stoma education, prior to ileostomy formation after anterior resection, contributes to a reduction in delayed discharge within the enhanced recovery programme. *Int J Colorectal Dis* 2011:1-5. doi: http://dx.doi.org/10.1007/s00384-011-1252-2

54. Chidwick P, Oliver J, Ball D, et al. Six Change Ideas that Significantly Minimize Alternate Level of Care (ALC) Days in Acute Care Hospitals. *Healthc Q* 2017;20(2):37-43. doi: 10.12927/hcq.2017.25226

55. Baumann M, Evans S, Perkins M, et al. Organisation and features of hospital, intermediate care and social services in English sites with low rates of delayed discharge. *Health Soc Care Community* 2007;15(4):295-305. doi: 10.1111/j.1365-2524.2007.00697.x

56. Burr E, Dickau S. Leading Practices in Alternate Level of Care (ALC) Avoidance: A Standardized Approach. *Healthc Q* 2017;20(2):44-47. doi: 10.12927/hcq.2017.25227

57. Holland DE, Pacyna JE, Gillard KL, et al. Tracking Discharge Delays: Critical First Step Toward Mitigating Process Breakdowns and Inefficiencies. *J Nurs Care Qual* 2016;31(1):17-23. doi: http://dx.doi.org/10.1097/NCQ.0000000000000141

58. Lian YC, Ying SHK, Peng CC, et al. Early discharge study for premature infants: singapore general hospital. *Perm J* 2008;12(4):15-18. doi: 10.7812/tpp/08-040

59. Mahant S, Peterson R, Campbell M, et al. Reducing inappropriate hospital use on a general pediatric inpatient unit. *Pediatrics* 2008;121(5):e1068-73. doi: 10.1542/peds.2007-2898

60. Moeller JJ, Ma M, Hernandez P, et al. Discharge delay in patients with community-acquired pneumonia managed on a critical pathway. *Can J Infect Dis Med Microbiol* 2006;17(2):109-13. doi: http://dx.doi.org/10.1155/2006/375645

61. Mur-Veeman I, Govers M. Buffer management to solve bed-blocking in the Netherlands 2000-2010. Cooperation from an integrated care chain perspective as a key success factor for managing patient flows. *Int J Integr Care* 2011;11(Spec 10th Anniversary Ed):e080. doi: 10.5334/ijic.650

62. Niemeijer GC, Trip A, Ahaus KT, et al. Quality in trauma care: improving the discharge procedure of patients by means of Lean Six Sigma. *J Trauma* 2010;69(3):614-19. doi: 10.1097/TA.0b013e3181e70f90

63. Ardagh M, Tonkin G, Possenniskie C. Improving acute patient flow and resolving emergency department overcrowding in New Zealand hospitals-the major challenges and the promising initiatives. *N Z Med J* 2011;124(1344):64-73.

64. Brown I, Jellish WS, Kleinman B, et al. Use of postanesthesia discharge criteria to reduce discharge delays for inpatients in the postanesthesia care unit. *J Clin Anesth* 2008;20(3):175-79. doi: http://dx.doi.org/10.1016/j.jclinane.2007.09.014

65. Gutmanis I, Speziale J, Van Bussel L, et al. The South West Local Health Integration Network Behavioural Supports Ontario Experience. *Healthc Q* 2016;18:50-56. doi: 10.12927/hcq.2016.24482

66. Lees-Deutsch L, Jackson J, Balaji DA, et al. Developing a Process for Criteria-Led Discharge: Selection of Patients for Efficient and Effective Discharge (SPEED). *J Nurs Care Qual* 2019 doi: http://dx.doi.org/10.1097/NCQ.0000000000000423

67. Toronto Central Community Care Access Centre. ALC Avoidance Leading Practices and Improvement Strategies for the Acute Care Sector. Ontario, Canada, 2015.

68. Arendts G, Fitzhardinge S, Pronk K, et al. Front-loading allied health intervention in the emergency department does not reduce length of stay for admitted older patients. *Int J Clin Pract* 2013;67(8):807-10. doi: 10.1111/ijcp.12153

69. Béland F, Bergman H, Lebel P, et al. A system of integrated care for older persons with disabilities in Canada: results from a randomized controlled trial. *J Gerontol A-Biol* 2006;61(4):367-73. doi: 10.1093/gerona/61.4.367

70. Blecker S, Goldfeld K, Park H, et al. Impact of an Intervention to Improve Weekend Hospital Care at an Academic Medical Center: An Observational Study. *JGIM: Journal of General Internal Medicine* 2015;30(11):1657-64. doi: 10.1007/s11606-015-3330-6

71. Boutette M, Hoffer A, Plant J, et al. Establishing an integrated model of subacute care for the frail elderly. *Healthc Manage Forum* 2018;31(4):133-36. doi: 10.1177/0840470418774807

72. Bowen A, Kumar R, Howard J, et al. Nurse led discharge: improving efficiency, safely. *Clin Govern Int J* 2013;19(2):110-16. doi: 10.1108/CGIJ-03-2013-0007

73. El-Eid GR, Kaddoum R, Tamim H, et al. Improving hospital discharge time: a successful implementation of Six Sigma methodology. *Medicine* 2015;94(12):e633-e33. doi: 10.1097/MD.0000000000000633

74. Graham L, Neal CP, Garcea G, et al. Evaluation of nurse-led discharge following laparoscopic surgery. *J Eval Clin Pract* 2012;18(1):19-24. doi: 10.1111/j.1365-2753.2010.01510.x

75. Maessen JMC, Dejong CHC, Kessels AGH, et al. Length of stay: An inappropriate readout of the success of enhanced recovery programs. *World J Surg* 2008;32(6):971-75. doi: http://dx.doi.org/10.1007/s00268-007-9404-9

76. Mahto R, Venugopal H, Vibhuti VS, et al. The effectiveness of a hospital diabetes outreach service in supporting care for acutely admitted patients with diabetes. *QJM* 2009;102(3):203-07. doi: http://dx.doi.org/10.1093/qjmed/hcn174

77. Meehan L, Banarsee R, Dunn-Toroosian V, et al. Improving outcomes for patients discharged early using a home assessment scheme. *London J Prim Care* 2018;10(3):62-67. doi: http://dx.doi.org/10.1080/17571472.2018.1489467

