Evidence reviews to support the update of NICE guidance on Tuberculosis: clinical diagnosis and management of tuberculosis and measures for its prevention and control

Supplementary review of review-level evidence on interventions to promote vaccination in high-risk groups for other disease areas

FINAL REPORT

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Declaration of authors' competing interests

No authors have any competing interests.

Abbreviations used in the review

BA	before-after (study)
BCG	Bacillus Calmette-Guérin
DTP	diphtheria, tetanus and pertussis (vaccine)
HCW	healthcare worker
Hib	Haemophilus influenzae type B (vaccine)
IQR	inter-quartile range
ITS	interrupted time series
LHW	lay health worker
MMR	measles, mumps and rubella (vaccine)
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NR	not reported
nRCT	non-randomised controlled trial
OECD	Organisation for Economic Co-operation and Development
OPV	oral polio vaccine
OR	odds ratio
P4P	payment for performance
QA	quality assessment
RCT	randomised controlled trial

RR	relative risk
SES	socio-economic status
TB	tuberculosis

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1 Executive summary

This report presents the findings of a systematic review of systematic reviews commissioned by the NICE Centre for Public Health to support the development of updated guidance on tuberculosis. This review is designed to supplement the review of interventions to increase the uptake of BCG vaccination for TB (published separately), and should be read in conjunction with that review.

The review question is:

- What is known from systematic reviews about the effectiveness and cost-effectiveness of interventions to improve the uptake of vaccinations?

We used a brief systematic review methodology (along the lines of a Rapid Evidence Assessment), with limited database searching covering the dates 2003-2013. We included any systematic review which reported data on the effectiveness and/or cost-effectiveness of interventions to improve the uptake of any vaccination in a high-income (OECD) country. Quality assessment and data extraction were carried out using standardised forms from the NICE methods manual. Data were synthesized narratively.

Twenty-seven reviews were included in the review. Most reviews were graded medium (+) or high (++) quality. A wide range of intervention types were included. The findings of the reviews are summarised in the evidence statements below. Where sufficient pooled analyses are reported, the effect sizes are characterised in the evidence statements as small, medium or large using the following heuristic:

- small: OR 1-1.25
- medium: OR 1.25-2
- large: OR >2

Evidence statement 1: Reminders and recall to increase uptake of vaccinations

There is strong evidence from seven reviews (Free et al., 2013 (++); Jacobson Vann and Szilagyi, 2009 (++); Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++); Williams et al., 2011 (++)) that recall and reminder interventions, including letters, telephone calls and text messages, are effective in increasing the uptake of a range of vaccinations. Three meta-analytic reviews (Jacobson Vann and Szilagyi, 2009 (++); Lau et al., 2012 (++); Thomas et al., 2010b (++)) show that these interventions have a medium to large effect size. There is evidence that these interventions are effective both for adults and older people (Jacobson Vann and Szilagyi, 2009 (++); Lau et al., 2012 (++); Thomas et al., 2010b (++)) and for parents of young children (Jacobson Vann and Szilagyi, 2009 (++)). There is some suggestion from one review (Tuckerman et al., 2009 (++) that these interventions may be less effective in socio-economically disadvantaged populations.

Applicability

The majority of the evidence in these reviews appears to come from the USA, with only a small amount of evidence from the UK. There are no obvious limits to the applicability of this evidence, although the different context of healthcare service organisation may affect the delivery of interventions.

Evidence statement 2: Patient education to increase uptake of vaccinations

There is mixed evidence from five reviews (Lau et al., 2012 (++); Moxey et al., 2003 (–); Ndiaye et al., 2005 (++); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++)) on the effectiveness of patient education interventions (other than reminders) in promoting the uptake of vaccination. One review (Lau et al., 2012 (++)) finds community media campaigns to be effective, with medium to large effect size. The findings on health education for patients or parents of young children are mixed.

Applicability

The majority of the evidence in these reviews appears to come from the USA, with only a small amount of evidence from the UK. This may limit the applicability of the findings, due to cultural or other differences.

Evidence statement 3: Incentives or disincentives for patients to increase uptake of vaccinations

There is mixed evidence from five reviews on the effectiveness of incentives or disincentives for promoting the uptake of vaccinations (Lagarde et al., 2009 (+); Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++)). There is some evidence from two reviews that providing free vaccines is effective (Lau et al., 2012 (++); Thomas et al., 2010b (++)). There is some evidence from two reviews (Lau et al., 2012 (++); Ndiaye et al., 2005 (++)) suggesting that cash incentives may be effective. The evidence on conditional cash transfers (Lagarde et al., 2009 (+)) and penalties for welfare recipients (Tuckerman et al., 2009 (++)) is inconclusive.

Applicability

There are potential limits to the applicability of this evidence: for example the provision of free vaccines is of limited relevance to the UK context; the evidence on conditional cash transfers is from Mexico, a middle-income country; and the evidence on welfare penalties is from the USA, and may represent a different policy context.

Evidence statement 4: Home visiting and lay health worker interventions to increase uptake of vaccinations

There is strong evidence from four reviews (Glenton et al., 2011 (++); Lewin et al., 2010 (+); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++)) that home visiting and lay health worker interventions are effective in increasing the uptake of vaccination. Home visiting has been found to be effective for socio-economically disadvantaged parents (Glenton et al., 2011 (++); Lewin et al.,

2010 (+); Tuckerman et al., 2009 (++)) and for older people (Thomas et al., 2010b (++)), although effect sizes are small. However, there is evidence from three reviews that home visiting interventions are ineffective for parents who use drugs or alcohol (Kaufman et al., 2013 (++); Tuckerman et al., 2009 (++); Turnbull and Osborn, 2012 (++)), and mixed evidence from one review for parents at risk for child abuse or neglect (Selph et al., 2013 (+)).

Applicability

The majority of the evidence in these reviews appears to come from the USA, with few or no studies from the UK. There may be limits to the applicability of this evidence resulting from the different cultural, policy or demographic contexts.

Evidence statement 5: Community engagement to increase uptake of vaccinations

There is strong evidence from two reviews (Lau et al., 2012 (++); Tuckerman et al., 2009 (++)) that community engagement interventions, including outreach to at-risk groups and information or case management, are effective in increasing the uptake of vaccinations. These interventions appear to be effective for the general adult population (Lau et al., 2012 (++)) and for disadvantaged parents (Tuckerman et al., 2009 (++)).

Applicability

The majority of the evidence in these reviews appears to come from the USA, with only a small amount of evidence from the UK. There may be limits to the applicability of this evidence resulting from the different cultural, policy or demographic contexts.

Evidence statement 6: Health checks and well-child clinics to increase uptake of vaccinations

There is mixed evidence from one review (Boulware et al., 2006 (++)) on the effectiveness of routine health checks in increasing vaccination uptake. There is medium evidence from one review (Coker et al., 2013 (+)) that well-child clinics, i.e. specialist preventive services for parents of young children, are effective in increasing vaccination uptake.

Applicability

There is limited information on the country and context of the studies included in this category, and most appear to be in the USA. There may be limits to the applicability of this evidence to the UK resulting from the different contexts of health service delivery.

Evidence statement 7: school-based interventions to increase uptake of vaccinations

There is medium evidence from one review (Tuckerman et al., 2009 (++)) that policies requiring children to be vaccinated in order to attend school or day care is effective in increasing the uptake of childhood vaccinations. There is insufficient evidence on other school-based interventions.

Applicability

The majority of the evidence in this review appears to come from the USA, with no evidence from the UK. There may be limits to the applicability of this evidence to the UK resulting from the different contexts in terms of educational policy.

Evidence statement 8: national vaccination programmes to increase uptake of vaccinations

There is medium evidence from one review (Tuckerman et al., 2009 (++)) that national vaccination programmes, including policy changes and promotion and education campaigns, increase the uptake of childhood vaccinations.

Applicability

The evidence in this review comes from Australia and Finland, with no evidence from the UK. There may be limits to the applicability of this evidence due to the different cultural or policy contexts.

Evidence statement 9: Reminders to clinicians to increase uptake of vaccinations

There is strong evidence from six reviews (Arditi et al., 2012 (+); Holt et al., 2012 (++); Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Shojania et al., 2011 (++); Tuckerman et al., 2009 (++)) that reminders to clinicians are effective in increasing vaccination uptake. However, two reviews report more mixed findings (Souza et al., 2011 (++); Thomas et al., 2010b (++)). Two meta-analytic reviews (Holt et al., 2012 (++); Lau et al., 2012 (++)) show medium to large effect sizes.

Applicability

The majority of the evidence in these reviews appears to come from the USA, with only a small amount of evidence from the UK. There may be limits to the applicability of this evidence due to the different contexts of health service delivery.

Evidence statement 10: Incentives and bonus payments to providers to increase uptake of vaccinations

There is medium evidence from six reviews (Eijkenaar et al., 2013 (–); Houle et al., 2012 (+); Lau et al., 2012 (++); Scott et al., 2011 (+); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++)) that incentives and bonus payments to clinicians or practices, such as pay-for-performance schemes or payments per vaccination carried out, is likely to increase vaccination uptake. Two meta-analytic reviews (Lau et al., 2012 (++); Thomas et al., 2010b (++)) find medium to large effect sizes.

Applicability

The majority of the evidence in these reviews appears to come from the USA, with only a small amount of evidence from the UK. There may be limits to the applicability of this evidence to the UK resulting from the different policy contexts and healthcare funding systems.

Evidence statement 11: Clinician education to increase uptake of vaccinations

There is mixed evidence from five reviews (Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++); Williams et al., 2011 (++)) regarding clinician education programmes to promote vaccination. Two reviews indicate that clinician education does not have a significant effect (Ndiaye et al., 2005 (++); Williams et al., 2011 (++)), one indicates that it is effective (Tuckerman et al., 2009 (++)), and one shows mixed findings (Lau et al., 2012 (++)). One review (Thomas et al., 2010b (++)) indicates that facilitators working with clinical practices may be effective in increasing vaccination uptake.

