SUPPLEMENTAL MATERIAL

Data Supplement 1

Search methods

Databases searched
Ovid MEDLINE(R) 1946 to April Week 4 2018
Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations May 08, 2018; Ovid MEDLINE(R) Epub Ahead of Print May 08, 2018
Embase 1974 to present; Embase Classic 1947 to 1973 (embase.com)
CINAHL Plus with Full Text (EBSCOhost)
Conference Proceedings Citation Index- Science (CPCI-S) --1990-present (Web of Science)
Cochrane Database of Systematic Reviews : Issue 5 of 12, May 2018 (Cochrane Library—Wiley)
Cochrane Central Register of Controlled Trials : Issue 4 of 12, April 2018 (Cochrane Library—Wiley)
Database of Abstracts of Reviews of Effects : Issue 2 of 4, April 2015 (Cochrane Library—Wiley)
Health Technology Assessment Database : Issue 4 of 4, October 2016 (Cochrane Library—Wiley)

We searched the databases listed above on November 3, 2016 and ran search updates on May 9, 2018. For the MEDLINE search, we used the McMaster multi-term filter with the best balance of sensitivity and specificity for retrieving randomized controlled trials (Haynes 2005). For EMBASE, we translated from Ovid to embase.com syntax the multi-term EMBASE filter with the best balance of sensitivity and specificity (Wong 2006). We translated from Ovid to EBSCOhost syntax the McMaster highly sensitive filter for retrieving randomized controlled trials and systematic reviews for CINAHL (Wong 2006b). For Conference Proceedings Citation Index-Science we used a modified version of the combination of terms for identifying trials from EMBASE described in the Cochrane Handbook section 6.3.2.2 (Lefebvre 2011). In addition to the filters above, we also employed search terms to capture crossover studies and interrupted time series per the review protocol. No search filters were used in the Cochrane Library databases.

Lefebvre C, Manheimer E, Glanville J. Chapter 6: Searching for studies. In: Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 [updated March 2011]. The Cochrane Collaboration, 2011. Available from www.cochrane-handbook.org.

Haynes, R. B., McKibbon, K. A., Wilczynski, N. L., Walter, S. D., & Werre, S. R. (2005). Optimal search strategies for retrieving scientifically strong studies of treatment from Medline: analytical survey. BMJ, 330(7501), 1179. doi: bmj.38446.498542.8F.

Wong, S. S., Wilczynski, N. L., & Haynes, R. B. (2006). Developing optimal search strategies for detecting clinically sound treatment studies in EMBASE. J Med Libr Assoc, 94(1), 41-47.

Wong, S. S., Wilczynski, N. L., & Haynes, R. B. (2006). Optimal CINAHL search strategies for identifying therapy studies and review articles. J Nurs Scholarsh, 38(2), 194-199.

Database search strategies

Database: Ovid MEDLINE(R) <1946 to April Week 4 2018>

1. Acute Coronary Syndrome/
2. acute coronary syndrome*.tw.
3. Myocardial Ischemia/
4. myocardial ischemi*.tw.
5. (heart adj3 ischemi*).tw.
6. exp Myocardial Infarction/
7. myocardial infarct*.tw.
8. heart infarct*.tw.
9. heart attack*.tw.
10. (preinfarct* or pre-infarct*).tw.
11. (stemi or nstemi).tw.
12. exp Angina, Unstable/
13. unstable angina*.tw.
14. or/1-13
15. "Outcome and Process Assessment (Health Care)"/
16. "Outcome Assessment (Health Care)"/
17. (outcome* adj3 assessment*).tw.
18. "Process Assessment (Health Care)"/
19. (process* adj3 assessment*).tw.
20. "Quality of Health Care"/
21. Quality Assurance, Health Care/
22. quality assurance.tw.
23. Quality Improvement/
24. quality improvement.tw.
25. (improvement adj intervention*).tw.
26. (improvement adj program*).tw.
27. (improvement adj initiative*).tw.
28. (process* adj improvement).tw.
29. Quality Indicators, Health Care/
30. quality indicator*.tw.
31. Management Quality Circles/
32. quality circle*.tw.
33. Reminder Systems/
34. reminder*.tw.
35. Total Quality Management/
36. (total quality management or tqm or six sigma*).tw.
37. Program Evaluation/
38. (program* adj3 effectiveness).tw.
39. (program* adj3 evaluation*).tw.
40. Checklist/
41. (checklist* or check list*).tw.
42. exp Patient Education as Topic/
43. patient education.tw.
44. Health Education/
45. exp Consumer Health Information/
46. Critical Pathways/
47. critical pathway*.tw.

48. clinical pathway*.tw.
49. care pathway*.tw.
50. Education, Medical, Continuing/
51. (continuing adj2 education).tw.
52. exp Inservice Training/
53. (inservice or in service).tw.
54. (staff adj3 train*).tw.
55. Guideline Adherence/
56. Clinical Competence/
57. Peer Review, Health Care/
58. Medical Audit/
59. (audit adj3 feedback).tw.
60. or/15-59
61. 14 and 60
62. randomized controlled trial.pt. or randomized.mp. or placebo.mp.
63. Interrupted Time Series Analysis/
64. interrupted time series.tw.
65. cross-over studies/
66. (crossover or cross-over).tw.
67. or/62-66
68. 61 and 67

Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations <May 08, 2018>, Ovid MEDLINE(R) Epub Ahead of Print <May 08, 2018>

1. Acute Coronary Syndrome/
2. acute coronary syndrome*.tw.
3. Myocardial Ischemia/
4. myocardial ischemi*.tw.
5. (heart adj3 ischemi*).tw.
6. exp Myocardial Infarction/
7. myocardial infarct*.tw.
8. heart infarct*.tw.
9. heart attack*.tw.
10. (preinfarct* or pre-infarct*).tw.
11. (stemi or nstemi).tw.
12. exp Angina, Unstable/
13. unstable angina*.tw.
14. or/1-13
15. "Outcome and Process Assessment (Health Care)"/
16. "Outcome Assessment (Health Care)"/
17. (outcome* adj3 assessment*).tw.
18. "Process Assessment (Health Care)"/
19. (process* adj3 assessment*).tw.
20. "Quality of Health Care"/
21. Quality Assurance, Health Care/
22. quality assurance.tw.
23. Quality Improvement/
24. quality improvement.tw.
25. (improvement adj intervention*).tw.
26. (improvement adj program*).tw.
27. (improvement adj initiative*).tw.
28. (process* adj improvement).tw.
29. Quality Indicators, Health Care/
30. quality indicator*.tw.
31. Management Quality Circles/
32. quality circle*.tw.
33. Reminder Systems/
34. reminder*.tw.
35. Total Quality Management/
36. (total quality management or tqm or six sigma*).tw.
37. Program Evaluation/
38. (program* adj3 effectiveness).tw.
39. (program* adj3 evaluation*).tw.
40. Checklist/
41. (checklist* or check list*).tw.
42. exp Patient Education as Topic/
43. patient education.tw.
44. Health Education/
45. exp Consumer Health Information/
46. Critical Pathways/
47. critical pathway*.tw.
48. clinical pathway*.tw.

49. care pathway*.tw.
50. Education, Medical, Continuing/
51. (continuing adj2 education).tw.
52. exp Inservice Training/
53. (inservice or in service).tw.
54. (staff adj3 train*).tw.
55. Guideline Adherence/
56. Clinical Competence/
57. Peer Review, Health Care/
58. Medical Audit/
59. (audit adj3 feedback).tw.
60. or/15-59
61. 14 and 60

Embase

#63
#61 AND #62

#62
[embase]/lim NOT [medline]/lim

#61
#55 AND #60

#60
#56 OR #57 OR #58 OR #59

#59
crossover:ab,ti OR 'cross over':ab,ti

#58
'crossover procedure'/de

#57
'interrupted time series':ab,ti

#56
random*:ab,ti OR placebo* OR ((double NEXT/1 blind*):ab,ti)

#55
#14 AND #54

#54
#15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43 OR #44 OR #45 OR #46 OR #47 OR #48 OR #49 OR #50 OR #51 OR #52 OR #53