78. Panis LJ, Verheggen FW, Pop P, et al. The impact of hospital discharge on inappropriate hospital stay. *Int J Health Care Qual Assur Inc Leadersh Health Serv* 2004;17(4-5):189-93. doi: 10.1108/09526860410541504

79. Sampson MJ, Crowle T, Dhatariya K, et al. Trends in bed occupancy for inpatients with diabetes before and after the introduction of a diabetes inpatient specialist nurse service. *Diabet Med* 2006;23(9):1008-15. doi: 10.1111/j.1464-5491.2006.01928.x

80. Starr-Hemburrow L, Parks JM, Bisaillon S. Home First: reducing ALC and achieving better outcomes for seniors through inter-organizational collaboration. *Healthc Q* 2011;14(1):70-76. doi: 10.12927/hcq.2011.22162

81. Taber DJ, Pilch NA, McGillicuddy JW, et al. Improved Patient Safety and Outcomes With a Comprehensive Interdisciplinary Improvement Initiative in Kidney Transplant Recipients. *Am J Med Qual* 2013;28(2):103-12. doi: http://dx.doi.org/10.1177/1062860612450309

82. Udayai K, Kumar P. Implementing six sigma to improve hospital discharge process. *Int J Pharm Sci Res* 2012;3(11):4528-32. doi: http://dx.doi.org/10.13040/IJPSR.0975-8232.3(11).4528-32

83. Calveley P. Doing, not talking: hospital admission avoidance. *Nursing and Residential Care* 2007;9(5):230-32. doi: 10.12968/nrec.2007.9.5.23554

84. Central East LHIN ALC Task Group. Alternate Level of Care Systems Issues and Recommendations. Ontario, Canada, 2008.

85. Joint Improvement Team. Home First - Ten Actions to Transform Discharge. United Kingdom, 2013.

86. Krystal A. Southlake at Home Webinar. Canada, 2019.

87. LHIN Collaborative. Sharing Best Practices: Transition Management in Ontario - Home First: Implementation Guide and Toolkit. Ontario, Canada, 2011.

88. North West Community Care Access Centre. Wait at Home Fact Sheet. Ontario, Canada, 2011.

89. Shah N. A New Philosophy Towards Solving The ALC Crisis (Home First). Ontario, Canada, 2010.

90. Shah N. A Call to Action on ER/ALC: Promoting Effective Care Across the Health Continuum. Ontario, Canada, 2011.

91. Starr-Hemburrow L. Home First - Optimizing Patient Flow and Patient Centred Care Canada, 2010.

92. Province of New Brunswick. Health Annual Report 2016-2017. New Brunswick, Canada, 2017.

93. Behan D. Delayed transfers of care -- an early review of progress. *J Integr Care* 2005;13(1):43-47. doi: https://doi.org/10.1108/14769018200500008

94. Levin KA, Crighton E. Measuring the impact of step down intermediate care on delayed discharge: an interrupted time series analysis. *J Epidemiol Community Health* 2019;73(7):674-79. doi: http://dx.doi.org/10.1136/jech-2018-211628

95. Manville M, Klein MC, Bainbridge L. Improved outcomes for elderly patients who received care on a transitional care unit. *Canadian family physician Medecin de famille canadien* 2014;60(5):e263-71.

96. Rae B, Busby W, Millard PH. Fast-tracking acute hospital care - from bed crisis to bed crisis. *Aust Health Rev* 2007;31(1):50-62. doi: 10.1071/ah070050

97. Shah A. The impact of the community care (delayed discharge) act 2003 on the length of stay and bed occupancy in old age psychiatry units in England. *Int J Geriatr Psychiatry* 2007;22(11):1164-65. doi: http://dx.doi.org/10.1002/gps.1808

98. Adams S, Care & Repair England. Reducing Delayed Transfer of Care through housing interventions: Evidence of Impact. United Kingdom, 2017.

99. Anonymous. Expedited discharge fund helps uninsured patients. Plan frees up beds for patients who can pay. *Hosp Case Manag* 2008;16(5):70-75.

100. Manzano-Santaella A. Payment by Results and delayed discharges. *Br J Health Care Manag* 2009;15(9):440-43. doi: 10.12968/bjhc.2009.15.9.44008

101. Gaughan J, Gravelle H, Siciliani L. Testing the bed-blocking hypothesis: Does nursing and care home supply reduce delayed hospital discharges? *Health Econ* 2015;24(S1):32-44. doi: http://dx.doi.org/10.1002/hec.3150

102. Katsaliaki K, Brailsford S, Browning D, et al. Mapping care pathways for the elderly. *J Health Organ Manag* 2005;19(1):57-72. doi: http://dx.doi.org/10.1108/14777260510592130

103. Qin S, Thompson C, Bogomolov T, et al. Hospital occupancy and discharge strategies: a simulation-based study. *Intern Med J* 2017;47(8):894-99. doi: http://dx.doi.org/10.1111/imj.13485

104. NHS Improvement. Guide to Reducing Long Hospital Stays. United Kingdom, 2018.

105. Hamilton AB, Finley EP. Qualitative methods in implementation research: An introduction. *Psychiatry Res* 2019;280:112516. doi: https://doi.org/10.1016/j.psychres.2019.112516

106. Southam-Gerow MA, Dorsey S. Qualitative and mixed methods research in dissemination and implementation science: introduction to the special issue. *J Clin Child Adolesc Psychol* 2014;43(6):845-50. doi: 10.1080/15374416.2014.930690 [published Online First: 2014/10/29]

107. Qualitative Research in Implementation Science group. Qualitative Methods in Implementation Science. United States: National Cancer Institute: Division of Cancer Control and Population Sciences, 2019:1-31.

