Appendix D: Clinical evidence tables

Study	Aag 2014[1]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=201)
Countries and setting	Conducted in Norway; Setting: One cardiology ward at a university hospital
Line of therapy	1st line
Duration of study	Intervention time: 5 weeks
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Cardiology patients
Subgroup analysis within study	Not applicable
Inclusion criteria	Aged 18 and over
Exclusion criteria	Terminal illness, isolated due to an infectious disease, unable to communicate in either Norwegian or English.
Recruitment/selection of patients	Consecutively admitted patients
Age, gender and ethnicity	Age - Mean (SD): Group 1: 68.9 (14.0), Group 2: 67.5 (11.6). Gender (M:F): 134:67. Ethnicity: NR
Further population details	Not stated
Indirectness of population	No indirectness
Interventions	(n=100) Intervention 1: Presence of medical ward based pharmacists. Medication reconciliation at admission performed by a clinical pharmacist using a structured interview to obtain medication history as well as additional sources (patient's own medication lists, relatives, other care givers, the patient's general practitioner or the community pharmacy). Medication was reconciled with the hand written medication charts. Duration unclear (patients for inclusion identified by principal investigator every morning during weekdays). Concurrent medication/care: usual care. (n=101) Intervention 2: No ward based pharmacists. Medication reconciliation at admission performed by a nurse using a structured interview to obtain medication history as well as additional sources (patient's own medication lists, relatives, other care givers, the patient's general practitioner or the community pharmacy). Medication was reconciled with the hand written medication charts. Duration: unclear (patients for inclusion identified by principal investigator every morning during weekdays). Concurrent medication/care: usual care Comments: Both pharmacists and nurses were taught and trained by an independent, experience clinical pharmacist

Study	Aag 2014[1]
	both theoretically and practically in order to perform medicine reconciliation.
Funding	Funding not stated
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS AT ADMISSION versus NO WARD BASED PHARMACISTS Protocol outcome 1: Medicines reconciliation during the study period - Actual outcome: Medication discrepancies identified at admission; Group 1: mean 3.1 discrepancies per patient (SD 2.1); n=99, Group 2: mean 2.8 discrepancies per patient (SD 2.2); n=94; Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: -- ; Baseline details: Pharmacist had greater number of patients arriving from home (60% vs 29%); Group 1 Number missing: 1, Reason: 'dropouts' (1); Group 2 Number missing: 7, Reason: 'dropouts' (7) Protocol outcome 2: Staff satisfaction during the study period - Actual outcome: Prescribing physician agreement at admission; Group 1: 139/235, Group 2: 97/222; Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: Serious indirectness, Comments: Surrogate outcome for staff satisfaction; Baseline details: Pharmacist had greater number of patients arriving from home (60% vs 29%); Group 1 Number missing: 1, Reason: 'dropouts' (1); Group 2 Number missing: 7, Reason: 'dropouts' (7)	
Protocol outcomes not reported by the study	Mortality during the study period; Avoidable adverse events during the study period; Quality of life during the study period; Patient and/or carer satisfaction during the study period; Length of stay in hospital during the study period; Readmissions within 30 days; Discharges during the study period; Prescribing errors during the study period; Missed medications during the study period

Study	Al-rashed 2002[3]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=83)
Countries and setting	Conducted in United Kingdom; Setting: Care of the elderly wards
Line of therapy	Not applicable
Duration of study	Intervention + follow up: Follow-up- 3 months post-discharge
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable

Study	Al-rashed 2002[3]
Inclusion criteria	All patients admitted to care of the elderly wards who were >65 years, prescribed 4 or more regular items, were to be discharged to their own home and had an abbreviated mental score >7/10, English as a first language, and routine clinical pharmacist assessment that they could have problems with their medicines after discharge
Exclusion criteria	Not stated
Recruitment/selection of patients	Not stated
Age, gender and ethnicity	Age - Mean (SD): Intervention - 80.2 (5.7) years; control-81.1 (5.8) years. Gender (M:F): not stated. Ethnicity: Not stated
Further population details	Not stated
Extra comments	There was no statistical difference in gender between the groups. There was no statistical difference for the drugs on admission between the 2 groups and those prescribed during their hospital stay and at discharge
Indirectness of population	No indirectness
Interventions	(n=43) Intervention 1: Presence of medical ward based pharmacists - Presence of medical ward based pharmacists for 7 days a week. The intervention group received pre-discharge counselling (24 hours before discharge) by the clinical pharmacist attached to that ward. During this counselling session (approximately 30 minutes per patient), patients received information about their medicines. This included why each item had been prescribed, other uses and side-effects. Doses and dosage times were stressed with the aid of the medicine reminder card together with instructions to keep this card with their medicines as a constant reminder. The importance of compliance was stressed together with the consequences of under and over use of their medicines. The pharmacist asked the patient appropriate questions to ensure that the patient had remembered the information. This counselling session was planned for the 24 hour period before the patient was planned to be discharged. Duration Admission (in-patient). Concurrent medication/care: Not stated. Comments: At discharge all control and study group patients were given 2 envelopes. Each envelope contained a questionnaire to obtain feedback on the information discharge system that had been implemented. Also on discharge all patients were informed that a research pharmacist would contact them within 7 days to arrange a visit at their home to 'check how they were coping with their medicines'. This visit was planned between 15 and 22 days post-discharge. A second visit was arranged for 3 months post-discharge. (n=40) Intervention 2: No ward based pharmacists. Normal hospital discharge policy – all patients, their GPs, district nurses and carers received a copy of the patient's medication and information discharge summary sheet (MIDS). This hand written sheet included data on the date of admission and discharge, reasons for admission, diagnosis and other problems together with their major in-patient events and follow-up procedure. Patients received a medicine reminder

Study	Al-rashed 2002[3]
	card. On this card the generic name for each drug prescribed was stated together with other common names given to the drug and what it was prescribed for. The number of doses together with the times of day was also included. All patients were given 14 days of medication on discharge and informed to show their GP and community pharmacist the MIDS and medicine card during their first visit post-discharge. Normal discharge was provided to control patients. At this point the nurse went through their discharge medicines and explained that a new supply (via their GP) should be arranged within 14 days. They used the medicine reminder card and each dispended item when explaining the prescribed drugs and doses. Duration Admission (in-patient). Concurrent medication/care: Not stated.
Funding	Funding not stated
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS FOR 7 DAYS A WEEK versus NO WARD BASED PHARMACISTS Protocol outcome 1: Readmission - Actual outcome: Re-admission at 15-22 days post-discharge ; Group 1: 5/43, Group 2: 13/40; Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness	
Protocol outcomes not reported by the study	Mortality; Avoidable adverse events; Quality of life; Patient and/or carer satisfaction; Length of stay in hospital; Discharges; Prescribing errors; Missed medications; Medicines reconciliation; Staff satisfaction

Study	Bladh 2011[8]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=345)
Countries and setting	Conducted in Sweden; setting: 2 internal medicine wards at a university hospital
Line of therapy	1st line
Duration of study	Follow up (post intervention): 6 months
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Capable of assessing their HRQL and giving written informed consent
Exclusion criteria	Poor Swedish language, planned discharge before intervention can be performed, transferred during their stay to other hospitals or wards not belonging to the Department of Medicine

