Supplementary File B: Summary of Studies Included in this Overview of Systematic Reviews

Study	Quality Score (0-11)	Focus	Inclusion Criteria					Single/ Multiple/ Guideline	EPOC Interv-entions	Main Results	Authors Main Conclusions
			Setting	Participants	Intervention	Outcomes	Period				
Anderson 1996[1]	3	Review of techniques to improve prescribing behaviour	Primary Care	Primary care physicians	Techniques for promoting appropriate prescribing	Appropriate prescriptions and cost	1989-1996	Multiple	EM, DEM, REM, AF, EOV	9 RCTs included. Printed educational materials of little benefit, though combination of education and feedback more effective. Face to face educational interventions were successful. Specific strategies recommending changes in medication also successful	Specific strategies combining education and feedback can improve the quality of care. Little data on benefit to patient outcomes. More research is needed in this area.
Arditi 2012[2]	11	Effectiveness of computer generated reminders delivered in paper to healthcare professionals on the process and outcomes of care	Primary or secondary care	Any qualified health professional	Computer generated reminders delivered on paper	Objective measures of the process of care or patient outcomes	1946-2012	Single	REM, AF, EM, PMI	32 included studies. Moderate improvement in prof practice (median 7.0%, IQR 3.9-16.4). Improved care by median of 11.2% (IQR 6.5-19.6) compared to usual care, and by 4.0% (IQR 3.0-6.0) compared to other interventions. Providing a space on the reminder for a response from the clinician and providing an explanation of the reminders advice/content both significantly predicted improvement	There is moderate quality evidence that computer generated reminders delivered on paper achieves moderate improvements in the process of care. Reminders can improve care in a variety of settings and conditions.
Austin 1994[3]	3	Effectiveness of reminders on preventive care	Primary and Secondary Care	Family or internal medicine physicians	Reminders	Process and outcome of care	Not given	Single	REM	10 RCTs included but only 4 trials eligible for meta-analysis (narrative or qualitative synthesis of remaining 6 not done). Results showed significant improvements with reminders for cervical cancer screening (n=5345, OR 1.18, 95%CI 1.02-1.34) and tetanus immunisation (n= 4905, OR 2.82, 95% CI 2.66-2.98).	Reminders may increase provision of preventive care services

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Baker 2015[4]	11	Effectiveness of interventions tailored to address determinants of practice	Primary and Secondary Care	Healthcare professionals responsible for patient care	Interventions tailored to address barriers vs no intervention or non-tailored intervention	Objective measures of professional practice or healthcare outcomes	1950-2007	Single	MAR	32 RCTs included in the review. 15 studies included in meta regression analysis, which gave a pooled OR of 1.56 (95% CI 1.27-1.93, p<0.001) in favour of tailored interventions. The remaining 17 showed variable effectiveness..	Interventions tailored to prospectively identified barriers are more likely to improve practice than no intervention or dissemination of educational materials. It is unclear which elements of intervention explained effectiveness
Balas 1996[5]	6	Effectiveness of computerised information systems	Primary and Secondary Care	Providers and Patients	Computer-ised information interventions	Process or outcome of care	Not given	Single	REM	98 RCTs (97 comparisons) included in review. Computerised information interventions included reminders, feedback, medical records diagnosis assistance and patient education. 76 of 97 studies showed benefit for process of care, whilst 10 of 14 demonstrated improved patient outcomes. Vote counting method of analysis showed significant (p<0.05) benefits of provider and patient reminders in diagnostic tests and preventive medicine, computer assisted treatment planners for drug prescription, and computer assisted patient education.	Provider prompts, computer assisted treatment planners, interactive patient education and patient prompts can improve quality of care, and these modalities should be incorporated into information strategies

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Balas 2000[6]	8	Assess the impact of prompting physicians on health maintenance	Primary and Secondary Care	Providers	Physician prompts	Preventative care measures	1966-1996	Single	REM	The statistical analyses included 33 eligible studies, which involved 1547 clinicians and 54 693 patients. Overall, prompting can significantly increase preventive care performance by 13.1% (95% CI 10.5%-15.6%). Effect ranges from 5.8% (95% CI, 1.5%-10.1%) for Papanicolaou smear to 18.3% (95% CI, 11.6%-25.1%) for influenza vaccination. The effect is not cumulative, and the length of intervention period did not show correlation with effect size (R = −0.015, P = .47). Academic affiliation, ratio of residents, and technique of delivery did not have a significant impact on the clinical effect of prompting.	Improvement in preventive care can be accomplished through prompting physicians. Health care organizations could effectively use prompts, alerts, or reminders to provide information to clinicians when patient care decisions are made.
Bauer 2002[7]	3	Effectiveness of guidelines on improving practice or patient outcomes	Primary and Secondary Care	Providers and patients in mental health care	Introduction of guidelines together with any associated intervention	Guideline adherence (with patient outcomes where available)	1950-2000	Guideline	AF, EM, DEM, REM	41 studies identified (26 cross-sectional, 6 before and after studies and 9 controlled trials). Guideline adherence rates adequate in 27% of cross-sectional and before and after studies and 67% of controlled trials. 6 controlled trials and 7 cross-sectional/before and after trials included patient outcome data, with 4 (67%) and 3 (43%) showing improved outcomes in the intervention group respectively. Successful interventions tended to multifaceted and intensive, with the use of additional resources (note guideline studies where adherence not reported with patient outcomes excluded)	Certain interventions can improve guideline adherence, but usually require specific intervention. The impact on patient outcomes remains to be seen.

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Beilby 1997[8]	5	Effectiveness of providing costing information to reduce costs by changing GP behaviour	Primary Care	GPs	Distribution of costing information to GPs	Objective Health provider performance	1980-1996	Multple	EOV, REM, AF	6 included studies. 2 studies (n=467) showed significant benefit on drug prescribing, with one of these showing outreach more effective than printed materials. 3 studies (n=206) showed significant reductions in test ordering and associated costs (interventions were information provision, education and computerised feedback). 1 study (n=2827) showed non-significant reduction in specialist visits.	Provision of costing information can change GP behaviour, particularly for prescribing and test ordering. Interventions labour intensive, and costs of intervention and sustainability requires more study.
Blackwood 2014[9]	11	Effectiveness of protocolised ventilator weaning compared to standard care	Hospital adult ICU	Ventilated adult ICU patients	Protocolised ventilator weaning	Patient outcomes (Mortality, adverse events, QoL, weaning time, LOS)	1950-2014	Single	DEM	17 trials (2434 patients) included. Geometric mean duration of mechanical ventilation in the protocolized weaning group was on average reduced by 26% compared with the usual care group (N = 14 trials, 95% CI 13%to 37%, P = 0.0002). Reductions were most likely to occur in medical, surgical and mixed ICUs, but not in neurosurgical ICUs. Weaning duration was reduced by 70% (N = 8 trials, 95% CI 27% to 88%, P = 0.009); and ICU length of stay by 11 %(N = 9 trials, 95%CI 3%to 19%, P = 0.01). There was significant heterogeneity among studies for total duration of mechanical ventilation (I2 = 67%, P < 0.0001) and weaning duration (I2 = 97%, P < 0.00001).	Protocols appear to reduce duration of mechanical ventilation, weaning duration and ICU length of stay. Reductions are most likely to occur in medical, surgical and mixed ICUs, but not in neurosurgical ICUs. However, significant heterogeneity among studies indicates caution in generalizing results.