Applicability

The majority of the evidence in these reviews appears to come from the USA, with only a small amount of evidence from the UK. There are no obvious limits to the applicability of this evidence.

Evidence statement 12: Audit and feedback to increase uptake of vaccinations

There is mixed evidence from five reviews (Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++); Williams et al., 2011 (++)) regarding the effectiveness of clinical audit and feedback interventions on the uptake of vaccination. Two reviews suggest that these interventions are effective (Ndiaye et al., 2005 (++); Tuckerman et al., 2009 (++)), while the findings of the other three are mixed (Lau et al., 2012 (++); Thomas et al., 2010b (++); Williams et al., 2011 (++)).

Applicability

The majority of the evidence in these reviews appears to come from the USA, with only a small amount of evidence from the UK. There may be limits to the applicability of this evidence resulting from the different contexts of clinical practice.

Evidence statement 13: Changes to service delivery models to increase uptake of vaccinations

There is strong evidence from three reviews (Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Tuckerman et al., 2009 (++)) that a range of changes to service delivery are effective in increasing vaccination uptake. One review (Lau et al., 2012 (++)) shows that delivering vaccination services in alternative sites (such as patients' homes or worksites or community pharmacies), and changing the team involved in delivering services (e.g. training nurses to give vaccinations) are both effective, with medium to large effect sizes. One review shows that group visits for people with chronic diseases are effective (Lau et al., 2012 (++)). One review finds mixed evidence for case management (Lau et al.,

2012 (++)). One review shows that increasing clinic accessibility (e.g. extended opening hours) in conjunction with education or reminders is effective (Ndiaye et al., 2005 (++)). One review finds that opportunistic vaccination policies are effective in hospitals and prisons, but not in GP services (Tuckerman et al., 2009 (++)). The findings on hospital vaccination policies are mixed (Ndiaye et al., 2005 (++); Tuckerman et al., 2009 (++)).

Applicability

The majority of the evidence in these reviews appears to come from the USA, with only a small amount of evidence from the UK. There may be limits to the applicability of this evidence resulting from the different health system or demographic contexts.

Evidence statement 14: Programmes to increase uptake of vaccinations among healthcare workers

There is mixed evidence from five reviews (Burls et al., 2006 (+); Jordan et al., 2004 (+); Lam et al., 2010 (++); Ndiaye et al., 2005 (++); Thomas et al., 2010a (+)) regarding the effectiveness of multi-component interventions, generally combining education and changes to vaccination service delivery, to increase the uptake of vaccination among healthcare workers. These reviews find that although most studies show some positive direction of effect, in most cases it does not attain significance.

Applicability

The evidence in these reviews appears to come from a range of countries, with relatively little evidence from the UK. There may be limits to the applicability of this evidence resulting from the differences in healthcare delivery and policy.

2 Introduction

This review of reviews is intended to support the separate review of primary study evidence on interventions to promote the uptake of BCG vaccination for TB. For further details and background, please refer to the report for that review.

This review covers review-level (secondary) evidence on all interventions to promote the uptake of any vaccination. By their nature, reviews of reviews cannot give a fully detailed and comprehensive picture of the primary evidence. Rather, the purpose of this review is to provide indicative information for the guideline development process on what is known about interventions to promote vaccination in disease areas other than TB.

3 Methods

This review was conducted according to the methods guidance set out in the current (third) edition of *Methods for the development of NICE public health guidance*. However, while the review process was systematic throughout, and designed to minimize bias as far as possible, fully comprehensive searches were not conducted for this review.

3.1 Review question

The review question is:

- What is known from systematic reviews about the effectiveness and cost-effectiveness of interventions to improve the uptake of vaccinations?

3.2 Searching

The search strategy focused on key healthcare sources and reviews published within the last 10 years (on the basis that restricting to recent reviews allows indirect access to older primary data). The following database sources were searched in June 2013, with a date limit of 2003-current:

- MEDLINE via OVID;
- MEDLINE in Process via OVID;
- EMBASE via OVID; and
- The Cochrane Library (CDSR, HTA and DARE) via www.thecochranelibrary.com

A filter was used to restrict the searches to studies of human populations. No language restriction was applied. The search strategy took the following form: (vaccination) AND (review filter). See Appendix 1 for full details of the database search strategy.

PROSPERO was also searched to identify any in-process unpublished reviews.

The following web-sites were searched:

- NICE (www.nice.org.uk);
- Public Health Observatory (www.apho.org.uk); and
- Public Health England (www.gov.uk/government/organisations/public-health-england)

Google Scholar was searched using a limited version of the search strategy and the first 100 hits screened.

3.3 Screening

EPPI-Reviewer 4 software was used to manage data. A random sample of 10% of titles and abstracts were screened by two reviewers independently and differences resolved by discussion. Agreement for this initial stage of abstract screening was 97.0%, with kappa = 0.78. This was deemed to be adequate to ensure reliability, and the remaining 90% of titles and abstracts were screened by one reviewer alone.

The full texts of all reviews which met the criteria, or where it was unclear whether they met the criteria, were retrieved and screened to the same criteria by two reviewers independently, with differences resolved by discussion.

The inclusion criteria were as follows:

1) Does the study report data on vaccination / immunization to prevent disease in humans? (The following were excluded: studies of vaccines used for immunotherapeutic treatment of disease; animal studies; studies of epidemiology or prevalence intended to inform vaccination programmes, but which do not report actual data regarding vaccination.)

2) Is the study a systematic review (i.e. does it report at least some information on both search strategy and inclusion criteria)?

3) Does the review include some data from high-income countries (OECD member)? [1]

4) Does the review include some data on the effectiveness and/or cost-effectiveness of interventions to improve the uptake of vaccination? (The following data types were excluded: descriptive data on rates of uptake, or determinants of uptake; data on the clinical effectiveness of vaccines themselves; data about views or beliefs regarding vaccination.)

5) Was the review published in 2003 or later?

As described below, subsequent to the application of these criteria a minimum quality threshold was applied based on the quality assessment tool in the methods manual.

3.4 Quality assessment, data extraction and synthesis

Review quality was assessed, and data extracted, using the tools in the methods manual (NICE, 2012). Quality assessment and data extraction were conducted by two reviewers independently, with differences resolved by discussion.

Following the completion of quality assessment, we decided to implement a further inclusion criterion, based on the fourth question of the quality assessment tool, which asks whether primary study quality was assessed by the review authors. Thus:

6) Was any form of quality assessment carried out within the review?

[1] These are: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, UK, USA

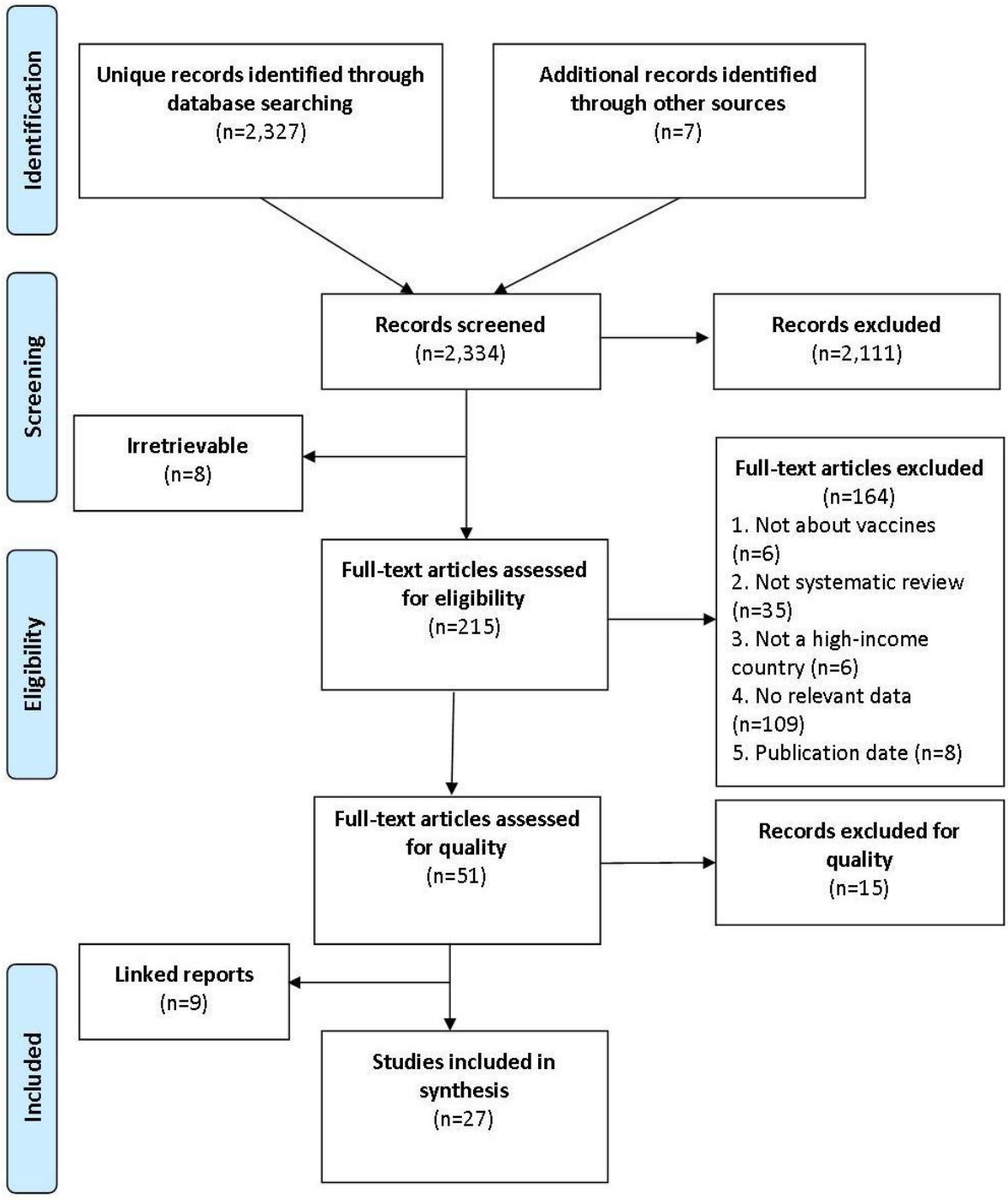
Data were synthesized narratively by type of intervention.