108. Shelton RC, Cooper BR, Stirman SW. The Sustainability of Evidence-Based Interventions and Practices in Public Health and Health Care. *Annu Rev Public Health* 2018;39(1):55-76. doi: 10.1146/annurev-publhealth-040617-014731

109. Geerligs L, Rankin NM, Shepherd HL, et al. Hospital-based interventions: a systematic review of staff-reported barriers and facilitators to implementation processes. *Implement Sci* 2018;13(1):36-36. doi: 10.1186/s13012-018-0726-9

110. Green LW, Glasgow RE. Evaluating the relevance, generalization, and applicability of research: issues in external validation and translation methodology. *Evaluation & the health professions* 2006;29(1):126-53. doi: 10.1177/0163278705284445 [published Online First: 2006/03/03]

111. Balasubramanian BA, Cohen DJ, Davis MM, et al. Learning Evaluation: blending quality improvement and implementation research methods to study healthcare innovations. *Implement Sci* 2015;10(1):31. doi: 10.1186/s13012-015-0219-z

112. Glasby J, Littlechild R, Pryce K. Show Me the Way to go Home: A Narrative Review of the Literature on Delayed Hospital Discharges and Older People. *Br J Soc Work* 2004;34(8):1189-97. doi: 10.1093/bjsw/bch136

113. Zhao G, Kennedy C, Mabaya G, et al. Patient engagement in the development of best practices for transitions from hospital to home: a scoping review. *BMJ Open* 2019;9(8):e029693. doi: 10.1136/bmjopen-2019-029693

Tables

Table 1. Categories, descriptions and examples of initiative categorization

Category Name	Description	Examples
Information Sharing A - Live Sharing B - Recommended Initiatives – Calls to Action	• A - Information sharing through in-person or technology-based communication (synchronous communication) • B - Information sharing through documents which share suggestions, recommendations or for information purposes (motivation)	• A - Rounding, team meetings, one-on-on 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 • Implemented tool/ guidance document that is being used in the healthcare system	• Toolkits, guidelines, tools, escalation processes, frameworks
Practice Change	• A change in how care is delivered	• Nurse led discharges, roles of providers and/or composition of team are organized differently
Infrastructure and Finances	• 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)

869 **Table 2. Characteristics of Included Articles**

Author (Year)	Country	Objective	Method Study Design	Participants	Sample Size	Key Conclusions
Database Searches						
Adlington et al. (2018)[40]	United Kingdom	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 Quality Improvement	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 program and community team
Ardagh et al. (2011)[63]	New Zealand	Identify 10 common challenges and promising initiatives relating to patient flow and emergency department overcrowding	Qualitative NR	NR	NR	• To improve patient flow and emergency department overcrowding the following are needed: – a comprehensive, systematic approach – changes to resource usage – sharing of expertise and experience
Arendts et al. (2013)[68]	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 Non-randomized prospective pragmatic study	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;	3,572	• Multidisciplinary allied health team assessment in the emergency department has no benefit in reducing hospital length of stay

Author (Year)	Country	Objective	Method Study Design	Participants	Sample Size	Key Conclusions
				respiratory tract infection)		
Baumann et al. (2007)[55]	United Kingdom	Identify the factors causing good discharge practice performance and organization of services	Qualitative Descriptive	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)[93]	United Kingdom	Explore the experience of service users across the United Kingdom during the first 6 months of the implementation of the Community Care (Delayed Discharges) Act	Qualitative Explorative	NR	NR	• Fines have resulted in a reduction of delayed discharges • The act has brought health and social care together
Béland et al. (2006)[69]	Canada	Assess the transformation of the organization and delivery of health and social services with additional interventions for frail elderly people	Quantitative Randomized controlled trial	Frail elderly	1,309	• Changing delivery of care for frail elderly persons is feasible • Integrated care can reduce hospital and nursing home use, without impacting cost
Blecker et al. (2015)[70]	United States	Evaluate the impact of a weekend hospital intervention on care processes, clinical outcomes and length of stay	Quantitative Interrupted time series observational study	Non-obstetric patients hospitalized	57,163	• Increased care on weekends may contribute to improved hospital flow, without negatively impacting clinical outcomes (30-day readmissions and mortality)
Boutette et al. (2018)[71]	Canada	Serve frail elderly patients at risk of deconditioning and/or disability, caused by prolonged hospitalization	NR Review/ description of program	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 et al. (2014)[72]	United Kingdom	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

Author (Year)	Country	Objective	Method Study Design	Participants	Sample Size	Key Conclusions
Boyd (2017)[41]	United States	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)[47]	United States	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 et al. (2008)[64]	United States	Determine if the length of patient stay is reduced in the post-anesthesia care unit when nurses use discharge criteria	Quantitative Prospective clinical study	Adult, ASA physical status I, II, and III patients (18+) requiring general anesthesia	1,198	• Decreased post-anesthesia care unit length of stay and discharge delays while maintaining patient status
Burr et al. (2017)[56]	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 et al. (2013)[42]	Italy	Evaluate the effectiveness of a strategy aimed to reduce delayed hospital discharge	Quantitative Cluster, parallel group, randomized trial/ Quality improvement	Hospital units: geriatric, medicine, long-term care	3,498	• Physician direct accountability can reduce unnecessary and avoidable hospital days, especially when delays are within staff control
Chidwick et al. (2017)[54]	Canada	Discuss concepts and ideas that led to lowest ALC days in the province	Mixed methods	ALC patients	NR	• Improved patient flow and reduced ALC days through the

Author (Year)	Country	Objective	Method Study Design	Participants	Sample Size	Key Conclusions
			Quality improvement			implementation of a multi-dimensional approach
El-Eid et al. (2015)[73]	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
Gaughan et al. (2015)[101]	England	Investigate the reduction in hospital bed-blocking due to a greater supply of nursing home beds or reduced costs	Quantitative Statistical modelling - Empirical analysis	Patients waiting for hospital discharge	NR	• Improved coordination between health and long-term care is essential for addressing delayed discharges
Graham et al. (2012)[74]	United Kingdom	Evaluate the effect of the laparoscopic nurse specialist on patient discharge	Quantitative Retrospective comparison	Laparoscopic cholecystectomy and laparoscopic inguinal hernia repair patients	128	• Nurse-led discharge may increase discharge post-laparoscopic surgery without impacting patient care
Gutmanis et al. (2016)[65]	Canada	Outline change strategies and their impact health system transformation and those living with responsive behaviors and their family members	Mixed methods Quality improvement	Individuals with responsive behaviors	NR	• Improved coordination and communication across sectors • Provided healthcare providers with learning opportunities
Henwood (2006)[48]	United Kingdom	Examine the partnership between health and social care by exploring issues with hospital discharges	Case study Case study	Inpatients	NR	• Addressing and improving delayed discharges requires partnerships between health and social care and a whole systems-based approach
Holland et al. (2016)[57]	United States	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

Author (Year)	Country	Objective	Method Study Design	Participants	Sample Size	Key Conclusions
			Practice improvement project			
Katsaliaki et al. (2005)[102]	United Kingdom	Describe a project investigating potential care pathways for elderly people after discharge from hospital	Quantitative Discrete-event simulation, simulation model	Inpatients	NR	• Simulation is a suitable methodology for recording and evaluating the new post-acute packages
Lees-Deutsch et al. (2019)[66]	United Kingdom	Identify core characteristics of patient discharge criteria, recorded in clinical management plans or case notes	Quantitative Systematic observational retrospective review	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 et al. (2019)[94]	Scotland	Examine the impact of Intermediate Care and the 72-hour target on delayed hospital discharge	Quantitative Controlled interrupted time series design	Patients aged 75+	107,022	• Immediate impact on days delayed, but increasing rates days delayed over time suggests that Intermediate Care services may need to be adapted
Lian et al. (2008)[58]	Singapore	Develop methods to reduce the hospital length of stay for premature infants by 30%, within 6 months	Quantitative Retrospective review	Premature infants	78	• Discharge planning should begin upon hospital admission • Nurses should coach parents to prepare them to care for their infant at home
Maessen et al. (2008)[75]	Netherlands	Assess the effect of enhanced recovery after surgery program on discharge delays	Quantitative Retrospective/ prospective study	Patients undergoing elective colorectal resection	173	• Additional recovery statistics should be added as outcomes of the ERAS program
Mahant et al. (2008)[59]	Canada	Determine if an audit-and-feedback intervention reduces delayed	Quantitative	Pediatric inpatient	3194	• Reduced inappropriate hospital days, without impacting readmission rates

Author (Year)	Country	Objective	Method Study Design	Participants	Sample Size	Key Conclusions
		discharge in a general pediatric inpatient unit	Prospective observational study			• Identified processes that impact inappropriate hospital days
Mahto et al. (2009)[76]	United Kingdom	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 et al. (2007)[49]	United States	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 et al. (2014)[95]	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 et al. (2018)[77]	United Kingdom	Explore patients' experiences of hospital discharge with the discharge to assess scheme	Qualitative Descriptive	Patients discharged through discharge to assess	30	• Patients and caregivers reported positive and negative experiences with the scheme, but it may be beneficial in improving outcomes for some patients
Moeller et al. (2006)[60]	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 standardizing 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 et al. (2011)[61]	Netherlands	Explain the theory of buffer management and discuss related previous assumptions	NR	Bed blockers	NR	• To practically apply buffer management, current routines, principles and beliefs should shift

Author (Year)	Country	Objective	Method Study Design	Participants	Sample Size	Key Conclusions
			Review/ theoretical paper			to focus on flow between organizations rather than within one organization
Niemeijer et al. (2010)[62]	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
Panis et al. (2004)[78]	Netherlands	Reduce inappropriate hospital stay by adjusting patient logistics, increasing efficiency and providing comfortable surroundings	Quantitative Retrospective cohort study	Mothers of newborn patients	2,889 days of hospital stay of gynecology 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 et al. (2019)[43]	United States	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
Pirani (2010)[44]	Pakistan	Emphasize 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 et al. (2017)[103]	Australia	Identify which barriers to discharge influence hospital occupancy when targeted by a hospital-wide policy	Quantitative	NR	NR	• Hospital occupancy rates and overcrowding can be improved by improving discharge processes

Author (Year)	Country	Objective	Method Study Design	Participants	Sample Size	Key Conclusions
			Simulation modelling			
Rae et al. (2007)[96]	New Zealand	Illustrate how the Delayed Discharge Project solved a bed crisis and controlled expenditure	Quantitative Continuous quality improvement project	Acute general medical	20,034	• 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 et al. (2013)[50]	Australia	Undertake a preliminary trial of the Goal Length of Stay tool at a rehabilitation center	Quantitative Prospective study	Inpatients in 2 units: stroke rehabilitation unit (SRU) or Brain Injury Rehabilitation Unit (BIRU)	202	• The program did not reduce length of stay and was perceived negatively by staff
Sampson et al. (2006)[79]	United Kingdom	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)[97]	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
Sobotka et al. (2017)[51]	United States	Describe a hospital-to-home transitional care model	Case study Illustrative case design/ review	Pediatric inpatient	1	• Transitional care programs can improve care for vulnerable populations by reducing health and developmental differences
Starr-Hemburrow	Canada	Minimize the number of post-acute patients transitioning from hospital	Quantitative	ALC patients	NR	• Inter and intra-professional collaboration is important to

Author (Year)	Country	Objective	Method Study Design	Participants	Sample Size	Key Conclusions
et al. (2011)[80]		to long-term care and develop an integrated plan for appropriate care and placement	Quality improvement			standardize discharge processes, build trust and respect and improve coordination of care
Sutherland et al. (2013)[45]	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 et al. (2013)[81]	United States	Test a program 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 et al. (2012)[82]	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 • Leadership support and employee participation were essential for success
Williams et al. (2010)[52]	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	1,123	• The critical care outreach role did not decrease delayed discharges • Reducing delays requires a collaborative approach focusing on hospital flow, rather than just the discharge process
Younis et al. (2011)[53]	United Kingdom	Compare the effect of an enhanced recovery program 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 program can reduce delayed discharges
Grey Literature						
Anonymous (2008)[99]	United States	Create an expedited discharge fund to pay for goods and services inhibiting a patient's discharge	N/A News article	Uninsured patients	NR	• Patients can be safely discharged through support from the discharge fund

Author (Year)	Country	Objective	Method Study Design	Participants	Sample Size	Key Conclusions
		(medical equipment, medication and transportation)				
Anonymous (2010)[46]	United States	Improve patient flow through initiatives that decrease length of stay and increase capacity	N/A News article	NR	NR	• NR
Calveley (2007)[83]	United Kingdom	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)[100]	United Kingdom	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)[86]	Canada	NR	Mixed methods Continuous quality improvement and evaluation	Medically and socially complex and frail elderly	100+	• Engaging partners early in the conception of the program was critical to its success
Walker (2011)[2]	Canada	Develop recommendations of care for frail Canadians	N/A N/A	NR	NR	• Community supports should be increased to keep people in their home as long as possible • Programs and services should be aimed at restoration and reactivation
North West Community Care Access Centre (2011)[88]	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 N/A	Seniors waiting for LTC placement	NR	• Staying home provides benefits for seniors including fewer risks (germs/ viruses) and a familiar setting compared to the hospital
Toronto Central Community Care Access	Canada	NR	N/A N/A	NR	NR	• This framework can help improve results around ALC avoidance and management

Author (Year)	Country	Objective	Method Study Design	Participants	Sample Size	Key Conclusions
Centre (2015)[67]						
Province of New Brunswick (2017)[92]	Canada	Identify priority strategic initiatives and implement community support orders across the province	N/A Annual Report	NR	NR	• NR
NHS Improvement (2018)[104]	United Kingdom	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)[91]	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)[87]	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
Shah (2011)[90]	Canada	Ensure the appropriate community resources are in place to support the patient upon 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)[84]	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 and Repair	United Kingdom	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

Author (Year)	Country	Objective	Method Study Design	Participants	Sample Size	Key Conclusions
England (2017)[98]			Case Study			implementation of this intervention
Shah (2010)[89]	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)[85]	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

Abbreviations: N/A = not applicable; NR = not reported; ALC = alternate level of care; ED = emergency department; SRU = stroke rehabilitation unit (SRU); BIRU = Brain Injury Rehabilitation Unit; GM = geriatric medicine; OAP = Old Age Psychiatry

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Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results
Database Searches					
Adlington et al. (2018)[40]	Quality Improvement Program • Weekly quality improvement meetings with driver diagrams to implement Plan Do Study Act cycles	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 et al. (2011)[63]	10 Promising Initiatives • Special beds, hospital operations planning, discharge planning, access to imaging, responsive acute secondary services, pathways for acute patients, acute demand mitigation, enhanced ED layout, enhanced ED senior staffing, engagement of staff	NR	Hospitals	Tools and Guidelines Practice Changes	• Identified top 10 challenges and 10 promising initiatives related to patient flow and emergency department overcrowding
Arendts et al. (2013)[68]	Allied Health Assessment • A comprehensive assessment of patients by an allied health team within hours of presentation to the hospital through the emergency department	Patients (≥65) diagnosed with one or more of six predetermined conditions	Hospitals Two Australian tertiary hospitals	Practice Change	• No benefit in reducing hospital length of stay
Baumann et al. (2007)[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,

[1] Initiative category is based on Doern and Phidd's adapted framework 39. Hosseus D, Pal LA. Anatomy of a Policy Area: The Case of Shipping. *Can Public Policy* 1997;23(4):399-415. doi: 10.2307/3552071

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results
					• Systems for monitoring and communicating patients' progress, • Patient choice protocols • Ensure availability of responsive transportation and discharge lounges
Behan (2005)[93]	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	NR	7 areas across the United Kingdom	Infrastructure and Money	• National decrease in delayed discharges between 2003 and 2004
Béland et al. (2006)[69]	Integrated Care • Community-based multidisciplinary teams who provide integrated care and coordinate health and social service	Frail elderly	Community service centres/ organizations	Practice Change	• Significant (50%) reduction in the number of patients in the integrated care group that became ALC • No significant differences in utilization or costs between groups • Increased caregiver satisfaction
Blecker et al. (2015)[70]	7-Day Hospital Initiative • Increased hospital services on the weekend (e.g. diagnostic imaging, weekend discharges, physician and care management services)	Non-obstetric hospitalized patients	Hospital Tisch Hospital, 705 beds	Practice Change	• Decreased average length of stay by 13% • Increased proportion of weekend discharges by 12% • Decreased 30-day readmissions • No changes in mortality
Boutette et al. (2018)[71]	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 hospitalization	Hospitals Ottawa Hospital; Perley and Rideau Veterans' Health Centre	Practice Change	• N/A
Bowen et al. (2014)[72]	Nurse led discharge • Allows nurses to facilitate discharge based on specific criteria that was developed to guide the discharge	Adult ear, nose, throat patients having routine,	Hospital University Hospital of	Practice Change	• Significant reduction in rate of delayed discharges in both audits

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results
	process (also allows for discharge in evenings and on weekends)	elective, short-stay surgery	South Manchester		
Boyd (2017)[41]	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 (2009)[47]	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 Center	Information Sharing Live Tools and Guidelines	• Decreased length of stay and improved timely discharges of patients resulted in cost savings • Increased communication within and between the hospital and nursing homes
Brown et al. (2008)[64]	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 anesthesia	Hospital Postoperative recovery area of a large, tertiary-care, academic hospital	Tools and Guidelines Practice Change	• Decreased length of stay in the post-anesthesia care unit by 24% • Reduced discharge delays with nurse-led discharge • No change in adverse events (airway obstruction, reintubation, arrest)
Burr et al. (2017)[56]	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 et al. (2013)[42]	Physician Accountability • Physician motivation and accountability through monthly	Hospital Units: geriatric,	Hospital University Hospital of	Information Sharing Live	• Reduction in unnecessary, avoidable hospital days • No significant changes in 30-day readmission or mortality

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results
	reports and audits (can compare their length of stay results to other staff)	medicine, long-term care	Parma, 1267 beds		
Chidwick et al. (2017)[54]	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 Change Tools, guidelines Information sharing Live	• Lowest ALC days in Ontario • Eliminated ethical errors, improved patient discharge experience and decreased patient confusion
El-Eid et al. (2015)[73]	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 Center, 386 beds	Practice Change	• Significant reduction in length of stay post-intervention • Decreased discharge time (2.2 hours to 1.7 hours)
Gaughan et al. (2015)[101]	Increasing supply of nursing home beds • The use of modeling 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 et al. (2012)[74]	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 Change	• 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 post-discharge
Gutmanis et al. (2016)[65]	Behavioural Supports Ontario • A quality improvement initiative for older adults with responsive	Individuals with	South West LHIN	Practice Change	• Decreased ALC care cases among persons with behavioural needs

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results
	behaviours through the identification of change strategies and knowledge translation best practices	responsive behaviours		Tools, guidelines	• Improved perceptions from families and clients around patient care
Henwood (2006)[48]	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 et al. (2016)[57]	Tracking and reporting system • Development and evaluation of a discharge delay tracking and reporting mechanism	Inpatients	Hospital (academic medical center)	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 et al. (2005)[102]	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
Lees-Deutsch et al. (2019)[66]	Criteria Led Discharge - Selection of Patients for Efficient and Effective Discharge (SPEED) • Patient discharge is guided by a set of clinical criteria; once the patient meets the criteria, a member of the team can facilitate discharge	Patients discharged from the AMU and both short-stay wards	Hospital (acute medicine service with 4 clinical areas)	Tools and Guidelines Practice Change	• 27 patients were suitable for CLD, 23 were not • Mean wait time for the 27 suitable patients prior to discharge was 4 hours and 51 minutes • Discharge delays were often caused by system delays
Levin et al. (2019)[94]	Step-up Intermediate Care Units • A bridging service between hospital and home for individuals ready for discharge from acute care; allows for recovery and regaining of independence	Aged 75+	Hospital	Infrastructure and Money	• Reduced bed days delayed • Rate of days delayed increased over time
Lian et al. (2008)[58]	New Discharge Guidelines for Premature Babies • Development of new discharge guidelines for premature neonates	Premature infants	Hospital Singapore General Hospital	Tools and Guidelines	• Reduced median duration of hospitalization from 58.2 days to 34.9 days • Cost savings of $6174/ infant

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results
Maessen et al. (2008)[75]	Enhanced Recovery After Surgery (ERAS) • Reduction in the postoperative recovery period to reduce overall hospital length of stay	Patients undergoing elective colorectal resection	Hospital	Practice Change	• No significant difference in proportion of patients with a discharge delay post-ERAS program • Approximately 90% of patients pre and post-ERAS were not discharged on the day discharge criteria/ functional recovery were met
Mahant et al. (2008)[59]	Medical Care Appropriateness Protocol (MCAP) - Audit and Feedback • A tool that provides information on hospital bed use (qualified and nonqualified hospital days)	Pediatric inpatients	Hospital Hospital for Sick Children	Tools and Guidelines	• Significantly lower risk of inappropriate hospital days • During the intervention, 33% of bed days were nonqualified, compared to 47% pre-intervention • No change in 48-hour readmission rate
Mahto et al. (2009)[76]	Hospital Diabetes Outreach Service • A service to prevent admission through a number of strategies (improved access to services, management of medical problems, early discharge planning, organization of follow-up care)	Acutely admitted patients with diabetes	Hospital New Cross Hospital, 700 beds	Practice Change	• Reduction in bed occupancy, inappropriate admissions, delayed discharges and effective discharge planning
Maloney et al. (2007)[49]	Patient Tracker • A web-based application to facilitate the discharge process by enhancing communication between disciplines	Inpatients	Hospital Primary Children's Medical Center	Tools and Guidelines Information Sharing Live	• Decreased number of cancelled surgeries, median emergency department length of stay and average number of inpatient admissions
Manville et al. (2014)[95]	Transitional Care Unit • A rehabilitation-style unit with enhanced nursing and rehabilitation services for elderly patients	Elderly ALC patients (70+)	Hospital St Joseph's Hospital, 22-bed transitional care unit	Infrastructure and Money	• Improved health outcomes and discharge disposition, decreased length of stay and costs per patient
Meehan et al. (2018)[77]	Discharge to Assess (D2A) • Patients who require care support are discharged home, or to the community, for a needs assessment in their personal environment	Patients discharged through D2A	Hospital	Practice Change	• Assists with early and effective hospital discharge • 60% of patients and caregivers reported a positive experience with D2A • Communication was noted as an issue

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results
Moeller et al. (2006)[60]	Critical Pathway • Criteria for the management and discharge of patients admitted with community-acquired pneumonia	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 to 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-Veeman et al. (2011)[61]	Buffer Management • A tool that aims to balance patient flow between hospital and nursing homes by maximizing patient throughput	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
Niemeijer et al. (2010)[62]	Lean Six Sigma • An initiative based on Lean Six Sigma to reduce length of stay, improve discharge procedures, create admission capacity and reduce costs	Trauma patients	Hospital University Medical Center 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
Panis et al. (2004)[78]	Dutch Evaluation Protocol • Altering discharge procedures to assess inappropriate hospital stay, efficiency and patient logistics	Mothers of newborn patients	Hospital Maternity unit of 17 beds (715 total hospital beds)	Practice Change	• Reduction in inappropriate patient stay by 6.1% • Decrease in length of stay by 0.7 days
Patel et al. (2019)[43]	Multidisciplinary Team-Based Structure for Discharge Rounds • Interventions based around multidisciplinary team-based discharge planning rounds (afternoon huddles, pilot teams for physician continuity)	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 to control

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results
Pirani (2010)[44]	Nurse Participation and Patient and Family Involvement • Communication between the nurse and patient/ family to promote continuity of care and coordination of services	Those experiencing delayed discharge	NR	Information Sharing Live	• Enhancing nurse involvement in the discharge planning process can improve delayed discharges
Qin et al. (2017)[103]	Simulation Modelling • Statistical simulations to explore patient flow and different discharge strategies that could reduce hospital occupancy	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)
Rae et al. (2007)[96]	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 Money	• 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 et al. (2013)[50]	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 2 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 program from staff
Sampson et al. (2006)[79]	Diabetes inpatient specialist nurse (DISN) • Diabetes management, based on structured group education, for all diabetes inpatients	Diabetes inpatients	Hospital Norfolk and Norwich University Hospital NHS Trust, 989 beds	Practice Change	• Decreased mean excess bed days by 0.7 days (from 1.9 to 1.2)
Shah (2007)[97]	Community Care (Delayed Discharge) Act 2003	Inpatient - specialties of Geriatric	Hospitals	Infrastructure and Money	GM: • Decreased median and mean length of stay

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results
	• Local authorities are financially responsible (payments) to acute hospital when patients remain in hospital because community care arrangements have not been made	Medicine (GM) and Old Age Psychiatry (OAP) services			• 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 et al. (2017)[51]	The Hospital-to-Home Transitional Care Program at AHK (Almost Home Kids) • A program to support and educate families on providing care for medically stable children at home	Pediatric inpatient	Transitional and Respite Centre Almost Home Kids	Practice Change 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-Hemburrow et al. (2011)[80]	Home First • A program 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 Change	• Rate of ALC patients decreased by at least 50% across the region of study
Sutherland et al. (2013)[45]	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
Taber et al. (2013)[81]	Comprehensive Interdisciplinary Improvement Initiative • A program 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 Change	• Delayed discharges decreased by 14% • Readmission rate (7-day) decreased by 50% • Acute rejection and infection rates decreased
Udayai et al. (2012)[82]	Improvement in Discharge Process - Six Sigma	NR	Hospital	Practice Change	• Discharge time was decreased by 21% (from 247 to 195 minutes)

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results
	• 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)				• Patients had improved satisfaction with the discharge process
Williams et al. (2010)[52]	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 Change Information Sharing Live	• Delayed discharges increased by 4% (from 27% to 31%)
Younis et al. (2011)[53]	Enhanced Recovery Program • A program 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					
Anonymous (2008)[99]	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 specialized 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
Anonymous (2010)[46]	Meetings • Daily and weekly meetings to discuss issues with patient throughput and strategies for eliminating barriers	NR	Hospital University of Cincinnati Health University	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%

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results
			Hospital, 693 beds		
Calveley (2007)[83]	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 Health Care, 18000 beds	Practice Change	• NR
Manzano-Santaella (2009)[100]	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 (2019)[86]	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 personalized care plan)	Medically and socially complex and frail elderly	Hospital Southlake Regional Health Centre	Practice Change	• Reduction in ALC days (average of 10.6 days) • 1088 ALC days avoided • Positive patient and provider experiences
Walker (2011)[2]	Recommendations for Improving Care for the Aging 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 (2011)[88]	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 Change	• NR

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results
Toronto Central Community Care Access Centre (2015)[67]	ALC Avoidance Framework • To create a standardized approach to avoid delayed discharges through 12 leadings 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 (2017)[92]	ALC Collaborative Committee • A committee developed to identify and implement priority strategic initiatives	NR	NR	Information Sharing Live Practice Change Infrastructure and Finance	• Reduction in percentage of acute hospital days used by patients waiting for discharge from 19.6% to 17.5%
NHS Improvement (2018)[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 visualize 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 (MADE) • 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	Home First • A program designed to help keep patients in their homes (with	NR	Hospital	Practice Change	• Percent of ALC (acute) reduced from 22-28% to 4-6%

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results
Task Group (2008)[84]	community supports) for as long as possible by connecting patients to their needed resources		Halton Health Services, 459 beds		
Adams, Care and Repair England (2017)[98]	Home First • A program 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 Change	• NR
Shah (2010)[89]	Home First • A program 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 organizations	Practice Change	• 2-fold reduction in monthly average of ALC patients • 30.5% reduction in number of ALC to LTC hospital referrals
Joint Improvement Team (2013)[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 Change	• Expected to reduced ALC days by 30% over the next three years
Adams, Care and Repair England (2017)[98]	West of England Care and Repair • Enables older patients to return home from hospital quickly and safely by organizing 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
Shah (2010)[89]	Home First • A program designed to help keep patients in their homes (with community supports)	Elderly patients	Hospital/ community in Mississauga Halton Local Health	Practice Change	• The equivalent of 35 acute care beds have been saved over 2 years • 250 people have been diverted from LTC placement

Author	Initiative Description/ Content	Target Population	Setting	Initiative Category[1]	Results
			Integration Network		
Joint Improvement Team (2013)[85]	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 Change	• Factors in reducing delays include: identifying estimated date of discharge, using a framework for admissions, transfers and discharges, appointing a provider for coordinating the patients discharge plan, screening for frailty, using transitional and intermediate care services, adopting a home first culture

Abbreviations: NR = not reported; ALC = alternate level of care; ERAS = Enhanced Recovery After Surgery; GM = geriatric medicine; OAP = Old Age Psychiatry; AHK = almost home kids; LTC = long-term care

Figures

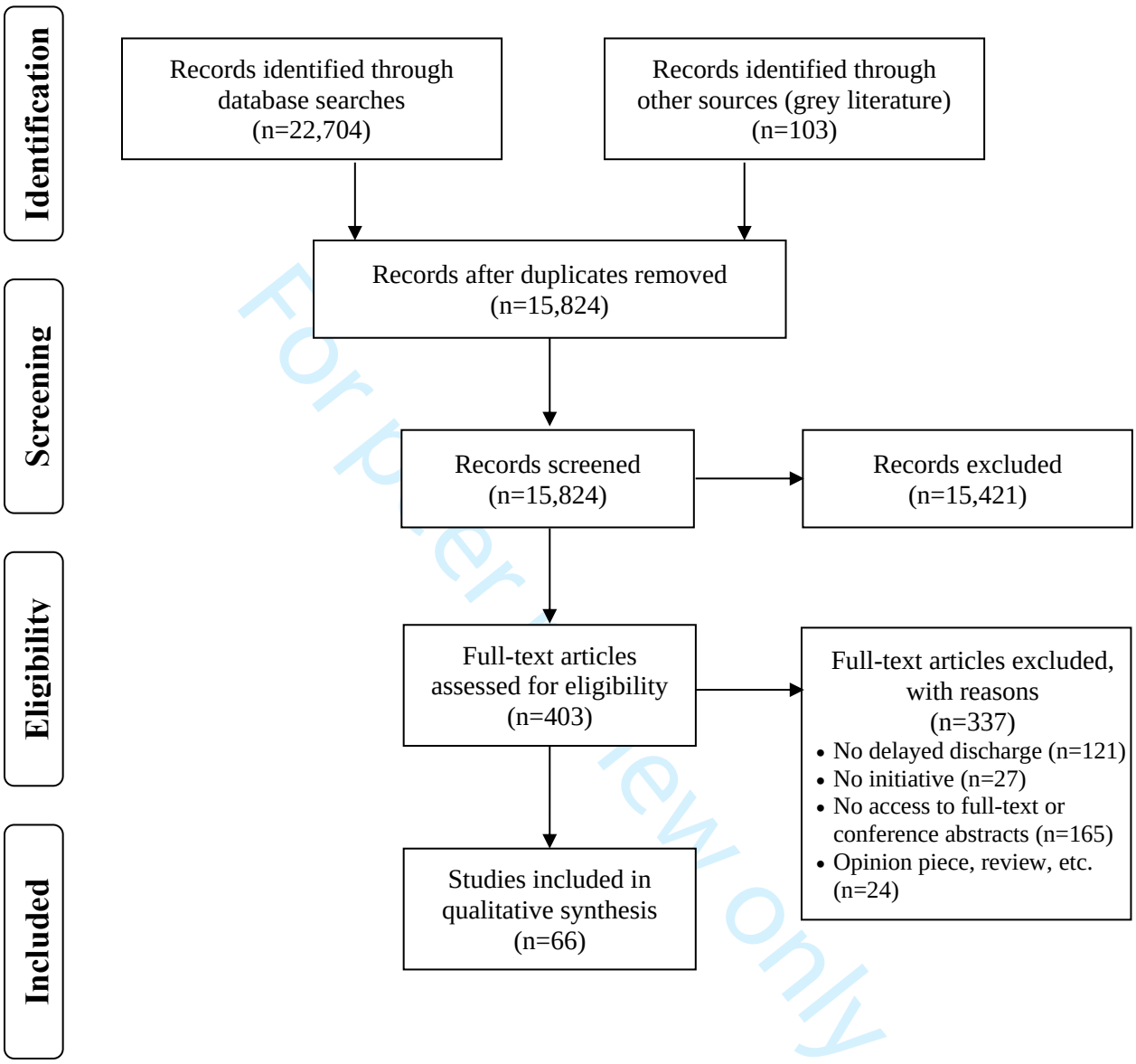

Figure 1. PRISMA flow diagram of included articles

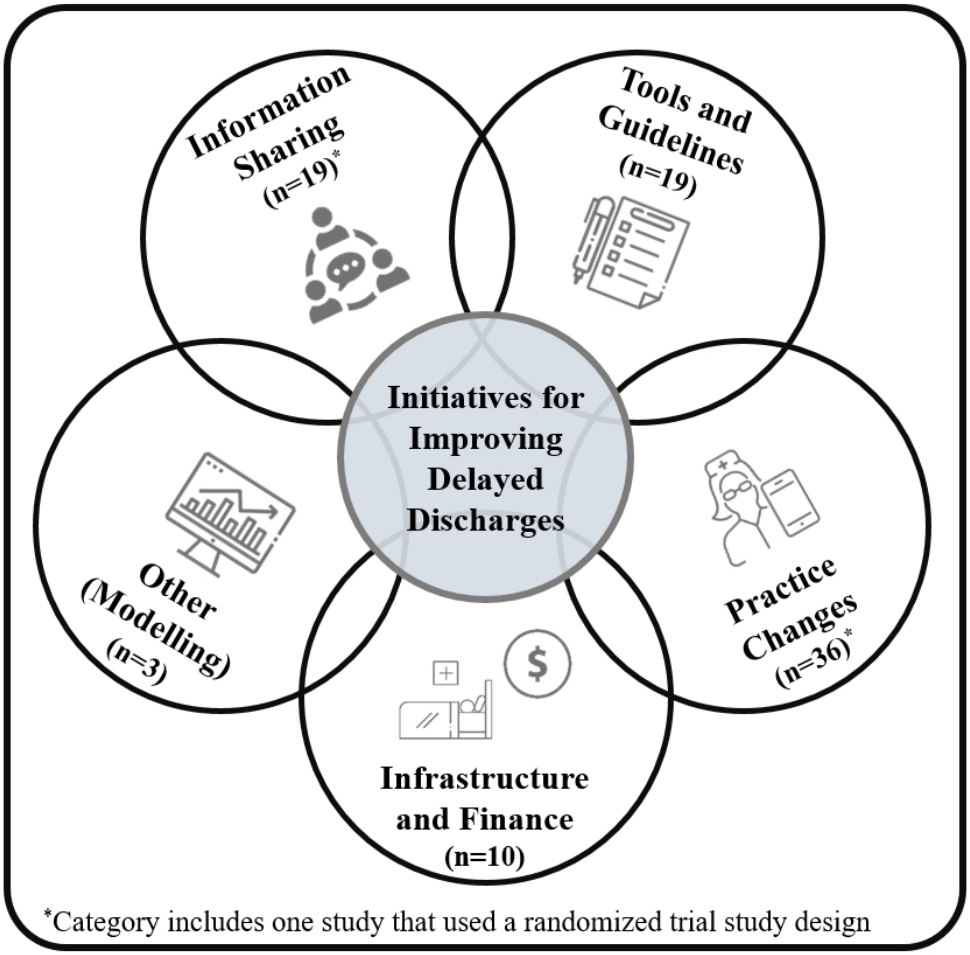

Figure 2. Categories of initiatives for improving delayed hospital discharges

Caption: Figure 2. Categories of initiatives for improving delayed hospital discharges

Legend: *Category includes one study that used a randomized trial study design

145x150mm (150 x 150 DPI)

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 and acknowledge 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 (PRISMAScR): 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 capacit* 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
Béland 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	NR	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 • Patients with afternoon operations who were not discharged within 24 hours	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
			too busy to discharge all patients, adverse events, miscommunication across disciplines, too many patients on staffs' care, not all conditions dealt with, IV medications not transferred to oral, lack of diagnosis, waiting for rehabilitation services/ consultations, waiting for bed	
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

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
Critical appraisal of individual	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe	Not applicable

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
sources of evidence§		the methods used and how this information was used in any data synthesis (if appropriate).	
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 and acknowledge 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 (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.