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Boren 2009[10]	4	Effectiveness of computerized prompting and feedback on diabetes care	Primary Care	Providers and patients in primary or secondary care	Computerized prompting or feedback of diabetes care.	Processes and patient outcomes in diabetes	1970-2008	Single	REM	Fifteen trials were included in this review. 5 studies studied the effect of a general prompt for a particular patient to be seen for diabetes-related follow-up, 13 studies looked at specific prompts reminding clinicians of particular tests or procedures, 5 studies looked at feedback to clinicians in addition to prompting, with the remaining 5 studies looking at patient reminders in addition to clinician prompts. Twelve of the 15 studies (80%) measured a significant process or outcome from the intervention. Fifty processes and 57 outcomes were measured in the 15 studies (Table 2). Fourteen studies evaluated the effect the interventions had on the processes of care. Thirty-five of 50 process measures (70%) were significantly improved. Nine of the 57 outcome measures (16%) were significantly improved.	The majority of trials identified at least one process or outcome that was significantly better in the intervention group than in the control group; however, the success of the information interventions varied greatly. Providing and receiving appropriate care is the first step toward better outcomes in chronic disease management.
Brennan 2013[11]	7	Educational interventions to change the behaviour of new prescribers in hospital settings	Secondary care	New prescribers	Any educational strategy	Prescribing related outcome measures	1994-2010	Multiple	DEM, EM, EOV, REM, MAR, PMI, LOL	Sixty-four studies were included in the review. Only 13% of interventions specifically targeted new prescribers. Most interventions (72%) were deemed effective in changing behaviour. Of the 15 most successful strategies, four provided specific feedback to prescribers through audit and feedback and six required active engagement with the process through reminders. However, five and six of the 10 studies classified as ineffective also involved audit and feedback, and reminders, respectively. This means no firm conclusions can be drawn about the most effective types of educational intervention.	Very few studies have tailored educational interventions to meet needs of new prescribers, or distinguished between new and experienced prescribers. Educational development and research will be required to improve this important aspect of early clinical practice.

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Bright 2012[12]	8	Effectiveness of clinical decision support systems (CDSS) to improve patient or health care process outcomes	Primary and Secondary Care	Any health care provider	Use of CDSS in clinical setting to aid decision making at the point of care	Objective measures of clinical, process, economic and implement-action outcomes	1976-2011	Single	REM	148 RCTs included, with 128 assessing process measures, 20 assessing clinical outcomes and 22 measuring cost. CDSSs improved process measures relating to preventative medicine (n=25, OR 1.42, 95%CI 1.27-1.58), ordering clinical studies (n=20, OR 1.72, 95%CI 1.47-2.00) and prescribing therapies (n=46, OR 1.57, 95%CI 1.35-1.82). CDSSs also improved morbidity (n=16, OR 0.88, 95%CI 0.80-0.96), though studies were heterogeneous. Other clinical outcomes showed no difference. Effects on the effects of CDSSs on implementation were variable and insufficient.	CDSS are effective in improving health care process measures but evidence for effects in clinical, economic, workload and efficiency outcomes remains sparse.
Brody 2013[13]	4	Effectiveness of inter-professional dissemination and education interventions for recognizing and managing dementia	Primary Care or secondary care	Providers and patients in primary or secondary care	Any interprofessio nal education intervention	Process or outcome of care	1990-2012	Single	EM	18 papers from 16 studies were included. Most studies found some improvement in clinician knowledge or confidence, or patient outcomes, though methods and patient and clinician populations were disparate.	While a significant evidence base for assessing and managing individuals with dementia has been developed, few studies have examined how to disseminate this research, and even fewer in an interprofessional manner

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Bryan 2008[14]	8	Effectiveness of clinical decision support systems (CDSS) to improve outcomes in primary care	Primary Care	Providers and patients in primary or ambulatory care	Use of CDSS	Objective measures of process of care or health outcomes	200-2006	Single	REM	17 studies included (12 RCTs, 5 observational). Virtually all looked at process outcome measures, with 9 finding improvements from using CDSSs, 4 with variable results and 4 showing no effect from CDSS use.	CDSS have the potential to improve outcomes, but findings are variable, as are methods and types of implementation. More work needs to be done to determine effective implementation strategies for CDSSs.
Buntinx 1993[15]	3	Effectiveness of feedback and reminders on diagnostic and preventive care	Primary Care	Physicians in ambulatory care	Feedback and reminders	Number and costs of diagnostic tests ordered, guideline compliance	1983-1992	Multiple	AF, REM	26 trials included. 8 looked at impact on reducing costs (2 of 2 RCTs and 5 of 6 other trials showed significant reductions). 14 trials evaluated guideline adherence (4 of 4 RCTs and 1 of 3 other trials showed significant improvements.	Feedback and reminders may reduce costs of diagnostic tests and improve guideline adherence
Chaillet 2006[16]	7	Effectiveness of strategies for implementing clinical practice guidelines in obstetric care	Secondary Care	Obstetric patients	Guideline implement-ation strategies	Objective measures of guideline compliance, process and patient outcomes	1990-2005	Guideline	DEM, AF, LOL, EOV, REM	33 included studies. Educational strategies (4 studies) were generally ineffective, whilst Audit and feedback (11 studies) showed significantly positive results in 9 studies. Quality improvement interventions (11 studies), Local opinion leaders (2 studies) and Academic detailing (1 study) had mixed effects. Reminders (2 studies) were generally effective and Multifaceted interventions (9 studies) demonstrated consistent benefit and high efficacy for changing behaviours. Studies where barriers to change were prospectively identified were more successful (93.8% vs 47.1%, p=0.04)	Prospective identification of efficient strategies and barriers to change is necessary for improved guideline implementation. Multifaceted strategies based on audit and feedback, perhaps facilitated by local opinion leaders seems most effective in the obstetric setting.

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Chhina 2013[17]	7	Effectiveness of Academic Detailing (AD), as a stand-alone intervention, at modifying drug prescription behaviour of	Primary care	Family physicians	Academic detailing	Prescribing practice	1983-2010	Single	EOV	11 RCTs and 4 observational studies were included. Five RCTS described results showing effectiveness, while 2 RCTs reported a positive effect on some of the target drugs. Two observational studies found AD to be effective, while 2 did not. The median difference in relative change among the studies reviewed was 21% (interquartile range 43.75%) for RCTs, and 9% (interquartile range 8.5%) for observational studies. The median effect size among the studies reviewed was - 0.09 (interquartile range 2.73)	AD can be effective at optimizing prescription of medications by Family Physicians. Although variable, the magnitude of the effect is moderate in the majority of studies. AD may also be effective as a strategy to promote evidence based prescription of medications or incorporation of clinical guidelines into clinical practice.
Clarke 2010[18]	8	Effectiveness of guidelines for referral for elective surgical assessment	Primary care	GPs	Guideline	Appropriateness of referrals	1950-2008	Single	DEM	24 eligible studies (5 randomised control trials, 6 cohort, 13 case series) included. Interventions varied from complex (“one-stop shops”) to simple guidelines. Four randomized control trials reported increases in appropriateness of pre-referral care (diagnostic investigations and treatment). No evidence was found for effects on practitioner knowledge. Mixed evidence was reported on rates of referral and costs (rates and costs increased, decreased or stayed the same). Two studies reported on health outcomes finding no change.	Guidelines for elective surgical referral can improve appropriateness of care by improving prereferral investigation and treatment, but there is no strong evidence in favour of other beneficial effects.