4 Results

4.1 Flow of literature through the review

Twenty-six reviews were included. Figure 1 shows the flow of literature through the review.

Figure 1: Flow of literature



4.2 Quality of the included reviews

Table 1 shows the quality ratings assigned to the included reviews by the quality assessment tool. An example of the completed tool is in Appendix 4. It should be noted that as Q2 and Q4 relate closely to the screening criteria (viz., criteria (4) and (6) respectively), the answer is 'yes' for all studies. It should also be noted that the tool reflects the relevance of the review to our question as much as the objective quality of the reviews, so methodologically similar reviews may receive different ratings if one is more relevant than the other.

Table 1. Quality of the included reviews

	Q1 (RQ)	Q2 (study type)	Q3 (search)	Q4 (QA)	Q5 (analysis)	Overall rating
Arditi et al., 2012	N	Y	Y	Y	Y	+
Boulware et al., 2006	Y	Y	Y	Y	Y	++
Burls et al., 2006	Y	Y	?	Y	N	+
Coker et al., 2013	N	Y	?	Y	Y	+
Eijkenaar et al., 2013	N	Y	Y	Y	N	–
Free et al., 2013	Y	Y	Y	Y	Y	++
Glenton et al., 2011	Y	Y	Y	Y	Y	++
Holt et al., 2012	Y	Y	Y	Y	Y	++
Houle et al., 2012	N	Y	Y	Y	Y	+
Jacobson Vann and Szilagyi, 2009	Y	Y	Y	Y	Y	++
Jordan et al., 2004	Y	Y	Y	Y	N	+
Kaufman et al., 2013	Y	Y	Y	Y	Y	++
Lagarde et al., 2009	N	Y	Y	Y	Y	+
Lam et al., 2010	Y	Y	Y	Y	Y	++
Lau et al., 2012	Y	Y	Y	Y	Y	++
Lewin et al., 2010	N	Y	Y	Y	Y	+
Moxey et al., 2003	N	Y	N	Y	N	–
Ndiaye et al., 2005	Y	Y	Y	Y	Y	++
Scott et al.,	N	Y	Y	Y	Y	+

2011						
Selph et al., 2013	Y	Y	?	Y	Y	+
Shojania et al., 2011	?	Y	Y	Y	Y	++
Souza et al., 2011	?	Y	Y	Y	Y	++
Thomas et al., 2010a	N	Y	Y	Y	?	+
Thomas et al., 2010b	Y	Y	Y	Y	Y	++
Tuckerman et al., 2009	Y	Y	Y	Y	Y	++
Turnbull and Osborn, 2012	Y	Y	Y	Y	Y	++
Williams et al., 2011	Y	Y	Y	Y	Y	++

Key: 'Y'=yes; 'N'=no; '?'=unclear

4.3 Populations included in the review

The reviews have various foci with respect to the populations included. The majority of the interventions attempt to increase vaccination uptake either among infants and children, by targeting parents, or among older people. Five reviews explicitly focus on increasing childhood vaccinations (Coker et al., 2013 (+); Glenton et al., 2011 (++); Kaufman et al., 2013 (++); Lewin et al., 2010 (+); Williams et al., 2011 (++)), and one on older people (Thomas et al., 2010b (++)), but most data refer to these populations even where there is no explicit review-level population focus.

Four reviews focus on healthcare workers (Burls et al., 2006 (+); Jordan et al., 2004 (+); Lam et al., 2010 (++); Thomas et al., 2010a (+)); these form a separate body of evidence and have been considered on their own in the results section.

Four reviews focus on more specific populations: one on parents who use alcohol or drugs (Turnbull and Osborn, 2012 (++)); one on parents at risk for child abuse or neglect (Selph et al., 2013 (+)); one on a range of populations considered to be 'high-risk', including people with chronic illnesses, injecting drug users, prisoners and others (Ndiaye et al., 2005 (++)); and one which considered evidence on the general population of children but focused within that on population inequalities, presenting evidence on a range of populations including low-SES and minority ethnic groups (Tuckerman et al., 2009 (++)).

4.4 Types of interventions included in the review

The interventions included in the review have been divided into three broad types. First, *patient-focused* interventions are those delivered primarily to the population being vaccinated, to encourage them to be vaccinated. Second, *provider-focused* interventions are those delivered primarily to the healthcare workers providing vaccination services, to encourage them to provide more vaccination or to improve the accessibility of services for the population. Third, interventions aiming to increase vaccination uptake among *healthcare workers* form an intermediate category, in that they can be seen as combining aspects of both patient- and provider-focused interventions; these have been dealt with in a separate category.

The more specific intervention types are set out in Table 2.

Table 2. Intervention categories and references

Patient-focused	Reminders and recall Patient education Incentives and disincentives Home visiting / lay health workers Community engagement Health checks / well-child clinics School-based interventions
Provider-focused	Reminders to clinicians Incentives and bonus payments Clinician education Audit and feedback Changes to service delivery
Healthcare workers	Programmes for healthcare workers

The following sections set out the evidence for each intervention type. For each result, the number of primary studies informing the result are listed (or 'N NR' if this is unclear). The designs of the primary studies are also shown, using the following abbreviations:

- RCT: randomised controlled trial (including cluster-RCTs)
- nRCT: non-randomised controlled trial
- BA: before-after (one-group) study

Other study designs have been reported where reviews use a different classification scheme (specifically interrupted time series (ITS) and cohort studies).

Where the reviews reported pooled effect sizes (i.e. where they conducted a meta-analysis), the overall result of this has been reported from the review authors' analyses. This may take the form of an odds ratio (OR), a relative risk (RR) or a median effect size; 95% confidence intervals for ORs and RRs, and interquartile ranges for median effect sizes, are reported where available in the review reports. Where sufficient pooled analyses are reported, the effect sizes are characterised in the evidence statements as small, medium or large using the following heuristic:

- small: OR 1-1.25
- medium: OR 1.25-2
- large: OR >2

If no pooled effect size is reported for a review, the overall direction of effect across each review's included studies has been characterized qualitatively as positive, negative, mixed or inconclusive (effect sizes for the individual primary studies are not reported).

The specific vaccination type considered is also listed, as far as possible. Standard abbreviations are used for vaccinations; these can be found in the list of abbreviations at the beginning of the report.

4.5 Patient-focused interventions

4.5.1 Reminders and recall

Seven reviews (Free et al., 2013 (++); Jacobson Vann and Szilagyi, 2009 (++); Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++); Williams et al., 2011 (++)) investigated the effectiveness of reminders for people to attend vaccination appointments. Overall, most reviews show these interventions to be effective in increasing the uptake of vaccination.

Free (2010 (++)) found one study showing that SMS (text message) reminders are effective in increasing uptake of hepatitis A and B vaccination amongst persons over 18 in travel clinics (1 nRCT, RR 1.19 (1.15-1.23)).

Jacobson Vann and Szilagyi (2009 (++)) focused on the effectiveness of patient reminder and recall interventions, finding that such interventions are effective overall in increasing vaccination rates or numbers of people up-to-date with vaccinations (34 RCTs, OR 1.57 (1.41-1.75)). Subgroup analysis showed that these interventions were effective for childhood influenza vaccination (4 RCTs, OR 2.18 (1.29-3.70)), routine childhood vaccination (15 RCTs, OR 1.47 (1.28-1.68)), adult influenza vaccination (12 RCTs, OR 1.66 (1.31-2.09)), and adult pneumococcus, tetanus, and Hepatitis B (3 RCTs, OR 2.19 (1.21-3.99)), but not for adolescent vaccinations (1 RCT, OR 1.14 (0.98-1.31)). (It should be noted that most of the studies on adults concerned older people (over-65s) and/or people with chronic illness.) Subgroup analysis by type of intervention found that reminders by telephone were the most effective.

Thomas et al. (2010b (++)) focused on reminder interventions for older people aged 60 or over living in the community. This review found that tailored letters or phone calls were effective in increasing influenza vaccination rates compared to no intervention (13 RCTs, OR 1.53 (1.33-1.76)), but that generic (i.e. non-tailored) reminders were only borderline significantly effective (11 RCTs, OR 1.21 (0.99-1.48)).

Lau et al. (2012 (++) also found reminders to be effective, with positive effects for both telephone reminders (N NR, OR 2.74 (1.23-6.12) for influenza and OR 2.86 (2.31-3.56) for pneumococcal illness) and mailed print materials (N NR, OR 1.45 (1.30-1.61) for influenza and OR 1.66 (1.59-1.74) for pneumococcal illness).

Ndiaye et al. (2005 (++)) found one study of reminders in a primary care setting, which found them to be effective in increasing influenza vaccination amongst 'high-risk' patients (1 RCT). (No further information is given on how 'high-risk' was defined.) They also found five studies of patient reminders combined with provider reminders in primary care settings, most of which showed some positive change (median +3.7%), although significance appears to have been attained in only two of seven comparisons (2 RCT, 1 nRCT, 2 BA). Of the five studies, two examined influenza vaccination rates, two examined influenza and pneumococcal vaccination rates and one examined hepatitis B vaccination (in chronic haemodialysis patients).