#53
'quality circle'/de OR 'quality circle*':ab,ti

#52
(audit NEAR/3 feedback):ab,ti

#51
'medical audit'/de

#50
'peer review'/de

#49
'clinical competence'/de

#48

(adhere* NEAR/5 guideline*):ab,ti

#47
'good clinical practice'/de

#46
(staff NEAR/3 train*):ab,ti

#45
'inservice':ab,ti OR 'in service':ab,ti

#44
'in service training'/de

#43
(continuing NEAR/2 education):ab,ti

#42
'care pathway*':ab,ti

#41
'clinical pathway*':ab,ti

#40
'critical pathway*':ab,ti

#39
'clinical pathway'/de

#38
'consumer health information'/de

#37
'health education'/de

#36
'patient education':ab,ti

#35
'patient education'/de

#34
'checklist*':ab,ti OR 'check list*':ab,ti

#33
'checklist'/exp

#32
(program* NEAR/3 effectiveness):ab,ti

#31

(program* NEAR/3 evaluation*):ab,ti

#30
'program evaluation'/exp

#29
'reminder*':ab,ti

#28
'reminder system'/de

#27
'quality indicator*':ab,ti

#26
(process* NEAR/1 improvement):ab,ti

#25
(improvement NEAR/1 initiative*):ab,ti

#24
(improvement NEAR/1 program*):ab,ti

#23
(improvement NEAR/1 intervention*):ab,ti

#22
'quality improvement':ab,ti

#21
'total quality management':ab,ti OR 'tqm':ab,ti OR 'six sigma*':ab,ti

#20
'total quality management'/de

#19
'quality assurance':ab,ti

#18
(process* NEAR/3 assessment*):ab,ti

#17
'health care quality'/de

#16
(outcome* NEAR/3 assessment*):ab,ti

#15
'outcome assessment'/de

#14

#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13

#13
'unstable angina*':ab,ti

#12
'unstable angina pectoris'/exp

#11
'stemi':ab,ti OR 'nstemi':ab,ti

#10
'preinfarct*':ab,ti OR 'pre-infarct*':ab,ti

#9
'heart attack*':ab,ti

#8
'heart infarct*':ab,ti

#7
'myocardial infarct*':ab,ti

#6
'heart infarction'/exp

#5
(heart NEAR/3 ischemi*):ab,ti

#4
'myocardial ischemi*':ab,ti

#3
'heart muscle ischemia'/de

#2
'acute coronary syndrome*':ab,ti

#1
'acute coronary syndrome'/exp

CINAHL with Full Text (EBSCOhost)

#	Query
S70	S59 AND S69
S69	S63 OR S68
S68	S64 OR S65 OR S66 OR S67
S67	TI crossover OR "cross over" OR AB crossover OR "cross over"
S66	(MH "Crossover Design")
S65	TI "interrupted time series" OR AB "interrupted time series"
S64	(MH "Interrupted Time Series Analysis")
S63	S60 OR S61 OR S62
S62	PT "clinical trial"
S61	MH "Treatment Outcomes"
S60	TI randomized or AB randomized
S59	S57 AND S58
S58	S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56
S57	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13
S56	TI audit N3 feedback OR AB audit N3 feedback
S55	(MH "Nursing Audit")
S54	(MH "Clinical Competence+")
S53	(MH "Guideline Adherence")
S52	TI staff N3 train* OR AB staff N3 train*
S51	TI inservice OR "in service" OR AB inservice OR "in service"
S50	(MH "Staff Development")
S49	TI continuing N2 education OR AB continuing N2 education
S48	(MH "Education, Continuing+")
S47	TI "care pathway*" OR AB "care pathway*"

S46 TI "clinical pathway*" OR AB "clinical pathway*"

S45 TI "critical pathway*" OR AB "critical pathway*"

S44 (MH "Critical Path")

S43 (MH "Consumer Health Information+")

S42 (MH "Health Education")

S41 TI "patient education" OR AB "patient education"

S40 (MH "Patient Education")

S39 TI checklist* OR "check list*" OR AB checklist* OR "check list*"

S38 (MH "Checklists")

S37 TI program* N3 evaluation* OR AB program* N3 evaluation*

S36 TI program* N1 effectiveness OR AB program* N1 effectiveness

S35 (MH "Program Evaluation")

S34 (MH "Evaluation and Quality Improvement Program")

S33 TI "total quality management" OR tqm OR "six sigma*" OR AB "total quality management" OR tqm OR "six sigma*"

S32 TI reminder* OR AB reminder*

S31 (MH "Reminder Systems")

S30 TI "quality circle*" OR AB "quality circle*"

S29 (MH "Quality Circles")

S28 TI "clinical indicator*" OR AB "clinical indicator*"

S27 TI "quality indicator*" OR AB "quality indicator*"

S26 (MH "Clinical Indicators")

S25 TI process* N1 improvement OR AB process* N1 improvement

S24 TI improvement N1 initiative* OR AB improvement N1 initiative*

S23 TI improvement N1 program* OR AB improvement N1 program*

S22 TI improvement N1 intervention* OR AB improvement N1 intervention*

S21 TI "quality improvement" OR AB "quality improvement"

S20 TI "quality assurance" OR AB "quality assurance"

S19 (MH "Quality Assurance+")

S18 (MH "Quality of Health Care")

S17 TI process* N3 assessment* OR AB process* N3 assessment*

S16 (MH "Process Assessment (Health Care)+")

S15 TI outcome* N3 assessment* OR AB outcome* N3 assessment*

S14 (MH "Outcome Assessment")

S13 TI "unstable angina*" OR AB "unstable angina*"

S12 (MH "Angina, Unstable")

S11 TI (stemi OR nstemi) OR AB (stemi OR nstemi)

S10 TI (preinfarct* OR pre-infarct*) OR AB (preinfarct* OR pre-infarct*)

S9 TI "heart attack*" OR AB "heart attack*"

S8 TI "heart infarct*" OR AB "heart infarct*"

S7 TI "myocardial infarct*" OR AB "myocardial infarct*"

S6 (MH "Myocardial Infarction+")

S5 TI heart N3 ischemi* OR AB heart N3 ischemi*

S4 TI "myocardial ischemi*" OR AB "myocardial ischemi*"

S3 (MH "Myocardial Ischemia")

S2 TI "acute coronary syndrome*" OR AB "acute coronary syndrome*"

S1 (MH "Acute Coronary Syndrome")

Conference Proceedings Citation Index- Science (CPCI-S) --1990-present (Web of Science)

#5 #4 AND #3
#4 TS=(random* OR "double-blind*" OR placebo* OR crossover* OR "cross-over*" OR "interrupted time series")
#3 #2 AND #1
#2 TS=((outcome* NEAR/3 assessment*) OR (process* NEAR/3 assessment*) OR "quality assurance" OR "quality improvement" OR (improvement NEAR/1 intervention*) OR (improvement NEAR/1 program*) OR (improvement NEAR/1 initiative*) OR "quality indicator*" OR "quality circle*" OR reminder* OR "total quality management" OR tqm OR "six sigma*" OR (program* NEAR/3 effectiveness) OR (program* NEAR/3 evaluation*) OR checklist* OR "check list*" OR "patient education" OR "consumer health information" OR "critical pathway*" OR "clinical pathway*" OR "care pathway*" OR (continuing NEAR/2 education) OR inservice OR "in service" OR (staff NEAR/3 train*) OR (adhere* NEAR/5 guideline*) OR "clinical competence" OR "medical audit" OR (audit NEAR/3 feedback))
#1 TS=("acute coronary syndrome*" OR "myocardial ischemi*" OR (heart NEAR/3 ischemi*) OR "myocardial infarct*" OR "heart infarct*" OR "heart attack*" OR preinfarct* OR "pre-infarct*" OR stemi OR nstemi OR "unstable angina*")

Cochrane Library Databases (Wiley)
Cochrane Database of Systematic Reviews : Issue 5 of 12, May 2018
Cochrane Central Register of Controlled Trials : Issue 4 of 12, April 2018
Database of Abstracts of Reviews of Effect : Issue 2 of 4, April 2015
Health Technology Assessment Database : Issue 4 of 4, October 2016