Study	Bladh 2011[8]
Recruitment/selection of patients	patients admitted on weekdays
Age, gender and ethnicity	Age - Median (IQR): group 1: 82 (75-86), group 2: 81 (72-87). Gender (M:F): 137:208. Ethnicity: NR
Further population details	1. Frail elderly: Not applicable/Not stated/Unclear 2. Haematology or oncology patients: Not applicable/Not stated/Unclear
Indirectness of population	No indirectness
Interventions	(n=199) Intervention 1: Presence of medical ward based pharmacists. Pharmacists performed continuous medication reviews (not ward-based) including oral feedback on prescribing to physicians; drug treatment discussion with the patient at discharge; a medication report given to the patient's GP. Duration till discharge. Concurrent medication/care: A regular discharge summary was sent to the patient's GP independent of the study. Patients received usual care. Comments: data on prescribing obtained from medical records, and no medication history was taken by the pharmacist (n=181) Intervention 2: No ward based pharmacists. Usual care, no clinical pharmacist involvement. Duration till discharge. Concurrent medication/care: regular discharge summary sent to the patient's GP Comments: same physicians and nurses undertook care for the intervention and control
Funding	Funding not stated

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS versus NO WARD BASED PHARMACISTS

Protocol outcome 1: Quality of life during the study period
- Actual outcome: Summated EQ-5D index at 6 months follow-up; Group 1: mean 0.48 (SD 0.34); n=95, Group 2: mean 0.43 (SD 0.37); n=109; EQ-5D summarised index - 1-1 Top=High is good outcome; Risk of bias: All domain - Very high, Selection - Low, Blinding - Very high, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Blinding details: Intervention group also recieved continuous medication reviews'; Group 1 Number missing: 104, Reason: During hospital: death (10), transfer (21) discharge (3), other (1); Follow-up: death (20), declined (7) not reached (42); Group 2 Number missing: 92, Reason: During hospital: death (5), transfer (11), other (4); Follow-up: death (15), declined (6) not reached (51)
- Actual outcome: Global Health at 6 months follow-up; Group 1: mean 3 (SD 0.91); n=95, Risk of bias: All domain - Very high, Selection - Low, Blinding - Very high, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Blinding details: Intervention group also recieved continuous medication reviews'; Group 1 Number missing: 104, Reason: During hospital: death (10), transfer (21) discharge (3), other (1); Follow-up: death (20), declined (7) not reached (42); Group 2 Number missing: 92, Reason: During hospital: death (5), transfer (11), other (4); Follow-up: death (15), declined (6) not reached (51)

- Actual outcome: EQ-VAS at 6 months follow-up; Group 1: mean 59.1 (SD 17); n=95, Risk of bias: All domain - Very high, Selection - Low, Blinding - Very high, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Blinding details:

Study	Bladh 2011[8]
Intervention group also recieved continuous medication reviews'; Group 1 Number missing: 104, Reason: During hospital: death (10), transfer (21) discharge (3), other (1); Follow-up: death (20), declined (7) not reached (42); Group 2 Number missing: 92, Reason: During hospital: death (5), transfer (11), other (4); Follow-up: death (15), declined (6) not reached (51)	
Protocol outcomes not reported by the study	Mortality during the study period; Avoidable adverse events during the study period; Patient and/or carer satisfaction during the study period; Length of stay in hospital during the study period; Readmissions up to 30 days; Discharges during the study period; Prescribing errors during the study period; Missed medications during the study period; Medicines reconciliation during the study period; Staff satisfaction during the study period

Study	Claus 2014[13]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=135)
Countries and setting	Conducted in Belgium; Setting: 22 bed Surgical ICU within a university hospital
Line of therapy	1st line
Duration of study	Intervention time: 2 months
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Over 16 years of age, length of stay greater than 48 hours
Exclusion criteria	None stated
Recruitment/selection of patients	Admission to the Surgical ICU on screening days
Age, gender and ethnicity	Age - Mean (SD): Group 1: 61.1 (2.0), Group 2: 58.0 (2.3). Gender (M:F): 91:44. Ethnicity: NR
Further population details	Not stated
Indirectness of population	No indirectness
Interventions	(n=69) Intervention 1: Presence of medical ward based pharmacists. Patients received active recommendations and follow-up from the pharmacist. Duration 2 months. Concurrent medication/care: No related patient rounds were followed and usual care

Study	Claus 2014[13]
	(n=66) Intervention 2: No ward based pharmacists. Pharmacist was present on the ward, but recommendations were not passed on to the primary care giver. Duration 2 months. Concurrent medication/care: No related ward rounds were followed, and usual care Comments: Patients crossed over to the intervention group if the caregiver specifically requested the project's pharmacist to provide advice (n=6)
Funding	
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS versus NO WARD BASED PHARMACISTS Protocol outcome 1: Mortality during the study period - Actual outcome: In-hospital mortality until discharge; Group 1: 14/75, Group 2: 11/60; Risk of bias: All domain - High, Selection - Low, Blinding - High, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: -6; Group 2 Number missing: 6	

Study	Eggink 2010[15]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=89)
Countries and setting	Conducted in Netherlands; Setting: Cardiology ward at a teaching hospital
Line of therapy	1st line
Duration of study	Intervention + follow up: 14 months + 6 weeks
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Heart failure patients
Subgroup analysis within study	Not applicable
Inclusion criteria	Over 18 years of age, admitted with a diagnosis of heart failure and prescribed 5 or more medicines (from any class) at discharge
Exclusion criteria	Living in a nursing home, unable to give informed consent or terminal illness
Recruitment/selection of patients	Patients to be discharged
Age, gender and ethnicity	Age - Mean (SD): Group 1: 72 (10), Group 2: 74 (12). Gender (M:F): 57:28. Ethnicity: NR
Further population details	Not stated

Study	Eggink 2010[15]
Indirectness of population	No indirectness
Interventions	(n=41) Intervention 1: Presence of medical ward based pharmacists. A clinical pharmacist identified potential prescription errors in the discharge medication and discussed them with the cardiologist in order to generate a finial discharge medication list. Patients received written and verbal information about (side) effects of, and changes in, their hospital drug therapy from the clinical pharmacist upon hospital discharge and the discharge medication list was faxed to the community pharmacy and given as written information to the patient to hand to their GP. Duration at discharge. Concurrent medication/care: usual care. (n=48) Intervention 2: No ward based pharmacists. Verbal and written information given by a nurse at hospital discharge, and discharge prescription was made by the physician to be given to the GP by the patient. Duration at discharge. Concurrent medication/care: usual care.
Funding	No funding
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS AT DISCHARGE versus NO WARD BASED PHARMACISTS Protocol outcome 1: Prescribing errors during the study period - Actual outcome: prescription errors identified during first outpatient follow-up at within 6 weeks; Group 1: 16/41, Group 2: 30/44; Risk of bias: All domain - Very high, Selection - High, Blinding - Very high, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 4, Reason: lost to follow-up (2), died (2)	
Protocol outcomes not reported by the study	Mortality during the study period; Avoidable adverse events during the study period; Quality of life during the study period; Patient and/or carer satisfaction during the study period; Length of stay in hospital during the study period; Readmissions up to 30 days; Discharges during the study period; Missed medications during the study period; Medicines reconciliation during the study period; Staff satisfaction during the study period