Tuckerman et al. (2009 (++)) found mixed evidence for reminder and recall interventions for parents of young children. Of three RCTs specifically focusing on low-income families, one found a significant increase in the overall vaccination rate for DTP, OPV, Hib and Hepatitis B, and two no significant

increase for DTP, OPV and MMR vaccinations. They also found one RCT of reminders to parents or carers sent by pre-schools, which showed a significant positive effect for MMR and the DTP booster, and two of verbal reminders to parents of children admitted to hospital, which show mixed results for a range of childhood vaccinations (2 nRCTs). Four further studies with a specific focus on the MMR vaccine also found mixed results (3 RCTs, 1 BA). This review also found eight cost-effectiveness studies of reminder and recall interventions, covering a range of vaccine types (MMR, DTP, OPV, Hib, Hep B), but this evidence was inconclusive as the studies only took a healthcare provider perspective and did not consider the effectiveness of vaccines in preventing disease.

Williams et al. (2011 (++)) focused on parents of children under 5 years old, and report mixed findings on reminder interventions. Across 22 studies (19 RCTs, 3 nRCTs), 14 of 41 intervention arms showed a significant effect, with a median increase in vaccination rates across the studies of 11%. The vaccination types included in these studies were varied, but included DTP, OPV, MMR and Hib.

Overall, three substantial meta-analytic reviews of RCTs show reminder and recall interventions to be effective, with ORs of 1.57 (1.41-1.75) (Jacobson Vann and Szilagyi, 2009 (++)), 1.53 (1.33-1.76) (tailored reminders (Thomas et al., 2010b (++)), 1.21 (0.99-1.48) (generic reminders (Thomas et al., 2010b (++)), 2.74 (1.23-6.12) (telephone, influenza (Lau et al., 2012 (++)), 2.86 (2.31-3.56) (telephone, pneumococcal (Lau et al., 2012 (++)), 1.45 (1.30-1.61) (print, influenza (Lau et al., 2012 (++)) and 1.66 (1.59-1.74) (print, pneumococcal (Lau et al., 2012 (++)). Some of the other reviews report more mixed findings (Tuckerman et al., 2009 (++); Williams et al., 2011 (++)), but neither of the latter report pooled effect sizes, and so cannot readily be compared; possibly they appear more mixed simply because a pooled meta-analysis was not carried out. There is also some difference in populations, as the latter both focus on childhood vaccinations, while Thomas et al. (2010b (++)) and Lau et al. (2012 (++)) focus on adults. However, Jacobson Vann and Szilagyi (2009 (++)) do find reminder and recall interventions to be effective for routine childhood vaccinations.

The majority of studies focus either on universal childhood vaccinations or on adult influenza or pneumococcal vaccination. Hence, their applicability to the TB context may be limited. The limited findings on socio-economically disadvantaged populations (Tuckerman et al., 2009 (++)) are more mixed than those reported for general-population samples. This may suggest that recall and reminder interventions are less effective for disadvantaged groups, although the evidence is not conclusive.

Evidence statement 1: Reminders and recall to increase uptake of vaccinations

There is strong evidence from seven reviews (Free et al., 2013 (++); Jacobson Vann and Szilagyi, 2009 (++); Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++); Williams et al., 2011 (++)) that recall and reminder interventions, including letters, telephone calls and text messages, are effective in increasing the uptake of a range of vaccinations. Three meta-analytic reviews (Jacobson Vann and Szilagyi, 2009 (++); Lau et al., 2012 (++); Thomas et al., 2010b (++)) show that these interventions have a medium to large effect size. There is evidence that these interventions are effective both for adults and older people (Jacobson Vann and Szilagyi, 2009 (++); Lau et al., 2012 (++); Thomas et al., 2010b (++)) and for parents of young children (Jacobson Vann and Szilagyi, 2009 (++)). There is some suggestion from one review (Tuckerman et al., 2009 (++) that these interventions may be less effective in socio-economically disadvantaged populations.

Applicability

The majority of the evidence in these reviews appears to come from the USA, with only a small amount of evidence from the UK. There are no obvious limits to the applicability of this evidence, although the different context of healthcare service organisation may affect the delivery of interventions.

4.5.2 Patient education

Five reviews investigated educational or informational interventions for patients, other than reminders (Lau et al., 2012 (++); Moxey et al., 2003 (–); Ndiaye et al., 2005 (++); Thomas et al., 2010b (++); Tuckerman et al., 2009 (+)). Overall, these reviews show mixed results.

Lau et al. (2012 (++)) report findings for several educational interventions. They found community media campaigns to be effective (N NR, OR 3.16 (1.35-7.37) for influenza and OR 1.31 (1.28-1.55) for pneumococcal illness); limited information is available on the content of these interventions, but most involved advertising or other exposure in broadcast and/or print media, and sometimes other formats such as posters and brochures. More mixed but potentially promising results were found for posters in waiting rooms or examination rooms (N NR, OR 1.78 (0.53-6.01) for influenza and OR 1.92 (1.09-3.40) for pneumococcal illness) and for brochures at office visits (N NR, OR 1.38 (0.82-2.33) for influenza and OR 5.86 (3.29-10.44) for pneumococcal illness). The findings on outreach by emergency medical technicians were very mixed (N NR, OR 0.67 (0.01-36.06) for influenza and OR 8.65 (0.02-4899.87) for pneumococcal illness).

Moxey et al. (2003 (–)) focused on how information is provided to patients. They found one RCT indicating that 'positively framed' information (i.e. information emphasizing the benefits of being vaccinated) is no more effective than standard information in increasing influenza vaccination uptake rates (full outcome data are not reported).

Ndiaye et al. (2005 (++)) found two studies of education for hospital patients, both of which showed a positive effect, one on hepatitis B and one on pneumococcal vaccination (2 RCTs).

Thomas et al. (2010b (++)), focusing on people aged 60 or over, found some evidence for the effectiveness of nurse- or pharmacist-led education (2 RCTs, OR 3.29 (1.91-5.66)) and for health risk appraisals (1 RCT, OR 2.17 (1.70-2.77)) for increasing influenza vaccination rates.

Tuckerman et al. (2009 (++)) found three studies of educational interventions. One found that health education about Hepatitis B for homeless young people was effective (1 BA), one that education combined with reminders for rural families was not effective for DTP, polio, Hib, MMR and Hepatitis B vaccination (1 cohort), and one that parent education about MMR was effective (1 nRCT).

Williams et al. (2011 (++)), focusing on parents of young children, found two studies of parental education (1 RCT, 1 nRCT), one of which focused on low-SES parents. Both studies found the intervention to be ineffective in increasing vaccination rates (one for MMR, one for childhood vaccinations in general).

Overall, the evidence on educational approaches is mixed, although this category encompasses a range of interventions of different types and intensities. One review (Lau et al., 2012 (++)) shows

community media campaigns to be effective, but more mixed results for brochures and posters in clinical settings. One review (Thomas et al., 2010b (++)) shows nurse- or pharmacist-led education to be effective for older people. One review (Williams et al., 2011 (++)) shows parental education to be ineffective. There is limited information on the populations covered, so it is unclear how applicable these findings may be to TB.

Evidence statement 2: Patient education to increase uptake of vaccinations

There is mixed evidence from five reviews (Lau et al., 2012 (++); Moxey et al., 2003 (–); Ndiaye et al., 2005 (++); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++)) on the effectiveness of patient education interventions (other than reminders) in promoting the uptake of vaccination. One review (Lau et al., 2012 (++)) finds community media campaigns to be effective, with medium to large effect size. The findings on health education for patients or parents of young children are mixed.

Applicability

The majority of the evidence in these reviews appears to come from the USA, with only a small amount of evidence from the UK. This may limit the applicability of the findings, due to cultural or other differences.

4.5.3 Incentives or disincentives for patients

Five reviews investigate some form of financial incentives or penalties (Lagarde et al., 2009 (+); Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++)).

Lagarde et al. (2009 (+)) found one study of conditional cash transfers in Mexico, showing them to be effective in increasing childhood vaccinations for TB and measles at 6 months but not at 12 months.

Lau et al. (2012 (++)) found incentives to be effective for increasing influenza vaccinations among community-dwelling adults, i.e. those not resident in long-term care (5 comparisons, OR 1.98 (1.54-2.56)). The incentives consisted of the provision of free vaccination (two studies), vouchers for preventive care services (one study), and cash incentives or lottery prizes (two studies).

Ndiaye et al. (2005 (++)) found one study focusing on monetary incentives to increase hepatitis B vaccination among injecting drug users, which found the intervention to be effective (1 RCT, OR 8.43 (3.95–18.0))

Thomas et al. (2010b (++)) found positive results from two studies evaluating the provision of free influenza vaccines to people aged 60 or over (2 RCTs, OR 2.36 (1.98-2.82) compared to invitations alone and OR 5.43 (2.85-10.35) compared to no intervention).

Tuckerman et al. (2009 (++)) found two studies focusing on the use of penalties relating to welfare payments to increase uptake of vaccinations among low-income families in the USA (1 RCT, 1 CCT): one of these found significant improvements, while the other found no effect (one on DTP, OPV, Hib, MMR, and Hep B, one on DTP, OPV, and MMR).

There is a limited evidence base overall on incentives and disincentives. Two reviews (Lau et al., 2012 (++); Ndiaye et al., 2005 (++)) show incentives to be effective, but on the basis of relatively few studies. The evidence on conditional cash transfers and penalties for welfare recipients is

inconclusive. There is some evidence that providing free vaccines is effective (Lau et al., 2012 (++); Thomas et al., 2010b (++)); however, this finding is of limited applicability to the UK context.

Evidence statement 3: Incentives or disincentives for patients to increase uptake of vaccinations

There is mixed evidence from five reviews on the effectiveness of incentives or disincentives for promoting the uptake of vaccinations (Lagarde et al., 2009 (+); Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++)). There is some evidence from two reviews that providing free vaccines is effective (Lau et al., 2012 (++); Thomas et al., 2010b (++)). There is some evidence from two reviews (Lau et al., 2012 (++); Ndiaye et al., 2005 (++)) suggesting that cash incentives may be effective. The evidence on conditional cash transfers (Lagarde et al., 2009 (+)) and penalties for welfare recipients (Tuckerman et al., 2009 (++)) is inconclusive.