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Damiani 2010[19]	9	Impact of computerised clinical guidelines (CCG) on the process of care	Primary and Secondary Care	All healthcare providers	CCG vs non-CCG	Objective measures of the process of care	1992-2006	Multiple	DEM, REM	45 studies included. 64% showed a positive effect of CCGs vs non-CCGs. Multivariate analysis showed the 'automatic provision of recommendation in electronic version as part of clinician workflow' was associated with increased chance of positive impact (OR 17.5, 95%CI 1.6-193.7).	Implementation of CCG significantly improves the process of care.
Davey 2013[20]	11	Effectiveness of professional interventions to improve antibiotic prescribing in hospitals	Secondary Care	Secondary care physicians and their patients	Any professional intervention	Objective measures of process and clinical outcomes	1980-2006	Multiple	DEM, REM, EOV, EM, AF	89 studies included. 76 had reliable outcome data (44 persuasive, 24 restrictive and 8 structural). For the persuasive interventions, the median change in antibiotic prescribing was 42.3% for the ITSs, 31.6% for the controlled ITSs, 17.7% for the CBAs, 3.5% for the cluster-RCTs and 24.7% for the RCTs. The restrictive interventions had a median effect size of 34.7% for the ITSs, 17.1% for the CBAs and 40.5% for the RCTs. The structural interventions had a median effect of 13.3% for the RCTs and 23.6% for the cluster-RCTs. When comparing restrictive vs persuasive, restrictive interventions had significantly greater impact at one and 6 months, but not longer term.	The results show that interventions to improve antibiotic prescribing to hospital inpatients are successful, and can reduce antimicrobial resistance or hospital acquired infections.

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Davis 1995[21]	8	Effectiveness of CME	Primary and Secondary Care	Physicians (various grades)	Educational interventions aimed at modifying physicians practice	Objective measure of physician performance and healthcare outcomes	1975-1994	Multiple	DEM, AF, EM, EOV, LOL, PMI, REM	99 studies (160 intervention comparisons) met inclusion criteria. Overall 62% of interventions showed an improvement in either physician performance (70% of those studies which analysed it) or health care outcomes (48%). Effect sizes were small to moderate. For single interventions, 60% demonstrated a change in at least 1 major outcome measure with those likely to be effective including educational outreach, opinion leaders, patient education or reminders. For two-method interventions, 64% of studies were positive, and this increased to 79% for multifaceted interventions. Studies where a gap analysis had been done to inform the intervention were more likely to be positive.	Physician performance may be altered (albeit in a small manner) by certain CME interventions. Outreach or focussed CME better than traditional wider methods such as conferences, though it is these less effective methods that are most used.
Delpierre 2004[22]	4	Effectiveness of computer-based patient record systems (CBPRS) on medical practice, quality of care, and user and patient satisfaction.	Primary and secondary care	Providers and patients in primary or secondary care	Computer-based patient record systems (CBPRS)	Process or outcome of care, and patient/user satisfaction	2000-2003	Single	REM	26 articles selected. Use of a CBPRS was perceived favourably by physicians, with studies of satisfaction being mainly positive. A positive impact of CBPRS on preventive care was observed in all three studies where this criterion was examined. The 12 studies evaluating the impact on medical practice and guidelines compliance showed that positive experiences were as frequent as experiences showing no benefit. None of the six studies analysing the impact of CBPRS on patient outcomes reported any benefit.	CBPRS increased user and patient satisfaction, which might lead to significant improvements in medical care practices. The impact of CBPRS on patient outcomes and quality of care were inconclusive.

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Dexheimer 2008[23]	8	Effectiveness of reminders on preventive care	Primary and Secondary Care	Physicians	Computer or paper based reminders	Use of preventive care interventions	1966-2004	Single	REM	61 studies included, with 264 preventative care interventions. Implementation strategies included paper based reminders (31%), computerised reminders (13% or a combination of both (56%). Average increase for all 3 strategies in delivering preventive care measures ranged between 12 and 14%. Computer generated prompts were the most commonly implemented reminders	Clinician reminders are a successful approach for increasing the rates of delivering preventive care, though their effectiveness remains modest.
Dexheimer 2014[24]	3	Effectiveness of implementation of asthma protocols to improve care	Primary and secondary care	Providers and patients in primary or secondary care	Implementation of asthma protocol using reminder-based strategies	Patient care and/or practitioner performance	1950-2010	Guideline	DEM, REM,	101 articles included in the analysis. Paper-based reminders were the most frequent with fully computerized, then computer generated, and other modalities. No study reported a decrease in health care practitioner performance or declining patient outcomes. The most common primary outcome measure was compliance with provided or prescribing guidelines, key clinical indicators such as patient outcomes or quality of life, and length of stay.	Paper-based reminders are the most popular approach to guideline implementation. Asthma guidelines generally improved patient care and practitioner performance regardless of the implementation method.

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EHC 1994[25]	5	Effectiveness of strategies for implementing clinical practice guidelines	Primary and Secondary Care	Medical staff	Guideline implementation strategies	Objective measures of process or patient outcomes	1976-1994	Guideline	DEM, AF, REM, EM, EOV	91 studies included. 81 of 87 showed that guidelines significantly improved the process of care (adherence with recommendations in guidelines). Educational interventions (seminars, outreach and opinion leaders) are more likely to lead to a change in behaviour. Educational and implementation strategies closer to the end user and integrated into healthcare delivery are more likely to be effective. Attributes of guidelines play important role (see table in paper), with those that offer validity, flexibility, clarity and reliability are more likely to be effective. 12 of 17 showed significant improvements in patient outcomes.	Well-developed guidelines can change practice and improve patient outcomes. Guidelines accounting for local circumstances and disseminated with active education are more likely to be effective. Research is needed into potential barriers to guideline adoption and ways to overcome these.
Figueras 2001[26]	6	Effectiveness of educational programmes designed to improve prescription practices in ambulatory care	Primary care	Primary care practitioners	Educational programme	Prescribing practice	1988-1996	Single	EM	51 studies included, with 43 studying the efficacy/effectiveness of one or various interventions as compared to no intervention. Among seven studies evaluating active strategies, four reported positive results (57%), as opposed to three of the eight studies assessing passive strategies (38%). Among the 28 studies that tested reinforced active strategies, 16 reported positive results for all variables (57%). Eight studies were classified as a high degree of evidence (16%)	The more personalized, the more effective the strategies are. Combining active and passive strategies results in a decrease of the failure rate. Finally, better studies are still needed to enhance the efficacy and efficiency of prescribing practices.

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Fleming 2013[27]	7	Interventions to reduce inappropriate antibiotic prescribing	Long term care facilities	Any qualified health professional	Interventions aimed at improving prescribing practice	Antibiotic use or adherence to guidelines	1946-2012	Multiple	LCP, DEM, EM, AF	4 studies included. 3 used educational materials for doctors and nurses (with 1 providing feedback to professional also) and 1 used educational material and feedback to doctors only. Multifaceted interventions involving small group education is most acceptable to nurses. The involvement of LCP was also beneficial.	LCP and education strategies and guideline may improve prescribing but quality of evidence is low
Flodgren 2010[28]	10	Effectiveness of strategies to change the behaviour of professionals and organisation of care to promote weight loss in the obese	Primary Care	Healthcare professionals and obese or overweight adults	Interventions to implement an intervention to target weight reduction	Objective measures of professional practice or patient outcomes	1966-2009	Multiple	EM, EOV, AF, DEM, REM, MM	6 RCTs included with 4 targeting professionals and 2 targeting organisation of care. 3 trials evaluated educational interventions aimed at GPs, showing an improvement of 1.2 kg (95%CI -0.4-2.8) but results were heterogeneic. One trial found reminders could change practice in men (by 11.2kg, 95%CI 1.7-20.7) but not women (1.3kg, 95%CI -4.7-6.7). In another trial use of dieticians (5.6kg, 95%CI 4.8-6.4) or doctor-dietician team (6kg, 95%CI 5-7) improved weight loss.	Most included trials had weaknesses so difficult to draw firm conclusions about effectiveness.

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Flodgren 2011[29]	10	Effectiveness of the use of local opinion leaders in improving professional practice and patient outcomes	Primary and Secondary Care	Healthcare professionals in charge of patient care	Local opinion leader to improve professional practice and patient outcomes	Objective measures of professional performance or patient outcomes	1966-2009	Single	LOL, EM, EOV, AF, REM, DEM, MM	18 studies included. Effect of interventions varied across the 63 different reported outcomes. However, for main comparisons, there was a 0.09 median improvement in compliance (risk difference) compared to no intervention, 0.14 compared to a single intervention, 0.1 compared to a single intervention and 0.1 when used as part of multiple interventions compared to no intervention. Overall across 15 studies, median adjusted risk difference was a 0.12 (=12%) absolute increase in compliance with the opinion leaders intervention group.	Opinion leaders alone or in combination with other interventions may successfully promote evidence based practice, though effectiveness is variable. The role of opinion leaders is not well defined in studies, so it is difficult to ascertain the optimal approach.
Flodgren 2013[30]	11	Effectiveness of interventions to improve professional adherence to infection control guidelines on device-related infection rates and measures of adherence.	Secondary care	Secondary care providers and their patients	Guideline implementation strategies	Device related infection rates and measures of adherence	1950-2012	Guideline	DEM, AF, EM, REM, EOV, MAR	13 studies included (1 cluster RCT, 12 ITS studies). All included studies were at moderate or high risk of bias. The 6 interventions that did result in significantly decreased infection rates involved more than one active intervention, which in some cases, was repeatedly administered over time. The one intervention involving specialised personnel showed the largest step change (-22.9 cases/1000 ventilator days), and the largest slope change (-6.45 cases/1000 ventilator days). Six of the included studies reported post-intervention adherence scores ranging from 14% to 98%. The effect on rates of infection was mixed and the effect sizes were small, with changes was not sustained over longer follow-up times.	The low quality of the evidence provides insufficient evidence to determine which interventions are most effective. However, interventions that may be worth further study are educational interventions involving multiple active elements, repeatedly administered over time, and interventions employing specialised personnel.

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Forsetlund 2009 [31]	11	Effectiveness of continuing education meetings on professional practice and health care outcomes	Primary and Secondary Care	Qualified Health Professionals	Educational meetings (conferences, lectures, workshops, courses)	Objective measures of professional performance or patient outcomes	1966-2008	Single	EOV, EM, DEM, AF, REM	81 trials included in review. 30 trials (36 comparisons) included in meta-regression. Median adjusted risk difference (RD) showed 6% improvement in compliance (IQR 1.8-15.9) for educational meetings as part of larger intervention vs control. Used alone (21 comparisons, 19 trials) median RD 6% (IQR 2.9-15.3). For continuous outcomes median percentage change was 10% (IQR 8-32, 5 trials) vs control. For treatment goals median RD was 3% (IQR 0.1-4, 5 trials). Meta-regression showed higher meeting attendance associated with larger RD ($p<0.01$). Mixed interactive and didactic meetings were more effective than either used alone. Educational meetings less effective for complex behaviours.	Educational meetings alone or as part of larger interventions can improve professional practice and healthcare outcomes. The effect is likely to be small. Effectiveness may be improved by increasing attendance, mixing interactive and didactic formats and focusing on serious outcomes.
Forsetlund 2011[32]	8	Effectiveness of interventions aimed at reducing potentially inappropriate use or prescribing of drugs in nursing homes.	Primary care	Primary care practitioners	Professional interventions to improve prescribing	Appropriateness of prescribing	1950-2010	Multiple	EOV, EM	Twenty randomised controlled trials were included from 1631 evaluated references. Ten studies tested different kinds of educational interventions while seven studies tested medication reviews by pharmacists. Only one study was found for each of the interventions geriatric care teams, early psychiatric intervening or activities for the residents combined with education of health care personnel.	Interventions using educational outreach, on-site education given alone or as part of an intervention package and pharmacist medication review may reduce inappropriate drug use, but the evidence is of low quality. Due to poor quality of the evidence, no conclusions may be drawn about the effect of the other three interventions.

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Frampton 2014[33]	11	Effectiveness and cost-effectiveness of educational interventions for preventing catheter-BSI in critical care units in England	ICU	ICU staff and patents	Educational interventions	CLABSI rates, LOS, mortality, staff practice	1950-2011	Multiple	EM, EOV, AF, DEM	74 studies were included, of which 24 were prioritised for systematic review. Most studies were single-cohort before-and-after study designs. Diverse types of educational intervention appear effective at reducing the incidence density of catheter-BSI (risk ratios statistically significantly < 1.0), but single lectures were not effective. The economic model showed that implementing an educational intervention in critical care units in England would be cost-effective and potentially cost-saving, with incremental cost-effectiveness ratios under worst-case sensitivity analyses of < £5000/quality-adjusted life-year.	It would be cost-effective and may be cost-saving for the NHS to implement educational interventions in critical care units. However, more robust primary studies are needed to exclude the possible influence of secular trends on observed reductions in catheter-BSI.
French 2010[34]	10	Effectiveness of interventions for improving appropriate use of imaging in musculo-skeletal conditions	Primary and Secondary Care	Health professionals, policy makes, patients and the public	Intervention to improve appropriate use of imaging for musculo-skeletal conditions	Objective measures of professional performance or patient health outcomes	1966-2007	Multiple	REM, DEM, AF, EOV, PMI, EM	28 studies included, with most aimed at health professionals and focussing on osteoporosis or low back pain. For any intervention in osteoporosis there was a modest improvement in practice (ordering of tests) with a 10% reduction (IQR 0-27.7), Patient mediated, reminders and organisational interventions appeared to have the most potential. Results for low back pain were variable.	Most interventions for osteoporosis demonstrated benefit, especially patient mediated, reminders and organisational interventions.

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Garg 2005[35]	7	Effectiveness of Computerized Clinical Decision Support Systems on Practitioner Performance and Patient Outcomes	Primary and secondary care	Providers and patients in primary or secondary care	Computerized Clinical Decision Support Systems	Practitioner Performance and Patient Outcomes	1950-2004	Single	REM	100 studies were included. CDSS improved practitioner performance in 62 (64%) of the 97 studies assessing this outcome, including 4 (40%) of 10 diagnostic systems, 16 (76%) of 21 reminder systems, 23 (62%) of 37 disease management systems, and 19 (66%) of 29 drug-dosing or prescribing systems. Fifty-two trials assessed 1 or more patient outcomes, of which 7 trials (13%) reported improvements. Improved practitioner performance was associated with CDSSs that automatically prompted users compared with requiring users to activate the system (success in 73% of trials vs 47%; P=.02) and studies in which the authors also developed the CDSS software compared with studies in which the authors were not the developers (74% success vs 28%, P=.001).	Many CDSSs improve practitioner performance. To date, the effects on patient outcomes remain understudied and, when studied, inconsistent
Giguere 2012[36]	10	Effectiveness of printed educational materials on professional practice and health care outcomes	Primary and Secondary Care	Any healthcare professionals provided with printed educational materials	Printed educational materials for clinical care, including guidelines	Objective measures of professional performance or patient health outcomes	1950-2007	Single	DEM	45 studies included (14 RCTs, 31 ITS). Based on 7 RCTs (54 outcomes), median risk difference in categorical practice outcomes was 0.02 (range 0-0.11) in favour of printed educational materials. Based on 3 RCTs (8 outcomes), the median improvement in mean difference for practice outcomes was 0.13 (range -0.16 to 0.36) in favour of printed educational materials. Only 2 RCTs and 2 ITS studies reported patient outcomes. Reanalysis of 54 outcomes from 25 ITS studies showed significant improvement in 27 patient outcome,	Compared to no intervention, printed educational materials may have a beneficial effect on professional practice outcomes. There is insufficient information on patient outcomes. The best approach for printed materials is unclear, as is their effectiveness compared to other interventions.

Study	Quality Score (0-11)	Focus	Inclusion Criteria					Single/ Multiple/ Guideline	EPOC Interv-entions	Main Results	Authors Main Conclusions
			Setting	Participants	Intervention	Outcomes	Period				
Gilbody 2003[37]	5	Effectiveness of organisational and educational interventions to improve the management of depression in primary care	Primary Care	Primary care physicians and their patients	Professional or organisational interventions to improve management of depression	Outcomes relating to the management of depression	1950-2003	Multiple	DEM, REM, LOL, EOV	36 included studies (29 RCT and non-RCTs, 5 CBA and 2 ITS). 21 studies had a positive outcome, with effective strategies including complex interventions incorporating clinician education, an enhanced nursing role and greater integration between primary and secondary care. Simple guideline implementation and educational strategies were generally ineffective.	There is potential to improve the management of depression in primary care. Commonly used guideline and educational strategies are generally ineffective.
Goodwin 2011[38]	7	Implementation of falls prevention strategies	Primary Care	Community dwelling older people	Implementation strategy for fall prevention	Measures of successful implementation including behaviour change, attitudes, uptake	1980-2010	Single	EM	15 included studies (1 controlled trial, 3 cross-sectional, 4 cohort studies, 5 surveys, 1 process evaluation and 1 case series). Implementation methods included training (6 studies - generally positive results with improvements in outcomes), practice management changes (3 studies - mixed but generally positive results), peer/volunteer delivered programs (3 studies - positive results) and community awareness programs (3 studies - positive results).	There is evidence to support active training and support of healthcare professionals to implement falls prevention into clinical practice. Evidence is mixed, as is the use of community awareness programs and peer delivered prevention programs

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Grimshaw 2004[39]	10	Effectiveness of guideline development, dissemination and implementation strategies to improve professional practice	Primary and Secondary Care	Medically qualified healthcare professionals	Guideline implementation strategies	Objective measures of provider behaviour and/or patient outcome	1966-1998	Guideline	DEM, EM, LCP, EOV, LOL, PMI, AF, REM, MAR, MM	235 studies (309 comparisons) included (110 cRCTs, 29 RCTs, 17 CCTs, 40 CBAs and 39 ITS). Majority of studies (86.6%) observed improvements in care, although this was variable both across and within studies. 73% evaluated multifaceted interventions (including 13 cRCTs, median improvement in performance 6%). Commonly evaluated single interventions were reminders (38 comparisons, median improvement 14.1% in 14 cRCTs), dissemination of educational materials (18 comparisons, median improvement 8.1% in 4 cRCTs), audit and feedback (12 comparisons, median improvement 7% in 5 cRCTs). No relationship between number of components and effects of multifaceted interventions.	Imperfect evidence base to support decision about which guideline dissemination and implementation strategies are likely to be effective under different circumstances.
Gross 2001[40]	1	Effectiveness of implementation strategies for practice guidelines for appropriate use of antimicrobial agents	Primary and Secondary Care	Medical practitioners and their patients	Implementation of clinical guideline	Measures of appropriate use of antibiotics	1966-2000	Guideline	EM, EOV, AF, REM, DEM, LOL, MAR	40 included studies. Multifaceted implementation methods (23 studies) were most successful, though this made it difficult to determine the components critical to success. Individual methods more likely to be useful were academic detailing, feedback from other professionals (nurses, pharmacists, physicians), local adaptation of guidelines, small-group interactive sessions and computer assisted care.	Effective tools to implement change exist, and these should be used to improve practice in this area. Multifaceted strategies are most successful, but on an individual basis academic detailing, feedback and local adaptation are also useful.

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			Setting	Participants	Intervention	Outcomes	Period				
Hakkennes 2008[41]	8	Effects of introduction of clinical guidelines and effectiveness of guideline dissemination and implementation strategies	Primary and Secondary Care	Allied health professionals	Guidelines and associated implementation and dissemination strategies	Objective measures of change in provider behaviour or patient outcomes	1966-2006	Guideline	DEM, EM, REM, EOV, LOL, AF	14 studies (27 papers) included, of variable methodological quality. 10 focussed on educational interventions. 6 studies used single interventions, 7 used multifaceted approaches and 1 used both. Most studies reported small effects in favour of the intervention group for process and patient outcomes. Multifaceted interventions were no more effective than single strategies.	No current evidence to support a set guideline implementation strategy for allied health professionals. Important to identify specific barriers to change using theoretical frameworks and then develop appropriate strategies.
Heselmans 2009[42]	8	Effectiveness of electronic guideline based implementation systems in ambulatory care	Primary Care	Physicians	Use of computer based guideline implementation systems	Objective measures of health professional practice or patient outcomes	1990-2008	Guideline	DEM, REM	27 studies included. None of the studies demonstrated improvements in 50% or more of their clinical outcome variables. Only 7 of the 17 studies reporting process outcomes showed improvements in the intervention group.	There is little evidence at the moment for the effectiveness of electronic multidimensional guidelines.
Ivers 2012[43]	10	Effectiveness of audit and feedback on the practice of health professionals and patient outcomes	Primary and Secondary Care	Healthcare professionals responsible for patient care	Audit and provision of feedback to healthcare professionals compared to usual care	Objective measures of health professional practice or patient outcomes	1950-2011	Single	AF, EM, EOV, REM, DEM, LOL, LCP	140 studies included (108 comparisons, 70 studies). For professional practice outcomes (82 comparisons, 49 studies) weighted median adjusted RD was a 4.3% (IQR 0.5-16%) increase in compliance with desired practice. For continuous outcomes (26 comparisons, 21 studies), weighted median change was 1.3% (IQR 1.3-28.9%). For patient outcomes, weighted median RD was -0.4% (IQR -1.3-1.6, 12 comparisons, 6 studies) for dichotomous outcomes, with weighted median change of 17% (IQR 1.5-1.7) for continuous outcomes (8 comparisons, 5 studies). Meta-regression showed that feedback may be more effective where baseline performance is low.	Audit and feedback generally leads to small but potentially important improvements in professional practice. Effectiveness seems to depend on the baseline performance and how the feedback is provided.

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Kahn 2013[44]	11	Interventions for implementation of thromboprophylaxis in hospitalized patients	Secondary care	Any qualified health professional	Interventions to increase implementation of VTE prophylaxis	Use of /adherence to prophylaxis	1946-2010	Multiple	REM, EM, AF, DEM, EOV	55 studies included with 54 included in analysis (8 RCT and 46 NRS). Alerts (reminders or stickers) were associated with a RD of 13% increase in prophylaxis (RCTs) and for NRS increases of 8-19% were seen, with education and alerts associated with significant improvements, and multifaceted interventions associated with significant benefits (multifaceted interventions had the largest pooled effect).	Significant benefits from alerts and multifaceted interventions. Multifaceted interventions with an alert component may be the most effective.
Kastner 2008[45]	7	Effectiveness of tools that support clinical decision making in osteoporosis disease management	Primary and secondary care	Providers and patients in primary or secondary care	Computerized Clinical Decision Support Systems	Measures of patient outcomes and process of care	1966-2006	Single	REM, EM	13 RCTs met the inclusion criteria. Study quality was generally poor. Meta-analysis was not done because of methodological and clinical heterogeneity; 77% of studies included a reminder or education as a component of their intervention. Three studies of reminders plus education targeted to physicians and patients showed increased BMD testing (RR range 1.43 to 8.67) and osteoporosis medication use (RR range 1.60 to 8.67). A physician reminder plus a patient risk assessment strategy found reduced fractures [RR 0.58, 95% confidence interval (CI) 0.37 to 0.90] and increased osteoporosis therapy (RR 2.44, CI 1.43 to 4.17).	Multi-component tools that are targeted to physicians and patients may be effective for supporting clinical decision making in osteoporosis disease management.

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Loganathan 2011[46]	8	Effects of interventions to optimise prescribing in care homes	Primary care	Providers and patients in primary care	Interventions to optimise prescribing	Appropriate prescribing	1990-2010	Multiple	REM, EM, EOV	16 studies that met the inclusion criteria. Four intervention strategies were identified: staff education, multi-disciplinary team (MDT) meetings, pharmacist medication reviews and computerised clinical decision support systems (CDSSs). Six of the eight studies using complex educational programmes focussing on improving patients' behavioural management demonstrated an improvement in prescribing. Mixed results were found for pharmacist interventions. CDSSs were evaluated in two studies, with one showing a significant improvement in appropriate drug orders. Two of three studies examining MDT meetings found an overall improvement in appropriate prescribing. A meta-analysis could not be performed due to heterogeneity in the outcome measures.	Results are mixed and there is no one interventional strategy that has proved to be effective. Education including academic detailing seems to show most promise. A multi-faceted approach and clearer policy guidelines are likely to be required to improve prescribing for these vulnerable patients.
Mandelblatt 1995[47]	4	Effectiveness of interventions to improve physician screening for breast cancer	Primary and Secondary Care	Physicians	Interventions to improve physician behaviours regarding breast cancer screening	Measures of breast cancer screening	1980-1993	Multiple	EM, REM, AF	20 studies included. Interventions included physician reminders, audit and feedback, office systems and physician education. Most trials used 2 or more interventions, 65% used physician reminders. 11 of 16 trials using reminders showed significant benefits (effects size ranging in improvements of 6-28%). Audit and feedback was effective in all 4 studies using it (effect size ranging from 19-23% improvement). Physician education and office based systems had variable effects but were largely ineffective.	Physician-based interventions can be effective in increasing screening use. Interventions should emphasize community practices and practices for caring for underserved and older populations.

Study	Quality Score (0-11)	Focus	Inclusion Criteria					Single/ Multiple/ Guideline	EPOC Interv-entions	Main Results	Authors Main Conclusions
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McGowan 2009[48]	10	Effectiveness of interventions providing electronic health information to healthcare providers to improve practice and patient care	Primary and Secondary Care	Health professionals	Provision of electronically retrievable information	Objective measures of professional behaviour or patient outcome	1966-2008	Multiple	MAR, DEM	2 included studies, with neither finding any changes in professional behaviour following an intervention that facilitated electronic retrieval of health information. Neither assessed patient outcomes or costs	Overall there was insufficient evidence to support or refute the use of electronic retrieval of healthcare information by healthcare providers to improve practice and patient care.
Medves 2010[49]	5	Effectiveness of practice guideline dissemination and implementation strategies for healthcare teams	Primary and Secondary Care	Primary and secondary healthcare providers and their patients	Guideline implementation strategy	Objective measures of process, patient or economic outcomes	1994-2007	Guideline	DEM, EM, LCP, EOV, LOL, PMI, AF, REM, MAR, MM	88 included studies. 10 different dissemination and implementation strategies identified. Proportions of studies with significant positive findings were 72.3% for distribution of educational materials (59 studies), 74.2% for educational meetings (62 studies), 64.7% for local consensus processes (34 studies), 66.6% for educational outreach (12 studies), 81.3% for local opinion leaders (16 studies), 64.3% for patient mediated (14 studies), 82.2% for audit and feedback (45 studies), 85.2% for reminders (27 studies) and 77.7% for marketing (18 studies). Overall 72.7% of studies had significantly positive findings. More complex healthcare seemed to require more complex, multifaceted interventions	Team based care using practice guidelines locally adapted can positively affect patient and provider outcomes.

Study	Quality Score (0-11)	Focus	Inclusion Criteria					Single/ Multiple/ Guideline	EPOC Interv-entions	Main Results	Authors Main Conclusions
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O'Brien 2007[50]	10	Effectiveness of educational outreach visits (EOVs) on health professional practice or patient outcomes	Primary and Secondary Care	Health professionals	Educational outreach visits	Objective measures of professional performance	1950-2007	Single	REM, EOV, EM, AF, PMI, LCP, MAR	69 studies included. 28 studies (34 comparisons) combined, showing median adjusted RD in compliance with desired practice was 5.6% (IQR 3-9%). Adjusted RDs were consistent for prescribing (median RD 4.8%, IQR 3-6.5%, 17 comparisons), but varied for other professional performance (median RD 6%, IQR 3.6-16%, 17 comparisons). Meta-regression limited by the multiple potential explanatory factors (8) and showed no evidence for the observed variation in RDs (31 comparisons). 18 comparisons had a continuous outcome, with a median adjusted improvement of 21% (IQR 11-41%). Interventions including EOVs were slightly superior to audit and feedback (8 trials, 12 comparisons).	EOVs alone or when combined with other interventions have effects on prescribing that are relatively consistent and small, but potentially important. Their effects on other professional performance types are variable, though it is not possible from this review to explain that variation.
Oxman 1995[51]	8	Effectiveness of interventions to improve delivery of health professional performance and health outcomes	Primary and Secondary Care	Health professionals	Interventions to improve professional practice or health outcomes	Objective assessment of provider performance or health outcome	1970-1993	Multiple	DEM, EM, LCP, EOV, LOL, PMI, AF, REM, MAR, MM	102 included studies. Passive dissemination strategies resulted in no change in behaviour or outcome. Multifaceted, complex interventions had variable results ranging from ineffective to highly effective, and generally moderate overall	There are no "magic bullets" for improving the quality of health care, but there are a wide range of interventions available that, if used appropriately, could lead to important improvements in professional practice and patient outcomes.

Study	Quality Score (0-11)	Focus	Inclusion Criteria					Single/ Multiple/ Guideline	EPOC Interv-entions	Main Results	Authors Main Conclusions
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Perry 2011[52]	8	Effectiveness of educational interventions about dementia, directed at primary care providers (PCPs)	Primary care	Primary care providers	Educational interventions	Process of care and provider knowledge	1950-2009	Single	EM, REM	6 articles representing five studies (four cluster RCTs and one CBA) were included. Compliance to the interventions varied from 18 to 100%. Systematic review of the studies showed moderate positive results. Five articles reported at least some effects of the interventions. A small group workshop and a decision support system (DSS) increased dementia detection rates. An interactive 2-h seminar raised GPs' suspicion of dementia. Adherence to dementia guidelines only improved when an educational intervention was combined with the appointment of dementia care managers. This combined intervention also improved patients' and caregivers' quality of life. Effects on knowledge and attitudes were minor	Active educational interventions for PCPs improve detection of dementia. Educational interventions alone do not seem to increase guideline adherence. To effectively change professionals' performance, education probably needs to be combined with other organizational incentives.
Randell 2007[53]	8	Effectiveness of computerized decision support systems (CDSSs) on nursing performance and patient outcomes	Secondary care	Nurses and their patients in secondary care	Computerized decision support systems	Patient care and/or practitioner performance	1950-2006	Single	REM	Eight studies, three comparing nurses using CDSS with nurses not using CDSS and five comparing nurses using CDSS with other health professionals not using CDSS, were included. Risk of contamination was a concern in four studies. The effect of CDSS on nursing performance and patient outcomes was inconsistent.	CDSS may not necessarily lead to a positive outcome; further studies are needed. CDSS are complex interventions and should be evaluated as such. Contamination is a significant issue so it is important that randomization is at the practitioner or the unit level.

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Robertson 2010[54]	8	Effectiveness of CDSSs targeting pharmacists on physician prescribing, clinical and patient outcomes	Primary and secondary care	Providers and patients in primary or secondary care	Computerized Clinical Decision Support Systems	Practitioner Prescribing Performance and Patient Outcomes	1990-2009	Single	REM	21 studies were included (11 addressing safety and 10 addressing QUM issues). CDSSs addressing safety issues were more effective than CDSSs focusing on QUM (10/11 vs 4/10 studies reporting significant improvements in favour of CDSSs on ≥50% of all outcomes reported; P = 0.01). More studies demonstrated CDSS benefits on prescribing outcomes than clinical outcomes (10/10 vs 0/3 studies; P = 0.002). There were too few studies to assess the impact of system- versus user-initiated CDSS, the influence of setting or multi-faceted interventions on CDSS effectiveness.	Use of CDSSs to improve safety led to greater improvements than those for quality use of medicines (QUM). It was not possible to draw any other conclusions about their effectiveness.
Safdar 2008[55]	7	Effectiveness of educational strategies of healthcare providers for reducing health care associated infection (HCAI)	Secondary Care	Healthcare professionals	Educational interventions targeted at healthcare personnel	Incidence of HCAI	1966-2006	Multiple	DEM, EM, MAR, AF	26 studies included, using a number of different educational programmes, including feedback on audits or current practices, practical demonstrations, courses, self-study modules, posters, lectures and web based training. 21 of the studies showed significant reductions in HCAI rates after intervention (risk reduction ranging from 0-0.79).	The implementation of educational interventions may reduce HCAI considerably. Cluster RCTs are needed to determine the independent effect of education on reducing HCAI and associated costs.

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Schedlbauer 2009[56]	8	Effectiveness of CDSSs on prescribing behaviour	Primary and secondary care	Providers and patients in primary or secondary care	Computerized Clinical Decision Support Systems	Practitioner Prescribing Performance and Patient Outcomes	1950-2007	Single	REM	20 studies were included which used 27 types of alerts and prompts. Of these 27, 23 achieved improved prescribing behaviour and/or reduced medication errors. In many of the studies, the changes noted were clinically relevant. Positive effects were noted for a wide range of alerts and prompts. Three of the alert types with lacking benefit showed weaknesses in their methodology or design. The impact appeared to vary based on the type of decision support. Some of these alerts (n=5) reported a positive impact on clinical and health service management outcomes.	Most empiric studies evaluating the effects of CDSSs on prescribing behaviour show positive, and often substantial, effects. Additional studies should be done to determine the design features that are most strongly associated with improved outcomes
Shea 1996[57]	7	Effectiveness of computer based reminder systems on preventive care	Primary Care	Ambulatory care physicians and their patients	Computer based reminder systems	Objective measures of improvements in preventive practice	1966-1995	Single	REM	16 studies in included. 4 of 6 preventative practices assessed were improved by computer reminders, as were all practices combined (OR 1.77, 95%CI 1.38-2.27). Manual reminders also improved 4 of the practices and all practices combined (OR 1.57, 95% CI 1.20-2.06). A combination of computerised and manual reminders increased all 6 practices assessed (OR 2.23, 95%CI 1.67-2.98). No significant difference between computerised and manual reminders.	Manual and computer reminders can both separately increase the use of preventive practices, and in combination have a greater effect than either alone.