Study	Gillespie 2009[21]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=400)
Countries and setting	Conducted in Sweden; Setting: University teaching hospital
Line of therapy	1st line
Duration of study	Intervention + follow up: 9 months + 12 months

Study	Gillespie 2009[21]
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	over 80 years of age and capable of giving informed consent
Exclusion criteria	Previously been admitted to the study wards during the study period or had scheduled admissions.
Recruitment/selection of patients	Admission to the 2 study acute internal wards
Age, gender and ethnicity	Age - Mean (SD): Group 1: 86.4 (4.2), Group 2: 87.1 (4.1). Gender (M:F): 152:216. Ethnicity: NR
Further population details	Not stated
Indirectness of population	No indirectness
Interventions	(n=199) Intervention 1: Presence of medical ward based pharmacists. A comprehensive list of current medications was compiled on admission. A drug review was performed, and advice was given to the patient's physician on drug selection, dosages, and monitoring needs, with the final decision made by the physician in charge. Patients were educated and monitored throughout the admission process, and received discharge counselling. A follow-up telephone call to patients 2 months after discharge was conducted. Duration in-hospital plus 2 months post-discharge. Concurrent medication/care: usual care. (n=201) Intervention 2: No ward based pharmacists. Standard care without pharmacist involvement in the health care team at the ward level. Standard care usually included the same elements as those of the intervention but was less extensive, focusing mainly on the cause of admission, and was performed by physicians and nurses. Duration until discharge. Concurrent medication/care: usual care.
Funding	Academic or government funding (Uppsala County Council, University Hospital of Uppsala, Uppsala University, Apoteket AB, and Swedish Society of Pharmaceutical Sciences)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS versus NO WARD BASED PHARMACISTS

Protocol outcome 1: Mortality during the study period
- Actual outcome: Overall survival at 12 months; HR 0.94 (95%CI 0.65 to 1.36); Risk of bias: All domain - Very high, Selection - High, Blinding - Very high, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low, Other 1 - Low; Indirectness of outcome: No indirectness, Comments: Intervention includes follow-up telephone call at 2 months post-discharge; Baseline details: intervention group had higher prescription drug use; Blinding details: During follow-up period intervention patients recieved intervention again, but were excluded during the intervention period; Group 1 Number missing: 17, Reason: 13 died before discharge, 4 withdrew; Group 2 Number missing: 15, Reason: 14 died before discharge, 1 withdrew

Study	Gillespie 2009[21]
Protocol outcome 2: Future admissions (over 30 days) during the study period - Actual outcome: Admission by 12 months; Group 1: 106/182, Group 2: 110/186; Risk of bias: All domain - High, Selection - High, Blinding - Very high, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low, Other 1 - Low; Indirectness of outcome: No indirectness, Comments: Intervention includes follow-up telephone call at 2 months post-discharge; Baseline details: intervention group had higher prescription drug use; Group 1 Number missing: 17, Reason: 13 died before discharge, 4 withdrew; Group 2 Number missing: 15, Reason: 14 died before discharge, 1 withdrew	
Protocol outcomes not reported by the study	Avoidable adverse events during the study period; Quality of life during the study period; Patient and/or carer satisfaction during the study period; Length of stay in hospital during the study period; Discharges during the study period; Prescribing errors during the study period; Missed medications during the study period; Medicines reconciliation during the study period; Staff satisfaction during the study period

Study	Iowa Continuity of Care Study trial: Farris 2014[18] (Farley 2014[17])
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	2 (n=631)
Countries and setting	Conducted in USA; Setting: Tertiary care
Line of therapy	1st line
Duration of study	Intervention + follow up: 6 years
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	English or Spanish speaker, 18 years or older, admitted with a diagnosis of hypertension, hyperlipidaemia, heart failure, coronary artery disease, myocardial infarction, stroke, transient ischemic attack, asthma, chronic obstructive pulmonary disease or receiving oral anticoagulation.
Exclusion criteria	Could not use the telephone had a life expectancy under 6 months, had dementia or cognitive impairment, had a severe psychiatric diagnosis or were admitted to psychiatry, surgery or haematology/oncology services.
Recruitment/selection of patients	General medicine, family medicine, cardiology or orthopaedic admissions
Age, gender and ethnicity	Age - Mean (SD): Group 1: <45= 12.2%, 45-54= 16.7%, 55-64= 30.8%, 65-74= 27.2%, >74= 13.1, Group 2: <45= 9.3%, 45-54= 15.7%, 55-64= 35.1%, 65-74= 27.2%, >74= 12.8. Gender (M:F): Define. Ethnicity: NR
Further population details	Not stated

Study	Iowa Continuity of Care Study trial: Farris 2014[18] (Farley 2014[17])
Indirectness of population	No indirectness
Interventions	(n=315) Intervention 1: Presence of medical ward based pharmacists. Immediately after randomisation a visit from a pharmacist case manager (PCM) who verifies admission medications with community pharmacy. PCM makes visits every 2-3 days and makes recommendations to the inpatient medical team and educates patient during hospitalisation, provides discharge medication counselling and wallet card medication list. Strategies are reviewed to enhance self-management. Duration until discharge. Concurrent medication/care: A unit pharmacist performs medication reconciliation. Usual care. Comments: unclear if initial visit is unit pharmacist or PCM, or if medicine reconciliation happens twice from both. (n=316) Intervention 2: No ward based pharmacists. Medication reconciliation at admission according to hospital policy (unit pharmacist), nurse discharge counselling and a discharge medication list for patients. Duration until discharge. Concurrent medication/care: usual care. Comments: implication that there is a ward-based unit pharmacist present for some periods.
Funding	Academic or government funding (National Institute of Health)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS FOR LESS THAN 7 DAYS A WEEK versus NO WARD BASED PHARMACISTS

Protocol outcome 1: Avoidable adverse events during the study period
- Actual outcome: Preventable adverse drug events in-hospital; Group 1: 3/312, Group 2: 1/313; Risk of bias: All domain - High, Selection - Low, Blinding - Very high, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - High, Crossover - Low, Subgroups - Low, Other 1 - Low; Indirectness of outcome: No indirectness ; Baseline details: Intervention had greater number of medications and lower self-reported medication adherence compared to control; Group 2 Number missing: 3, Reason: 1 found ineligible early the study; 2 did not have baseline evaluator data
- Actual outcome: Preventable adverse drug events at 90 days follow-up; Group 1: 7/295, Group 2: 9/293; Risk of bias: All domain - High, Selection - Low, Blinding - Very high, Incomplete outcome data - High, Outcome reporting - Low, Measurement - Very high, Crossover - Low, Subgroups - Low, Other 1 - Low; Indirectness of outcome: No indirectness ; Baseline details: Intervention had greater number of medications and lower self-reported medication adherence compared to control; Group 1 Number missing: 6, Reason: 2 found ineligible early the study; 1 did not have baseline evaluator data; 3 unlear; Group 2 Number missing: 5, Reason: 1 found ineligible early the study; 2 did not have baseline evaluator data; 2 unclear