Applicability

There are potential limits to the applicability of this evidence: for example the provision of free vaccines is of limited relevance to the UK context; the evidence on conditional cash transfers is from Mexico, a middle-income country; and the evidence on welfare penalties is from the USA, and may represent a different policy context.

4.5.4 Home visiting and lay health workers

Seven reviews evaluate interventions using home visitors or lay health workers (LHWs) to engage with patients (Glenton et al., 2011 (++); Kaufman et al., 2013 (++); Lewin et al., 2010 (+); Selph et al., 2013 (+); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++); Turnbull and Osborn, 2012 (++)). Overall these reviews suggest that these interventions are effective in increasing the uptake of vaccination. However, the underlying primary evidence base appears to be fairly small, and there is considerable duplication of primary studies between the reviews; this should be borne in mind in interpreting the findings.

Glenton et al. (2011 (++)) found that LHW interventions targeted at disadvantaged families were effective in improving the number of children under 2 years whose vaccinations were up-to-date (4 RCTs, RR 1.19 (1.09-1.30); four further studies presented limited data).

Kaufman et al. (2013 (++)) found one RCT of a home visiting intervention for mothers of young children who used illegal drugs, which showed a non-significant adverse effect on vaccination rates for DPT, OPV, Hib and Hepatitis B (1 RCT, RR 0.67 (0.33-1.35)).[2]

Lewin et al. (2010 (+)) investigated LHW interventions for disadvantaged families (one study looked at older people, and the others at parents of children under 5 years). The main component of these interventions consisted of home visits by trained peer health workers, with some also including other modes of communication. They found that these interventions were effective in increasing the number of people with vaccinations up-to-date (6 RCTs, RR 1.23 (1.09-1.38); one study was excluded from the meta-analysis as it reported insufficient data).

[2] This review included two other studies which measured relevant outcomes, but the reviewers did not extract data on them as they were considered not attributable to the relevant component of the intervention.

Selph et al. (2013 (++)) evaluated a range of interventions to prevent child abuse and neglect. This review is included under this category as home visiting was a substantial component of many of the interventions, but some also included a screening component and/or elements of social work or case management. The findings of this review are mixed, with two of five comparisons (four studies) showing significant positive effects on vaccination-related outcomes, and three no significant effect. The types of vaccinations included in the study were not reported.

Thomas et al. (2010b (++)), focusing on older people, found that home visits were more effective than invitation to attend the vaccination clinic for influenza immunisation alone (2 RCTs, OR 1.30 (1.05-1.61)), and that home visiting with a care plan was effective compared to no intervention (1 RCT, OR 8.15 (3.28-20.29)). However, home visits focused on promoting influenza vaccination were no more effective than home visits focusing on safety (1 RCT, OR 0.98 (0.64-1.50)).

Tuckerman et al. (2009 (++)) found that home visiting interventions were effective in increasing childhood vaccination rates (5 RCTs, 1 BA) in a range of populations, including children not up-to-date with vaccinations (DTP/OPV/Hib, MMR), low-SES families (one on DTP, OPV, Hib, MMR; one on DTP [DT], OPV or IPV, Hib, Hep B) , black and minority ethnic families (vaccines not reported), and children of teenage mothers (DTP, polio). They also found interventions which combine home visiting with reminder/recall interventions to be effective for low-SES families (1 RCT, 1 BA; one on DTP, OPV, Hib, Hep B, one on DTP, OPV, Hib, MMR). However, they found home visiting to be ineffective for mothers who used illegal drugs (1 RCT; the types of vaccinations included in this study were not reported).

Turnbull and Osborn (2012 (++)) focused on home visiting by midwives for mothers who used drugs or alcohol: their review showed these interventions to be ineffective in increasing the number of children up-to-date with vaccinations (2 RCTs, RR 1.09 (0.91-1.32)). The vaccination types were not reported.

As noted above, the underlying evidence base for these reviews appears to be fairly small. Nonetheless, it provides reasonably consistent evidence that home visiting interventions are effective in increasing vaccination uptake among disadvantaged parents of young children, and possibly older people, although effect sizes are generally modest. However, for parents who use drugs or alcohol, and parents who are at risk for child abuse or neglect, the evidence suggests home visiting is ineffective.

It should be noted that many of the interventions were intended to provide support about a range of issues, mainly to do with parenting, and did not focus primarily on vaccination. One analysis (Thomas et al., 2010b (++)) suggests that the whether the intervention specifically targets vaccination or not may make little difference to its effectiveness.

This category is of particular interest as most studies focus on disadvantaged populations, and may thus be more relevant to TB than many of the other categories.

Evidence statement 4: Home visiting and lay health worker interventions to increase uptake of vaccinations

There is strong evidence from four reviews (Glenton et al., 2011 (++); Lewin et al., 2010 (+); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++)) that home visiting and lay health worker

interventions are effective in increasing the uptake of vaccination. Home visiting has been found to be effective for socio-economically disadvantaged parents (Glenton et al., 2011 (++); Lewin et al., 2010 (+); Tuckerman et al., 2009 (++)) and for older people (Thomas et al., 2010b (++)), although effect sizes are small. However, there is evidence from three reviews that home visiting interventions are ineffective for parents who use drugs or alcohol (Kaufman et al., 2013 (++); Tuckerman et al., 2009 (++); Turnbull and Osborn, 2012 (++)), and mixed evidence from one review for parents at risk for child abuse or neglect (Selph et al., 2013 (+)).

Applicability

The majority of the evidence in these reviews appears to come from the USA, with few or no studies from the UK. There may be limits to the applicability of this evidence resulting from the different cultural, policy or demographic contexts.

4.5.5 Community engagement

Two reviews investigated approaches they describe as 'community-based outreach' (Tuckerman et al., 2009 (++)) or 'community engagement' (Lau et al., 2012 (++)). Overall, the reviews suggest that these interventions are effective in increasing vaccination uptake. However, due to the nature of these interventions, there is considerable heterogeneity in intervention content in this category.

Lau et al (2012 (++)) located two studies of similar interventions targeting influenza vaccination, and found them to be effective (OR 3.00 (1.28-7.03)).

Tuckerman et al. (2009 (++)) included ten studies covering a range of outreach programmes focused on parents of young children. Some interventions adopt a more case-management approach, while others are more focused on raising awareness at community level, but all include some component of actively seeking out parents in order to deliver information and support. A range of populations were included in the studies, with most focusing on low-income and ethnic minority families. They found that these interventions were broadly effective in increasing vaccination uptake (5 RCTs, 1 nRCT, 4 BA; included vaccinations: DTP, polio, Hib, MMR, Hepatitis B, OPV), although one study which followed up participants seven years after the intervention found that the intervention effect was not sustained.

These reviews provide some evidence that community engagement approaches are effective in increasing vaccination uptake. As with home visiting, the evidence in this category may be of greater relevance to TB with respect to population than other interventions considered in this review.

Evidence statement 5: Community engagement to increase uptake of vaccinations

There is strong evidence from two reviews (Lau et al., 2012 (++); Tuckerman et al., 2009 (++)) that community engagement interventions, including outreach to at-risk groups and information or case management, are effective in increasing the uptake of vaccinations. These interventions appear to be effective for the general adult population (Lau et al., 2012 (++)) and for disadvantaged parents (Tuckerman et al., 2009 (++)).

Applicability

The majority of the evidence in these reviews appears to come from the USA, with only a small amount of evidence from the UK. There may be limits to the applicability of this evidence resulting from the different cultural, policy or demographic contexts.

4.5.6 Health checks and well-child clinics

One review evaluated the effectiveness of regular 'health checks' in which patients are examined by a clinician, who may also provide specific risk assessments and preventative health advice and referrals (Boulware et al., 2006 (++)). This review found mixed results: of three RCTs, two showed significant positive effects and one a significant negative effect on influenza vaccination uptake; one retrospective comparative study showed mixed results for tetanus vaccination, and two non-comparative studies showed positive effects. The studies in this review cover the general adult population, with most including Medicare and Veterans Administration service recipients in the USA.

A broadly similar intervention evaluated in one review (Coker et al., 2013(+)) is 'well-child clinics', i.e. specialist preventive health services for parents of young children, incorporating clinical assessment and advice on child health, and in some cases also an educational component. This review found broadly positive results, with three studies (2 RCT, 1 nRCT) all finding significant positive impacts for well-child clinics on routine vaccination uptake.

Evidence statement 6: Health checks and well-child clinics to increase uptake of vaccinations

There is mixed evidence from one review (Boulware et al., 2006 (++)) on the effectiveness of routine health checks in increasing vaccination uptake. There is medium evidence from one review (Coker et al., 2013 (+)) that well-child clinics, i.e. specialist preventive services for parents of young children, are effective in increasing vaccination uptake.

Applicability

There is limited information on the country and context of the studies included in this category, and most appear to be in the USA. There may be limits to the applicability of this evidence to the UK resulting from the different contexts of health service delivery.

4.5.7 School-based interventions

One review investigated the impact of policies which require children to be vaccinated in order to attend school or day care (Tuckerman et al., 2009 (++)). This review found that such policies have generally positive impacts on vaccination uptake (2 BA, 2 cohort). Such policies focus on universally provided childhood vaccinations (Hepatitis B, DTP, polio, Hib, MMR, varicella), and hence may be of limited applicability to TB.

The same review (Tuckerman et al., 2009 (++)) also looked at school-based education, finding evidence from one study that a multi-component education programme, including posters, reminder stickers, parent homework assignments and information brochures, is not more effective than standard printed information alone in increasing hepatitis B vaccinations (1 RCT).

Evidence statement 7: school-based interventions to increase uptake of vaccinations

There is medium evidence from one review (Tuckerman et al., 2009 (++)) that policies requiring children to be vaccinated in order to attend school or day care is effective in increasing the uptake of childhood vaccinations. There is insufficient evidence on other school-based interventions.

Applicability

The majority of the evidence in this review appears to come from the USA, with no evidence from the UK. There may be limits to the applicability of this evidence to the UK resulting from the different contexts in terms of educational policy.