ID	Search
#1	MeSH descriptor: [Acute Coronary Syndrome] this term only
#2	"acute coronary syndrome*":ab,ti,kw
#3	MeSH descriptor: [Myocardial Ischemia] this term only
#4	"myocardial ischemi*":ab,ti,kw
#5	(heart near/3 ischemi*):ab,ti,kw
#6	MeSH descriptor: [Myocardial Infarction] explode all trees
#7	"myocardial infarct*":ab,ti,kw
#8	"heart infarct*":ab,ti,kw
#9	"heart attack*":ab,ti,kw
#10	"preinfarct*":ab,ti,kw or "pre-infarct*":ab,ti,kw
#11	stemi:ab,ti,kw or nstemi:ab,ti,kw
#12	MeSH descriptor: [Angina, Unstable] explode all trees
#13	"unstable angina":ab,ti,kw
#14	{or #1-#13}
#15	MeSH descriptor: [Outcome and Process Assessment (Health Care)] this term only
#16	MeSH descriptor: [Outcome Assessment (Health Care)] this term only
#17	(outcome* near/3 assessment*):ab,ti,kw
#18	MeSH descriptor: [Process Assessment (Health Care)] this term only
#19	(process* near/3 assessment*):ab,ti,kw
#20	MeSH descriptor: [Quality of Health Care] this term only
#21	MeSH descriptor: [Quality Assurance, Health Care] this term only
#22	"quality assurance":ab,ti,kw
#23	MeSH descriptor: [Quality Improvement] this term only
#24	"quality improvement":ab,ti,kw
#25	(improvement near/1 intervention*):ab,ti,kw
#26	(improvement near/1 program*):ab,ti,kw
#27	(improvement near/1 initiative*):ab,ti,kw
#28	(process* near/1 improvement):ab,ti,kw
#29	MeSH descriptor: [Quality Indicators, Health Care] this term only
#30	"quality indicator*":ab,ti,kw
#31	MeSH descriptor: [Management Quality Circles] this term only
#32	"quality circle*":ab,ti,kw
#33	MeSH descriptor: [Reminder Systems] this term only
#34	reminder*:ab,ti,kw
#35	MeSH descriptor: [Total Quality Management] this term only
#36	"total quality management":ab,ti,kw or "tqm":ab,ti,kw or "six sigma*":ab,ti,kw
#37	MeSH descriptor: [Program Evaluation] this term only
#38	(program* near/3 evaluation*):ab,ti,kw
#39	(program* near/3 effectiveness):ab,ti,kw
#40	MeSH descriptor: [Checklist] this term only
#41	"checklist*":ab,ti or "check list*":ab,ti,kw
#42	MeSH descriptor: [Patient Education as Topic] explode all trees
#43	"patient education":ab,ti,kw
#44	MeSH descriptor: [Health Education] this term only

#45 MeSH descriptor: [Consumer Health Information] explode all trees
#46 MeSH descriptor: [Critical Pathways] this term only
#47 "critical pathway*":ab,ti,kw
#48 "clinical pathway*":ab,ti,kw
#49 "care pathway*":ab,ti,kw
#50 MeSH descriptor: [Education, Medical, Continuing] this term only
#51 (continuing near/2 education):ab,ti,kw
#52 MeSH descriptor: [Inservice Training] explode all trees
#53 "inservice":ab,ti,kw or "in service":ab,ti,kw
#54 (staff near/3 train*):ab,ti,kw
#55 MeSH descriptor: [Guideline Adherence] this term only
#56 (adhere* near/5 guideline*):ab,ti,kw
#57 MeSH descriptor: [Clinical Competence] this term only
#58 MeSH descriptor: [Peer Review, Health Care] this term only
#59 MeSH descriptor: [Medical Audit] this term only
#60 (audit near/3 feedback):ab,ti,kw
#61 {or #15-#60}
#62 #14 and #61

Trials Register Searches

ClinicalTrials.gov
Search dates: February 14, 2017 (109 unique records) and May 16, 2018 (54 unique records). We de-duplicated the 2018 records against the 2017 result set. Due to character limits in ClinicalTrials.gov, we broke up the search into four segments.

("acute coronary" OR "myocardial ischemia" OR "myocardial infarction" OR angina) AND ("quality improvement" OR "quality assessment" OR "outcome assessment" OR "process assessment" OR "quality assurance" OR "improvement intervention")
https://goo.gl/ygZbAA

("acute coronary" OR "myocardial ischemia" OR "myocardial infarction" OR angina) AND ("improvement program" OR "improvement initiative" OR "quality indicator"OR "quality circle" OR "reminder system" OR "total quality management")
https://goo.gl/B8BZB8

("acute coronary" OR "myocardial ischemia" OR "myocardial infarction" OR angina) AND ("program evaluation" OR "program effectiveness" OR checklist OR "patient education" OR "health education" OR "consumer health")
https://goo.gl/4adY4b

("acute coronary" OR "myocardial ischemia" OR "myocardial infarction" OR angina) AND ("critical pathway" OR "clinical pathway" OR "care pathway" OR inservice OR "guideline adherence" OR audit)
https://goo.gl/BBlOYt

Data supplement 2. Characteristics of included controlled quasi-experimental studies.

Study	Setting	N	Population	Intervention vs. comparator	1° and key 2° outcomes
Carlhed 2006[23] 2001-2004	Controlled before and after study at multisite national registry participants in Sweden	**I:** 19 hospitals **C:** 19 hospitals **TP:** 6,726	Patients with AMI	**Intervention 1:** Rigorous education program **Intervention 2:** Less rigorous education program **Comparator:** Usual care	Guideline directed in-hospital and discharge medications
Carlhead 2009[24] 2001-2004	Controlled before and after study at multisite national registry participants in Sweden	**I**: 19 hospitals **C:** 19 hospitals **TP:** 13,362	Patients with AMI	**Intervention 1:** Rigorous education program **Intervention 2:** Less rigorous education program **Comparator:** Usual care	Guideline directed in-hospital and discharge medications, in-hospital mortality
Chen 2011[25] 2008-2009	Controlled before and after study at a single center in China	**I:** 54 patients **C:** 51 patients **TP:** 105	Patients with STEMI	**Intervention:** Tele-ECG triage system **Comparator:** Usual care	Door to balloon time, rates of PCI < 90 minutes
Ellerbeck 2000[27] 1992-1995	Controlled before and after study in Iowa, US	**I:** 44 hospitals **C:** 73 hospitals **TP:** 113	Patients with AMI	**Intervention:** Targeted performance feedback and subsequent intervention based on feedback **Comparator:** Usual care	Reperfusion within 12 hours of arrival, thrombolysis < 60 minutes, guideline directed in-hospital and discharge medications
Fakhr-Movahedi 2015[27]	Non-randomized intervention vs. control study in Semnan, Iran	**I:** 69 patients **C:** 69 patients **TP:** 138	Patients with AMI	**Intervention:** Clinical pathway **Comparator:** Usual care	Levels of patient anxiety, depression, and satisfaction

Robinson 1996[35] 1991-1992	Time-series controlled before and after study in the UK	**I:** 4 hospitals **C**: 1 hospital **TP**: 2,593	Patients with AMI	**Intervention:** Audit and feedback and subsequent interventions **Comparator:** Usual care	Use of thrombolytic therapy in eligible patients
Scott 2001[37] 1991-1999	Non-randomized intervention vs. control study in Queensland, Australia	**I:** 335 patients **C:** 98 patients **TP:** 433	Patients with AMI	**Intervention:** Clinical guidelines, regular audits and feedback **Comparator:** Usual care	In-hospital mortality, guideline directed medications and reperfusion

I: intervention, C: comparator, STEMI: ST-elevation myocardial infarction, AMI: acute myocardial infarction, PCI: percutaneous coronary intervention TP: total participants. QI: quality improvement, 1°: primary, 2°: secondary

Data Supplement 3. Characteristics of included uncontrolled quasi-experimental study design.

Study	Study design & setting	N	Population	Intervention	1° and key 2° outcomes
Alexander 2017[21] 2012-2014	Before and after study; Tamil Nadu, India	Pre: 2420 patients Post: 1522 patients TP: 3942	Patients with STEMI	Regional QI program that linked non-PCI to large PCI hub hospitals	Rates of reperfusion, timely reperfusion, post fibrinolysis angioplasty, 1-year mortality
Aziz 2012[22] 2004-2005	Before and after study; New York, USA	Pre: 215 patients Post: 269 patients TP: 484	Patients with AMI	Clinical pathways, check-lists, educational material	Guideline directed In-hospital and discharge medications, behavioral counseling, MACE in first 12 months
Dai 2016[26] 2007-2011	Before and after study; University of North Carolina, USA	Pre: 45 patients Post: 51 patients TP: 96	Inpatients who developed STEMI while hospitalized	Educational material	Symptom to ECG time, ECG to thrombolysis and catheterization time
Feng-Yu 2013[29] 2005-2008	Before and after study at a single center veteran's hospital; Kaoshiung, Taiwan	Baseline: 86 patients Stage 1: 80 patients Stage 2: 219 patients TP: 385	STEMI patients who received PCI	**Stage1:** Intra-hospital clinical pathway. **Stage 2:** STEMI network to improve inter-hospital communication and transfer	Door to balloon time, in-hospital mortality, guideline directed admission and discharge medications
Fonarow 2003[30] 1992-1995	Before and after study; California, USA	Pre: 256 patients Post: 302 patients TP: 558	Patients with AMI	Critical pathways, order sets, checklists, educational material, feedback reports (CHAMP)	Guideline directed discharge medications, 1- year clinical events
Khot 2007[31] 2004-2006	Before and after study; Indiana, USA	Pre: 60 patients Post: 86 patients TP: 148	STEMI patients who received PCI within 24 hours	Clinical protocol and an emergency heart attack response team	Door to balloon time, rates of PCI < 90 minutes, door to ECG time, in-hospital mortality

Lai 2009[32] 2206-2007	Before and after study; Taiwan	Pre:104 patients Post: 76 patients TP: 180	STEMI patients destined for PCI	Audit and feedback program	Door to balloon time
Prabhakaran 2008[33] 2005-2006	Before and after study; Kerala, India	Pre: 34 hospitals Post: 34 hospitals TP: 1032	Patients with AMI	Admission orders, discharge instructions, educational material	Door to needle time, time to thrombolysis guideline directed discharge medications
Scholz 2017[34] 2007-2009	Before and after multiregional study; Germany	Pre: 226 patients Post: 194 patients TP: 420	Patients with STEMI	Quarterly data feedback	Door to balloon time, in-hospital and 30-day mortality
Scott 2000[36] 1996-1998	Before and after study; Queensland, Australia	Pre: 11277 patients Post: 11568 patients TP: 22,845	Patients with AMI	Evidence based clinical guidelines disseminated to hospital staff	Guideline directed medications and reperfusion, in-hospital MACE
Scott 2004[38] 2000-2002	Before and after study; Brisbane, Australia	Pre: 428 patients Post: 435 patients TP: 863	Patients with AMI	Reminder tools, educational intervention, performance feedback	Guideline directed discharge medications, key diagnostics and in-hospital mortality

Pre: pre- intervention, post: post-intervention, TP: total participants, MACE: major adverse cardiovascular events, RCT: randomized controlled trial, AMI: acute myocardial infarction, STEMI: ST-elevation myocardial infarction, NSTEMI: non-ST elevation myocardial infarction; QI: quality improvement, AMI: acute myocardial infarction.

Data Supplement 4. Risk of bias assessments for included randomized controlled trials.

Bailey 2007 N= 853		
Domain	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Method of random sequence generation not reported.
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment not reported
Blinding of participants and personnel (performance bias)	High risk	Unblinded study.
Blinding of outcome assessment (detection bias)	Low risk	Outcome assessors were unblinded; however, outcome measures were objective and not likely to be affected by unblinding of outcome assessors.
Incomplete outcome data (attrition bias)	Low risk	>80% of included patients in the study also included in the analysis.
Selective reporting (reporting bias)	Unclear risk	No access to study protocol to assess potential selective reporting bias.
Other bias	High risk	Cross contamination bias: "There were 27 patients in the control arms and 15 patients in the intervention arm with cross contaminations. These patients were excluded from the analysis".
Other bias	High risk	Recruitment bias: "We did not include some patients who may have benefited from the intervention. For example, automated detection of elevation in troponin levels was the mechanism for identifying potential candidates for intervention. Therefore, patients with acute coronary syndrome or established coronary heart disease without an elevated troponin I level were not included in our study."

Brener 2003 N= 2,210		
Domain	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Method of random sequence generation not reported.
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment not reported
Blinding of participants and personnel (performance bias)	High risk	Unblinded study.

Blinding of outcome assessment (detection bias)	Low risk	Outcome assessors were unblinded; however, outcome measures were objective and not likely to be affected by unblinding of outcome assessors.
Incomplete outcome data (attrition bias)	Low risk	One cluster hospital out of 21 randomized hospitals withdrew from the study and before implementation of the intervention. This hospital was excluded form analysis.
Selective reporting (reporting bias)	Unclear risk	No access to trial register protocol to assess potential selective reporting bias.

Berwanger 2012 N= 1,150		
Domain	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"All clusters were randomized at once on by a statistician using a central web-based randomization system before enrollment of the first patient."
Allocation concealment (selection bias)	Low risk	"The survey was conducted prior to randomization to avoid potential systematic errors caused by awareness of allocation of intervention and control groups."
Blinding of participants and personnel (performance bias)	High risk	Unblinded study.
Blinding of outcome assessment (detection bias)	Low risk	Outcome assessors were unblinded; however, outcome measures were objective and not likely to be affected by unblinding of outcome assessors.
Incomplete outcome data (attrition bias)	Low risk	No loss of clusters reported.
Selective reporting (reporting bias)	Low risk	Outcomes in final study publication included all outcomes included in published trial register. NCT00958958
Other bias	Low risk	None identified

Du 2014 N= 3,500		
Domain	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Using a central computer-based system, 70 participating hospitals were randomly allocated, stratified by hospital level, to 1 of 2 groups."

Allocation concealment (selection bias)	Low risk	All clusters randomized at once using a central computer-based system, which minimizes risk of allocation concealment.
Blinding of participants and personnel (performance bias)	Unclear risk	Unblinded study.
Blinding of outcome assessment (detection bias)	Low risk	Outcome assessors were unblinded; however, outcome measures were objective and not likely to be affected by unblinding of outcome assessors.
Incomplete outcome data (attrition bias)	Low risk	No loss of clusters reported
Selective reporting (reporting bias)	Low risk	Outcomes in final study publication included all outcomes included in published trial register. ACTRN12609000491268
Other bias	Unclear risk	Recruitment bias: There was a difference of 6 hospitals between the two arms.

Flather 2003 N= 2,622		
Domain	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Method of random sequence generation not specified.
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment not reported
Blinding of participants and personnel (performance bias)	High risk	Unblinded study.
Blinding of outcome assessment (detection bias)	Low risk	Outcome assessors were unblinded; however, outcome measures were objective and not likely to be affected by unblinding of outcome assessors.
Incomplete outcome data (attrition bias)	Low risk	Out of 40 clusters, one cluster withdrew prior to randomization, and one study withdrew after randomization prior to implementation of QI training. Final randomization of 19 clusters in each arm.
Selective reporting (reporting bias)	Unclear risk	Outcomes in final study publication included all outcomes included in published trial register. NCT00716430
Other bias	Unclear risk	Recruitment bias: The paper does not explicitly list cluster characteristics. Unclear balance of community vs teaching vs. small vs. large sized facilities. The stratification only done at the level of PCI or no PCI facility and by country.

Guenancia 2016 N= 572		
Domain	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Method of random sequence generation not specified.
Allocation concealment (selection bias)	High risk	The local investigator allocated patients to either arm using a 1:1 randomization ratio, which suggests that the investigator may have been able to influence the allocation schedule.
Blinding of participants and personnel (performance bias)	High risk	Unblinded study,
Blinding of outcome assessment (detection bias)	Low risk	Outcome assessors were unblinded; however, outcome measures were objective and not likely to be affected by unblinding of outcome assessors.
Incomplete outcome data (attrition bias)	Low risk	No loss of participants reported
Selective reporting (reporting bias)	Unclear risk	No access to trial register protocol to assess potential selective reporting bias.
Other bias	High risk	Recruitment bias: Informed consent from patient participants was required to participate in the study.

Heller 2001 N= 3,242		
Domain	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Method of random sequence generation not specified.
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment not reported
Blinding of participants and personnel (performance bias)	High risk	Unblinded study.
Blinding of outcome assessment (detection bias)	Low risk	Outcome assessors were unblinded; however, outcome measures were objective and not likely to be affected by unblinding of outcome assessors.

Incomplete outcome data (attrition bias)	Unclear risk	Of the 48 hospitals included in the baseline survey, 36 took part in the follow-up survey. 12 were omitted to allow comparison of the same hospitals. Unclear what level of hospitals were excluded in the analysis.
Selective reporting (reporting bias)	Unclear risk	No access to trial register protocol to assess potential selective reporting bias.
Other bias	High risk	Recruitment bias: Control hospitals had significantly higher proportion of patients with severe illness at both baseline and follow-up compared to intervention hospitals.

Huffman 2018 N= 21,374		
Domain	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	The study biostatisticians performed central, computer-based randomization of hospitals.
Allocation concealment (selection bias)	Low risk	Central randomization; the study team and the selected sites were informed of the 12 or 13 sites that would cross-over to the intervention period two weeks before each of the pre-defined steps to maintain allocation concealment while aiding in training logistics.
Blinding of participants and personnel (performance bias)	High risk	Unblinded study.
Blinding of outcome assessment (detection bias)	Low risk	Outcome assessors were unblinded, however, outcome measures were objective and not likely to be affected by unblinding of outcome assessors.
Incomplete outcome data (attrition bias)	Low risk	No loss of clusters reported.
Selective reporting (reporting bias)	Low risk	Outcomes published in protocol are included (NCT02256657)
Other bias	Unclear risk	Recruitment bias: Informed consent from patient participants was required to participate in the study but participant characteristics were largely similar between intervention and comparator groups.

Kinsman 2012 N=108		
Domain	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Simple coin toss used for random sequence generation.
Allocation concealment (selection bias)	Low risk	Method of allocation concealment not reported; however, randomization carried out ahead of study which limits risk of allocation concealment bias in cluster RCTs.
Blinding of participants and personnel (performance bias)	High risk	Unblinded study.
Blinding of outcome assessment (detection bias)	Low risk	Outcome assessors were unblinded; however, outcome measures were objective and not likely to be affected by unblinding of outcome assessors.
Incomplete outcome data (attrition bias)	Low risk	No loss of clusters reported.
Selective reporting (reporting bias)	Low risk	Outcomes in final study publication included all outcomes included in published trial register. ANZCTR12608000209392.
Other bias	Low risk	None identified

Lytle 2015 N= 19,579		
Domain	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Method of random sequence generation not specified.
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment not reported
Blinding of participants and personnel (performance bias)	High risk	Unblinded study.
Blinding of outcome assessment (detection bias)	Low risk	Outcome assessors were unblinded; however, outcome measures were objective and not likely to be affected by unblinding of outcome assessors.
Incomplete outcome data (attrition bias)	Unclear risk	Loss of 16 hospitals from the intervention group and 9 hospitals from the control group. Unclear which types of hospitals were lost.
Selective reporting (reporting bias)	Low risk	No access to trial register protocol to assess potential selective reporting bias
Other bias	Low risk	None identified

Sauaia 2000 N= 1367		
Domain	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Method of random sequence generation not specified.
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment not reported
Blinding of participants and personnel (performance bias)	High risk	Unblinded study
Blinding of outcome assessment (detection bias)	Low risk	Outcome assessors were unblinded, however, outcome measures were objective and not likely to be affected by unblinding of outcome assessors.
Incomplete outcome data (attrition bias)	Low risk	One urban hospital from control group withdrew from study. To balance it out another urban hospital from the intervention group dropped from the analysis.
Selective reporting (reporting bias)	Unclear risk	No access to trial register protocol to assess potential selective reporting bias
Other bias	Low risk	None identified

Soumerai 1998 N= 5,347		
Domain	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias	Unclear risk	Method of randomization not specified.
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment not reported.
Blinding of participants and personnel (performance bias)	High risk	Unblinded study.
Blinding of outcome assessment (detection bias)	Low risk	Outcome assessors were unblinded; however, outcome measures were objective and not likely to be affected by unblinding of outcome assessors.
Incomplete outcome data (attrition bias)	Unclear risk	One hospital from control group closed and was excluded from the analysis.

Selective reporting (reporting bias)	Unclear risk	No access to trial register protocol to assess potential selective reporting bias.
Other bias	High risk	Recruitment bias: Baseline imbalance of cluster arms reported. “To minimize contamination of control hospitals, large cities were randomized as clusters, resulting in a statewide sample of 20 experimental and 17 control hospitals. While this randomization plan may have reduced baseline comparability somewhat, it avoided extensive contamination of controls that would have been caused by physicians working in multiple hospitals within each city.”

Tu 2009 N=18,492		
Domain	**Authors’ judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Central randomization by study statistician.
Allocation concealment (selection bias)	Low risk	Method of allocation concealment not reported; however, randomization carried out ahead of study which limits risk of allocation concealment bias in cluster RCTs.
Blinding of participants and personnel (performance bias)	High risk	Unblinded study.
Blinding of outcome assessment (detection bias)	Low risk	Outcome assessors were unblinded; however, outcome measures were objective and not likely to be affected by unblinding of outcome assessors.
Incomplete outcome data (attrition bias)	Unclear risk	Two clusters lost from the early feedback group and 3 clusters lost from the delayed feedback group. Data from the lost clusters were not included in the analysis.
Selective reporting (reporting bias)	High risk	Trial registration occurred in 2005 but the study began in 1999. NCT00187460
Other bias	Unclear risk	Recruitment bias: Consecutive patients reportedly recruited

Wu 2019 N=29,346		
Domain	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Central randomization by study statistician.
Allocation concealment (selection bias)	Low risk	Allocation codes were concealed by a statistician separately.
Blinding of participants and personnel (performance bias)	High risk	Unblinded study.
Blinding of outcome assessment (detection bias)	Low risk	Outcome assessors were blinded
Incomplete outcome data (attrition bias)	Low risk	
Selective reporting (reporting bias)	High risk	Trial pre-registered prior on ClinicalTrials.gov. NCT01398228
Other bias	Low risk	None identified

Data supplement 5. Detailed Summary of outcomes of randomized controlled trials including all outcomes

Outcome	Trial	Event Rates, No (%)		Significance	
		Intervention	Comparator	Effect (95% CI)	p-value
In-hospital MACE	Berwanger 2012[9]	33 (5.5)	38 (7.0)	OR: 0.72 (0.36, 1.43)	0.35
	Du 2014[10]	92 (5.8)	122 (6.4)	RR: 1.12 (0.58, 2.14)	0.74
	Guenancia 2016[12]	26 (9.1)	31 (10.8)	OR: 1.59 (0.61, 4.17)	0.49
	Wu 2019[20]	559 (3.8)	655 (4.4)	OR: 0.93 (0.75, 1.15)	NR
In-hospital mortality	Berwanger 2012[9]	29 (4.8)	28 (5.1)	OR: 0.82 (0.37, 1.82)	0.62
	Du 2014[10]	41 (2.6)	78 (4.1)	RR: 1.60 (0.97, 2.64)	0.07
	Guenancia 2016[12]	6 (2.1)	11 (3.8)	OR: 1.16 (0.68, 2.01)	NR
	Huffman 2018[16]	321 (2.8)	331 (3.3)	aOR: 0.98 (0.82, 1.17)	NR
Rates of reperfusion for STEMI	Du 2014[10]	290 (42.7)	229 (31.8)	RR: 1.24 (0.98, 1.55)	0.07
	Huffman 2018[16]	4805 (71.0)	5067 (73.2)	OR: 1.24 (1.06,1.46)	
	Kinsman 2012[14]	Thrombolysis Baseline: 80% Post-intervention: 78%	Thrombolysis Baseline: 96% Post-intervention: 84%		I: 0.86 C: 0.19
	Lytle 2015[15]	730 (97.2)	228 (94.2)		0.03
	Sauaia 2000[17]	Baseline: 12 (55) Post-intervention: 9 (75)	Baseline: 31 (84) Post-intervention: 4 (44)	Control 6.5x worse compared to baseline	I: 0.01 C: 0.02
	Tu 2009[19]	% change (95% CI): 6.7 (-0.8, 14.2)	% change (95% CI): 7.2 (-0.5, 15.1)	Absolute %difference: 3.3 (-5.7, 12.4)	0.47
	Wu 2019[20]	1414 (48.9)	1683 (52.2)	OR: -2.2 (-4.7,0.3)	NR
Rates of in-hospital medical therapy	Berner 2003[8]	ASA, % change: 20.2	*	OR: 1.92 (1.19, 3.32)	< 0.01
		AC, % change: 31	AC, % change: 9.1	OR: 0.89 (0.58, 1.34)	NR
	Berwanger 2012[9]	ASA, n/N: 584/599 (97.5)	ASA, n/N: 520/543 (95.8)	OR: 1.73 (0.84, 3.56)	0.14
		AC, n/N: 509/587 (86.7)	AC, n/N: 433/535 (80.9)	OR: 1.34 (0.72, 2.49)	0.36
	Flather 2012[11]	AC, n/N: 666/717 (92.9)	AC, n/N: 442/477 (93.7)	OR: 1.08 (0.59,1.98)	0.81
	Heller 2001[13]	ASA, change in management follow-up vs. baseline, OR (95% CI): 1.15 (0.87, 1.52)	ASA, change in management follow-up vs. baseline, OR (95% CI): 0.90 (0.64, 1.26)	Difference in management intervention vs. control OR: 1.14 (0.74, 1.76)	0.28

		AC, change in management follow-up vs. baseline, OR (95% CI): 0.67 (0.22, 2.01)	AC, change in management follow-up vs. baseline, OR (95% CI): 1.61 (1.08, 2.39)	Difference in management intervention vs. control OR: 0.54 (0.25, 1.18)	0.13
		BB, change in management follow-up vs. baseline, OR (95% CI): 1.57 (1.13, 2.20)	BB, change in management follow-up vs. baseline, OR (95% CI): 1.11 (0.89,1.38)	Difference in management intervention vs. control OR: 1.33 (0.90, 1.97)	0.07
	Huffman 2018[16]	ASA, n/N: 11027/11286 (97.7)	ASA, n/N: 9858/10042 (98.2)	OR: 0.98 (0.69, 1.39)	
		AC, n/N: 9654/11281 (85.6)	AC, n/N: 8602/10051 (85.6)	OR: 1.27 (1.09, 1.49)	
		BB, n/N: 4638/10885 (42.6)	BB, n/N: 3676/9874 (37.2)	OR: 1.46 (1.29, 1.65)	
	Sauaia 2000[17]	ASA, n: Baseline: 188 (90) Post-intervention: 89 (95)	ASA, n: Baseline: 208 (93) Post-intervention: 88 (98)		NR
		AC, n/N: 919/1020 (90)	AC, n/N: 765/850 (90)		0.94
	Tu 2009[19]	ASA, absolute % change (95% CI): 6.7 (3.7, 9.6)	ASA, absolute % change (95% CI): 4.3 (0.2, 8.3)	Absolute % difference: 4.3 (-0.1, 8.8)	0.06
		BB, absolute % change (95% CI): 45.4 (38.8, 51.9)	BB, absolute % change (95% CI): 39.1 (31.3, 46.8)	Absolute % difference: 3.1 (-5.8, 12.1)	0.49
	Wu 2019[20]	ASA, n/N: 13334/14537 (91.7)	ASA, n/N: 13241/14809 (89.4)	OR: 1.01 (0.80, 1.28)	NR
		DAPT, n/N: 10725/14537 (73.8)	DAPT, n/N: 8680/14809 (58.6)	OR: 1.21 (1.02, 1.44)	NR
		Statin, n/N: 12501/4537 (86.0)	Statin, n/N:12,479/14809 (84.3)	OR: 1.04 (0.87, 1.24)	NR
Rates of discharge medical therapy	Bailey 2007[7]	ASA, n/N: 352/365 (96.4)	ASA, n/N: 471/488 (96.5)		0.95
		BB, n/N: 350/365 (95.9)	BB, n/N: 448/488 (91.8)		0.08
		ACE-i/ARB, n/N: 328/365 (89.9)	ACE-i/ARB n/N: 409/488 (83.8)		0.01
		Statin, n/N: 344/365 (94.2)	Statin, n/N: 436/488 (89.3)		0.01
	Berner 2003[8]	ASA, % change: 5.2%	ASA, % change: *	OR: 1.29 (0.79, 2.09)	NR
		BB, % change: 4.0%	BB, % change: *	OR: 0.85 (0.50, 1.43)	NR
	Berwanger 2012[9]	ASA, n/N: 556/576 (96.5)	ASA, n/N: 493/531 (92.8)	OR: 2.08 (0.83, 5.24)	0.12

	BB, n/N: 451/525 (85.9)	BB, n/N: 425/520 (81.7)	OR: 1.35 (0.64, 2.81)	0.43
	ACE-i/ARB, n/N: 415/509 (81.5)	ACE-i/ARB, n/N: 383/503 (76.1)	OR: 1.21 (0.58, 2.51)	0.61
	Statin, n/N: 508/577 (88)	Statin, n/N: 461/536 (86.0)	OR: 1.87 (0.81, 4.30)	0.14
Du 2014[10]	Recommended therapies, n/N: 976/1555 (62.7)	Recommended therapies, n/N: 932/1822 (51.2)	RR: 1.23 (1.06,1.42)	0.011
Flather 2012[11]	BB, n/N (%):188/213 (88.3)	BB n/N (%): 110/124 (88.7)	OR: 1.23 (0.49, 3.13)	0.66
	ACE-i/ARB, n/N: 467/540 (86.5)	ACE-i/ARB, n/N: 290/352 (82.4)	OR: 1.29 (0.76, 2.18)	0.34
	Statin, n/N: 674/707 (95.3)	Statin, n/N: 445/471 (94.5)	OR: 1.46 (0.72, 2.99)	0.30
Huffman 2018[16]	ASA, n/N: 10360/10559 (98.1)	ASA, n/N: 8777/8998 (97.5)	OR: 1.65 (1.15, 2.37)	NR
	BB, n/N: 6799/10178 (66.8)	BB, n/N: 5808/8894 (65.3)	OR: 1.48 (1.30, 1.68)	NR
	ACE-i/ARB, n/N: 643/1495 (43.0)	ACE-i/ARB, n/N:534/1029 (51.9)	OR: 1.45 (1.03, 2.04)	NR
	Statin, n/N: 10289/1057 (97.3)	Statin n/N: 8700/9006 (96.6)	OR: 1.42 (1.04, 1.92)	NR
Lytle 2015[15]	ASA, (%): 97.0	ASA, (%): 97.8		0.62
	ACE-i/ARB (%): 75.5	ACE-i/ARB, (%): 89.0		0.01
	Statin, (%): 97.9	Statin, (%): 96.5		0.51
Sauaia 2000[17]	ASA, n (%): Baseline: 103 (83) Post-intervention: 57 (88)	ASA, n (%): Baseline:129 (87) Post-intervention: 63 (86)		NR
	BB, n (%): Baseline: 16 (46) Post-intervention: 15 (54)	BB, n (%): Baseline: 32 (65) Post-intervention: 9 (75)		NR
	ACE-i/ARB, n (%): Baseline: 16 (57) Post-intervention: 14 (82)	ACE-i/ARB, n (%): Baseline: 21 (75) Post-intervention: 9 (82)		NR
Soumerai 1998[18]	ASA, median % change from baseline: 17%	ASA, median % change from baseline: -4%		0.04
	BB, median % change from baseline: 63%	BB, median % change from baseline: 30%		0.02
Tu 2009[19]	ASA, absolute % change (95% CI): -0.6 (-4.0, 2.7)	ASA, absolute % change (95% CI): -1.5 (-6.5, 3.4)	Absolute % difference: 0.9 (-4.7, 6.6)	0.75

		BB, absolute % change (95% CI): 8.2 (5.4,11.1)	BB, absolute % change (95% CI): 7.6 (4.1, 11.2)	Absolute % difference: 0.6 (-3.2, 4.3)	0.75
		ACE-i/ARB, absolute % change (95% CI): 6.7 (1.0, 12.4)	ACE-i/ARB, absolute % change (95% CI): 5.4 (-0.8, 11.5)	Absolute % difference: 2.8 (-5.2, 10.8)	0.48
	Wu 2019[20]	ASA, n/N: 11975/14537 (85.5)	ASA, n/N: 11565/14809 (81.5)	OR: 1.48 (1.14, 1.93)	NR
		BB, n/N: 8358/14537 (59.7)	BB, n/N: 7458/14809 (52.5)	OR: 1.36 (1.17, 1.59)	NR
		Statin, n/N: 11532 (82.3)	Statin, n/N: 11166 (78,7)	OR: 1.33 (1.06, 1.67)	NR
		ACE-i/ARB, n (%): 1382 (50.6)	ACE-i/ARB, n (%): 1295 (47.9)	OR: 1.27 (1.05, 1.53)	NR
Door to ECG time	Kinsman 2012[14]	Mean door to ECG time min (SD) baseline 6.4 (7.2) vs. post-intervention 11.4 (17.1)	Mean door to ECG time min (SD) baseline 7.0 (8.4) vs. post-intervention 7.4 (4.9)		I: 0.21 C: 0.82
	Wu 2019[20]	done in time, n (%): 9020 (62.0)	done in time, n (%): 7768 (52.5	OR: 1.12 (0.90, 1.39)	NR
Door to any reperfusion time for STEMI	Du 2014[10]	DTB, min (ICC=0.144): 141.09 (103.69)	DTB, min (ICC=0.144): 130.09 (90.98)	Mean difference: -10.6 (-44.4, 23.21)	
	Huffman 2018[16]	DTB, median (IQR), min: 77 (55-118)	DTB, median (IQR), min: 65 (53-105)	β coefficient: 13.00 (3.64, 22.36)	
	Kinsman 2012[14]	Mean DTN, min (SD): Baseline: 46.6 (37.7) Post- intervention: 47.2 (40.5)	Mean DTN, min (SD): Baseline: 43.8 (33.6) Post-intervention: 35.9 (29.6)		I: 0.96 C: 0.40
	Lytle 2015[15]	DTB < 90 min, n: 234 (94.0)	DTB < 90 min, n: 332 (92.0)	Mean difference: -10.6 (-44.4, 23.21)	0.35
	Wu 2019[20]	Under 90 minutes, n (%): 539 (37.4)	Under 90 minutes, n (%): 516 (30.0)	OR: 1.12 (0.77, 1.62)	NR
30-day total mortality	Berwanger 2012[9]	42 (7.0)	46 (8.4)	OR: 0.79 (0.46, 1.34)	0.38
	Huffman 2018[16]	445 (3.9)	509 (5.1)	aOR: 0.87 (0.75, 1.00)	
	Sauaia 2000[17]	Baseline: 81 (19) Post-intervention: 33 (15)	Baseline: 85 (17) Post-intervention: 46 (22)		NR
	Tu 2009[19]	Absolute % change (95% CI): -1.9 (-3.8, -0.1)	Absolute % change (95% CI): 0 (-2.3, 2.3)	Absolute % difference: -2.5 (-4.9, -0.1)	0.045
30-day MACE	Berwanger 2012[9]	49 (8.1)	55 (10.1)	OR: 0.76 (0.45, 1.27)	0.30
	Huffman 2018[16]	445 (3.9)	645 (6.4)	OR: 0.92 (0.81, 1.04)	NR

CI: confidence interval, ACE-I: angiotensin converting enzyme inhibitor, ARB: angiotensin receptor blocker, BB: beta-blocker, ASA: Aspirin, AC: anticoagulation, DTB: door to balloon time, DTN: door to needle time, ECG: electrocardiogram, STEMI: ST-elevation myocardial infarction, MACE: major adverse cardiovascular events, TP: total participants. * Values not provided in manuscript. NS: not significant, aOR: adjusted odds ratio. NR: not reported. QI: quality improvement, 1°: primary, 2°: secondary

Data Supplement 6. Summary of outcomes of controlled pre-post studies.

Outcome	Trials	Intervention		Control		Significance
In-hospital mortality	Scott 2001[37]	***Baseline*** Absolute rate: 12.3%	***Post*** Absolute rate: 8.8%	***Baseline*** Absolute rate: 13.4%	***Post*** Absolute rate: 12.8%	OR: 0.59 (0.45, 0.78)
	Carlhead 2006[23]	***Baseline*** 14.2(events/100 patient years	***Post*** 11.4(events/100 patient years)	***Baseline*** 14.2(events/100 patient years)	***Post*** 14.2(events/100 patient years)	P=0.03
Rates of reperfusion for STEMI	Ellerbeck 2000[27]	***Baseline*** Absolute rate: 17%	***Post*** Absolute rate: 18%	***Baseline*** Absolute rate: 17%	***Post*** Absolute rate: 20%	NR
Rates of in-hospital medical therapy	Carlhead 2006[23]	***Baseline*** AC% (SD):66.2 (14.1)	***Post*** AC% (SD): 82.5 (7.9)	***Baseline*** AC% (SD): 65.5 (16.2)	***Post*** AC% (SD): 70.8 (11.9)	P=0.01
	Carlhead 2009[24]	AC% (range): 69.2 (63.9-73.2)	AC% (range): 77.3 (71.2-84.9)	AC% (range): 67.3 (53.8-76.5)	AC% (range): 72.8 (63.5-79.5)	P=0.38
	Ellerbeck 2000[27]	ASA%: 70	ASA%: 83	ASA %: 71	ASA %: 81	P< 0.05
Rates of discharge medical therapy	Carlhead 2006[23]	***Baseline*** Clopidogrel % (SD): 32.2 (17.4)	***Post*** Clopidogrel % (SD): 73.4 (7.2)	***Baseline*** Clopidogrel % (SD): 28.0 (20.4)	***Post*** Clopidogrel % (SD): 54.3[23.7]	P=0.01
		ACE-i/ARB % (SD): 62.8 (9.8)	ACE-i/ARB % (SD): 75.5 (9.8)	ACE-i/ARB % (SD): 61.9 (10.0)	ACE-i/ARB % (SD): 63.2 (9.2)	P=0.002
		Statin % (SD): 84.7 (9.1)	Statin % (SD): 91.9 (5.0)	Statin % (SD): 82.3 (7.9)	Statin % (SD): 83.1 (9.7)	P=0.065
	Carlhead 2009[24]	ASA % (range): 84.3 (81.1-86.6)	ASA % (range): 87.6 (84-90)	ASA % (range): 82.9 (76.3-87.1)	ASA % (range): 83.5 (81.6-87.4)	P=0.78
		BB % (range): 84.3 (75.7-90.9)	BB % (range): 87.4 (84.3-90.3)	BB % (range): 86.2 (80.8-89.1)	BB % (range): 85.4 (81.5-90.1)	P=0.34

		ACE-I %(range): 48.7 (40.1-55.0)	ACE-i % (range): 61.0 (52.1-73.3)	ACE-i % (range): 48.6 (43.2-52.8)	ACE-i % (range): 48.0 (43.3-53.7)	P=0.0005
		Statin% (range): 71.6 (61.3-78.1)	Statin% (range): 81.5 (75.6-87.9)	Statin% (range): 67.8 (60.6-73.7)	Statin % (range): 72.9 (66.0-79.3)	P=0.035
	Ellerbeck 2000[27]	ASA %: 61	ASA %: 77	ASA %: 69	ASA %: 75	P< 0.05
		BB%: 34	BB%: 55	BB%: 34	BB%: 49	P< 0.05
		ACE-i/ARB %:36	ACE-i/ARB %: 53	ACE-i/ARB %: 55	ACE-i/ARB %: 62	P= NR
Door to ECG time	Chen 2011[25]	Median (IQR), min: 6 (2-8)		Median (IQR), min: 9 (5-11)		P=0.00
Door to reperfusion time for STEMI	Chen 2011[25]	DTB median (IQR), min: 86 (75-95)		DTB median (IQR), min: 125 (90-127)		P<0.0001
1-year total mortality	Carlhead 2009[24]	Event: % (SD): 12.2 (4.5)	Event: % (SD): 11.4 (3.6)	Event: % (SD): 14.2 (4.2)	Event % (SD): 14.2 (4.5)	P=0.03, P=NR
Health related quality of life	Fakhr 2015[28]	Pre-post difference in anxiety scores mean (SD): 0.52 (1.36)		Pre-post difference in anxiety scores mean (SD): -0.17 (1.69)		P=0.009
		Pre-post difference in depression scores mean (SD): 0.75 (2.05)		Pre-post difference in depression scores mean (SD): 0.00 (1.83)		P=0.024
		Overall Patient satisfaction score mean (SD): 3.69 (0.39)		Overall patient satisfaction score mean (SD): 3.45 (0.47)		P=0.002

Abbreviations: CI: confidence interval, ACE-I: angiotensin converting enzyme inhibitor, ARB: angiotensin receptor blocker, BB: beta-blocker, ASA: Aspirin, AC: anticoagulation, DTB: door to balloon time, DTN: door to needle time, ECG: electrocardiogram, STEMI: ST-elevation myocardial infarction, MACE: major adverse cardiovascular events, NS: p-value reported as not significant. NR: not reported

Data Supplement 7. Summary of outcomes of pre-post studies

Outcome	Trials	Pre-intervention	Post-intervention	Significance
In-hospital mortality	Alexander 2017[21]	Absolute event rate n (%): 52 (5.8)	Absolute event rate n (%): 85 (5.6)	P=0.83
	Khot 2007[31]	Absolute event rate n (%): 5 (7.4)	Absolute event rate n (%): 5 (5.2)	P=0.74
	Scholz 2017[34]	Absolute event rate: 11.1%	Absolute event rate: 9%	P=0.28
	Scott 2000[36]	Absolute event rate: 15.8%	Absolute event rate: 8.6%	P=0.02
	Scott 2001[37]	Absolute event rate: 16.7%	Absolute event rate: 4.0%	P< 0.05
	Scott 2004[38]	Absolute event rate: 7.4%	Absolute event rate: 5.9%	P=0.39
Rates of reperfusion for STEMI	Alexander 2017[21]	No (%): 795 (88.5)	No (%): 1372 (90.1)	P=0.21
	Scott 2000[36]	No (%): 133 (100)	No (%): 245 (100)	P=NR
	Scott 2001[37]	No (%): 60 (100)	No (%): 40 (94)	P=NR
	Scott 2004[38]	No (%): 49 (100)	No (%): 39 (100)	P=NR
Rates of in-hospital medical therapy	Aziz 2012[22]	Antiplatelet: 50%	Antiplatelet: 75%	P=0.007
		BB: 45%	BB: 54%	P=0.19
		ACE-i/ARB: 32%	ACE-i/ARB: 54%	P< 0.0001
		Statin: 35%	Statin: 62%	P< 0.001
	Prabhakaran 2008[33]	ASA: 89.7%	ASA: 96.8%	P< 0.05
		AC: 57.6%	AC: 66.3%	P< 0.05
		BB: 48.6%	BB: 63.4%	P< 0.05

		ACE-i: 36.4%	ACE-i: 38.8%	P= NR
		Statin: 74.1%	Statin: 86.3%	P< 0.05
Rates of discharge medical therapy	Aziz 2012[22]	Antiplatelet: 34%	Antiplatelet: 91%	P< 0.0001
		BB: 30%	BB: 61%	P< 0.0001
		ACE-i/ARB: 32%	ACE-i/ARB: 68%	P< 0.0001
		Statin: 37%	Statin: 70%	P< 0.0001
	Fonarow 2003[30]	ASA: 78%	ASA: 92%	P<0.01
		BB: 12%	BB: 61%	P<0.01
		ACE-i/ARB: 4%	ACE-i/ARB: 56%	P<0.01
		Statin: 6%	Statin: 86%	P<0.001
	Scott 2001[37]	ASA: 76%	ASA: 83%	P=NS
		BB: 60%	BB: 73%	P< 0.05
		ACE-i/ARB: 44%	ACE-i/ARB: 59%	P< 0.05
	Scott 2004[38]	ASA: 89%	ASA: 90	P=0.82
		BB: 76%	BB: 77%	P=0.52
		ACE-i/ARB: 60%	ACE-i/ARB: 70%	P=0.002
		Statin: 68%	Statin: 77%	P=0.005
Door to ECG time	Alexander 2017[21]	median (IQR), min: 7 (5-13)	median (IQR), min: 5 (5-10)	P=0.02

	Khot 2007[31]	median (25^{th},75^{th} percentile range), min: 5(1,9)	median (25^{th},75^{th} percentile range), min: 4(1,6)	P=0.239
	Scott 2004[38]	ECG within 10 min of arrival n/N (%): 145/238 (61)	ECG within 10 min of arrival n/N (%): 170/243 (70)	P=0.04
Door to reperfusion time for STEMI	Alexander 2017[21]	DTB median (IQR), min: 100 (84-143)	DTB median (IQR), min: 105 (80-145)	P=0.56
	Dai 2016[26]	Symptom to balloon mean (SD), min: 136 (117)	Symptom to balloon mean (SD): 483 (504)	P=0.004
	Khot 2007[31]	< 60min DTB time: 8.3%	< 60 min DTB time: 19.8%	P<0.0001
	Prabhakaran 2008[33]	DTN median time: 33.3 min	DNT median time 22.3 min	P<0.05
	Scholz 2017[34]	Time to thrombolysis median time: 193 min	Time to thrombolysis median time: 139	P<0.05
	Scott 2001[37]	< 90 min DTB time: 65%	< 90 min DTB time: 82%	P<0.05
	Scott 2004[38]	< 1hr thrombolysis: 33%	<1hr thrombolysis: 57%	P< 0.05
		Door to thrombolysis within 30 min (%): 35%	Door to thrombolysis within 30 min (%): 41	P=0.59
30-day mortality	Scholz 2017[34]	Absolute event rate: 12.3%	Absolute event rate: 9.9%	P= 0.15
1-year total mortality	Aziz 2012[22]	Absolute event rate: 5%	Absolute event rate: 1%	HR (95% CI):0.42(0.19-0.84),p: 0.015
	Fonarow 2003[30]	Absolute event rate: 7.0%	Absolute event rate: 3.3%	P< 0.05
	Scholz 2017[34]	Absolute event rate: 14.9%	Absolute event rate: 12.5%	P< 0.05

CI: confidence interval, ACE-I: angiotensin converting enzyme inhibitor, ARB: angiotensin receptor blocker, BB: beta-blocker, ASA: Aspirin, AC: anticoagulation, DTB: door to balloon time, DTN: door to needle time, ECG: electrocardiogram, STEMI: ST-elevation myocardial infarction, MACE: major adverse cardiovascular events, TP: total participants.

Data Supplement 8. Summary of finding of controlled and non-controlled pre-post studies

Hospital-based acute myocardial infarction quality improvement interventions vs. usual care				
Outcomes	Effect on outcome	studies/total participants	Quality of the evidence	Comments
In-hospital mortality	An absolute event rate reduction raging from 0.2%-13.0% post intervention in seven studies.[21, 23, 31, 34, 36, 37, 38]	7 studies TP: 42,013	⊕◯◯◯ VERY LOW*,†,‡	Downgraded due to study limitations*, inconsistency†, and imprecision‡.
Rates of reperfusion for STEMI	All five studies showed no significant change in rates of reperfusion post-intervention.[21, 27, 36, 37, 38]	5 studies TP: 28,196	⊕◯◯◯ VERY LOW*,†,‡	Downgraded due to study limitations*, inconsistency[2], and imprecision[3].
Rates of in-hospital medical therapy	***In-hospital medical therapy*** The effect estimates were 2.6%-25% higher in rates of in-hospital medical therapy post-intervention.[22, 23, 24, 27, 33]	5 studies TP: 21,722	⊕◯◯◯ VERY LOW*,†,‡	Downgraded due to study limitations*, inconsistency†, and imprecision‡.
	Discharge medical therapy The effect estimates were 2%-80% higher in rates of discharge medical therapy post-intervention.[22, 23, 24, 27, 30, 33, 37, 38]	7 studies TP: 22,539	⊕◯◯◯ VERY LOW*,†,‡	Downgraded due to study limitations*, inconsistency†, and imprecision‡.
Door to ECG time	Three studies showed a statistically significant reduction in door to ECG time associated with the intervention while one study showed no difference.[21, 25, 31, 38]	4 studies TP: 5,058	⊕◯◯◯ VERY LOW*,†,‡	Downgraded due to study limitations*, inconsistency†, and imprecision‡.
Door to any reperfusion for STEMI time	Six of the seven studies showed a reduction in door to reperfusion time or an increase in rates of reperfusion <1hr in the intervention achieving statistical significance. One study showed no difference.[21, 25, 26, 31, 33, 34, 37, 38]	7 studies TP: 6,176	⊕◯◯◯ VERY LOW*,†,‡	Downgraded due to study limitations*, inconsistency†, and imprecision‡.

30-day MACE	One study showed an overall total mortality rate reduction by 2.4% post-intervention that was not statistically significant. [34]	1 study TP: 420	⊕◯◯◯ VERY LOW*,†,‡	Downgraded due to study limitations*, inconsistency†, and imprecision‡.
1-year MACE	The effect estimates were 2.4%-4% lower rates of 1-year MACE post intervention with three studies achieving statistical significance.[22, 24, 30, 34]	4 studies TP: 14,842	⊕◯◯◯ VERY LOW*,†,‡	Downgraded due to study limitations*, inconsistency†, and imprecision‡.

*Downgraded due to study limitations. †Downgraded due to inconsistency. ‡Downgraded due to imprecision
GRADE Working Group grades of evidence.[6] **High quality**: We are very confident that the true effect lies close to that of the estimate of the effect. **Moderate quality**: We are 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 quality**: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect. **Very low quality**: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect.

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