Protocol outcome 2: Readmissions up to 30 days
- Actual outcome: hospital Admission at 30 days; Group 1: 40/298, Group 2: 43/294; Risk of bias: All domain - High, Selection - Low, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Very high, Crossover - Low, Subgroups - Low, Other 1 - Low; Indirectness of outcome: No indirectness ; Baseline details: Intervention had greater number of medications and lower self-reported medication adherence compared to control; Group 1 Number missing: 17,

Study	Iowa Continuity of Care Study trial: Farris 2014[18] (Farley 2014[17])
Reason: 2 found ineligible early the study; 1 did not have baseline evaluator data; 5 deceased; 2 withdrew; 8 lost to follow-up; 1 other; 6 unlear; Group 2 Number missing: 22, Reason: 1 found ineligible early the study; 2 did not have baseline evaluator data; 7 deceased; 1 withdrew; 5 lost to follow-up; 15 unlear Protocol outcome 2: Future admissions (over 30 days) during the study period - Actual outcome: Admission by 90 days; Group 1: 51/295, Group 2: 47/293; Risk of bias: All domain - High, Selection - Low, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Very high, Crossover - Low, Subgroups - Low, Other 1 - Low; Indirectness of outcome: No indirectness ; Baseline details: Intervention had greater number of medications and lower self-reported medication adherence compared to control; Group 1 Number missing: 20, Reason: 2 found ineligible early the study; 1 did not have baseline evaluator data; 5 deceased; 2 withdrew; 8 lost to follow-up; 1 other; 8 unclear; Group 2 Number missing: 23, Reason: 1 found ineligible early the study; 2 did not have baseline evaluator data; 7 deceased; 1 withdrew; 5 lost to follow-up; 16 unclear Protocol outcome 3: Prescribing errors during the study period - Actual outcome: Medication appropriateness index (MAI) at 30 days; Group 1: mean 11.7 (SD 11.2); n=304, Group 2: mean 9.6 (SD 9.5); n=309; medication appropriateness index 0-12 Top=High is poor outcome; Risk of bias: All domain - High, Selection - Low, Blinding - Very high, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low, Other 1 - Low; Indirectness of outcome: No indirectness ; Baseline details: Intervention had greater number of medications and lower self-reported medication adherence compared to control; Group 1 Number missing: 11, Reason: 2 found ineligible early the study; 1 did not have baseline evaluator data; 5 deceased; 8 lost to follow-up; 2 withdrew; 1 other; Group 2 Number missing: 7, Reason: 1 found ineligible early the study; 2 did not have baseline evaluator data; 7 deceased; 5 lost to follow-up; 1 withdrew - Actual outcome: Medication appropriateness index (MAI) in-hospital; Group 1: mean 8 (SD 8.4); n=312, Group 2: mean 6.1 (SD 6.6); n=313; medication appropriateness index 0-12 Top=High is poor outcome; Risk of bias: All domain - High, Selection - Low, Blinding - Very high, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low, Other 1 - Low; Indirectness of outcome: No indirectness ; Baseline details: Intervention had greater number of medications and lower self-reported medication adherence compared to control; Group 1 Number missing: 3, Reason: 2 found ineligible early the study; 1 did not have baseline evaluator data; Group 2 Number missing: 3, Reason: 1 found ineligible early the study; 2 did not have baseline evaluator data	
Protocol outcomes not reported by the study	Mortality during the study period; Quality of life during the study period; Patient and/or carer satisfaction during the study period; Length of stay in hospital during the study period; Discharges during the study period; Missed medications during the study period; Medicines reconciliation during the study period; Staff satisfaction during the study period

Study	Khalil 2016 [31]

Study	Khalil 2016 [31]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=110)
Countries and setting	Conducted in Australia; Setting: Acute Assessment and Admission Unit via the ED at a metropolitan Australian hospital
Line of therapy	Not applicable
Duration of study	Intervention + follow up:
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall: NA
Subgroup analysis within study	Not applicable: NA
Inclusion criteria	adult medical patients admitted to the Acute Assessment and Admission Unit
Exclusion criteria	not admitted to Acute Assessment and Admission Unit within 24 hours, did not have any medications prior to admission, not a general medical patient
Recruitment/selection of patients	consecutive
Age, gender and ethnicity	Age - Other: Intervention average 65.1 years (95% CI 60-69), Control average 74.83 (95% CI 70-79). Gender (M:F): Intervention 1.24, Control 1.45. Ethnicity: not reported
Further population details	Not stated
Indirectness of population	No indirectness: NA
Interventions	(n=56) Intervention 1: Presence of medical ward based pharmacists - Presence of medical ward based pharmacists for 7 days a week. pharmacist-initiated medication reconciliation - pharmacist obtained a 'best possible medication history' from the patient and/or other sources, undertook admission medication reconciliation, reviewed current medications and the need for new medications in relation to the admission diagnosis, developed a medication management plan with the referring senior medical officer and charted on the electronic medication administration record. Duration 6 weeks. Concurrent medication/care: not reported. (n=54) Intervention 2: No ward based pharmacists. Usual care - medication orders charted by medical staff. Duration 6 weeks. Concurrent medication/care: not reported.
Funding	Academic or government funding (Victorian Department of Health and Human Services for the Advanced Practice Allied Health Workforce Program)
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS FOR 7 DAYS A WEEK versus NO WARD	

Study	Khalil 2016 [31]
BASED PHARMACISTS Protocol outcome 1: Prescribing errors at end of follow-up - Actual outcome: number of errors at 24 hours.; Group 1: 29/56, Group 2: 238/54; Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness :	
Protocol outcomes not reported by the study	Mortality; Avoidable adverse events; Quality of life; Patient and/or carer satisfaction; Length of stay in hospital; Readmission; Discharges; Missed medications; Medicines reconciliation; Staff satisfaction

Study	Kucukarslan 2003[35]
Study type	Quasi-RCT
Number of studies (number of participants)	(n=165)
Countries and setting	Conducted in USA; Setting: 2 internal medicine wards within a 802-bed tertiary care hospital
Line of therapy	1st line
Duration of study	Intervention time: 3 months
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Admitted to the internal medicine service and remained in the same patient care unit until discharge
Exclusion criteria	No reported exclusion criteria
Recruitment/selection of patients	All patients admitted to 1 of the 2 wards
Age, gender and ethnicity	Age - Mean (SD): group 1: 53.94 (18.95), group 2: 56.49 (19.6). Gender (M:F): 72:93. Ethnicity: African American - 81%, White - 18%, Other - 1%
Further population details	Not stated
Extra comments	Admitting process was based on the availability of beds and physician service
Indirectness of population	No indirectness
Interventions	(n=86) Intervention 1: Presence of medical ward based pharmacists. Two clinical pharmacists assigned to provide patient care at the bedside from Monday through to Friday. Pharmacist's