4.5.8 National vaccination programmes

One review (Tuckerman et al., 2009 (++)) considered the evidence on national vaccination promotion programmes, including policy changes, promotion campaigns, education for the public and service providers, and a range of other components. They found nine studies of two national campaigns (9 BA) which consistently indicated that such campaigns are associated with increases in vaccination uptake. Some analysis indicates that such interventions may reduce inequalities in vaccination coverage. One campaign focused on the MMR vaccine, the other on childhood vaccination in general.

The evidence on national programmes is methodologically limited (it is challenging to evaluate such programmes using comparative designs), but promising. However, the evidence concerns childhood vaccinations for the general population.

Evidence statement 8: national vaccination programmes to increase uptake of vaccinations

There is medium evidence from one review (Tuckerman et al., 2009 (++)) that national vaccination programmes, including policy changes and promotion and education campaigns, increase the uptake of childhood vaccinations.

Applicability

The evidence in this review comes from Australia and Finland, with no evidence from the UK. There may be limits to the applicability of this evidence due to the different cultural or policy contexts.

4.6 Provider-focused interventions

4.6.1 Reminders to clinicians

Eight reviews focused on the effectiveness of reminders delivered to clinical staff to increase the uptake of vaccinations (Arditi et al., 2012 (+); Holt et al., 2012 (++); Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Shojania et al., 2011 (++); Souza et al., 2011 (++); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++)). Such reminders are generally integrated into computer systems in clinical practices, and may be delivered to clinicians electronically or in printed formats. Overall, the reviews generally show clinician reminders to be effective, although there are some more mixed findings.

Arditi et al. (2012 (+)) investigated the effectiveness of computer-generated reminders delivered on paper to healthcare professionals. They found these interventions to be effective in increasing vaccination rates (including influenza, pneumococcal, tetanus) (9 RCTs and nRCTs, median

improvement 13.1% (interquartile range 12.2% to 20.7%)). Some of the interventions included in this review also included other components, such as clinician education or audit and feedback.

Holt et al. (2012 (++)) found that clinician reminders, generated by patient-specific information and provided either on screen or on paper, were effective at increasing influenza and tetanus immunisation rates (2 RCTs, OR 4.69 (1.25-17.53)).

Lau et al. (2012 (++)), focussing on older people, found clinician reminders to be effective in increasing influenza vaccination rates (30 comparisons, OR 1.53 (1.26-18.5)) and pneumococcal vaccination rates (27 comparisons, OR 2.13 (1.50-3.03)).

Ndiaye et al. (2005 (++)) found seven studies showing provider reminder system to be effective in increasing influenza or pneumococcal vaccination rates (4 RCTs, 2 retrospective cohorts, 1 ITS, median change +17.9%). The reminder types varied and included notations in clients' charts, chart prompts or stickers, and checklists generated by the clinical staff computer databases.

Shojania et al. (2011 (++)) identified six studies (4 RCTs, 2 nRCTs) that examined the effectiveness of computer reminders for physicians regarding eligibility for vaccinations or guidelines to manage chronic diseases. This review concluded that such reminders were effective at improving the prescription of recommended vaccinations, although effect sizes were relatively limited (median 3.8% (IQR 0.5% to 6.6%) on the median outcome from each study, 4.8% (IQR 0.5% to 7.8%) on the best outcome). The authors did not specify the vaccine types included in these studies.

Souza et al. (2011 (++)) reported mixed effectiveness for interventions that utilised computer systems to deliver reminders to offer vaccination for influenza, pneumococcal disease or tetanus (13 RCTs). Six studies report significant positive impacts on vaccination rates (and one further study reports positive results whose significance is unclear), five studies no significant effect, and one mixed results.

Thomas et al. (2010b (++)) examined clinician reminders aimed at increasing influenza vaccination rates amongst adults over the age of 60. Four RCTs focussed on reminders provided directly to physicians and found mixed evidence for effectiveness: one study found a significant positive effect, two studies showed no effect and one study showed a significant negative effect.

Tuckerman et al. (2009 (++)) found two studies showing reminder systems to be effective at increasing the proportion of infants receiving timely vaccinations (1 ITS, 1 BA; one for BCG, one for DTP and OPV).

Overall, several reviews show that clinician reminders to increase vaccination uptake are effective, although some reviews have more mixed findings, and the reasons for the difference are not obvious. The reviews thus provide indicative but not conclusive evidence of effectiveness. There is limited information available on the study populations or practice contexts, which may limit applicability.

Evidence statement 9: Reminders to clinicians to increase uptake of vaccinations

There is strong evidence from six reviews (Arditi et al., 2012 (+); Holt et al., 2012 (++); Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Shojania et al., 2011 (++); Tuckerman et al., 2009 (++)) that

reminders to clinicians are effective in increasing vaccination uptake. However, two reviews report more mixed findings (Souza et al., 2011 (++); Thomas et al., 2010b (++)). Two meta-analytic reviews (Holt et al., 2012 (++); Lau et al., 2012 (++)) show medium to large effect sizes.

Applicability

The majority of the evidence in these reviews appears to come from the USA, with only a small amount of evidence from the UK. There may be limits to the applicability of this evidence due to the different contexts of health service delivery.

4.6.2 Incentives and bonus payments for providers

Six reviews included studies of various forms of incentive or bonus payment to service providers, including pay-for-performance schemes or straightforward per-vaccination payments (Eijkenaar et al., 2013 (–); Houle et al., 2012 (+); Lau et al., 2012 (++); Scott et al., 2011 (+); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++)).

Eijkenaar et al. (2013 (–)), a review of 8 systematic reviews, examined small increases in clinicians' payment for reaching vaccination targets and found that such interventions were broadly effective in increasing vaccination rates (effect range +4% to +7%). However, this review of reviews is not well reported and there is limited detail on the interventions or findings.

Houle et al. (2012 (+)) identified 8 studies (2 RCTs, 1 nRCT, 1 cohort, 4 BA) focussing on bonus systems to encourage clinician adherence to vaccination guidelines. This review broadly found such systems to be effective in increasing vaccination rates. Two RCTs examining payment-for-performance (P4P) compared to fee-for-service found small but significant improvements in vaccination rates. One nRCT also found P4P to be effective for influenza vaccination uptake. Four BA studies found P4P to be effective in increasing MMR (2 BA) and influenza vaccination rates (2 BA). A final cohort study, however, found that P4P did not have a significant effect on influenza vaccination rates.

Lau et al. (2012 (++)) found financial incentives for clinicians aimed at improving vaccination uptake rates amongst older people were effective for influenza vaccinations (3 comparisons, OR 1.52 (1.20-1.93)) and pneumococcal vaccinations (1 comparison, OR 7.43 (2.25-24.53)).

Scott et al. (2011 (+)) found one controlled before-after study that examined the impact of changing the way that NHS general practitioners were paid, switching from capitation to salaried contracts, which found a slight adverse effect in childhood vaccination rates (significance not reported). They identified one further study using a controlled interrupted time series design that evaluated the impact of bonuses paid to medical groups in California. The study review authors report a statistically significant difference in the change in the childhood immunisation rate, which was due to a large fall in the rates of the control group.

Thomas et al. (2010b (++)) found financial incentives offered to physicians for improving influenza vaccination rates were effective (2 RCTs, pooled OR 2.22 (1.77-2.77). Both studies focused on older people.

Tuckerman et al. (2009 (++)) found 8 BA studies that examined a large Australian programme that included provider incentives for immunisation (cf. also section 0 above). The studies found that the campaign resulted in an increase in age-appropriate vaccination coverage.

The evidence base on clinician incentives appears not to be very extensive, and there is some duplication of primary studies in the reviews presented here, particularly between Lau et al. (2012 (++)) and Thomas et al. (2010b (++)). There is some promising evidence that incentive or pay-for-performance schemes may have a positive impact on vaccination rates, although the evidence is not entirely consistent. Much of the evidence is from countries other than the UK, and there may be limits to its applicability to the UK context, given major differences in the organisation and financing of healthcare services.

Evidence statement 10: Incentives and bonus payments to providers to increase uptake of vaccinations

There is medium evidence from six reviews (Eijkenaar et al., 2013 (–); Houle et al., 2012 (+); Lau et al., 2012 (++); Scott et al., 2011 (+); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++)) that incentives and bonus payments to clinicians or practices, such as pay-for-performance schemes or payments per vaccination carried out, is likely to increase vaccination uptake. Two meta-analytic reviews (Lau et al., 2012 (++); Thomas et al., 2010b (++)) find medium to large effect sizes.

Applicability

The majority of the evidence in these reviews appears to come from the USA, with only a small amount of evidence from the UK. There may be limits to the applicability of this evidence to the UK resulting from the different policy contexts and healthcare funding systems.

4.6.3 Clinician education

Five reviews looked at various forms of education programmes for service providers to increase vaccination uptake among their patients (Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++); Williams et al., 2011 (++)). The findings of the reviews are mixed overall.

Lau et al. (2012 (++)) found clinician education programmes to be effective for increasing the uptake of pneumococcal vaccination (7 comparisons, OR 1.54 (1.19-1.99)) but not influenza vaccination (8 comparisons, 0.99 (0.94-1.04)).

Ndiaye et al. (2005 (++)) found one study of clinician education which showed no significant effect on influenza vaccination rates (1 nRCT).

Thomas et al. (2010b (++)) investigated interventions which involve facilitators visiting practices on a regular basis, and working directly with clinicians and healthcare teams to promote influenza vaccination among older people. Of four RCTs, three show a significant positive effect for such interventions and one no significant effect.

Tuckerman et al. (2009 (++)) found four studies of programmes to educate clinicians (all four focus on BCG vaccination for TB, and all but one are included in the main lot 1 review). All these studies used non-comparative designs (4 BA) and showed improvements in vaccination rates in at-risk

infants. However, interventions to provide clinicians with information about children's vaccination status were ineffective in increasing vaccination uptake (1 RCT, 1 BA).

Williams et al. (2011 (++)) found four studies of clinician education to improve vaccination rates in children (1 RCT, 1 nRCT, 2 BA). Two studies looked specifically at disadvantaged populations. Only one (non-comparative) study showed a significant positive effect; the other three showed a positive but non-significant direction of effect. Vaccination type was only specified for one study and included DTP, OPV and MMR vaccinations.

Overall the evidence for clinician education appears to be limited in extent, and the results are mixed. The findings of the studies included in Tuckerman et al. (2009 (++)) are considered in more depth in the main lot 1 review. The other reviews show mixed and inconclusive findings. One review (Thomas et al., 2010b (++)) suggests that facilitators working with clinicians may be effective.

Evidence statement 11: Clinician education to increase uptake of vaccinations

There is mixed evidence from five reviews (Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++); Williams et al., 2011 (++)) regarding clinician education programmes to promote vaccination. Two reviews indicate that clinician education does not have a significant effect (Ndiaye et al., 2005 (++); Williams et al., 2011 (++)), one indicates that it is effective (Tuckerman et al., 2009 (++)), and one shows mixed findings (Lau et al., 2012 (++)). One review (Thomas et al., 2010b (++)) indicates that facilitators working with clinical practices may be effective in increasing vaccination uptake.

Applicability

The majority of the evidence in these reviews appears to come from the USA, with only a small amount of evidence from the UK. There are no obvious limits to the applicability of this evidence.

4.6.4 Audit and feedback

Five reviews evaluated interventions involving the audit of clinical services, with some form of feedback to healthcare staff of results on their performance as individuals or teams, as a means to improve service provision and hence the uptake of vaccination (Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++); Williams et al., 2011 (++)). Such interventions may be undertaken alone or with broader interventions using a social influence model (e.g. clinician peer education). Overall, the findings from the reviews are mixed.

Lau et al. (2012 (++)) found audit and feedback interventions to be effective for influenza vaccination (4 comparisons, OR 1.83 (1.28-2.61)), but not for pneumococcal vaccination (3 comparisons, OR 1.18 (0.57-2.45)). They also found that continuous quality improvement approaches are not effective (4 comparisons, OR 0.99 (0.94-1.04) for influenza and OR 1.86 (0.66-5.21) for pneumococcal).

Ndiaye et al. (2005 (++)) found one study of an audit and feedback intervention in a hospital setting, which showed it to be effective in increasing influenza and pneumococcal vaccination (1 BA).

Tuckerman et al. (2009 (++)) found one study of an intervention incorporating feedback with peer influence, which showed it to be effective in increasing DTP, OPV and MMR vaccination uptake among infants (1 BA), and one study of an intervention combining feedback with patient reminders

and opportunistic vaccination policies, which showed it to be effective in increasing DTP and Hib vaccination uptake among children in a deprived area (1 BA). Finally, they also find that process improvement approaches at practice level are effective in increasing vaccination rates among low-income families (1 RCT); this intervention involved reviewing data to identify suboptimal delivery of preventive services, and then implementing and monitoring evidence-based changes to improve delivery of services (e.g. flow sheets), with on-going support from the project team.

Thomas et al. (2010b (++)) compared different forms of feedback intervention to increase influenza vaccination rates. They found:

- no significant effect for a programme of academic detailing (i.e. educational visits by clinical academics, not further described) and peer comparisons compared to mailed educational materials alone (1 RCT, OR 1.13 (0.80- 1.58));
- a significant effect for review and feedback with benchmarking, compared to review and feedback alone (1 RCT, OR 3.43 (2.37-4.97);
- a significant negative effect for educational outreach and feedback compared to feedback alone (1 RCT, OR 0.77 (0.72-0.81)).

Williams et al. (2011 (++)) found four studies of clinician feedback interventions evaluating childhood vaccination outcomes (2 RCT, 1nRCT, 1 BA). Two studies looked specifically at low-SES children. Two studies find a significant positive effect of a feedback intervention (1 study vaccination type not reported; 1 study DTP, OPV and MMR); one finds feedback in conjunction with clinician bonuses to be effective for DTP, Hib, OPV and MMR vaccination, but not feedback alone; and the fourth finds no significant difference between feedback with peer education and feedback alone (vaccination type not specified).

Evidence statement 12: Audit and feedback to increase uptake of vaccinations

There is mixed evidence from five reviews (Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Thomas et al., 2010b (++); Tuckerman et al., 2009 (++); Williams et al., 2011 (++)) regarding the effectiveness of clinical audit and feedback interventions on the uptake of vaccination. Two reviews suggest that these interventions are effective (Ndiaye et al., 2005 (++); Tuckerman et al., 2009 (++)), while the findings of the other three are mixed (Lau et al., 2012 (++); Thomas et al., 2010b (++); Williams et al., 2011 (++)).

Applicability

The majority of the evidence in these reviews appears to come from the USA, with only a small amount of evidence from the UK. There may be limits to the applicability of this evidence resulting from the different contexts of clinical practice.

4.6.5 Changes to service delivery

Three reviews also covered a range of provider-oriented interventions which involve the reorganisation of services, or delivering vaccination services in different ways (Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Tuckerman et al., 2009 (++)). The results suggest that several such changes are effective in increasing vaccination uptake.

Lau et al. (2012 (++)) found the following. Group visits for people with chronic diseases are effective (2 comparisons, OR 2.44 (1.42-4.20) for influenza and OR 2.25 (1.30-3.92) for pneumococcal). Delivering vaccination services in alternative sites, such as patients' homes or worksites or community pharmacies, is effective (7 comparisons, OR 1.32 (1.14-1.52) for influenza and OR 1.66 (1.59-1.74) for pneumococcal). Changes to the team involved in delivering services, such as training nurses to give vaccinations, is effective (34 comparisons, OR 1.44 (1.16-1.79) for influenza and OR 2.09 (1.48-2.95) for pneumococcal). Findings on case management approaches were mixed (7 comparisons, OR 1.66 (0.81-3.43) for influenza and OR 1.49 (1.05-2.13) for pneumococcal).

Ndiaye et al. (2005 (++)) evaluated interventions which combine patient education or reminders with changes to services to increase accessibility, such as extended opening hours or special vaccination clinics, for influenza, hepatitis B and pneumoccal vaccination. They find six studies, all of which indicate some positive effect, four significantly (6 RCTs). They also find two studies of changes in hospital vaccination policy, one of which shows a significant effect and the other no effect (1 RCT, 1 nRCT).

Tuckerman et al. (2009 (++)) investigated several service-level or provider-oriented interventions. They find evidence that 'opportunistic' vaccination policies are effective in increasing vaccination rates among patients attending hospital (1 RCT, 1 cohort, 5 BA), but more mixed results for such policies in the context of GP services (1 RCT, 2 nRCTs). They find that offering hepatitis B vaccination to injecting drug users in prisons is effective in increasing uptake (1 BA). Changes to hospital policy around hepatitis B vaccination may be effective, with three of four studies showing some positive change (2 cohort, 2 BA).

This category subsumes a wide range of interventions. Nonetheless, there is promising evidence for the effectiveness of several interventions. In particular, one review (Lau et al., 2012 (++)) shows that changing the site where vaccinations are offered (e.g. worksites or homes), or the personnel carrying out vaccinations (e.g. nurses rather than doctors), can be effective in increasing uptake. Ndiaye et al. (2005 (++)) suggests that changes to services to increase accessibility are effective. The findings of Tuckerman et al. (2009 (++)) regarding changes to vaccination policy in hospitals and prisons are also promising. These findings suggest that a range of changes to service delivery models may be effective in increasing uptake of vaccination, although some findings may be of limited applicability to TB.

Evidence statement 13: Changes to service delivery models to increase uptake of vaccinations

There is strong evidence from three reviews (Lau et al., 2012 (++); Ndiaye et al., 2005 (++); Tuckerman et al., 2009 (++)) that a range of changes to service delivery are effective in increasing vaccination uptake. One review (Lau et al., 2012 (++)) shows that delivering vaccination services in alternative sites (such as patients' homes or worksites or community pharmacies), and changing the team involved in delivering services (e.g. training nurses to give vaccinations) are both effective, with medium to large effect sizes. One review shows that group visits for people with chronic diseases are effective (Lau et al., 2012 (++)). One review finds mixed evidence for case management (Lau et al., 2012 (++)). One review shows that increasing clinic accessibility (e.g. extended opening hours) in conjunction with education or reminders is effective (Ndiaye et al., 2005 (++)). One review finds that opportunistic vaccination policies are effective in hospitals and prisons, but not in GP services

(Tuckerman et al., 2009 (++)). The findings on hospital vaccination policies are mixed (Ndiaye et al., 2005 (++); Tuckerman et al., 2009 (++)).

Applicability

The majority of the evidence in these reviews appears to come from the USA, with only a small amount of evidence from the UK. There may be limits to the applicability of this evidence resulting from the different health system or demographic contexts.

4.7 Programmes for healthcare workers

Programmes focusing on increasing the uptake of vaccination among healthcare workers (HCWs) are considered here as a separate category, as they have some elements of both provider- and patient-focused approaches. Five reviews investigated such approaches (Burls et al., 2006 (+); Jordan et al., 2004 (+); Lam et al., 2010 (++); Ndiaye et al., 2005 (++); Thomas et al., 2010a (+)), and all included a similar range of interventions, generally multi-component programmes incorporating a combination of information and vaccination promotion activities with some changes to services (e.g. on-site vaccination clinics) in order to increase vaccination among HCWs. The reviews cover a range of healthcare settings, including hospitals, primary care and long-stay care for older people. All the reviews but one (Ndiaye et al., 2005 (++)) focus exclusively on influenza vaccination.

Burls et al. (2006 (+)) found mixed results: of three studies using designs with a control group, one shows no effect and one a significant positive effect (one shows a positive effect but does not report significance), while of four studies with no control group, all show positive effects but significance is only reported for one.

Jordan et al. (2004 (+)) found a significant positive effect from one nRCT, and positive effects but with significance not reported in two RCTs and four non-comparative studies.

Lam et al. (2010 (++)) found that in non-hospital settings (mainly long-term care), eight of nine comparisons showed a positive effect (4 RCTs, 1 BA). In hospital settings the findings were more mixed, with six of 14 comparisons showing a significant positive effect, one a significant adverse effect, and seven no significant effect (in six of these the direction of effect was positive). Subgroup analyses suggested that while interventions involving educational or promotional approaches alone tend not to be effective, multi-component interventions, such as those involving both an educational component and improvements to the accessibility of vaccination services, are more promising.

Ndiaye et al. (2005 (++)) found positive effects in four studies of long-term care and primary care, although significance is reported only in one (2 nRCT, 2 BA). Three of these studies focused on influenza vaccination, and one on hepatitis B.

Thomas et al. (2010a (+)) focused on HCWs who work with older people, and found two studies, both of which find positive effects, although significance is not reported in the review (2 RCTs).

The findings on programmes for healthcare workers are thus mixed overall. According to the review reports, there are considerable limitations in the design and reporting of the primary studies. Direction of effect in the primary studies appears to be mostly positive, but often does not reach significance; no pooled meta-analyses were conducted in any review. One review (Lam et al., 2010

(++)) indicates that multi-component approaches combining education or promotion with increased accessibility of services are more likely to be effective than promotion of vaccination alone.

Almost all the available data on HCW interventions focus on influenza vaccination, and there is limited information on the populations of HCWs and settings included. This may limit the generalisability of the findings to HCWs who work with TB patients (for whom BCG is recommended), although it is likely that the results may be considered generally relevant.

Evidence statement 14: Programmes to increase uptake of vaccinations among healthcare workers

There is mixed evidence from five reviews (Burls et al., 2006 (+); Jordan et al., 2004 (+); Lam et al., 2010 (++); Ndiaye et al., 2005 (++); Thomas et al., 2010a (+)) regarding the effectiveness of multi-component interventions, generally combining education and changes to vaccination service delivery, to increase the uptake of vaccination among healthcare workers. These reviews find that although most studies show some positive direction of effect, in most cases it does not attain significance.

Applicability

The evidence in these reviews appears to come from a range of countries, with relatively little evidence from the UK. There may be limits to the applicability of this evidence resulting from differences in healthcare delivery and policy.

5 Discussion

5.1 Overview of findings

This review of systematic reviews covers a wide range of strategies which have been evaluated for promoting the uptake of vaccinations. The intervention category with the strongest evidence overall is reminder and recall interventions, for which there appears to be substantial evidence of positive effects. Several other intervention categories show promising but not absolutely conclusive results, including: provider reminders; provider incentives; home visiting; national vaccination programmes; community engagement; improvements to the accessibility of services; changes to the staffing of services; and offering services in different locations, such as community sites.

The evidence for many types of intervention is more mixed, and the reviews do not provide strong evidence of effectiveness. These include: patient education; patient incentives and disincentives; provider education; and provider audit and feedback. Multi-component interventions to promote vaccination among healthcare workers also show somewhat mixed results.

We might attempt to summarise over the findings as follows. Purely educational or informational approaches, either for patients or service providers, are not strongly supported by the evidence, although national- or community-level multi-component campaigns may be more promising. Systemic or policy-level changes in the provision of vaccination services are promising, including changes to the site or personnel involved in delivering services. Policies aiming to change the behaviour of clinicians offering general health services, including opportunistic vaccination policies and clinician reminders, are also promising. Approaches which involve more direct engagement with targeted individuals or communities, such as home visiting or community outreach, are also promising, although they may not be effective for some hard-to-reach groups.

5.2 Strengths and limitations of the review

This review of reviews was carried out systematically, with *a priori* inclusion criteria and data extraction to minimise bias in the review process. We included only reviews which reported their search strategies, inclusion criteria, and quality assessment processes, to provide a minimum baseline of methodological rigour at the level of the included reviews. We used a standardised tool to assess quality and extract data.

The search was not fully comprehensive, and focused on databases specialising in health research. Hence, some reviews may not have been located. Searches were limited to reviews published in 2003 or later. However, many of the primary studies in the included reviews are earlier than this, so the review provides an overview of research over a longer time frame.

By their nature, reviews of reviews are at some distance from the evidence. We did not retrieve the included primary studies, and so could not engage in detailed assessment of their quality, or extract further data when information was not provided in the review reports. We also did not carry out any analysis of the extent to which primary studies overlap between reviews, and may have been double- or triple-counted in the synthesis, although this has been noted within the results where it is obvious. The reporting of the included reviews varied widely, with some providing exhaustive detail on intervention content, implementation, context and population, and others providing very minimal information. There is also considerable heterogeneity in how review authors define and

categorise the interventions they investigate, which, combined with the lack of detail on intervention content, makes it difficult to draw detailed conclusions.

As noted in the evidence statements, few of the studies included in the included reviews appear to have been conducted in the UK, with most evidence coming from the USA. This may limit the applicability of some findings to the UK context. This is particularly an issue for the provider-focused interventions, due to differences in the context of healthcare policy, funding and service delivery, and arguably for interventions targeting specific disadvantaged populations, due to differences in population demographics and culture.

5.3 Applicability to TB/BCG

Potential barriers to the applicability of the evidence to the context of BCG vaccination for TB have been noted throughout the results section. There are two main issues here: the types of vaccination considered, and the populations included in the reviews.

Most evidence, other than that on healthcare workers, concerns either vaccinations offered universally either as part of the standard childhood vaccination schedule (e.g. DTP) and/or to older people (e.g. influenza). Vaccinations such as BCG which are recommended for particular selected populations may face different barriers to uptake, both at patient and provider level. Many of the interventions discussed above could probably be adapted to the context of selective vaccinations. Nonetheless, the evidence on their effectiveness presented in this review may not be applicable to the context of BCG, where interventions may face greater challenges in reaching and engaging their targeted populations.

Because the focus of the great majority of the evidence is on vaccinations provided universally either to infants or young children, or to older people (e.g. influenza), studies tend to evaluate effectiveness with general-population samples. We have noted where the reviews considered disadvantaged populations specifically, but most of these results concern low-SES groups, rather than the more specific populations for whom BCG is recommended. Moreover, even this minimal information on populations is patchy for the patient-oriented interventions, and almost entirely lacking for the provider-oriented interventions.

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7 Appendix 1. Search strategies

Literature searching was conducted Tuesday June 11th 2013. The full details of the searches as run are provided below.

Searches were limited 2002-Current in line with the review protocol. The searches were not limited by population nor were they restricted by language.

Database	Hits
Medline	1216
Embase	2005
Cochrane Library – CDSR, DARE and HTA	435 (see notes)
PROSPERO	0
Total	3656
- de-duplication	1333
Unique Records to Screen	2323

Strategy Annex

Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R
Host: OVID
Data Parameters: 1946 to Present
Date Searched: Tuesday, June 11th 2013
Hits: 1215
Strategy:

Search Strategy:

#	Searches	Results
1	(vaccin$ or revaccinat$ or immunisation or immunization or immunis$ or immuniz$ or inoculat$).ti,ab,kw.	362776
2	exp Immunization/	133503
3	*Immunization Programs/	4721
4	*Communicable Disease Control/	11647
5	1 or 2 or 3 or 4	418284
6	(systematic$ adj5 review$).ti,ab,kw.	52833
7	Meta-Analysis.pt.	42741
8	meta analy$.ti,ab,kw.	55176
9	metaanaly$.ti,ab,kw.	1294
10	6 or 7 or 8 or 9	104126
11	5 and 10	1388
12	limit 11 to yr="2002 -Current"	1216

Notes: N/A

File Name: MEDLINE

Database: Embase
Host: OVID
Data Parameters: 1980 to 2013 Week 23
Date Searched: Tuesday, June 11th 2013
Hits: 2005
Strategy:

#	Searches	Results
1	(vaccin$ or revaccinat$ or immunisation or immunization or immunis$ or immuniz$ or inoculat$).ti,ab,kw.	384841
2	exp Immunization/	195521
3	*infection control/	23530
4	1 or 2 or 3	457869
5	(systematic$ adj5 review$).ti,ab,kw.	62187
6	exp "Systematic Review"/	60954
7	(meta-analys$ or meta analys$ or metaanalys$).ti,ab,kw.	68848
8	5 or 6 or 7	133199
9	4 and 8	2177
10	limit 9 to yr="2002 -Current"	2005

Notes: N/A
File Name: EMBASE

Database: The Cochrane Library – CDSR, DARE and HTA
Host: The Cochrane Library via http://www.thecochranelibrary.com/view/0/index.html
Data Parameters: Issue 2 of 4, Apr 2013 (for all)
Date Searched: Tuesday, June 11th 2013
Hits: CDSR: 145; DARE: 218; HTA: 143. (total: 506)
Strategy:

ID	Search	Hits
#1	(vaccin* or revaccinat* or immunisation or immunization or immunis* or immuniz* or inoculat*):ti,ab,kw (Word variations have been searched)	11701
#2	MeSH descriptor: [Immunization] explode all trees	3798
#3	MeSH descriptor: [Immunization Programs] this term only	305
#4	MeSH descriptor: [Communicable Disease Control] this term only	94
#5	#1 or #2 or #3 or #4	11866

Notes: A filter to limit to reviews was not used. Instead, the contents of CDSR, DARE and HTA were exported – acting as a proxy methods filter. For completeness of reporting, the other libraries returned hits as followed: CENTRAL: 10499; Methods: 149; NHS EEDS: 711.

The date limiter did not work in the search. Accordingly, each library (CDSR, DARE and HTA) was downloaded separately and pre-2002 records were removed manually. N taken forward for screening became

CDSR: 138; DARE 218; HTA 119. