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Quality Improvement Strategies to Optimize Transition of Heart Failure patients to Independent Living: Protocol for a scoping review

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Key words: heart failure; quality improvement; systematic review

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ABSTRACT:

Introduction:

Heart failure (HF) is a leading reason for hospitalization and readmissions to hospital, particularly among individuals older than 65 years of age. The prognosis of HF patients is grim, with high rates of both mortality risk and hospital readmissions. The transition period early after hospital discharge represents a window of opportunity to positively influence patient outcomes using quality improvement (QI) strategies. However, little is known about which QI interventions exist for early events of HF after discharge, so the main objective of our study is to systematically review the literature to determine which QI strategies are effective for reducing hospital readmissions and mortality for HF patients who transition from the hospital back into independent living. We will also investigate which elements contribute to effective QI strategies.

Methods and analysis:

We will search the literature in MEDLINE, EMBASE, CINAHL, and the Cochrane library for randomized controlled trials and systematic reviews evaluating QI interventions aimed at improving outcomes for HF patients transitioning from the hospital back into the community. Two reviewers will independently apply our eligibility criteria at level 1 (abstract/title) and level 2 (full-text) screening; disagreements will be resolved through consensus. We will extract data in duplicate on study characteristics, population, setting, QI intervention, and outcomes. We will synthesize results descriptively and explore QI elements to determine which aspect contributes to its impact. We will also consider synthesis of our data according to several conceptual frameworks such as Wagner's Chronic Care Model.

Discussion and dissemination:

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The findings of this scoping review will be used to determine what elements should comprise a QI intervention aimed at facilitating the transition of newly admitted HF patients back into the community. We will disseminate our findings through publications, presentations as well as through a stakeholder meeting to generate key messages most relevant to each.

Strengths and limitations of this study:

- We will contribute to the knowledge by investigating the specific elements that contribute to the effectiveness of QI interventions aimed at transitioning HF patients from the hospital into the community
- Findings will directly inform the development a new QI intervention (or adaptation of an existing effective intervention) aimed at improving the care of HF patients and reducing rehospitalizations and mortality
- Many QI interventions are evaluated in non-randomized trials, so we may not capture all existing QI interventions

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INTRODUCTION:

Heart failure (HF) is a chronic disease that is associated with substantial morbidity, mortality and utilization of healthcare resources. It is a leading reason for hospitalization and readmissions to hospital, particularly among individuals older than 65 years of age[1]. The costs of heart failure have been estimated to exceed $30 billion in the United States[2], and hospital-based care is the major contributor to the direct costs of this condition. Heart failure is also a major health care resource and economic burden in Canada, Europe, and other developed countries[3]. Future projections suggest that it will continue to be an important public health concern given our increasingly aging population[4].

The prognosis of heart failure patients is grim, with both high rates of both mortality risk and hospital readmissions[1,5]. Within the first year after discharge from hospital, patients on average have a 28% risk of death[6], but despite their high mortality risks, they also exhibit high rates of hospital readmission[4]. A Canadian study found that among patients who survived to discharge, 24% were readmitted for HF within one year[2]. Reports from the United States have found that readmissions for any cause occurred in nearly 25% of patients at 30 days, with the majority of these events occurring within the first 7 days post-discharge[7]. The transition period early after hospital discharge represents a window of opportunity to positively influence patient outcomes using targeted interventions[8]. While timely care by health care professionals may be an important component of transitional care interventions[9], the optimal strategies to reduce readmissions or improve survival among heart failure patients are unknown. Adding to the complexity of heart failure management is multimorbidity[10], which makes the care of patients and implementation of effective interventions and programs more challenging.

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Evidence from systematic reviews suggests that quality improvement (QI) strategies such as multidisciplinary outpatient disease management programs are beneficial for reducing mortality, and all-cause and HF-specific hospital admissions[5]. Most of these QI strategies are complex (i.e., multi-faceted with multiple targets and components). However, few studies have described such interventions and their components in sufficient detail to allow for in-depth and clinically meaningful comparison(s), and it is unknown which components (delivered by whom and to which targets) contribute to their impact. Furthermore, little is known about which QI interventions exist for early events after discharge for inpatients, and no systematic review has previously investigated the impact of QI interventions that focus specifically on optimizing the transition of HF patients from the hospital to independent living.

The objectives of our study are to systematically review the literature for randomized controlled trials (RCTs) and systematic reviews to determine which QI strategies aimed at transitioning adult HF patients from the hospital back into independent living, are effective for reducing hospital readmissions and mortality. We will also investigate the specific components of QI interventions to identify common elements of those that are effective, and to specifically determine elements that contribute to their effectiveness.

METHODS AND ANALYSIS

We will use the scoping review methodology as outlined by Arksey and O'Malley[11] to conduct our study, which is currently considered the most rigorous methodology for conducting scoping reviews. Our protocol was conceived, developed and reviewed by all members of our team.

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Eligibility criteria:

We developed our eligibility criteria from our research question: *What are effective Quality Improvement strategies for transitioning adult patients admitted to the hospital for HF back into the community?* We used the following PICOS elements to build our eligibility criteria (Population, Intervention, Comparator, Outcomes, and Study design): *Population*: We will include adults (age 18 ≥ years) who are newly admitted to the hospital or Emergency Department with a diagnosis of heart failure (i.e., HF, CHF). We will assume that unless otherwise stated, newly admitted patients are living independently in the community (vs. in a long-term care facility). We will exclude patients who are selected or enrolled in the study from outpatient clinics including HF clinics and primary care practice, and enrolled from administrative databases. *Intervention:* We will consider any Quality Improvement (QI) intervention aimed at improving outcomes for HF patients transitioning from the hospital back into the community. We will consider any of: care coordination (a QI strategy involving the deliberate organization of patient care activities between two or more participants [including the patient] involved in a patient's care to facilitate the appropriate delivery of health care services); QI strategies targeting health systems (case management, team changes; electronic patient registry; facilitated relay of information to clinicians; continuous QI); QI strategies targeting health care providers (e.g., audit and feedback; education; reminders; telemonitoring); QI strategies targeting patients (patient education; promotion of self-management; and reminder systems). Our exclusion criteria are: interventions targeting only health care providers or patients unless the intervention included at least one other strategy related to clinician or organizational change; educational strategies focusing on how to educate patients, counseling skills, motivational interviewing, self-directed

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learning, and skills related to the intervention (e.g., teaching how to use the website for the randomized controlled trial); strategies involving ad-hoc clinician reminders only; interventions involving only self-management or reminders unless they also include at least one other strategy related to clinician or organisational change. For example, we would not include an intervention targeted to patients involving reminders alone to monitor glucose. However, if the intervention included case management in addition to reminders to monitor glucose, then we would include it.

Comparator: We will consider any standard or usual HF care or control intervention; *Outcomes:* Our primary outcomes are: hospital or emergency department (ED) readmission; hospitalization, and mortality. Our secondary outcomes are the composite of hospital admission and mortality, hospital length of stay, clinician visits, appropriate use of HF medications (compliance, adherence), and cost of intervention or cost-effectiveness. Outcomes related to adherence or compliance to the intervention or to guidelines rather than HF medications will be excluded.

Study design: We will include randomized controlled trials (RCTs), cluster RCTs and systematic reviews for inclusion. Exclusion criteria are: quasi RCTs (non-randomized methods of assignment); studies using other experimental designs (controlled before-after studies and interrupted time series); observational studies (prospective/retrospective cohort studies); cross-sectional and case-control studies; case reports; and opinion-driven reports (i.e., editorials, letters and non-systematic or narrative reviews). A summary of our inclusion/exclusion criteria are in the online supplementary Appendix 1.

Information sources

We will conduct a systematic search of the literature without language restrictions in MEDLINE, EMBASE, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), and the

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Cochrane Central Register of Controlled Trials. We will also search unpublished or grey literature from other sources such as healthcare provider organizations (e.g., the Canadian Cardiovascular Society, American Heart Association, American College of Cardiology, and Heart Failure Society of America). Additionally, we will search the reference lists of included articles and identify other articles through contact with experts in cardiovascular medicine.

Search strategy

An experienced information specialist developed our search strategy in MEDLINE using the search terms: *heart failure, cardiac failure, heart decompensation, myocardial failure*; as well as a list of terms for QI strategies. We applied the validated search filters developed by Haynes et al to identify RCTs[12] and systematic reviews[13]. The search strategy was peered reviewed by another experienced information specialist using the PRESS checklist (i.e. Peer Review of Electronic Search Strategies)[14]. The search strategy for MEDLINE is available in the online supplementary Appendix 2. This was adjusted for our other data sources (EMBASE, CINAHL, and the Cochrane Library), which are available from the authors on request.

Study selection

Our study selection will involve performing an exercise to calibrate reviewers to ensure reliability of screening. Two reviewers will apply our eligibility criteria and independently screen a random sample of 25 citations using our online Synthesi.SR Tool (a proprietary online systematic review software developed for our Knowledge Synthesis Center at St. Michael's Hospital)[15]. We will calculate inter-rater agreement for applying the eligibility criteria (using percent agreement), and we will repeat this exercise in 2 subsequent pilot screenings to reach

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90% agreement. Once we attain this level of consistency, two reviewers will independently screen the titles and abstracts of the remainder of potentially relevant articles in duplicate (level 1 screening). We will follow a similar calibration procedure during level 2 screening to identify potentially relevant articles in full text, which will also require 2 pilot calibration tests to attain a high level of consistency. Disagreements will be resolved through research team consensus for both levels of screening.

Data collection process

We will develop a standardized data abstraction form in Excel, which will be pilot tested on a random sample of 5-10 included studies to ensure agreement between data extractors. The form will be modified accordingly, and once we reach at least 90% agreement, data from the remainder of included articles will be extracted independently by two reviewers. We will extract data on study characteristics (e.g., first author, citation), population (inclusion criteria), setting, QI intervention, and outcomes.

QI interventions are complex (i.e., multi-faceted with multiple targets), so we will explore their elements to determine which aspect contributes to its impact. To do this, we will extract information about the overall QI intervention, so we will also explore their elements to determine which aspect contributes to its impact. To do this, we will extract information about the overall QI intervention, as well as details about its components or elements (for example, a home-based intervention may include the components such as *education*, *telemonitoring*, and *follow-up* with a physician).

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Data synthesis

The analysis will involve collating and summarizing all of the findings for each outcome. For RCTs and systematic reviews that do not conduct any statistical testing, results will be presented in a narrative synthesis. Conversely, for studies that include statistical analysis, we will present the statistical estimates (e.g. relative risks or hazard ratios, with 95% confidence intervals) in a tabular format, in addition to summarizing them. Interventions determined to be effective by high quality systematic reviews and/or RCTs will be highlighted. We will consider analyzing systematic reviews with pooled results, and present summary of findings only for those that do not. We will also prepare descriptive tables to give an overview of the included study characteristics (i.e. with the following data presented for all included studies: author, year, target population, study design, intervention vs. comparator, outcome(s) studied, follow-up period, etc).

Given that we are conducting a scoping review and not a systematic review, we will not be carrying out a meta-analysis or assess study quality, as this is not generally performed in scoping reviews[16]. However, we will considered the synthesis of our data according to several conceptual frameworks such as the Donabedian's structure-process-outcome framework[17] as well as Wagner's Chronic Care Model (CCM)[18,19]. The aim of CCM is to modify chronic disease care so it becomes patient-centered and high quality. The model provides a structure for organizational/practice change according to six elements for improvement: Health care organization, Community resources, Self-management support, Delivery system design, Decision support, and Clinical information system[18]. We will also perform additional and more targeted syntheses on interventions (and their components) identified by our stakeholder team as having potential to inform practice (e.g., interventions and their components that are identified as

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effective and feasible to implement). More specifically, we will use the CCM to map QI interventions and their components according to the 6 CCM elements to determine which has the most potential for improving the transition of care for HF patients. As a final step, we will interpret the findings and outline the broader implications for practice and future study.

To explore the elements of QI interventions and determine which of these contributes to their impact, we will use content analysis of the overall QI interventions identified. We will also create taxonomies of HF QI interventions and their elements, and built definitions for each. To do this, two investigators will independently review the description of the overall extracted QI intervention and document its components (e.g., telemonitoring, education, prompts), by whom each of the components was delivered by and to which target (e.g., education delivered by a study nurse to patients), as well as the frequency and duration of the intervention component (e.g., transmission of telemonitored data once per day for 6 months). We will also classified QI interventions into logical categories (e.g., Disease management interventions). If there are discrepancies between reviewers for documenting this information, we will use group consensus amongst our team to finalize QI categories, interventions and their components.

Discussion and dissemination

The findings of this scoping review will be used to determine what elements should comprise a QI intervention aimed at facilitating the transition of newly admitted HF patients back into the community. In particular, we will identify the specific components of QI interventions that contribute to their impact.

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We will use different knowledge translation (KT) strategies to ensure that findings from this scoping review are broadly disseminated to the right audiences. These will include publications in open-access, peer-reviewed journals as well as presenting our work at relevant cardiology and HF conferences (e.g., American Heart Association, American College of Cardiology). As part of a more active KT strategy, we will also plan a meeting with our key stakeholders (i.e. clinicians, researchers, decision makers and people with HF) to discuss the findings, to generate key messages most relevant to each, and to discuss the next steps including the development of a QI intervention that will address current gaps in care.

Contributorship statement

DSL conceived the study, DSL, MK, and SS conceived the study design. MK and DSL helped draft the protocol. LP developed and executed the search strategy. All authors edited the draft protocol and read and approved the final manuscript.

Ethics declaration

Ethics approval is not required for this study

Funding

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Competing interests

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None

Provenance and peer review

Not commissioned; internally peer reviewed.

Data sharing statement

Unpublished study data such as the search strategies for the other databases (EMBASE, CINAHL, The Cochrane Library) are available upon request to the corresponding author.

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Appendix 1
Inclusion/Exclusion criteria

PICOS element	RESEARCH QUESTION: What are effective Quality Improvement strategies for transitioning patients admitted to the hospital for Heart Failure (HF) back into the community for reducing hospital admissions and mortality?	
	Inclusion criteria	**Exclusion criteria**
Population	• Adults (patients 18 ≥ years of age) who are newly admitted to the hospital or Emergency Department with a diagnosis of heart failure (i.e., HF, CHF) • We will assume that unless otherwise stated, newly admitted patients were living independently in the community (vs. in a long-term care facility – please exclude if this is stated in the study). o Also include those who were enrolled during hospital stay or a discharge.	• If patients are selected or enrolled in: o Outpatient clinics; o Heart Failure clinics o Primary care practice o In the community (without hospitalization) o Enrolled from administrative databases
Intervention	**Quality improvement (QI) strategies** – intervention aimed at reducing the quality gap (the difference between healthcare processes or outcomes observed in practice and those potentially obtainable based on current professional knowledge) for a group of patients representative of those encountered in routine practice. Care coordination – is a QI strategy involving the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient's care to facilitate the appropriate delivery of health care services QI targeting health systems • Case management (targeting health systems); Team changes; Electronic patient registry; Facilitated relay of information to clinicians; Continuous QI QI targeting health care providers • Audit and feedback; Education; Reminders; Financial incentives; Tele-monitoring QI targeting patients: Patient education; Promotion of self-management; Reminder systems	Targeting health care providers • Education: Exclude teaching how to educate patients, counseling skills, motivational interviewing, self-directed learning, and skills related to the intervention (e.g., teaching how to use the website for the randomized controlled trial). • Reminders: Ad-hoc clinician reminders are excluded Targeting patients: • Education: Include interventions with education of patients only if they also include at least one other strategy related to clinician or organisational change. • Self-management: Include interventions promoting self-management only if they also include at least one other strategy related to clinician or organisational change. • Reminders: Include interventions with reminders only if they also include at least one other strategy related to clinician or organizational change. An example is: reminders to monitor glucose. If the intervention included case management, reminders to patients need to be explicit and an extra task to the normal case management.
Comparator	• Usual care; Control	None
Outcome	• Hospital or ED readmission; Hospitalization (Primary) • Mortality (Primary) • Hospital length of stay • Clinician visits • Appropriate use of HF medications (compliance, adherence) • Cost-effectiveness	• Adherence or compliance to the intervention or to guidelines rather than HF medications
Study design	• Randomized controlled trials (RCTs); Cluster RCTs:An experiment in which groups of patients/participants are randomly assigned/allocated to two or more interventions or a control intervention or placebo • Systematic review: A review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research; and collect and analyse data from the studies that are included in the review. May or may not use meta-analysis to analyse and summarise the results	• Quasi RCTs (non-randomized methods of assignment); Controlled before-after studies; Interrupted time series; Observational studies (prospective / retrospective cohort studies; Cross-sectional studies; Case-control studies);Case reports; Editorials or letters: Narrative reviews (Non-systematicreviews typically written by one author that represents their opinion on a particular topic), Basic science or animal studies

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Appendix 2

MEDLINE Search strategy

Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations

Search Strategy:

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1 exp Heart Failure/ [Heart Failure terms]
2 (heart adj failure).tw.
3 (cardiac adj failure).tw.
4 (heart adj decompensation).tw.
5 (myocardial adj failure).tw.
6 or/1-5
7 "Continuity of Patient Care"/ [QI strategies]
8 Cooperative Behavior/
9 Case Management/
10 Disease Management/
11 "Delivery of Health Care, Integrated"/
12 Interinstitutional Relations/
13 Progressive Patient Care/
14 "Patient-Centered Care"/
15 "Patient Care Planning"/
16 (case adj coordination).tw.
17 (case adj co-ordination).tw.
18 (case adj management).tw.
19 (care adj management).tw.
20 (care adj interface?).tw.
21 (coordinat$ adj1 care).tw.
22 (coordinat$ adj1 healthcare).tw.
23 (coordinat$ adj1 "health care").tw.
24 (coordinat$ adj1 "health services?").tw.
25 (co-ordinat$ adj1 care).tw.
26 (co-ordinat$ adj1 healthcare).tw.
27 (co-ordinat$ adj1 "health care").tw.
28 (co-ordinat$ adj1 "health service?").tw.
29 (continu$ adj1 care).tw.
30 (continu$ adj1 healthcare).tw
31 (continu$ adj1 "health care").tw.

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32 (continu$ adj1 "health service?").tw.
33 "continuity of care".tw.
34 "continuity of healthcare".tw.
35 "continuity of health care".tw.
36 "continuity of health service?".tw.
37 comanag$.tw.
38 co-manag$.tw.
39 (care adj pathway?).tw.
40 (care adj3 aftercare).tw.
41 (care adj3 after-care).tw.
42 (care adj3 collaborat$).tw.
43 (care adj3 cooperat$).tw.
44 (care adj3 co-operat$).tw.
45 (care adj3 interinstitution$).tw.
46 (care adj3 inter-institution$).tw.
47 (care adj3 progressive).tw.
48 (care adj3 shared).tw.
49 (care adj3 transition$).tw.
50 (clinician$ adj coach$).tw.
51 (disease adj management).tw.
52 (disconnect$ adj2 care).tw.
53 (disconnect$ adj2 healthcare).tw.
54 (disconnect$ adj2 "health service?").tw.
55 "discontinuity of care".tw.
56 "discontinuity of healthcare".tw.
57 "discontinuity of health care".tw. (
58 "discontinuity of health service?".tw.
59 discoordinat$.tw.
60 disco-ordinat$.tw.
61 (disjoint$ adj care).tw.
62 (disjoint$ adj healthcare).tw.
63 (disjoint$ adj "health care").tw.
64 (disjoint$ adj "health service?").tw.
65 (fragment$ adj care).tw.
66 (fragment$ adj healthcare).tw.
67 (fragment$ adj "health care").tw.
68 (fragment$ adj "health service?").tw

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69 (gap? adj2 care).tw.
70 (gap? adj2 healthcare).tw.
71 (gap? adj2 "health care").tw.
72 (gap? adj2 "health service?").tw.
73 (healthcare adj pathway?).tw.
74 (healthcare adj3 aftercare).tw.
75 ("health service?" adj3 aftercare).tw.
76 (healthcare adj3 after-care).tw.
77 ("health service?" adj3 after-care).tw.
78 (healthcare adj3 collaborat$).tw.
79 ("health service?" adj3 collaborat$).tw.
80 (healthcare adj3 cooperat$).tw.
81 ("health service?" adj3 cooperat$).tw.
82 (healthcare adj3 co-operat$).tw.
83 ("health service?" adj3 co-operat$).tw.
84 (healthcare adj3 interinstitution$).tw.
85 ("health service?" adj3 interinstitution$).tw.
86 (healthcare adj3 inter-institution$).tw.
87 ("health service?" adj3 inter-institution$).tw.
88 (healthcare adj3 progressive).tw.
89 ("health service?" adj3 progressive).tw.
90 (healthcare adj3 shared).tw.
91 ("health service?" adj3 shared).tw.
92 (healthcare adj3 transition$).tw.
93 ("health service?" adj3 transition$).tw.
94 (healthcare adj management).tw.
95 (healthcare adj interface?).tw.
96 handover$.tw.
97 (hand adj over$).tw.
98 handoff$.tw.
99 (hand adj off$).tw.
100 (harmon$ adj care).tw.
101 (harmon$ adj healthcare).tw.
102 (harmon$ adj "health care").tw.
103 (harmon$ adj "health service?").tw.
104 ((interagency or inter-agency) adj care).tw.
105 ((interagency or inter-agency) adj healthcare).tw.

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106 ((interagency or inter-agency) adj "health care").tw.
107 ((interagency or inter-agency) adj "health service?").tw.
108 ((interinstitution$ or inter-institution$) adj care).tw.
109 ((interinstitution$ or inter-institution$) adj healthcare).tw.
110 ((interinstitution$ or inter-institution$) adj "health care").tw.
111 ((interinstitution$ or inter-institution$) adj "health service?").tw.
112 ((interorganization$ or inter-organization$) adj care).tw.
113 ((interorganization$ or inter-organization$) adj healthcare).tw.
114 ((interorganization$ or inter-organization$) adj "health care").tw.
115 ((interorganization$ or inter-organization$) adj "health service?").tw.
116 (inter-connect$ adj care).tw.
117 (inter-connect$ adj healthcare).tw.
118 (inter-connect$ adj "health care").tw.
119 (inter-connect$ adj "health service?").tw.
120 (interconnect$ adj care).tw.
121 (interconnect$ adj healthcare).tw.
122 (interconnect$ adj "health care").tw.
123 (interconnect$ adj "health service?").tw.
124 (integrat$ adj2 care).tw.
125 (integrat$ adj2 healthcare).tw.
126 (integrat$ adj2 "health service?").tw.
127 (lia?son adj service?).tw.
128 (linked adj care).tw.
129 (linked adj healthcare).tw.
130 (linked adj "health care").tw.
131 (linked adj "health service?").tw.
132 "patient care plan$".tw.
133 "patient healthcare plan$".tw.
134 "patient health care plan$".tw.
135 ("patient centred" adj2 care).tw.
136 ("patient centred" adj2 healthcare).tw.
137 ("patient centered" adj2 care).tw.
138 ("patient centered" adj2 healthcare).tw.
139 (shared adj care).tw.
140 (shared adj healthcare).tw.
141 (shared adj "health care").tw.
142 (seamless adj care).tw.

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143 (seamless adj healthcare).tw.
144 (seamless adj "health care").tw.
145 (seamless adj "health service?").tw.
146 (synchron$ adj2 care).tw.
147 (synchron$ adj2 healthcare).tw.
148 (synchron$ adj2 "health service?").tw.
149 (self adj manage$).tw.
150 telemonitor$.tw.
151 tele-monitor$.tw.
152 "transfer of care".tw.
153 (transition$ adj care).tw.
154 (transition$ adj healthcare).tw.
155 (transition$ adj "health care").tw.
156 (transition$ adj "health service?").tw.
157 (uncoordinat$ adj care).tw.
158 (uncoordinat$ adj healthcare).tw.
159 (uncoordinat$ adj "health service?").tw.
160 (uncoordinat$ adj "health care").tw.
161 (unco-ordinat$ adj care).tw.
162 (unco-ordinat$ adj healthcare).tw.
163 (unco-ordinat$ adj "health care").tw.
164 (unco-ordinat$ adj "health service?").tw.
165 Medical Records Systems, Computerized/ [clinical information systems]
166 "clinical information system?".tw.
167 "clinical data system?".tw.
168 "information retrieval system?".tw.
169 "ancillary information system?".tw.
170 Decision Support Techniques/ [decision support]
171 Decision Support Systems, Clinical/
172 Decision-Making Computer Assisted/
173 (cross adj disciplin$).tw.
174 "computer$ decision making".tw.
175 (decision$ adj2 support$).tw.
176 (decision$ adj2 aid$).tw.
177 (decision$ adj2 tool$).tw.
178 (decision$ adj2 instrument$).tw.
179 (decision$ adj2 technolog$).tw.

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180 (decision$ adj2 technique$).tw.
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184 (decision$ adj2 process$).tw.
185 (decision$ adj2 method$).tw.
186 (decision$ adj material$).tw.
187 (decision$ adj2 counsel$).tw.
188 (decision$ adj2 guid$).tw.
189 (decision$ adj board).tw.
190 (interacti$ adj3 tool$).tw.
191 "risk communication tool$".tw.
192 (risk adj calculator?).tw.
193 interprofession$.tw. [team changes]
194 inter-profession$.tw.
195 interdisciplin$.tw.
196 inter-disciplin$.tw.
197 interoccupation$.tw.
198 inter-occupation$.tw.
199 interdepartment$.tw.
200 inter-department$.tw.
201 Interprofessional Relations/
202 team$.tw.
203 multiprofession$.tw.
204 multi-profession$.tw.
205 multidisciplin$.tw.
206 multi-disciplin$.tw.
207 multioccupation$.tw.
208 multi-occupation$.tw.
209 or/7-208
210 6 and 209
211 randomized controlled trial.pt. [RCT validated filter]
212 randomized.mp.
213 placebo.mp.
214 meta analysis.mp,pt. [systematic review filter - validated]
215 review.pt.
216 search$.tw.

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217	or/211-216
218	210 and 217
219	exp Animals/ not (exp Animals/ and Humans/) [removing animal studies]
220	218 not 219

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PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			1
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			2
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2-3
INTRODUCTION			4
Rationale	3	Describe the rationale for the review in the context of what is already known.	4-5
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	5
METHODS			5
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	NA
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	6-7
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	7-8
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Appendix
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	8-9
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	9
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	9
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	NA
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	NA
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	10-11

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PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	NA
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	10-11
RESULTS			NA
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	NA
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	NA
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	NA
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	NA
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	NA
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	NA
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	NA
DISCUSSION			11-12
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	NA
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	NA
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	NA
FUNDING			12
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	12

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

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Quality Improvement Strategies to Optimize Transition of Heart Failure Patients to Independent Living: Protocol for a scoping review

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Primary Subject Heading:	Cardiovascular medicine
Secondary Subject Heading:	Health services research
Keywords:	Heart failure < CARDIOLOGY, Change management < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Organisation of health services < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

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Quality Improvement Strategies to Optimize Transition of Heart Failure patients to Independent Living: Protocol for a scoping review

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Key words: heart failure; quality improvement; systematic review

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ABSTRACT:

Introduction:

Heart failure (HF) is a leading reason for hospitalization and readmissions to hospital, particularly among individuals older than 65 years of age. The prognosis of HF patients is grim, with high rates of both mortality risk and hospital readmissions. The transition period early after hospital discharge represents a window of opportunity to positively influence patient outcomes using quality improvement (QI) strategies. However, little is known about which QI interventions exist for early events of HF after discharge, so the main objective of our study is to conduct a scoping review of the literature to determine which QI strategies are effective for reducing hospital readmissions and mortality for HF patients who transition from the hospital back into independent living. We will also investigate which elements contribute to effective QI strategies.

Methods and analysis:

We will search the literature in MEDLINE, EMBASE, CINAHL, and the Cochrane library for randomized controlled trials and systematic reviews evaluating QI interventions aimed at improving outcomes for HF patients transitioning from the hospital back into the community. Two reviewers will independently apply our eligibility criteria at level 1 (abstract/title) and level 2 (full-text) screening; disagreements will be resolved through consensus. We will extract data in duplicate on study characteristics, population, setting, QI intervention, and outcomes. We will synthesize results descriptively and explore QI elements to determine which aspect contributes to its impact. We will also consider synthesis of our data according to several conceptual frameworks such as Wagner's Chronic Care Model.

Discussion and dissemination:

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The findings of this scoping review will be used to determine what elements should comprise a QI intervention aimed at facilitating the transition of newly admitted HF patients back into the community. We will disseminate our findings through publications, presentations as well as through a stakeholder meeting to generate key messages most relevant to each.

Strengths and limitations of this study:

- We will contribute to the knowledge by investigating the specific elements that contribute to the effectiveness of QI interventions aimed at transitioning HF patients from the hospital into the community
- Findings will directly inform the development a new QI intervention (or adaptation of an existing effective intervention) aimed at improving the care of HF patients and reducing rehospitalizations and mortality
- Many QI interventions are evaluated in non-randomized trials, so we may not capture all existing QI interventions
- A limitation of scoping reviews is that the assessment of risk of bias is not part of its conduct since its goal is to provide an overview of the literature regardless of methodological quality.

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INTRODUCTION:

Heart failure (HF) is a chronic disease that is associated with substantial morbidity, mortality and utilization of healthcare resources. It is a leading reason for hospitalization and readmissions to hospital, particularly among individuals older than 65 years of age[1]. The costs of heart failure have been estimated to exceed $30 billion in the United States[2], and hospital-based care is the major contributor to the direct costs of this condition. Heart failure is also a major health care resource and economic burden in Canada, Europe, and other developed countries[3]. Future projections suggest that it will continue to be an important public health concern given our increasingly aging population[4].

The prognosis of heart failure patients is grim, with both high rates of both mortality risk and hospital readmissions[1,5]. Within the first year after discharge from hospital, patients on average have a 28% risk of death[6], but despite their high mortality risks, they also exhibit high rates of hospital readmission[4]. A Canadian study found that among patients who survived to discharge, 24% were readmitted for HF within one year[2]. Reports from the United States have found that readmissions for any cause occurred in nearly 25% of patients at 30 days, with the majority of these events occurring within the first 7 days post-discharge[7]. The transition period early after hospital discharge represents a window of opportunity to positively influence patient outcomes using targeted interventions[8]. While timely care by health care professionals may be an important component of transitional care interventions[9], the optimal strategies to reduce readmissions or improve survival among heart failure patients are unknown. Adding to the complexity of heart failure management is multimorbidity[10], which makes the care of patients and implementation of effective interventions and programs more challenging.

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Evidence from systematic reviews suggests that quality improvement (QI) strategies such as multidisciplinary outpatient disease management programs are beneficial for reducing mortality, and all-cause and HF-specific hospital admissions[5]. Most of these QI strategies are complex (i.e., multi-faceted with multiple targets and components). However, few studies have described such interventions and their components in sufficient detail to allow for in-depth and clinically meaningful comparison(s), and it is unknown which components (delivered by whom and to which targets) contribute to their impact. Furthermore, little is known about which QI interventions exist for early events after discharge for inpatients, and no systematic review has previously investigated the impact of QI interventions that focus specifically on optimizing the transition of HF patients from the hospital to independent living.

The objectives of our study are to conduct a scoping review of the literature for randomized controlled trials (RCTs) and systematic reviews to determine which QI strategies aimed at transitioning adult HF patients from the hospital back into independent living, are effective for reducing hospital readmissions and mortality. We will also investigate the specific components of QI interventions to identify common elements of those that are effective, and to specifically determine elements that contribute to their effectiveness.

METHODS AND ANALYSIS

We will use the scoping review methodology as outlined by Arksey and O'Malley[11] to conduct our study, which is currently considered the most rigorous methodology for conducting scoping reviews. Our protocol was conceived, developed and reviewed by all members of our team.

Eligibility criteria:

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We developed our eligibility criteria from our research question: *What are effective Quality Improvement strategies for transitioning adult patients admitted to the hospital for HF back into the community?* We used the following PICOS elements to build our eligibility criteria (Population, Intervention, Comparator, Outcomes, and Study design): *Population*: We will include adults (age 18 ≥ years) who are newly admitted to the hospital or Emergency Department with a diagnosis of heart failure (i.e., HF, CHF). We will assume that unless otherwise stated, newly admitted patients are living independently in the community (vs. in a long-term care facility). We will exclude patients who are selected or enrolled in the study from outpatient clinics including HF clinics and primary care practice, and enrolled from administrative databases. *Intervention:* We will consider any Quality Improvement (QI) intervention aimed at improving outcomes for HF patients transitioning from the hospital back into the community. We will consider any of: care coordination (a QI strategy involving the deliberate organization of patient care activities between two or more participants [including the patient] involved in a patient's care to facilitate the appropriate delivery of health care services); QI strategies targeting health systems (case management, team changes; electronic patient registry; facilitated relay of information to clinicians; continuous QI); QI strategies targeting health care providers (e.g., audit and feedback; education; reminders; telemonitoring); QI strategies targeting patients (patient education; promotion of self-management; and reminder systems). Our exclusion criteria are: interventions targeting only health care providers or patients unless the intervention included at least one other strategy related to clinician or organizational change; educational strategies focusing on how to educate patients, counseling skills, motivational interviewing, self-directed learning, and skills related to the intervention (e.g., teaching how to use the website for the randomized controlled trial); strategies involving ad-hoc clinician reminders only; interventions involving only self-management or reminders unless they also include at least one other strategy related to clinician or organisational change. For example, we would not include an

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intervention targeted to patients involving reminders alone to monitor glucose. However, if the intervention included case management in addition to reminders to monitor glucose, then we would include it. *Comparator*: We will consider any standard or usual HF care or control intervention; *Outcomes:* Our primary outcomes are: hospital or emergency department (ED) readmission; hospitalization, and mortality. Our secondary outcomes are the composite of hospital admission and mortality, hospital length of stay, clinician visits, appropriate use of HF medications (compliance, adherence), and cost of intervention or cost-effectiveness. Outcomes related to adherence or compliance to the intervention or to guidelines rather than HF medications will be excluded. *Study design*: We will include randomized controlled trials (RCTs), cluster RCTs and systematic reviews for inclusion. Exclusion criteria are: quasi RCTs (non-randomized methods of assignment); studies using other experimental designs (controlled before-after studies and interrupted time series); observational studies (prospective/retrospective cohort studies); cross-sectional and case-control studies; case reports; and opinion-driven reports (i.e., editorials, letters and non-systematic or narrative reviews). A summary of our inclusion/exclusion criteria are in the online supplementary Appendix 1.

Information sources

We will conduct a systematic search of the literature without language restrictions in MEDLINE, EMBASE, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), and the Cochrane Central Register of Controlled Trials. We will also search unpublished or grey literature from other sources such as healthcare provider organizations (e.g., the Canadian Cardiovascular Society, American Heart Association, American College of Cardiology, and Heart Failure Society of America). Additionally, we will search the reference lists of included articles and identify other articles through contact with experts in cardiovascular medicine.

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Search strategy

An experienced information specialist developed our search strategy in MEDLINE using the search terms: *heart failure, cardiac failure, heart decompensation, myocardial failure*; as well as a list of terms for QI strategies. We applied the validated search filters developed by Haynes et al to identify RCTs[12] and systematic reviews[13]. The search strategy was peered reviewed by another experienced information specialist using the PRESS checklist (i.e. Peer Review of Electronic Search Strategies)[14]. The search strategy for MEDLINE is available in the online supplementary Appendix 2. This was adjusted for our other data sources (EMBASE, CINAHL, and the Cochrane Library), which are available from the authors on request.

Study selection

Our study selection will involve performing an exercise to calibrate reviewers to ensure reliability of screening. Two reviewers will apply our eligibility criteria and independently screen a random sample of 25 citations using our online Synthesi.SR Tool (a proprietary online systematic review software developed for our Knowledge Synthesis Center at St. Michael's Hospital)[15]. We will calculate inter-rater agreement for applying the eligibility criteria (using percent agreement), and we will repeat this exercise in 2 subsequent pilot screenings to reach 90% agreement. Once we attain this level of consistency, two reviewers will independently screen the titles and abstracts of the remainder of potentially relevant articles in duplicate (level 1 screening). We will follow a similar calibration procedure during level 2 screening to identify potentially relevant articles in full text, which will also require 2 pilot calibration tests to attain a high level of consistency. Disagreements will be resolved through research team consensus for both levels of screening.

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Data collection process

We will develop a standardized data abstraction form in Excel, which will be pilot tested on a random sample of 5-10 included studies to ensure agreement between data extractors. The form will be modified accordingly, and once we reach at least 90% agreement, data from the remainder of included articles will be extracted independently by two reviewers. We will extract data on study characteristics (e.g., first author, citation), population (inclusion criteria), setting, QI intervention, and outcomes.

QI interventions are complex (i.e., multi-faceted with multiple targets), so we will explore their elements to determine which aspect contributes to its impact. To do this, we will extract information about the overall QI intervention, so we will also explore their elements to determine which aspect contributes to its impact. To do this, we will extract information about the overall QI intervention, as well as details about its components or elements (for example, a home-based intervention may include the components such as *education*, *telemonitoring*, and *follow-up* with a physician).

Data synthesis

The analysis will involve collating and summarizing all of the findings for each outcome. For RCTs and systematic reviews that do not conduct any statistical testing, results will be presented in a narrative synthesis. Conversely, for studies that include statistical analysis, we will present the statistical estimates (e.g. relative risks or hazard ratios, with 95% confidence intervals) in a tabular format, in addition to summarizing them. Interventions determined to be effective by high quality systematic reviews and/or RCTs will be highlighted. We will consider analyzing systematic reviews with pooled results, and present summary of findings only for those that do not. We will also prepare descriptive tables to give an

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overview of the included study characteristics (i.e. with the following data presented for all included studies: author, year, target population, study design, intervention vs. comparator, outcome(s) studied, follow-up period, etc).

Given that we are conducting a scoping review and not a systematic review, we will not be carrying out a meta-analysis or assess study quality, as this is not generally performed in scoping reviews[16]. However, we will considered the synthesis of our data according to several conceptual frameworks such as the Donabedian's structure-process-outcome framework[17] as well as Wagner's Chronic Care Model (CCM)[18,19]. The aim of CCM is to modify chronic disease care so it becomes patient-centered and high quality. The model provides a structure for organizational/practice change according to six elements for improvement: Health care organization, Community resources, Self-management support, Delivery system design, Decision support, and Clinical information system[18]. We will also perform additional and more targeted syntheses on interventions (and their components) identified by our stakeholder team as having potential to inform practice (e.g., interventions and their components that are identified as effective and feasible to implement). More specifically, we will use the CCM to map QI interventions and their components according to the 6 CCM elements to determine which has the most potential for improving the transition of care for HF patients. As a final step, we will interpret the findings and outline the broader implications for practice and future study.

To explore the elements of QI interventions and determine which of these contributes to their impact, we will use content analysis of the overall QI interventions identified. We will also create taxonomies of HF QI interventions and their elements, and built definitions for each. To do this, two investigators will independently review the description of the overall extracted QI intervention and document its components (e.g., telemonitoring, education, prompts), by whom each of the components was delivered

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by and to which target (e.g., education delivered by a study nurse to patients), as well as the frequency and duration of the intervention component (e.g., transmission of telemonitored data once per day for 6 months). We will also classified QI interventions into logical categories (e.g., Disease management interventions). If there are discrepancies between reviewers for documenting this information, we will use group consensus amongst our team to finalize QI categories, interventions and their components.

Discussion and dissemination

The findings of this scoping review will be used to determine what elements should comprise a QI intervention aimed at facilitating the transition of newly admitted HF patients back into the community. In particular, we will identify the specific components of QI interventions that contribute to their impact.

We will use different knowledge translation (KT) strategies to ensure that findings from this scoping review are broadly disseminated to the right audiences. These will include publications in open-access, peer-reviewed journals as well as presenting our work at relevant cardiology and HF conferences (e.g., American Heart Association, American College of Cardiology). As part of a more active KT strategy, we will also plan a meeting with our key stakeholders (i.e. clinicians, researchers, decision makers and people with HF) to discuss the findings, to generate key messages most relevant to each, and to discuss the next steps including the development of a QI intervention that will address current gaps in care.

Contributorship statement

DSL conceived the study, DSL, MK, and SS conceived the study design. MK and DSL helped draft the protocol. LP developed and executed the search strategy. All authors edited the draft protocol and read and approved the final manuscript.

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Ethics declaration

Ethics approval is not required for this study

Funding

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Dr. Lee is supported by a clinician-scientist award from the Canadian Institutes of Health Research.

Competing interests

None

Provenance and peer review

Not commissioned; internally peer reviewed.

Data sharing statement

Unpublished study data such as the search strategies for the other databases (EMBASE, CINAHL, The Cochrane Library) are available upon request to the corresponding author.

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Quality Improvement Strategies to Optimize Transition of Heart Failure patients to Independent Living: Protocol for a scoping review

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Key words: heart failure; quality improvement; systematic review

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ABSTRACT:

Introduction:

Heart failure (HF) is a leading reason for hospitalization and readmissions to hospital, particularly among individuals older than 65 years of age. The prognosis of HF patients is grim, with high rates of both mortality risk and hospital readmissions. The transition period early after hospital discharge represents a window of opportunity to positively influence patient outcomes using quality improvement (QI) strategies. However, little is known about which QI interventions exist for early events of HF after discharge, so the main objective of our study is to conduct a scoping ~~systematically~~ review of the literature to determine which QI strategies are effective for reducing hospital readmissions and mortality for HF patients who transition from the hospital back into independent living. We will also investigate which elements contribute to effective QI strategies.

Methods and analysis:

We will search the literature in MEDLINE, EMBASE, CINAHL, and the Cochrane library for randomized controlled trials and systematic reviews evaluating QI interventions aimed at improving outcomes for HF patients transitioning from the hospital back into the community. Two reviewers will independently apply our eligibility criteria at level 1 (abstract/title) and level 2 (full-text) screening; disagreements will be resolved through consensus. We will extract data in duplicate on study characteristics, population, setting, QI intervention, and outcomes. We will synthesize results descriptively and explore QI elements to determine which aspect contributes to its impact. We will also consider synthesis of our data according to several conceptual frameworks such as Wagner's Chronic Care Model.

Discussion and dissemination:

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The findings of this scoping review will be used to determine what elements should comprise a QI intervention aimed at facilitating the transition of newly admitted HF patients back into the community. We will disseminate our findings through publications, presentations as well as through a stakeholder meeting to generate key messages most relevant to each.

Strengths and limitations of this study:

- We will contribute to the knowledge by investigating the specific elements that contribute to the effectiveness of QI interventions aimed at transitioning HF patients from the hospital into the community
- Findings will directly inform the development a new QI intervention (or adaptation of an existing effective intervention) aimed at improving the care of HF patients and reducing rehospitalizations and mortality
- Many QI interventions are evaluated in non-randomized trials, so we may not capture all existing QI interventions
- A limitation of scoping reviews is that the assessment of risk of bias is not part of its conduct since its goal is to provide an overview of the literature regardless of methodological quality.

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INTRODUCTION:

Heart failure (HF) is a chronic disease that is associated with substantial morbidity, mortality and utilization of healthcare resources. It is a leading reason for hospitalization and readmissions to hospital, particularly among individuals older than 65 years of age[1]. The costs of heart failure have been estimated to exceed $30 billion in the United States[2], and hospital-based care is the major contributor to the direct costs of this condition. Heart failure is also a major health care resource and economic burden in Canada, Europe, and other developed countries[3]. Future projections suggest that it will continue to be an important public health concern given our increasingly aging population[4].

The prognosis of heart failure patients is grim, with both high rates of both mortality risk and hospital readmissions[1,5]. Within the first year after discharge from hospital, patients on average have a 28% risk of death[6], but despite their high mortality risks, they also exhibit high rates of hospital readmission[4]. A Canadian study found that among patients who survived to discharge, 24% were readmitted for HF within one year[2]. Reports from the United States have found that readmissions for any cause occurred in nearly 25% of patients at 30 days, with the majority of these events occurring within the first 7 days post-discharge[7]. The transition period early after hospital discharge represents a window of opportunity to positively influence patient outcomes using targeted interventions[8]. While timely care by health care professionals may be an important component of transitional care interventions[9], the optimal strategies to reduce readmissions or improve survival among heart failure patients are unknown. Adding to the complexity of heart failure management is multimorbidity[10], which makes the care of patients and implementation of effective interventions and programs more challenging.

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Evidence from systematic reviews suggests that quality improvement (QI) strategies such as multidisciplinary outpatient disease management programs are beneficial for reducing mortality, and all-cause and HF-specific hospital admissions[5]. Most of these QI strategies are complex (i.e., multi-faceted with multiple targets and components). However, few studies have described such interventions and their components in sufficient detail to allow for in-depth and clinically meaningful comparison(s), and it is unknown which components (delivered by whom and to which targets) contribute to their impact. Furthermore, little is known about which QI interventions exist for early events after discharge for inpatients, and no systematic review has previously investigated the impact of QI interventions that focus specifically on optimizing the transition of HF patients from the hospital to independent living.

The objectives of our study are to conduct a scoping ~~systematically~~ review of the literature for randomized controlled trials (RCTs) and systematic reviews to determine which QI strategies aimed at transitioning adult HF patients from the hospital back into independent living, are effective for reducing hospital readmissions and mortality. We will also investigate the specific components of QI interventions to identify common elements of those that are effective, and to specifically determine elements that contribute to their effectiveness.

METHODS AND ANALYSIS

We will use the scoping review methodology as outlined by Arksey and O'Malley[11] to conduct our study, which is currently considered the most rigorous methodology for conducting scoping reviews. Our protocol was conceived, developed and reviewed by all members of our team.

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Eligibility criteria:

We developed our eligibility criteria from our research question: *What are effective Quality Improvement strategies for transitioning adult patients admitted to the hospital for HF back into the community?* We used the following PICOS elements to build our eligibility criteria (Population, Intervention, Comparator, Outcomes, and Study design): *Population*: We will include adults (age 18 ≥ years) who are newly admitted to the hospital or Emergency Department with a diagnosis of heart failure (i.e., HF, CHF). We will assume that unless otherwise stated, newly admitted patients are living independently in the community (vs. in a long-term care facility). We will exclude patients who are selected or enrolled in the study from outpatient clinics including HF clinics and primary care practice, and enrolled from administrative databases. *Intervention:* We will consider any Quality Improvement (QI) intervention aimed at improving outcomes for HF patients transitioning from the hospital back into the community. We will consider any of: care coordination (a QI strategy involving the deliberate organization of patient care activities between two or more participants [including the patient] involved in a patient's care to facilitate the appropriate delivery of health care services); QI strategies targeting health systems (case management, team changes; electronic patient registry; facilitated relay of information to clinicians; continuous QI); QI strategies targeting health care providers (e.g., audit and feedback; education; reminders; telemonitoring); QI strategies targeting patients (patient education; promotion of self-management; and reminder systems). Our exclusion criteria are: interventions targeting only health care providers or patients unless the intervention included at least one other strategy related to clinician or organizational change; educational strategies focusing on how to educate patients, counseling skills, motivational interviewing, self-directed

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learning, and skills related to the intervention (e.g., teaching how to use the website for the randomized controlled trial); strategies involving ad-hoc clinician reminders only; interventions involving only self-management or reminders unless they also include at least one other strategy related to clinician or organisational change. For example, we would not include an intervention targeted to patients involving reminders alone to monitor glucose. However, if the intervention included case management in addition to reminders to monitor glucose, then we would include it.

Comparator: We will consider any standard or usual HF care or control intervention; *Outcomes:* Our primary outcomes are: hospital or emergency department (ED) readmission; hospitalization, and mortality. Our secondary outcomes are the composite of hospital admission and mortality, hospital length of stay, clinician visits, appropriate use of HF medications (compliance, adherence), and cost of intervention or cost-effectiveness. Outcomes related to adherence or compliance to the intervention or to guidelines rather than HF medications will be excluded.

Study design: We will include randomized controlled trials (RCTs), cluster RCTs and systematic reviews for inclusion. Exclusion criteria are: quasi RCTs (non-randomized methods of assignment); studies using other experimental designs (controlled before-after studies and interrupted time series); observational studies (prospective/retrospective cohort studies); cross-sectional and case-control studies; case reports; and opinion-driven reports (i.e., editorials, letters and non-systematic or narrative reviews). A summary of our inclusion/exclusion criteria are in the online supplementary Appendix 1.

Information sources

We will conduct a systematic search of the literature without language restrictions in MEDLINE, EMBASE, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), and the

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Cochrane Central Register of Controlled Trials. We will also search unpublished or grey literature from other sources such as healthcare provider organizations (e.g., the Canadian Cardiovascular Society, American Heart Association, American College of Cardiology, and Heart Failure Society of America). Additionally, we will search the reference lists of included articles and identify other articles through contact with experts in cardiovascular medicine.

Search strategy

An experienced information specialist developed our search strategy in MEDLINE using the search terms: *heart failure, cardiac failure, heart decompensation, myocardial failure*; as well as a list of terms for QI strategies. We applied the validated search filters developed by Haynes et al to identify RCTs[12] and systematic reviews[13]. The search strategy was peered reviewed by another experienced information specialist using the PRESS checklist (i.e. Peer Review of Electronic Search Strategies)[14]. The search strategy for MEDLINE is available in the online supplementary Appendix 2. This was adjusted for our other data sources (EMBASE, CINAHL, and the Cochrane Library), which are available from the authors on request.

Study selection

Our study selection will involve performing an exercise to calibrate reviewers to ensure reliability of screening. Two reviewers will apply our eligibility criteria and independently screen a random sample of 25 citations using our online Synthesi.SR Tool (a proprietary online systematic review software developed for our Knowledge Synthesis Center at St. Michael's Hospital)[15]. We will calculate inter-rater agreement for applying the eligibility criteria (using percent agreement), and we will repeat this exercise in 2 subsequent pilot screenings to reach

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90% agreement. Once we attain this level of consistency, two reviewers will independently screen the titles and abstracts of the remainder of potentially relevant articles in duplicate (level 1 screening). We will follow a similar calibration procedure during level 2 screening to identify potentially relevant articles in full text, which will also require 2 pilot calibration tests to attain a high level of consistency. Disagreements will be resolved through research team consensus for both levels of screening.

Data collection process

We will develop a standardized data abstraction form in Excel, which will be pilot tested on a random sample of 5-10 included studies to ensure agreement between data extractors. The form will be modified accordingly, and once we reach at least 90% agreement, data from the remainder of included articles will be extracted independently by two reviewers. We will extract data on study characteristics (e.g., first author, citation), population (inclusion criteria), setting, QI intervention, and outcomes.

QI interventions are complex (i.e., multi-faceted with multiple targets), so we will explore their elements to determine which aspect contributes to its impact. To do this, we will extract information about the overall QI intervention, so we will also explore their elements to determine which aspect contributes to its impact. To do this, we will extract information about the overall QI intervention, as well as details about its components or elements (for example, a home-based intervention may include the components such as *education*, *telemonitoring*, and *follow-up* with a physician).

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Data synthesis

The analysis will involve collating and summarizing all of the findings for each outcome. For RCTs and systematic reviews that do not conduct any statistical testing, results will be presented in a narrative synthesis. Conversely, for studies that include statistical analysis, we will present the statistical estimates (e.g. relative risks or hazard ratios, with 95% confidence intervals) in a tabular format, in addition to summarizing them. Interventions determined to be effective by high quality systematic reviews and/or RCTs will be highlighted. We will consider analyzing systematic reviews with pooled results, and present summary of findings only for those that do not. We will also prepare descriptive tables to give an overview of the included study characteristics (i.e. with the following data presented for all included studies: author, year, target population, study design, intervention vs. comparator, outcome(s) studied, follow-up period, etc).

Given that we are conducting a scoping review and not a systematic review, we will not be carrying out a meta-analysis or assess study quality, as this is not generally performed in scoping reviews[16]. However, we will considered the synthesis of our data according to several conceptual frameworks such as the Donabedian's structure-process-outcome framework[17] as well as Wagner's Chronic Care Model (CCM)[18,19]. The aim of CCM is to modify chronic disease care so it becomes patient-centered and high quality. The model provides a structure for organizational/practice change according to six elements for improvement: Health care organization, Community resources, Self-management support, Delivery system design, Decision support, and Clinical information system[18]. We will also perform additional and more targeted syntheses on interventions (and their components) identified by our stakeholder team as having potential to inform practice (e.g., interventions and their components that are identified as

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Contributorship statement

DSL conceived the study, DSL, MK, and SS conceived the study design. MK and DSL helped draft the protocol. LP developed and executed the search strategy. All authors edited the draft protocol and read and approved the final manuscript.

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Funding

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Competing interests

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Appendix 1
Inclusion/Exclusion criteria

PICOS element	RESEARCH QUESTION: What are effective Quality Improvement strategies for transitioning patients admitted to the hospital for Heart Failure (HF) back into the community for reducing hospital admissions and mortality?	
	Inclusion criteria	**Exclusion criteria**

Population	• Adults (patients 18 ≥ years of age) who are newly admitted to the hospital or Emergency Department with a diagnosis of heart failure (i.e., HF, CHF)
	• We will assume that unless otherwise stated, newly admitted patients were living independently in the community (vs. in a long-term care facility – please exclude if this is stated in the study).
	  ○ Also include those who were enrolled during hospital stay or a discharge.
		• If patients are selected or enrolled in:
		  ○ Outpatient clinics;
		  ○ Heart Failure clinics
		  ○ Primary care practice
		  ○ In the community (without hospitalization)
		  ○ Enrolled from administrative databases

Intervention	**Quality improvement (QI) strategies** – intervention aimed at reducing the quality gap (the difference between healthcare processes or outcomes observed in practice and those potentially obtainable based on current professional knowledge) for a group of patients representative of those encountered in routine practice. Care coordination – is a QI strategy involving the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient's care to facilitate the appropriate delivery of health care services QI targeting health systems • Case management (targeting health systems); Team changes; Electronic patient registry; Facilitated relay of information to clinicians; Continuous QI QI targeting health care providers • Audit and feedback; Education; Reminders; Financial incentives; Tele-monitoring QI targeting patients: Patient education; Promotion of self-management; Reminder systems	Targeting health care providers • Education: Exclude teaching how to educate patients, counseling skills, motivational interviewing, self-directed learning, and skills related to the intervention (e.g., teaching how to use the website for the randomized controlled trial). • Reminders: Ad-hoc clinician reminders are excluded Targeting patients: • Education: Include interventions with education of patients only if they also include at least one other strategy related to clinician or organisational change. • Self-management: Include interventions promoting self-management only if they also include at least one other strategy related to clinician or organisational change. • Reminders: Include interventions with reminders only if they also include at least one other strategy related to clinician or organizational change. An example is: reminders to monitor glucose. If the intervention included case management, reminders to patients need to be explicit and an extra task to the normal case management.
Comparator	• Usual care; Control	None
Outcome	• Hospital or ED readmission; Hospitalization (Primary) • Mortality (Primary) • Hospital length of stay • Clinician visits • Appropriate use of HF medications (compliance, adherence) • Cost-effectiveness	• Adherence or compliance to the intervention or to guidelines rather than HF medications
Study design	• Randomized controlled trials (RCTs); Cluster RCTs:An experiment in which groups of patients/participants are randomly assigned/allocated to two or more interventions or a control intervention or placebo • Systematic review: A review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research; and collect and analyse data from the studies that are included in the review. May or may not use meta-analysis to analyse and summarise the results	• Quasi RCTs (non-randomized methods of assignment); Controlled before-after studies; Interrupted time series; Observational studies (prospective / retrospective cohort studies; Cross-sectional studies; Case-control studies);Case reports; Editorials or letters: Narrative reviews (Non-systematicreviews typically written by one author that represents their opinion on a particular topic), Basic science or animal studies

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Appendix 2
MEDLINE Search strategy

Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations

Search Strategy:

---

1 exp Heart Failure/ [Heart Failure terms]
2 (heart adj failure).tw.
3 (cardiac adj failure).tw.
4 (heart adj decompensation).tw.
5 (myocardial adj failure).tw.
6 or/1-5
7 "Continuity of Patient Care"/ [QI strategies]
8 Cooperative Behavior/
9 Case Management/
10 Disease Management/
11 "Delivery of Health Care, Integrated"/
12 Interinstitutional Relations/
13 Progressive Patient Care/
14 "Patient-Centered Care"/
15 "Patient Care Planning"/
16 (case adj coordination).tw.
17 (case adj co-ordination).tw.
18 (case adj management).tw.
19 (care adj management).tw.
20 (care adj interface?).tw.
21 (coordinat$ adj1 care).tw.
22 (coordinat$ adj1 healthcare).tw.
23 (coordinat$ adj1 "health care").tw.
24 (coordinat$ adj1 "health services?").tw.
25 (co-ordinat$ adj1 care).tw.
26 (co-ordinat$ adj1 healthcare).tw.
27 (co-ordinat$ adj1 "health care").tw.
28 (co-ordinat$ adj1 "health service?").tw.
29 (continu$ adj1 care).tw.
30 (continu$ adj1 healthcare).tw
31 (continu$ adj1 "health care").tw.

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32 (continu$ adj1 "health service?").tw.
33 "continuity of care".tw.
34 "continuity of healthcare".tw.
35 "continuity of health care".tw.
36 "continuity of health service?".tw.
37 comanag$.tw.
38 co-manag$.tw.
39 (care adj pathway?).tw.
40 (care adj3 aftercare).tw.
41 (care adj3 after-care).tw.
42 (care adj3 collaborat$).tw.
43 (care adj3 cooperat$).tw.
44 (care adj3 co-operat$).tw.
45 (care adj3 interinstitution$).tw.
46 (care adj3 inter-institution$).tw.
47 (care adj3 progressive).tw.
48 (care adj3 shared).tw.
49 (care adj3 transition$).tw.
50 (clinician$ adj coach$).tw.
51 (disease adj management).tw.
52 (disconnect$ adj2 care).tw.
53 (disconnect$ adj2 healthcare).tw.
54 (disconnect$ adj2 "health service?").tw.
55 "discontinuity of care".tw.
56 "discontinuity of healthcare".tw.
57 "discontinuity of health care".tw. (
58 "discontinuity of health service?".tw.
59 discoordinat$.tw.
60 disco-ordinat$.tw.
61 (disjoint$ adj care).tw.
62 (disjoint$ adj healthcare).tw.
63 (disjoint$ adj "health care").tw.
64 (disjoint$ adj "health service?").tw.
65 (fragment$ adj care).tw.
66 (fragment$ adj healthcare).tw.
67 (fragment$ adj "health care").tw.
68 (fragment$ adj "health service?").tw

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69 (gap? adj2 care).tw.
70 (gap? adj2 healthcare).tw.
71 (gap? adj2 "health care").tw.
72 (gap? adj2 "health service?").tw.
73 (healthcare adj pathway?).tw.
74 (healthcare adj3 aftercare).tw.
75 ("health service?" adj3 aftercare).tw.
76 (healthcare adj3 after-care).tw.
77 ("health service?" adj3 after-care).tw.
78 (healthcare adj3 collaborat$).tw.
79 ("health service?" adj3 collaborat$).tw.
80 (healthcare adj3 cooperat$).tw.
81 ("health service?" adj3 cooperat$).tw.
82 (healthcare adj3 co-operat$).tw.
83 ("health service?" adj3 co-operat$).tw.
84 (healthcare adj3 interinstitution$).tw.
85 ("health service?" adj3 interinstitution$).tw.
86 (healthcare adj3 inter-institution$).tw.
87 ("health service?" adj3 inter-institution$).tw.
88 (healthcare adj3 progressive).tw.
89 ("health service?" adj3 progressive).tw.
90 (healthcare adj3 shared).tw.
91 ("health service?" adj3 shared).tw.
92 (healthcare adj3 transition$).tw.
93 ("health service?" adj3 transition$).tw.
94 (healthcare adj management).tw.
95 (healthcare adj interface?).tw.
96 handover$.tw.
97 (hand adj over$).tw.
98 handoff$.tw.
99 (hand adj off$).tw.
100 (harmon$ adj care).tw.
101 (harmon$ adj healthcare).tw.
102 (harmon$ adj "health care").tw.
103 (harmon$ adj "health service?").tw.
104 ((interagency or inter-agency) adj care).tw.
105 ((interagency or inter-agency) adj healthcare).tw.

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106 ((interagency or inter-agency) adj "health care").tw.
107 ((interagency or inter-agency) adj "health service?").tw.
108 ((interinstitution$ or inter-institution$) adj care).tw.
109 ((interinstitution$ or inter-institution$) adj healthcare).tw.
110 ((interinstitution$ or inter-institution$) adj "health care").tw.
111 ((interinstitution$ or inter-institution$) adj "health service?").tw.
112 ((interorganization$ or inter-organization$) adj care).tw.
113 ((interorganization$ or inter-organization$) adj healthcare).tw.
114 ((interorganization$ or inter-organization$) adj "health care").tw.
115 ((interorganization$ or inter-organization$) adj "health service?").tw.
116 (inter-connect$ adj care).tw.
117 (inter-connect$ adj healthcare).tw.
118 (inter-connect$ adj "health care").tw.
119 (inter-connect$ adj "health service?").tw.
120 (interconnect$ adj care).tw.
121 (interconnect$ adj healthcare).tw.
122 (interconnect$ adj "health care").tw.
123 (interconnect$ adj "health service?").tw.
124 (integrat$ adj2 care).tw.
125 (integrat$ adj2 healthcare).tw.
126 (integrat$ adj2 "health service?").tw.
127 (lia?son adj service?).tw.
128 (linked adj care).tw.
129 (linked adj healthcare).tw.
130 (linked adj "health care").tw.
131 (linked adj "health service?").tw.
132 "patient care plan$".tw.
133 "patient healthcare plan$".tw.
134 "patient health care plan$".tw.
135 ("patient centred" adj2 care).tw.
136 ("patient centred" adj2 healthcare).tw.
137 ("patient centered" adj2 care).tw.
138 ("patient centered" adj2 healthcare).tw.
139 (shared adj care).tw.
140 (shared adj healthcare).tw.
141 (shared adj "health care").tw.
142 (seamless adj care).tw.

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143 (seamless adj healthcare).tw.
144 (seamless adj "health care").tw.
145 (seamless adj "health service?").tw.
146 (synchron$ adj2 care).tw.
147 (synchron$ adj2 healthcare).tw.
148 (synchron$ adj2 "health service?").tw.
149 (self adj manage$).tw.
150 telemonitor$.tw.
151 tele-monitor$.tw.
152 "transfer of care".tw.
153 (transition$ adj care).tw.
154 (transition$ adj healthcare).tw.
155 (transition$ adj "health care").tw.
156 (transition$ adj "health service?").tw.
157 (uncoordinat$ adj care).tw.
158 (uncoordinat$ adj healthcare).tw.
159 (uncoordinat$ adj "health service?").tw.
160 (uncoordinat$ adj "health care").tw.
161 (unco-ordinat$ adj care).tw.
162 (unco-ordinat$ adj healthcare).tw.
163 (unco-ordinat$ adj "health care").tw.
164 (unco-ordinat$ adj "health service?").tw.
165 Medical Records Systems, Computerized/ [clinical information systems]
166 "clinical information system?".tw.
167 "clinical data system?".tw.
168 "information retrieval system?".tw.
169 "ancillary information system?".tw.
170 Decision Support Techniques/ [decision support]
171 Decision Support Systems, Clinical/
172 Decision-Making Computer Assisted/
173 (cross adj disciplin$).tw.
174 "computer$ decision making".tw.
175 (decision$ adj2 support$).tw.
176 (decision$ adj2 aid$).tw.
177 (decision$ adj2 tool$).tw.
178 (decision$ adj2 instrument$).tw.
179 (decision$ adj2 technolog$).tw.

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(decision$ adj2 technique$).tw.
(decision$ adj2 system$).tw.
(decision$ adj2 program$).tw.
(decision$ adj2 algorithm$).tw.
(decision$ adj2 process$).tw.
(decision$ adj2 method$).tw.
(decision$ adj material$).tw.
(decision$ adj2 counsel$).tw.
(decision$ adj2 guid$).tw.
(decision$ adj board).tw.
(interacti$ adj3 tool$).tw.
"risk communication tool$".tw.
(risk adj calculator?).tw.
interprofession$.tw. [team changes]
inter-profession$.tw.
interdisciplin$.tw.
inter-disciplin$.tw.
interoccupation$.tw.
inter-occupation$.tw.
interdepartment$.tw.
inter-department$.tw.
Interprofessional Relations/
team$.tw.
multiprofession$.tw.
multi-profession$.tw.
multidisciplin$.tw.
multi-disciplin$.tw.
multioccupation$.tw.
multi-occupation$.tw.
or/7-208
6 and 209
randomized controlled trial.pt. [RCT validated filter]
randomized.mp.
placebo.mp.
meta analysis.mp,pt. [systematic review filter - validated]
review.pt.
search$.tw.

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217	or/211-216
218	210 and 217
219	exp Animals/ not (exp Animals/ and Humans/) [removing animal studies]
220	218 not 219

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Appendix 1

Inclusion/Exclusion criteria

PICOS element	**RESEARCH QUESTION:** What are effective Quality Improvement strategies for transitioning patients admitted to the hospital for Heart Failure (HF) back into the community for reducing hospital admissions and mortality?	
	Inclusion criteria	**Exclusion criteria**
Population	• Adults (patients 18 ≥ years of age) who are newly admitted to the hospital or Emergency Department with a diagnosis of heart failure (i.e., HF, CHF) • We will assume that unless otherwise stated, newly admitted patients were living independently in the community (vs. in a long-term care facility – please exclude if this is stated in the study). o Also include those who were enrolled during hospital stay or a discharge.	• If patients are selected or enrolled in: o Outpatient clinics; o Heart Failure clinics o Primary care practice o In the community (without hospitalization) o Enrolled from administrative databases
Intervention	**Quality improvement (QI) strategies** – intervention aimed at reducing the quality gap (the difference between healthcare processes or outcomes observed in practice and those potentially obtainable based on current professional knowledge) for a group of patients representative of those encountered in routine practice. Care coordination – is a QI strategy involving the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient's care to facilitate the appropriate delivery of health care services QI targeting health systems • Case management (targeting health systems); Team changes; Electronic patient registry; Facilitated relay of information to clinicians; Continuous QI QI targeting health care providers • Audit and feedback; Education; Reminders; Financial incentives; Tele-monitoring QI targeting patients: Patient education; Promotion of self-management; Reminder systems	Targeting health care providers • Education: Exclude teaching how to educate patients, counseling skills, motivational interviewing, self-directed learning, and skills related to the intervention (e.g., teaching how to use the website for the randomized controlled trial). • Reminders: Ad-hoc clinician reminders are excluded Targeting patients: • Education: Include interventions with education of patients only if they also include at least one other strategy related to clinician or organisational change. • Self-management: Include interventions promoting self-management only if they also include at least one other strategy related to clinician or organisational change. • Reminders: Include interventions with reminders only if they also include at least one other strategy related to clinician or organizational change. An example is: reminders to monitor glucose. If the intervention included case management, reminders to patients need to be explicit and an extra task to the normal case management.
Comparator	• Usual care; Control	None
Outcome	• Hospital or ED readmission; Hospitalization (Primary) • Mortality (Primary) • Hospital length of stay • Clinician visits • Appropriate use of HF medications (compliance, adherence) • Cost-effectiveness	• Adherence or compliance to the intervention or to guidelines rather than HF medications
Study design	• Randomized controlled trials (RCTs); Cluster RCTs:An experiment in which groups of patients/participants are randomly assigned/allocated to two or more interventions or a control intervention or placebo • Systematic review: A review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research; and collect and analyse data from the studies that are included in the review. May or may not use meta-analysis to analyse and summarise the results	• Quasi RCTs (non-randomized methods of assignment); Controlled before-after studies; Interrupted time series; Observational studies (prospective / retrospective cohort studies; Cross-sectional studies; Case-control studies);Case reports; Editorials or letters: Narrative reviews (Non-systematic reviews typically written by one author that represents their opinion on a particular topic); Basic science or animal studies

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Appendix 2
MEDLINE Search strategy

Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations
Search Strategy:
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3 (cardiac adj failure).tw.
4 (heart adj decompensation).tw.
5 (myocardial adj failure).tw.
6 or/1-5
7 "Continuity of Patient Care"/ [QI strategies]
8 Cooperative Behavior/
9 Case Management/
10 Disease Management/
11 "Delivery of Health Care, Integrated"/
12 Interinstitutional Relations/
13 Progressive Patient Care/
14 "Patient-Centered Care"/
15 "Patient Care Planning"/
16 (case adj coordination).tw.
17 (case adj co-ordination).tw.
18 (case adj management).tw.
19 (care adj management).tw.
20 (care adj interface?).tw.
21 (coordinat$ adj1 care).tw.
22 (coordinat$ adj1 healthcare).tw.
23 (coordinat$ adj1 "health care").tw.
24 (coordinat$ adj1 "health services?").tw.
25 (co-ordinat$ adj1 care).tw.
26 (co-ordinat$ adj1 healthcare).tw.
27 (co-ordinat$ adj1 "health care").tw.
28 (co-ordinat$ adj1 "health service?").tw.
29 (continu$ adj1 care).tw.
30 (continu$ adj1 healthcare).tw
31 (continu$ adj1 "health care").tw.
32 (continu$ adj1 "health service?").tw.
33 "continuity of care".tw.
34 "continuity of healthcare".tw.
35 "continuity of health care".tw.
36 "continuity of health service?".tw.
37 comanag$.tw.
38 co-manag$.tw.
39 (care adj pathway?).tw.
40 (care adj3 aftercare).tw.
41 (care adj3 after-care).tw.
42 (care adj3 collaborat$).tw.

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43 (care adj3 cooperat$).tw.
44 (care adj3 co-operat$).tw.
45 (care adj3 interinstitution$).tw.
46 (care adj3 inter-institution$).tw.
47 (care adj3 progressive).tw.
48 (care adj3 shared).tw.
49 (care adj3 transition$).tw.
50 (clinician$ adj coach$).tw.
51 (disease adj management).tw.
52 (disconnect$ adj2 care).tw.
53 (disconnect$ adj2 healthcare).tw.
54 (disconnect$ adj2 "health service?").tw.
55 "discontinuity of care".tw.
56 "discontinuity of healthcare".tw.
57 "discontinuity of health care".tw. (
58 "discontinuity of health service?".tw.
59 discoordinat$.tw.
60 disco-ordinat$.tw.
61 (disjoint$ adj care).tw.
62 (disjoint$ adj healthcare).tw.
63 (disjoint$ adj "health care").tw.
64 (disjoint$ adj "health service?").tw.
65 (fragment$ adj care).tw.
66 (fragment$ adj healthcare).tw.
67 (fragment$ adj "health care").tw.
68 (fragment$ adj "health service?").tw
69 (gap? adj2 care).tw.
70 (gap? adj2 healthcare).tw.
71 (gap? adj2 "health care").tw.
72 (gap? adj2 "health service?").tw.
73 (healthcare adj pathway?).tw.
74 (healthcare adj3 aftercare).tw.
75 ("health service?" adj3 aftercare).tw.
76 (healthcare adj3 after-care).tw.
77 ("health service?" adj3 after-care).tw.
78 (healthcare adj3 collaborat$).tw.
79 ("health service?" adj3 collaborat$).tw.
80 (healthcare adj3 cooperat$).tw.
81 ("health service?" adj3 cooperat$).tw.
82 (healthcare adj3 co-operat$).tw.
83 ("health service?" adj3 co-operat$).tw.
84 (healthcare adj3 interinstitution$).tw.
85 ("health service?" adj3 interinstitution$).tw.
86 (healthcare adj3 inter-institution$).tw.
87 ("health service?" adj3 inter-institution$).tw.
88 (healthcare adj3 progressive).tw.
89 ("health service?" adj3 progressive).tw.
90 (healthcare adj3 shared).tw.

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91 ("health service?" adj3 shared).tw.
92 (healthcare adj3 transition$).tw.
93 ("health service?" adj3 transition$).tw.
94 (healthcare adj management).tw.
95 (healthcare adj interface?).tw.
96 handover$.tw.
97 (hand adj over$).tw.
98 handoff$.tw.
99 (hand adj off$).tw.
100 (harmon$ adj care).tw.
101 (harmon$ adj healthcare).tw.
102 (harmon$ adj "health care").tw.
103 (harmon$ adj "health service?").tw.
104 ((interagency or inter-agency) adj care).tw.
105 ((interagency or inter-agency) adj healthcare).tw.
106 ((interagency or inter-agency) adj "health care").tw.
107 ((interagency or inter-agency) adj "health service?").tw.
108 ((interinstitution$ or inter-institution$) adj care).tw.
109 ((interinstitution$ or inter-institution$) adj healthcare).tw.
110 ((interinstitution$ or inter-institution$) adj "health care").tw.
111 ((interinstitution$ or inter-institution$) adj "health service?").tw.
112 ((interorganization$ or inter-organization$) adj care).tw.
113 ((interorganization$ or inter-organization$) adj healthcare).tw.
114 ((interorganization$ or inter-organization$) adj "health care").tw.
115 ((interorganization$ or inter-organization$) adj "health service?").tw.
116 (inter-connect$ adj care).tw.
117 (inter-connect$ adj healthcare).tw.
118 (inter-connect$ adj "health care").tw.
119 (inter-connect$ adj "health service?").tw.
120 (interconnect$ adj care).tw.
121 (interconnect$ adj healthcare).tw.
122 (interconnect$ adj "health care").tw.
123 (interconnect$ adj "health service?").tw.
124 (integrat$ adj2 care).tw.
125 (integrat$ adj2 healthcare).tw.
126 (integrat$ adj2 "health service?").tw.
127 (lia?son adj service?).tw.
128 (linked adj care).tw.
129 (linked adj healthcare).tw.
130 (linked adj "health care").tw.
131 (linked adj "health service?").tw.
132 "patient care plan$".tw.
133 "patient healthcare plan$".tw.
134 "patient health care plan$".tw.
135 ("patient centred" adj2 care).tw.
136 ("patient centred" adj2 healthcare).tw.
137 ("patient centered" adj2 care).tw.
138 ("patient centered" adj2 healthcare).tw.

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(shared adj care).tw.
(shared adj healthcare).tw.
(shared adj "health care").tw.
(seamless adj care).tw.
(seamless adj healthcare).tw.
(seamless adj "health care").tw.
(seamless adj "health service?").tw.
(synchron$ adj2 care).tw.
(synchron$ adj2 healthcare).tw.
(synchron$ adj2 "health service?").tw.
(self adj manage$).tw.
telemonitor$.tw.
tele-monitor$.tw.
"transfer of care".tw.
(transition$ adj care).tw.
(transition$ adj healthcare).tw.
(transition$ adj "health care").tw.
(transition$ adj "health service?").tw.
(uncoordinat$ adj care).tw.
(uncoordinat$ adj healthcare).tw.
(uncoordinat$ adj "health service?").tw.
(uncoordinat$ adj "health care").tw.
(unco-ordinat$ adj care).tw.
(unco-ordinat$ adj healthcare).tw.
(unco-ordinat$ adj "health care").tw.
(unco-ordinat$ adj "health service?").tw.
Medical Records Systems, Computerized/ [clinical information systems]
"clinical information system?".tw.
"clinical data system?".tw.
"information retrieval system?".tw.
"ancillary information system?".tw.
Decision Support Techniques/ [decision support]
Decision Support Systems, Clinical/
Decision-Making Computer Assisted/
(cross adj disciplin$).tw.
"computer$ decision making".tw.
(decision$ adj2 support$).tw.
(decision$ adj2 aid$).tw.
(decision$ adj2 tool$).tw.
(decision$ adj2 instrument$).tw.
(decision$ adj2 technolog$).tw.
(decision$ adj2 technique$).tw.
(decision$ adj2 system$).tw.
(decision$ adj2 program$).tw.
(decision$ adj2 algorithm$).tw.
(decision$ adj2 process$).tw.
(decision$ adj2 method$).tw.
(decision$ adj material$).tw.

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187	(decision$ adj2 counsel$).tw.
188	(decision$ adj2 guid$).tw.
189	(decision$ adj board).tw.
190	(interacti$ adj3 tool$).tw.
191	"risk communication tool$".tw.
192	(risk adj calculator?).tw.
193	interprofession$.tw. [team changes]
194	inter-profession$.tw.
195	interdisciplin$.tw.
196	inter-disciplin$.tw.
197	interoccupation$.tw.
198	inter-occupation$.tw.
199	interdepartment$.tw.
200	inter-department$.tw.
201	Interprofessional Relations/
202	team$.tw.
203	multiprofession$.tw.
204	multi-profession$.tw.
205	multidisciplin$.tw.
206	multi-disciplin$.tw.
207	multioccupation$.tw.
208	multi-occupation$.tw.
209	or/7-208
210	6 and 209
211	randomized controlled trial.pt. [RCT validated filter]
212	randomized.mp.
213	placebo.mp.
214	meta analysis.mp,pt. [systematic review filter - validated]
215	review.pt.
216	search$.tw.
217	or/211-216
218	210 and 217
219	exp Animals/ not (exp Animals/ and Humans/) [removing animal studies]
220	218 not 219

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PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			1
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			2
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2-3
INTRODUCTION			4
Rationale	3	Describe the rationale for the review in the context of what is already known.	4-5
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	5
METHODS			5
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	NA
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	6-7
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	7-8
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Appendix
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	8-9
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	9
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	9
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	NA
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	NA
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	10-11

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PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	NA
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	10-11
RESULTS			NA
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	NA
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	NA
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	NA
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	NA
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	NA
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	NA
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	NA
DISCUSSION			11-12
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	NA
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	NA
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	NA
FUNDING			12
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	12

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

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