Study	Kucukarslan 2003[35]
	evaluated patients' medications during the round with physicians. Duration until discharge. Concurrent medication/care: usual care + pharmacists identified medication-related problems through the review of medication orders (that is, medication administration records) every morning. Also, a list of medications, which require evaluation because of cost or safety, was used to identify potential medication-related problems. (n=79) Intervention 2: No ward based pharmacists. Pharmacists identified medication-related problems through the review of medication orders (that is, medication administration records) every morning. Also, a list of medications, which require evaluation because of cost or safety, was used to identify potential medication-related problems. Duration until discharge. Concurrent medication/care: usual care.
Funding	Funding not stated
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS FOR LESS THAN 7 DAYS A WEEK versus NO WARD BASED PHARMACISTS Protocol outcome 1: Avoidable adverse events during the study period - Actual outcome: Preventable adverse drug events until discharge; Group 1: 2/79, Group 2: 9/86; Risk of bias: All domain - Very high, Selection - Very high, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - LowIndirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0 Protocol outcome 2: Length of stay in hospital during the study period - Actual outcome: Reduction in length of stay in-hospital; Mean study group mean was 0.3 days shorter; Risk of bias: All domain - Very high, Selection - Very high, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0 Protocol outcome 3: Readmissions up to 30 days - Actual outcome: Reduction re-admission (unclear study period); Other: study group readmission rate was 44% less; Risk of bias: All domain - Very high, Selection - Very high, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 0	
Protocol outcomes not reported by the study	Mortality during the study period; Quality of life during the study period; Patient and/or carer satisfaction during the study period; Discharges during the study period; Prescribing errors during the study period; Missed medications during the study period; Medicines reconciliation during the study period; Staff satisfaction during the study period

Study	**Lind 2016[37]**
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=448)
Countries and setting	Conducted in Denmark; Setting: Acute admission unit via ED at Randers Regional Hospital, Denmark
Line of therapy	Not applicable
Duration of study	Intervention time:
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall: NA
Subgroup analysis within study	Not applicable: NA
Inclusion criteria	Patients 18 years and over, taking at least 4 drugs daily
Exclusion criteria	Terminal or intoxicated, assigned to triage level 1, referred to acute outpatient clinic, unable to give informed consent, interviewed by physician prior to giving informed consent, unexpected overnight stay
Recruitment/selection of patients	Consecutive
Age, gender and ethnicity	Age - Mean (SD): intervention 70.9 (13.8), control 69.8 (12.7). Gender (M:F): 216/232. Ethnicity: not reported
Further population details	Not stated
Indirectness of population	No indirectness
Interventions	(n=216) Intervention 1: Presence of medical ward based pharmacists - Presence of medical ward based pharmacists for

	less than 7 days a week. Clinical pharmacist intervention - obtaining medication history (using a minimum of 2 sources, 1 of which was an interview with the patient and/or relatives where possible), entering prescriptions into the electronic medication module, medication reconciliation, reviewing overall medication treatment and writing a note in the electronic medical record. The clinical pharmacist intervention replaced the physician's task related to medication apart from assessing and approving the suggested prescriptions in the electronic medication module. Duration 126 weekday shifts. Concurrent medication/care: not reported. (n=232) Intervention 2: No ward based pharmacists. Standard care – on arrival, patients triaged by a nurse and then seen by a physician who was responsible for obtaining medication history, reconciling and assessing medication treatment and entering prescriptions in the EMM. Duration 126 weekday shifts. Concurrent medication/care: not stated.
Funding	Academic or government funding (Research Centre for Emergency Medicine at Aarhus University Hospital)
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS FOR LESS THAN 7 DAYS A WEEK versus NO WARD BASED PHARMACISTS Protocol outcome 1: Length of stay in hospital at end of follow-up - Actual outcome: Length of stay in AAU at end of study; Mean 3.2 (95%CI -25.2 to 34.2); Risk of bias: All domain - Low, Selection - Low, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness	
Protocol outcomes not reported by the study	Mortality at Define; Avoidable adverse events at end of follow-up; Quality of life at end of follow-up; Patient and/or carer satisfaction at end of follow-up; Readmission at end of follow-up; Discharges at end of follow-up; Prescribing errors at end of follow-up; Missed medications at end of follow-up; Medicines reconciliation at end of follow-up; Staff satisfaction at end of follow-up

Study	**Lisby 2010[39]**
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=100)
Countries and setting	Conducted in Denmark; Setting: acute ward of internal medicine within 1 regional hospital
Line of therapy	1st line

Study	Lisby 2010[39]
Duration of study	Intervention + follow up: 1 year + 3 month follow-up
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	70 years or older who were taking at least 1 drug daily and were expected to be admitted for more than 24 hours.
Exclusion criteria	Suicidal, dying and patients unable to give written consent
Recruitment/selection of patients	Consecutively admitted patients
Age, gender and ethnicity	Age - Mean (SD): Group 1: 80.2 (6.69), Group 2: 78.2 (6.96). Gender (M:F): 40:60. Ethnicity: NR
Further population details	Not stated
Indirectness of population	No indirectness
Interventions	(n=50) Intervention 1: Presence of medical ward based pharmacists. Systematic medication review and drug counselling by a clinical pharmacist and a clinical pharmacologist after the usual routine medication in the ward had been conducted. Duration within 24 hours of admission or by first-coming day of the week. Concurrent medication/care: Usual care + usual routine medication review. (n=50) Intervention 2: No ward based pharmacists. Usual routine medication review: review by junior physician on admission and within 24 hours an assessment by a senior physician, specialised in internal medicine. Duration 24 hours. Concurrent medication/care: usual care.
Funding	Academic or government funding (ALIS, Amgros I/S)
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS AT ADMISSION versus NO WARD BASED PHARMACISTS Protocol outcome 1: Mortality during the study period - Actual outcome: Mortality at 3 months; Group 1: 8/50, Group 2: 5/49; Risk of bias: All domain - High, Selection - Low, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: ; Group 2 Number missing: 1, Reason: withdrew (1 Protocol outcome 2: Quality of life during the study period - Actual outcome: EQ-VAS at 3 months; Group 1: mean 60.9 (SD 21.4335); n=33, Group 2: mean 54.7 (SD 26.2449); n=30; EQ VAS 0-100 Top=High is good outcome; Risk of bias: All domain - High, Selection - Low, Blinding - Very high, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low;	

Study	Lisby 2010[39]
Indirectness of outcome: No indirectness ; Group 1 Number missing: ; Group 2 Number missing: 1, Reason: withdrew (1) Protocol outcome 3: Length of stay in hospital during the study period - Actual outcome: Length of stay until discharge; Group 1: mean 239.9 hours (SD 176.28); n=50, Group 2: mean 238.6 hours (SD 353.02); n=49; Risk of bias: All domain - High, Selection - Low, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 0; Group 2 Number missing: 1, Reason: withdrew (1) Protocol outcome 4: Future admissions (over 30 days) during the study period - Actual outcome: Admissions per patient at 3 months; Mean 0.4 (95%CI 0.3 to 0.6); Risk of bias: All domain - High, Selection - Low, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: ; Group 2 Number missing: 1, Reason: withdrew (1)	
Protocol outcomes not reported by the study	Avoidable adverse events during the study period; Patient and/or carer satisfaction during the study period; Discharges during the study period; Prescribing errors during the study period; Missed medications during the study period; Medicines reconciliation during the study period; Staff satisfaction during the study period