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Shiffman 1999[58]	7	Effectiveness of computer based guideline implementation	Primary and Secondary Care	Primary and secondary care physicians and their patients	Computer based guideline implementation	Objective measure of effectiveness in a practice setting	1992-1998	Guideline	DEM, REM	25 studies included. Guideline adherence improved in 14 of 18 studies where it was measured Documentation improved in 4 of 4 studies.	To evaluate the effect of information management on the effectiveness of computer-based guideline implementation, more of the confounding variables need to be controlled. In this review, different types of guidelines, settings, and systems make conclusions difficult.
Shojania 2009[59]	10	Effectiveness of point-of-care computer reminders on physician behaviour	Primary and Secondary Care	Physicians or physician trainees	Point of care computer reminders	Objective measures of the process of care and clinical outcomes	1950-2008	Single	REM	28 studies (32 comparisons) included. Computer reminders improved process adherence by a median of 4.2% (IQR 0.8-18.8%) across all reported process outcomes. In 8 comparisons reporting clinical outcomes there was a median improvement of 2.5% (IQR 1.3-4.2%), with blood pressure being the most commonly reported endpoint.	POC computer reminders generally achieve small to modest improvements in provider behaviour. No specific features of the interventions were associated with effect magnitude. Further work is needed to determine the factors associated with larger improvements

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Siddiqui 2011[60]	9	Effectiveness of physician reminders in faecal occult blood (FOB) testing for colorectal cancer screening	Primary care	Physicians in primary care	Reminders for FOB testing	FOB testing	1975-2010	Single	REM	Five studies (25287 patients) were included. There were 12641 patients in the Reminder and 12646 in the No-reminder group. All 5 studies obtained a higher percentage uptake when physician reminders were given, though this was only significantly higher in 2 of the studies. There was significant heterogeneity among trials (I2=95%). The combined increase in FOB test uptake was not statistically significant (random effects model: risk difference 6.6%, 95% CI: 2 – 14.7%; P=0.112)	Reminding physicians about those patients due for FOB testing may not improve the effectiveness of a colorectal cancer screening programme.
Steinman 2006[61]	7	Effectiveness of interventions to improve the prescribing of recommended antibiotics for acute outpatient infections	Outpatients	Outpatient prescribers	Interventions aimed at improving prescribing	Appropriate antibiotic prescribing	1950-2004	Multiple	EM, DEM, AF, EOV	26 studies reporting 33 trials were included. Most interventions used education alone or in combination with audit and feedback. Among the 22 comparisons amenable to quantitative analysis, recommended antibiotic prescribing improved by a median of 10.6% (interquartile range IQR 3.4–18.2%). Education alone reported larger effects than combinations of education with audit and feedback (median effect size 13.9% IQR 8.6–21.6% vs. 3.4% IQR 1.8–9.7% , P=0.03). This result was confounded by trial sample size, as trials having a smaller number of participating clinicians reported larger effects and were more likely to use clinician education alone. Active forms of education, sustained interventions, and other features traditionally associated with success were not associated with effect size.	Multifaceted interventions using audit and feedback were less effective than interventions using education alone. Although confounding may partially account for this finding, our results suggest that enhancing the intensity of a focused intervention may be preferable to a less intense, multidimensional approach.

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Tan 2005[62]	11	Effectiveness of CDSSs on improving the mortality and morbidity of newborn infants and the performance of physicians treating them	Neonatal care	Physicians and infants in neonatal care	CDSS	Infant mortality and morbidity and physician performance	1966-2007	Single	REM	3 studies were included. Two looked at computer-aided prescribing. The first focussed on parenteral nutrition ordering. No significant effects on short-term outcomes were found and longer term outcomes were not studied. The second investigated the effects of a database program in aiding the calculation of neonatal drug dosages. Time taken for calculation was significantly reduced and there was a significant reduction in the number of calculation errors. The other study looked at the effects of computerised cot side physiological trend monitoring and display. There were no significant effects on mortality, volume of colloid infused, frequency of blood gases sampling or severe intraventricular haemorrhage.	There are very limited data from randomised trials on which to assess the effects of CDSSs in neonatal care. Further evaluation of CDSS using randomised controlled trials is warranted.
Thomas 1999[63]	10	Effectiveness of guidelines for professions allied to medicine	Primary and Secondary Care	Allied health professionals	Introduction of a clinical guideline to change AHP behaviour	Objective measures of the process or outcome of care provided by AHPs.	1975-1996	Single	DEM, EM, EOV, REM, LCP	18 included studies. 9 studies compared guidelines vs none, and of these 3 of 5 showed significant improvements in the process of care, 6 of 8 found improvements in outcomes of care. 3 studies compared 2 guideline implementation strategies with mixed results. 6 studies compared nurses operating in accordance with a guideline with standard (physician) care, with no difference between groups seen for process or patient outcomes.	There is some evidence that guideline-driven care is effective in changing the process and outcome of care provided by professions allied to medicine. However, caution is needed in generalising findings to other professions and settings

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Tinmouth 2005[64]	5	Effectiveness of behavioural interventions to reduce blood product utilisation.	Secondary Care	Hospital patients and clinicians	Intervention to change transfusion practice and the behaviour of clinicians	Number of units transfused or number of patients receiving transfusion	1966-2003	Multiple	REM, AF, EM	19 studies included, using both single (guidelines, audits, reminders) and multifaceted interventions. 18 studies demonstrated a relative reduction in the number of units given (9-77%) or proportion of patients receiving transfusion (17-79%). No particular intervention or combination of interventions seemed more effective than another.	Behavioural interventions, including simple interventions, appear to be effective in changing physician transfusion practices and reducing blood utilization. Clinical trials are still needed to determine the relative effectiveness of different interventions to change practices.
Wensing 1998[65]	7	Effectiveness of interventions to implement guidelines or innovations in general practice	Primary Care	Primary care physicians	Intervention to improve professional behaviour	Objective measures of provider behaviour	1980-1994	Guideline	DEM, AF, REM, EM, PMI	143 studies included, but only 61 'best evidence' (RCTs and CBAs) studies selected for analysis. For single interventions, 8 of 17 showed information transfer (IT) to be effective, 14 of 15 found in favour of information linked to performance (ILP), 3 of 5 showed learning through social influence (LTSI) to be effective and all 3 studies looking at management support MS showed significant improvements. For multifaceted interventions, 8 of 20 showed improvements for IT with ILP, 7 of 8 for IT with LTSI, 6 of 7 for IT with M, 3 of 3 for ILP with LTSI. 5 of 6 studies using 3 or more interventions showed significant improvements	Strategies using multifaceted interventions are more expensive but also more effective. All interventions had variable effectiveness. The combination of information transfer and LTSI or management support showed superior levels of improvement, as did reminders or feedback.

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Worrall 1997[66]	6	Effectiveness of clinical practice guidelines on patient outcomes in primary care	Primary Care	Primary care physicians	Guideline dissemination and/or implementation strategies	Objective measures of patient outcomes	1980-1995	Single	DEM, EM, AF, REM	13 studies included (7 looked at hypertension, 2 at asthma, 6 at smoking). Only 5 of 13 (38%) showed statistically significant benefits. 6 studies used computer or automated reminders while the others used small workshops or education sessions.	There is little evidence that guidelines improve patient outcomes in primary medical care, but most studies published to date have used older guidelines and methods, which may have been insensitive to small changes in outcomes. Research is needed to determine if newer approaches are better
Wutoh 2004[67]	5	Effectiveness of internet-based continuing medical education (CME) interventions on physician performance and health care outcomes	Primary or secondary care	Practicing health care professionals or health professionals in training	Internet based education	Physician performance and health care outcomes	1966-2004	Single	DEM	16 studies were included. Six studies generated positive changes in participant knowledge over traditional formats; three studies showed a positive change in practices. The remainder of the studies showed no difference in knowledge levels between Internet-based interventions and traditional formats for CME.	Internet-based CME programs are as effective at improving knowledge as traditional formats of CME. It is unclear whether these positive changes in knowledge are translated into changes in practice Additional studies need to be performed to assess how long these new learned behaviours are be sustained.

CBA Controlled Before and After Study; CRCT cluster Randomised Controlled Trial; ITS Interrupted Time Series; RCT Randomised Controlled Trial; RD Risk Difference

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