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In-Hospital Performance Indicators for In-Hospital Heart Failure Management: A Rapid Review

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Conflict of Interest Statement

All reports prepared by the Division of Evidence Development and Standards at Health Quality Ontario are impartial. There are no competing interests or conflicts of interest to declare.

Rapid Review Methodology

Clinical questions are developed by the Division of Evidence Development and Standards at Health Quality Ontario in consultation with experts, end-users, and/or applicants in the topic area. A systematic literature search is then conducted to identify relevant systematic reviews, health technology assessments, and meta-analyses; if none are located, the search is expanded to include randomized controlled trials (RCTs), and guidelines. Systematic reviews are evaluated using a rating scale developed for this purpose. If the systematic review has evaluated the included primary studies using the GRADE Working Group criteria (http://www.gradeworkinggroup.org/index.htm), the results are reported and the rapid review process is complete. If the systematic review has not evaluated the primary studies using GRADE, the primary studies included in the systematic review are retrieved and a maximum of two outcomes are graded. If no well-conducted systematic reviews are available, RCTs and/or guidelines are evaluated. Because rapid reviews are completed in very short timeframes, other publication types are not included. All rapid reviews are developed and finalized in consultation with experts.

Disclaimer

This rapid review is the work of the Division of Evidence Development and Standards at Health Quality Ontario, and is developed from analysis, interpretation, and comparison of published scientific research. It also incorporates, when available, Ontario data and information provided by experts. As this is a rapid review, it may not reflect all the available scientific research and is not intended as an exhaustive analysis. Health Quality Ontario assumes no responsibility for omissions or incomplete analysis resulting from its rapid reviews. In addition, it is possible that other relevant scientific findings may have been reported since completion of the review. This report is current to the date of the literature search specified in the Research Methods section, as appropriate. This rapid review may be superseded by an updated publication on the same topic. Please check the Health Quality Ontario website for a list of all publications: http://www.hqontario.ca/evidence/publications-and-ohtac-recommendations.

About Health Quality Ontario

Health Quality Ontario is an arms-length agency of the Ontario government. It is a partner and leader in transforming Ontario's health care system so that it can deliver a better experience of care, better outcomes for Ontarians, and better value for money.

Health Quality Ontario strives to promote health care that is supported by the best available scientific evidence. Health Quality Ontario works with clinical experts, scientific collaborators, and field evaluation partners to develop and publish research that evaluates the effectiveness and cost-effectiveness of health technologies and services in Ontario.

Based on the research conducted by Health Quality Ontario and its partners, the Ontario Health Technology Advisory Committee (OHTAC)—a standing advisory subcommittee of the Health Quality Ontario Board—makes recommendations about the uptake, diffusion, distribution, or removal of health interventions to Ontario's Ministry of Health and Long-Term Care, clinicians, health system leaders, and policy makers.

Rapid reviews, evidence-based analyses and their corresponding OHTAC recommendations, and other associated reports are published on the Health Quality Ontario website. Visit http://www.hqontario.ca for more information.

About Health Quality Ontario Publications

To conduct its rapid reviews, Health Quality Ontario and/or its research partners reviews the available scientific literature, making every effort to consider all relevant national and international research; collaborates with partners across relevant government branches; consults with clinical and other external experts and developers of new health technologies; and solicits any necessary supplemental information.

In addition, Health Quality Ontario collects and analyzes information about how a health intervention fits within current practice and existing treatment alternatives. Details about the diffusion of the intervention into current health care practices in Ontario can add an important dimension to the review. Information concerning the health benefits, economic and human resources, and ethical, regulatory, social, and legal issues relating to the intervention may be included to assist in making timely and relevant decisions to optimize patient outcomes.

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List of Abbreviations

ACCF	American College of Cardiology Foundation
AHA	American Heart Association
AMA–PCPI	American Medical Association–Physician Consortium for Performance Improvement
AMSTAR	Assessment of Multiple Systematic Reviews

Background

As legislated in Ontario's *Excellent Care for All Act*, Health Quality Ontario's mandate includes the provision of objective, evidence-informed advice about health care funding mechanisms, incentives, and opportunities to improve quality and efficiency in the health care system. As part of its Quality-Based Funding (QBF) initiative, Health Quality Ontario works with multidisciplinary expert panels (composed of leading clinicians, scientists, and administrators) to develop evidence-based practice recommendations and define episodes of care for selected disease areas or procedures. Health Quality Ontario's recommendations are intended to inform the Ministry of Health and Long-Term Care's Health System Funding Strategy.

For more information on Health Quality Ontario's Quality-Based Funding initiative, visit www.hqontario.ca.

Objective of Analysis

The objective of this analysis was to determine if in-hospital performance indicators for in-hospital heart failure management are effective at improving patient outcomes.

Clinical Need and Target Population

Quality assurance is a process whereby a health care organization can ensure that the care it delivers for a particular illness meets accepted quality standards. (1) A characteristic of this process is the existence of evidence-based clinical guidelines for the illness of interest, and from which quality of care performance indicators can be derived. Such indicators can refer to structures, processes, or outcomes of care. (1)

Several organizations have developed, through consensus processes, restricted sets of performance indicators that are considered indicators of quality care in patients with heart failure. (1) Of interest to this rapid review are the in-hospital performance indicators that apply to in-hospital heart failure management.

Rapid Review Analysis

Research Questions

Are in-hospital performance indicators for the in-hospital management of heart failure effective at improving patient outcomes?

Research Methods

Literature Search

A literature search was performed on September 17, 2012, using OVID MEDLINE, MEDLINE In-Process and Other Non-Indexed Citations, OVID EMBASE, the Wiley Cochrane Library, and the Centre for Reviews and Dissemination database, for studies published from January 1, 2008, to September 17, 2012. Abstracts were reviewed by a single reviewer and, for those studies meeting the eligibility criteria, full-text articles were obtained. Reference lists were also examined for any additional relevant studies not identified through the search.

Inclusion Criteria

- English language full-text reports
- published between January 1, 2008, and September 17, 2012
- health technology assessments, systematic reviews, and meta-analyses
- studies describing in-hospital performance indicators for in-hospital heart failure management

Exclusion Criteria

- randomized controlled trials, observational studies, case reports, editorials

Outcomes of Interest

- mortality
- rehospitalization

Quality of Evidence

The Assessment of Multiple Systematic Reviews (AMSTAR) measurement tool was used to assess the methodological quality of systematic reviews. (2)

The quality of the body of evidence for each outcome was examined according to the GRADE Working Group criteria. (3) The overall quality was determined to be very low, low, moderate, or high using a step-wise, structural methodology.

Study design was the first consideration; the starting assumption was that randomized controlled trials are high quality, whereas observational studies are low quality. (3) Five additional factors—risk of bias, inconsistency, indirectness, imprecision and publication bias—were then taken into account. Limitations in these areas resulted in downgrading the quality of evidence. Finally, 3 main factors that may raise the

quality of evidence were considered: large magnitude of effect, dose response gradient, and accounting for all residual confounding. (3) For more detailed information, please refer to the latest series of GRADE articles.

As stated by the GRADE Working Group, (3) the final quality score can be interpreted using the following definitions:

High	Very confident that the true effect lies close to the estimate of the effect
Moderate	Moderately confident in the effect estimate—the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low	Confidence in the effect estimate is limited—the true effect may be substantially different from the estimate of the effect
Very Low	Very little confidence in the effect estimate—the true effect is likely to be substantially different from the estimate of effect

Results of Literature Search

The database search yielded 1,443 citations published between January 1, 2008, and September 17, 2012 (with duplicates removed). Articles were excluded based on information in the title and abstract. The full texts of potentially relevant articles were obtained for further assessment.

No meta-analyses, health technology assessments or systematic reviews were identified in the literature search.

Two guideline reports were identified that reported on in-hospital performance indicators for in-hospital heart failure management: 2010 Canadian Cardiovascular Society (CCS) Guidelines for the Diagnosis and Management of Heart Failure Update (1) and the American College of Cardiology Foundation (ACCF) / American Heart Association (AHA) / American Medical Association–Physician Consortium for Performance Improvement (AMA–PCPI) 2011 Performance Measures for Adults with Heart Failure. (4)

The AMSTAR measurement tool was not used since no systematic reviews were identified in the literature search.

A summary of the performance indicators listed in the CCS guidelines (1) is shown in Table 1. The ACCF/AHA /AMA-PCPI 2011 Performance Measures report mentions similar performance indicators. (4)

Table 1: Summary of Performance Indicators for Heart Failure by Development Group

Indicator	Canadian Cardiovascular Outcomes Research Team (CCORT) inpatient	American Heart Association/ American College of Cardiology (AHA/ACC) inpatient	Joint Commission on Accreditation of Healthcare Organizations (JCAHO)	Organized Program to Initiate Lifesaving Treatment in Hospitalized Patients with Heart Failure (OPTIMIZE-HF)	Assessing the Care of Vulnerable Elders Project (ACOVE)
Therapeutics					
ACEi and/or ARB if LV systolic dysfunction in eligible patients	x	x	x	x	x
Use of beta blockers in eligible patients	x	x		x	x
Use of statins in eligible patients if underlying CAD, PVD, CVD, or diabetes				x	
Aldosterone antagonists for eligible patients				x	
Anticoagulants for atrial fibrillation	x	x		x	
Use of ICD in eligible patients					
Avoid 1st and 2nd generation CCBs if LV systolic dysfunction				x	
Avoid type 1 antiarrhythmic agents if LV systolic dysfunction (unless ICD in place)				x	
Investigations					
Outpatient assessment including one or more of regular volume assessment, weight, blood pressure, activity level	x				x
Appropriate baseline blood/urine tests, ECG, CXR					x
Appropriate biochemical monitoring of renal function and electrolytes					x
Assessment of LV function	x	x	x	x	x
Measure digoxin levels if toxicity suspected					x
Education and follow-up					
HF patient education/discharge instructions	x	x	x	x	x
Outpatient follow-up within 4 weeks					
Advice on smoking cessation		x	x	x	

Abbreviations: ACEi, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; CAD, coronary artery disease; CCB, calcium channel blocker; CVD, cardiovascular disease; CXR, chest x-ray; ECG, electrocardiogram; ICD, implantable cardioverter defibrillator; LV, left ventricle; PVD, peripheral vascular disease.

From: Howlett et al., 2010. (1)

Performance Measures and Patient Outcomes

Overall, the relationship between specific performance measures and patient outcomes remains unclear. (1;5) The reasons include:

- Methodological limitations of the studies, such as nonrandomized designs and limited follow-up, affect their quality.
- In clinical trials, many commonly assessed performance indicators have not been shown to reduce mortality and prevent hospitalization.
- Some performance indicators, such as smoking cessation counselling, may have been delivered in a suboptimal manner.
- Baseline adherence to performance indicators such as angiotensin-converting enzyme inhibitors in eligible patients was already high in some studies, making further improvements in patient outcomes more difficult to demonstrate.

Conclusions

There is very low quality evidence that in-hospital performance indicators for in-hospital heart failure management are effective at improving patient outcomes, in particular, reducing mortality and rehospitalization. (GRADE: Very low)

Details about the GRADE assessment for the quality of evidence on in-hospital performance indicators for in-hospital heart failure management are in Appendix 2.

Acknowledgements

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Dr. Malcolm Arnold	Professor of Medicine	Western University, London Health Sciences Centre
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Appendices

Appendix 1: Literature Search Strategies

Database: Ovid MEDLINE(R) <1946 to September Week 1 2012>, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations <September 14, 2012>, Embase <1980 to 2012 Week 37>
Search Strategy:

#	Searches	Results
1	exp Heart Failure/	324437
2	(((cardia? or heart) adj (decompensation or failure or incompetence or insufficiency)) or cardiac stand still or ((coronary or myocardial) adj (failure or insufficiency))).ti,ab.	255967
3	or/1-2	413760
4	exp Hospitals/ use mesz	187674
5	Cardiology Service, Hospital/ use mesz	1321
6	Coronary Care Units/ use mesz	3910
7	exp Emergency Service, Hospital/ use mesz	43344
8	exp Hospital/ use emez	532235
9	Coronary Care Unit/ use emez	6467
10	Hospital Care/ use emez	14879
11	Emergency Ward/ use emez	43791
12	(in-hospital* or hospital*).ti,ab.	1677498
13	or/4-12	2056459
14	exp "Quality of Health Care"/ use mesz	4439685
15	exp Health Care Quality/ use emez	1729083
16	exp Quality Control/	257197
17	Mortality/	477513
18	Standard/ use emez	327469
19	exp Hospitalization/	319669
20	Hospital Readmission/ use emez	10748
21	"Length of Stay"/ use emez	66396
22	performance*.ti,ab.	1019847
23	(indicat* or measure* or outcome* or quality or standards).ti.	1172305
24	(readmission? or re-admission? or rehospitalization? or rehospitalisation? or re-hospitalization? or re-hospitalisation? or hospitalization? or hospitalisation? or "length of stay").ti,ab.	253711
25	or/14-24	8499942
26	Hospital Mortality/ use mesz	19178
27	((in-house or in-hospital* or hospital*) adj mortalit*).ti,ab.	38305
28	or/26-27	50715
29	Meta Analysis.pt.	36232
30	Meta Analysis/ use emez	65756
31	Systematic Review/ use emez	52961
32	exp Technology Assessment, Biomedical/ use mesz	8833
33	Biomedical Technology Assessment/ use emez	11371
34	(meta analy* or metaanaly* or pooled analysis or (systematic* adj2 review*) or published studies or published literature or medline or embase or data synthesis or data extraction or cochrane).ti,ab.	288884
35	((health technolog* or biomedical technolog*) adj2 assess*).ti,ab.	3611
36	or/29-35	348468

37	3 and ((13 and 25) or 28) and 36	1441
38	limit 37 to english language	1356
39	limit 38 to yr="2008 -Current"	676
40	remove duplicates from 39	508=MA/SR/HTA set
41	exp Practice Guideline/ use emez	276902
42	exp Professional Standard/ use emez	266918
43	exp Standard of Care/ use mesz	560
44	exp Guideline/ use mesz	22989
45	exp Guidelines as Topic/ use mesz	101554
46	(guideline* or guidance or consensus statement* or standard or standards).ti.	217940
47	3 and (25 or 28) and 46	2950
48	limit 47 to english language	2441
49	limit 48 to yr="2008 -Current"	1207
50	remove duplicates from 49	949=Guideline set
51	40 or 50	1443=both sets

Cochrane Library

Line #	Terms	Results
#1	MeSH descriptor: [Heart Failure] explode all trees	4860
#2	((cardia? or heart) next (decompensation or failure or incompetence or insufficiency)) or cardiac stand still or ((coronary or myocardial) next (failure or insufficiency)):ti,ab,kw (Word variations have been searched)	9323
#3	Enter terms for search#1 or #2	9328
#4	MeSH descriptor: [Hospitals] explode all trees	2411
#5	MeSH descriptor: [Cardiology Service, Hospital] this term only	39
#6	MeSH descriptor: [Coronary Care Units] this term only	139
#7	MeSH descriptor: [Emergency Service, Hospital] this term only	1312
#8	in-hospital* or hospital*:ti,ab,kw (Word variations have been searched)	49579
#9	Enter terms for search#4 or #5 or #6 or #7 or #8	49683
#10	MeSH descriptor: [Quality of Health Care] explode all trees	315788
#11	MeSH descriptor: [Quality Control] explode all trees	452
#12	MeSH descriptor: [Mortality] this term only	360
#13	MeSH descriptor: [Hospitalization] explode all trees	10283
#14	performance*:ti or indicat* or measure* or outcome* or quality or standards:ti,ab,kw or readmission? or re-admission? or rehospitalization? or rehospitalisation? or re-hospitalization? or re-hospitalisation? or hospitalization? or hospitalisation? or "length of stay":ti,ab,kw (Word variations have been searched)	311277
#15	Enter terms for search#10 or #11 or #12 or #13 or #14	431037
#16	MeSH descriptor: [Hospital Mortality] explode all trees	807
#17	(in-house or in-hospital* or hospital*) next mortalit*:ti,ab,kw (Word variations have been searched)	1461
#18	Enter terms for search#16 or #17	1461
#19	Enter terms for search#3 and ((#9 and #15) or #18)	674 from 2008 to 2012

CRD

Search	Hits	
1	MeSH DESCRIPTOR Heart Failure EXPLODE ALL TREES	510
2	(((cardia? OR heart) ADJ (decompensation OR failure OR incompetence OR insufficiency)) OR cardiac stand still OR ((coronary OR myocardial) ADJ (failure OR insufficiency))):TI	307
3	#1 OR #2	542
4	MeSH DESCRIPTOR Hospitals EXPLODE ALL TREES	529
5	MeSH DESCRIPTOR Cardiology Service, Hospital EXPLODE ALL TREES	9
6	MeSH DESCRIPTOR Coronary Care Units EXPLODE ALL TREES	15
7	MeSH DESCRIPTOR Emergency Service, Hospital EXPLODE ALL TREES	309
8	(in-hospital* OR hospital*):TI	938
9	#4 OR #5 OR #6 OR #7 OR #8	1530
10	MeSH DESCRIPTOR Quality of Health Care EXPLODE ALL TREES	24737
11	MeSH DESCRIPTOR Quality Control EXPLODE ALL TREES	58
12	MeSH DESCRIPTOR Mortality	109
13	MeSH DESCRIPTOR Hospitalization EXPLODE ALL TREES	2389
14	(performance*):TI OR (indicat* OR measure* OR outcome* OR quality OR standards):TI OR (readmission? OR re-admission? OR rehospitalization? OR rehospitalisation? OR re-hospitalization? OR re-hospitalisation? OR hospitalization? OR hospitalisation? OR "length of stay"):TI	3154
15	#10 OR #11 OR #12 OR #13 OR #14	26051
16	MeSH DESCRIPTOR Hospital Mortality EXPLODE ALL TREES	240
17	((in-house OR in-hospital* OR hospital*) ADJ mortalit*):TI	7
18	#16 OR #17	242
19	#3 AND #9 AND #15	45
20	#3 AND #18	5
21	#19 OR #20	47

Appendix 2: GRADE Tables

Table A2: GRADE Evidence Profile for Performance Indicators

No. of Studies (Design)	Risk of Bias	Inconsistency	Indirectness	Imprecision	Publication Bias	Upgrade Considerations	Quality
Mortality/Rehospitalizations							
2 Guidelines	Some serious limitations (−2) [a]	No serious limitations	Some limitations (−1) [b]	No serious limitations	Undetected	None	⊕Very Low

[a] Methodological limitations of the studies such as nonrandomized designs and limited follow-up; in clinical trials, many commonly assessed performance indicators have not been shown to reduce mortality and prevent hospitalization; while some performance indicators such as smoking cessation counselling may have been met, the manner in which they were delivered may have been suboptimal; baseline adherence to performance indicators such as angiotensin-converting enzyme inhibitors in eligible patients was already high in some studies, making further improvements in patient outcomes difficult to demonstrate.

[b] Performance indicators reported by the Assessing the Care of Vulnerable Elders Project are not all directly related to in-hospital performance indicators.

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