Study	Nester 2002[44]
Study type	Quasi-RCT
Number of studies (number of participants)	1 (n=100)
Countries and setting	Conducted in USA; Setting: Tertiary care referral centre
Line of therapy	1st line
Duration of study	Not clear:
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Over 18, responsive and able to speak English
Exclusion criteria	Intensive care, ambulatory surgical, and labour-and-delivery units
Recruitment/selection of patients	Consecutive admissions on weekdays between 0700 and 1530
Age, gender and ethnicity	Age - Mean (SD): Group 1: 67 (18), Group 2: 56 (21). Gender (M:F): 46:54. Ethnicity: NR
Further population details	1. Frail elderly: Not applicable/Not stated/Unclear 2. Haematology or oncology patients: Not applicable / Not stated /

Study	Nester 2002[44]
	Unclear
Indirectness of population	No indirectness
Interventions	(n=50) Intervention 1: Presence of medical ward based pharmacists - Presence of medical ward based pharmacists for 7 days a week. Medication reconciliation within 2 hours of admission performed by a clinical pharmacist using a standardised medication history form as well as additional sources (admitting physician or community pharmacy). Medication history was given to the order-entry pharmacist to compare with the medications ordered later by physicians. Duration within 2 hours of admission. Concurrent medication/care: usual care. Comments: Nurses still performed medication history taking, but in all cases the intervention was conducted first. (n=50) Intervention 2: No ward based pharmacists. Medication reconciliation within performed by a nurse using a standardised medication history form as well as additional sources (admitting physician or community pharmacy). Medication history was given to the order-entry pharmacist to compare with the medications ordered later by physicians. Duration unclear. Concurrent medication/care: usual care.
Funding	
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS AT ADMISSION versus NO WARD BASED PHARMACISTS Protocol outcome 1: Medicines reconciliation during the study period - Actual outcome: Medication discrepancies identified at admission at admission; Group 1: mean 0.6 discrepancies identified per patient (SD 1.07); n=50, Group 2: mean 0.22 discrepancies identified per patient (SD 0.55); n=50; Risk of bias: All domain - Very high, Selection - Very high, Blinding - Very high, Crossover - Low; Indirectness of outcome: No indirectness ; Baseline details: Age significantly different between the groups; Group 1 Number missing: 0; Group 2 Number missing: 0	

Study	Nickerson 2005[46]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=253)
Countries and setting	Conducted in Canada; Setting: The Moncton Hospital, South East Health Regional Health Authority, Moncton. The Moncton Hospital is a 381 bed regional hospital that provides tertiary care services.
Line of therapy	1st line

Study	Nickerson 2005[46]
Duration of study	Intervention + follow up: 9 months (6 month follow-up)
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Family practice patient discharged from 3600 or 4200 (family practice patient units), discharged between 8h00 and 14h00, not discharged to another hospital, prescribed at least 1 prescription medication at discharge, completion of informed consent, patient's community pharmacy had signed study participation agreement, no previous enrolment
Exclusion criteria	Not able to answer the questions needed to complete the study or if they would not be available for follow up after discharge
Recruitment/selection of patients	Patients admitted to 1 of 2 family practice units from September 2000 to June 2001 were screened to participate in the study.
Age, gender and ethnicity	Age - Other: Mean age (years): intervention -67.3; control-61.8. Gender (M:F): Define. Ethnicity: not stated
Further population details	Not stated
Extra comments	The intervention group had a statistically significant greater number of home medication changes, and their mean age, number of medications upon admission and number of co-morbidities were marginally significantly greater.
Indirectness of population	No indirectness
Interventions	(n=134) Intervention 1: Presence of medical ward based pharmacists - Presence of medical ward based pharmacists for 7 days a week. Patients in the intervention group were subject to an intervention conducted by a clinical pharmacist (seamless care pharmacist) at the time of discharge. The seamless care pharmacist carried out medication reconciliation process by reviewing discharge prescriptions and compared these with Medical Administration Record (MAR) and the patients' medical chart to identify any discrepancies in the discharge orders. This pharmacist also reviewed the intervention patient's drug regime as part of comprehensive pharmaceutical care work-up. The pharmacist also identified problems with drug therapy and communicated these to community pharmacy, hospital staff and family physician. The pharmacist also performed the medication discharge counselling and a medication compliance chart. Duration 3 months. Concurrent medication/care: Mean number of prescriptions at hospital admission – 6.94; control- 6.03. No further details. (n=119) Intervention 2: No ward based pharmacists. The control patients received standard care at discharge - discharge counselling and manual transcription of discharge notes from medical chart by nurse. Duration 3 months. Concurrent medication/care: Mean number of prescriptions at

Study	Nickerson 2005[46]
	hospital admission – 6.94; control- 6.03. No further details.
Funding	Funding not stated.
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS FOR 7 DAYS A WEEK versus NO WARD BASED PHARMACISTS Protocol outcome 1: Medicines reconciliation - Actual outcome: Unresolved drug therapy inconsistencies and omissions (DTIOs) at the time of discharge; Group 1: 53/134, Group 2: 67/119; Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low, Other 1 - Low, Other 2 - Low, Other 3 - Low, Comments - Every 6th chart reviewed in the intervention group; Indirectness of outcome: No indirectness ; Group 1 Number missing: ; Group 2 Number missing:	
Protocol outcomes not reported by the study	Mortality; Avoidable adverse events; Quality of life; Patient and/or carer satisfaction; Length of stay in hospital; Readmission; Discharges; Prescribing errors; Missed medications; Staff satisfaction

Study	Shen 2011 [58]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=354)
Countries and setting	Conducted in China; Setting: Tertiary teaching hospital
Line of therapy	Not applicable
Duration of study	Intervention time: 10 months
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Define
Exclusion criteria	Define
Recruitment/selection of patients	Between July 2009 and April 2010 all inpatients who were diagnosed with RTI were eligible for the study
Age, gender and ethnicity	Age - Mean (SD): Intervention-60.3 (18.1); control- 59.8 (17.6). Gender (M:F): Define. Ethnicity: not stated
Further population details	Not stated

Study	Shen 2011 [58]
Indirectness of population	No indirectness
Interventions	(n=176) Intervention 1: Presence of medical ward based pharmacists - Presence of medical ward based pharmacists for 7 days a week. Clinical pharmacist part of the treating team – communicated any potentially inappropriate antibiotic use (indication, choice, dosage, dosing schedule, duration, conversion) with the physician to discuss and make recommendations. Duration 10 months. Concurrent medication/care: not reported (n=178) Intervention 2: No ward based pharmacists. Standard treatment strategies performed by the physicians and nurses without pharmacist involvement. Duration 10 months. Concurrent medication/care: not reported
Funding	No funding
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS FOR 7 DAYS A WEEK versus NO WARD BASED PHARMACISTS Protocol outcome 1: Length of stay in hospital at end of follow-up - Actual outcome: Length of stay at end of study; Group 1: mean 14.2 (SD 6.2); n=176, Group 2: mean 15.8 (SD 6); n=178; Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low, Other 1 - Low, Other 2 - Low, Other 3 - Low; Indirectness of outcome: No indirectness	
Protocol outcomes not reported by the study	Mortality at Define; Avoidable adverse events at end of follow-up; Quality of life at end of follow-up; Patient and/or carer satisfaction at end of follow-up; Readmission at end of follow-up; Discharges at end of follow-up; Prescribing errors at end of follow-up; Missed medications at end of follow-up; Medicines reconciliation at end of follow-up; Staff satisfaction at end of follow-up

Study	Scullin 2007[57]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=762)
Countries and setting	Conducted in United Kingdom; Setting: Medical wards within 3 general hospitals
Line of therapy	1st line
Duration of study	Intervention time: 1.5 years
Method of assessment of guideline condition	Adequate method of assessment/diagnosis

Study	Scullin 2007[57]
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	One of the following criteria: taking at least 4 regular medication, were taking a high risk drug(s), were taking antidepressants and were 65 years old or older, had a hospital admission within the last 6 months, prescribed antibiotics on day 1 of admission
Exclusion criteria	Scheduled admissions and patients admitted from private nursing homes
Recruitment/selection of patients	All admitted patients
Age, gender and ethnicity	Age - Mean (SD): Group 1: 70.3 (13.8), Group 2: 69.9 (14.8). Gender (M:F): 359:403. Ethnicity: NR
Further population details	Not stated
Indirectness of population	No indirectness
Interventions	(n=371) Intervention 1: Presence of medical ward based pharmacists. Patients received integrated management service, which consisted of 5 pairs of clinical pharmacists and pharmacy technicians with each pair assigned to a particular ward. Duties included admission, inpatient monitoring and discharge. Admission: medicine reconciliation during admission using patient's admission prescription list, the patient's GP, the patient's own drugs, information obtained from the patient or their carer, and from the patients community pharmacist. In-patient monitoring: drug treatment was reviewed daily (unclear if ward-based) and counselling tailored to suit the needs of each individual patient. Discharge: IMM pharmacist generated and authorised a discharge prescription and a medicines record sheet. Duration until discharge. Concurrent medication/care: usual treatment. (n=391) Intervention 2: No ward based pharmacists. Traditional clinical pharmacy services which were in place across the participating hospitals (no further details given). Duration until discharge. Concurrent medication/care: usual care.
Funding	Academic or government funding (Northern Ireland Department of Health and Social Services)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS versus NO WARD BASED PHARMACISTS

Protocol outcome 1: Mortality during the study period
- Actual outcome: Mortality at 12 months; Group 1: 67/370, Group 2: 76/383; Risk of bias: All domain - Very high, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Very high, Measurement - Low, Crossover - Low, Subgroups - Low,; Indirectness of outcome: No indirectness ; Baseline details: not comparable for gender, not many factors listed; Group 1 Number missing: 1, Reason: no reasons stated; Group 2 Number missing: 7, Reason: no reasons stated

Study	Scullin 2007[57]
Protocol outcome 2: Length of stay in hospital during the study period - Actual outcome: Length of stay until discharge; Group 1: mean 7.8 days (SD 7.8362); n=371, Group 2: mean 9.8 days (SD 15.4679); n=391; Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness ; Baseline details: not comparable for gender, not many factors listed; Group 1 Number missing: 0; Group 2 Number missing: 0 Protocol outcome 3: Future admissions (over 30 days) during the study period - Actual outcome: Admission by 12 months; Group 1: 141/370, Group 2: 172/383; Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low,; Indirectness of outcome: No indirectness ; Baseline details: not comparable for gender, not many factors listed; Group 1 Number missing: 1, Reason: no reasons stated; Group 2 Number missing: 7, Reason: no reasons stated	
Protocol outcomes not reported by the study	Avoidable adverse events during the study period; Quality of life during the study period; Patient and/or carer satisfaction during the study period; Discharges during the study period; Prescribing errors during the study period; Missed medications during the study period; Medicines reconciliation during the study period; Staff satisfaction during the study period

Study	Spinewine 2007[59]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=203)
Countries and setting	Conducted in Belgium; Setting: 27 bed acute Geriatric Evaluation and Management (GEM) unit within a university teaching hospital
Line of therapy	1st line
Duration of study	Intervention + follow up: 1 year
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Pharmacist external to the main study checked inclusion criteria. No further details reported
Exclusion criteria	Terminal illness with a life expectancy of less than 3 months; refusal to participate; expected length of stay of 48 hours or less; pharmacist unable to perform an abstracted chart within 3 days of admission because of time constraints; patient transferred from another acute unit where he or she had been cared for by geriatrician(s); and inclusion during previous admission
Recruitment/selection of patients	All patients admitted to the unit

Study	Spinewine 2007[59]
Age, gender and ethnicity	Age - Mean (SD): Group 1: 81.9 (6.2), Group 2: 82.4 (6.9). Gender (M:F): 57:129. Ethnicity: NR
Further population details	Not stated
Indirectness of population	No indirectness
Interventions	(n=103) Intervention 1: Presence of medical ward based pharmacists. Pharmacist was present on the unit for 4 days per week. Duties included: participating in medical and multidisciplinary rounds; direct contact with patients and caregivers; performing a medication history on admission and preparation of a patient record with clinical and pharmaceutical data; preparation of a pharmaceutical care plan; answering all questions that healthcare professionals asked about medication; identifying any optimisations and discussing with the prescriber, who could accept or reject the recommendation; providing at discharge written and oral information on treatment changes to the patient or caregiver, as well as written information to the general practitioner. Duration until discharge. Concurrent medication/care: usual care. (n=100) Intervention 2: No ward based pharmacists. Usual care. Duration until discharge. Concurrent medication/care: - Comments: unclear if there was any clinical pharmacist involvement, for example, medication reviews from medical records.
Funding	Academic or government funding (National Institutes of Health, Grants RO1 AI 5535901 and K23 AI068582-01)

RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS FOR LESS THAN 7 DAYS A WEEK versus NO WARD BASED PHARMACISTS

Protocol outcome 1: Mortality during the study period
- Actual outcome: Mortality at 1 year follow-up; Group 1: 20/89, Group 2: 25/83; Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 14, Reason: 2 transferred, 5 died in-hospital; 7 unclear; Group 2 Number missing: 17, Reason: 5 transferred, 5 died in-hospital; 7 unclear

Protocol outcome 2: Patient and/or carer satisfaction during the study period
- Actual outcome: satisfaction with information received at 1 month follow-up; Group 1: 71/95, Group 2: 37/88; Risk of bias: All domain - Very high, Selection - High, Blinding - Very high, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 8, Reason: 2 transferred, 5 died, 1 unclear; Group 2 Number missing: 12, Reason: 5 transferred, 5 died, 2 unclear
Protocol outcome 3: Future admissions (over 30 days) during the study period
- Actual outcome: Admission by 12 months; Group 1: 29/89, Group 2: 28/83; Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 14, Reason: 2 transferred, 5 died, 7 unclear; Group 2 Number missing: 17, Reason: 5 transferred, 5 died, 7 unclear

Study	Spinewine 2007[59]
Protocol outcome 4: Prescribing errors during the study period - Actual outcome: Medical appropriateness index at discharge; Group 1: mean 7.1 (SD 7.5); n=96, Group 2: mean 19.3 (SD 12.5); n=90; Risk of bias: All domain - Very high, Selection - High, Blinding - Very high, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low; Indirectness of outcome: No indirectness ; Group 1 Number missing: 7, Reason: 2 transferred, 5 died; Group 2 Number missing: 10, Reason: 5 transferred, 5 died	
Protocol outcomes not reported by the study	Avoidable adverse events during the study period; Quality of life during the study period; Length of stay in hospital during the study period; Discharges during the study period; Missed medications during the study period; Medicines reconciliation during the study period; Staff satisfaction during the study period

Study	Tong 2016[62]
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=881)
Countries and setting	Conducted in Australia; Setting: Adult major referral hospital
Line of therapy	Not applicable
Duration of study	Intervention time: 4 months
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	Patients admitted to the general medical unit (GMU) and emergency short stay unit (ESSU) during pharmacist working hours (7am-9pm)
Exclusion criteria	Medication chart written by a doctor before pharmacist review; admitted to ESSU and not reviewed by a pharmacist
Recruitment/selection of patients	The evaluation included patients' medication charts written in the period 16 March 2015 to 27 July 2015.
Age, gender and ethnicity	Age - Mean (SD): intervention 75 (16.3); control 71.5 (18.4). Gender (M:F): males- intervention 42.9%; control 46.1%. Ethnicity: not stated
Further population details	Not stated
Indirectness of population	No indirectness
Interventions	(n=408) Intervention 1: Presence of medical ward based pharmacists - Presence of medical ward based pharmacists for 7 days a week. Early medication review and charting on admission involving a partnership between a pharmacist and a medical

Study	Tong 2016[62]
	officer – pharmacist took medical history, VTE risk assessment and discussed medical and medication problems with admitting medical officer to agree a medication management plan. Appropriate pre-admission medications and VTE prophylaxis were charted by the pharmacist on the inpatient medication record from which nurses administered medications. This was followed by a discussion between the treating nurse and pharmacist about the medication management plan, including any urgent medications to be administered, drug-related monitoring and reasons for any changes to medications. A second pharmacist independently reviewed all medications charted by a pharmacist within 24 hours to provide a second check. Duration 4 months. Concurrent medication/care: Number of regular medication - mean (range) 8 (5-11). (n=473) Intervention 2: No ward based pharmacists. Standard medication charting by medical officers of relevant teams, with subsequent medication reconciliation performed by pharmacist within24 hours of admission. Duration 4 months. Concurrent medication/care: Number of regular medication- mean (range) 7 (4-11).
Funding	Academic or government funding
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS FOR 7 DAYS A WEEK versus NO WARD BASED PHARMACISTS Protocol outcome 1: Prescribing errors at end of follow-up - Actual outcome: Medication error detected within 24 hours of patients admission at Please enter a time period; Group 1: 15/408, Group 2: 372/473; Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness	
Protocol outcomes not reported by the study	Mortality at Define; Avoidable adverse events at end of follow-up; Quality of life at end of follow-up; Patient and/or carer satisfaction at end of follow-up; Length of stay in hospital at end of follow-up; Readmission at end of follow-up; Discharges at end of follow-up; Missed medications at end of follow-up; Medicines reconciliation at end of follow-up; Staff satisfaction at end of follow-up

Study (subsidiary papers)	Zhao 2015[69] (Zhao 2015[70])
Study type	RCT (Patient randomised; Parallel)
Number of studies (number of participants)	1 (n=90)
Countries and setting	Conducted in China; Setting: 49 bed cardiology ward of the Peoples Hospital of Henan Province, China.

Study (subsidiary papers)	Zhao 2015[69] (Zhao 2015[70])
Line of therapy	Not applicable
Duration of study	Intervention + follow up: Follow-up 6 months after discharge
Method of assessment of guideline condition	Adequate method of assessment/diagnosis
Stratum	Overall
Subgroup analysis within study	Not applicable
Inclusion criteria	To participate in the study, patients needed to: have already been diagnosed with coronary heart disease by their physician, have accepted ≥4 kinds of drugs for heart conditions (for example, antiplatelet agents, B-blockers, ACE inhibitors and statins) and be 18 years of age or older.
Exclusion criteria	The following were excluded from the study: pregnant or lactating women, patients who were enrolled in other research projects, severe co-morbidities such as liver failure, kidney failure or lung failure, patients with a family history of psychosis, patients with barriers to communication and patients unable to complete the study.
Recruitment/selection of patients	Eligible patients who were discharged from the People's Hospital of Henan Province between 1 January and 30 June 2012.
Age, gender and ethnicity	Age - Mean (SD): Number patients- above 60 years: Intervention- 24 (53.3%); control-23 (51.1%). Gender (M:F): Intervention- 19/26; control-17/28. Ethnicity: not stated
Further population details	Not stated
Extra comments	The pharmacists (3 clinical pharmacists and 2 pharmacy students) taking part in the study had at least 2 years of experience in coronary heart disease and could spend the entire day on the cardiology ward.
Indirectness of population	No indirectness
Interventions	(n=45) Intervention 1: Presence of medical ward based pharmacists - Presence of medical ward based pharmacists for 7 days a week. The intervention group received conventional medical treatment plus interventions by clinical pharmacists. The clinical pharmacists developed individual drug regimens based on each patient's needs and condition. The pharmacists attended daily medical rounds and advised physicians on the risk factors and clinical manifestations of CHD, possible complications and treatment principles. The pharmacists also educated medical staff on the properties and possible adverse drug reactions of the medications given to the patient and the properties and possible adverse drug reactions. The pharmacists provided patient education on lifestyle changes, psychological interventions, such as stress reduction, and medication counselling at discharge. The pharmacist called the patient on the telephone every month to check on changes in the patients' disease status and the patients' compliance with doctors' orders. Duration In-hospital stay. Concurrent medication/care: multi-drug therapy (4-6 types): 24 (53.3%)

Study (subsidiary papers)	Zhao 2015[69] (Zhao 2015[70])
	(n=45) Intervention 2: No ward based pharmacists. The control group received conventional medical treatment without pharmacist participation. Duration In-hospital stay. Concurrent medication/care: Multi-drug therapy (4-6 types): 26 (57.78%)
Funding	No funding
RESULTS (NUMBERS ANALYSED) AND RISK OF BIAS FOR COMPARISON: PRESENCE OF MEDICAL WARD BASED PHARMACISTS FOR 7 DAYS A WEEK versus NO WARD BASED PHARMACISTS Protocol outcome 1: Avoidable adverse events - Actual outcome: Adverse drug reactions at 6 months; Group 1: 3/43, Group 2: 2/42; Risk of bias: All domain - High, Selection - High, Blinding - Low, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness Protocol outcome 2: Quality of life - Actual outcome: Self-care ability and Quality of life - satisfaction self-evaluation (scale not specified) at discharge; Group 1: 35/43, Group 2: 23/42; Risk of bias: All domain - High, Selection - High, Blinding - High, Incomplete outcome data - Low, Outcome reporting - Low, Measurement - Low, Crossover - Low, Subgroups - Low; Indirectness of outcome: No indirectness	
Protocol outcomes not reported by the study	Mortality; Patient and/or carer satisfaction; Length of stay in hospital; Readmission; Discharges; Prescribing errors; Missed medications; Medicines reconciliation; Staff satisfaction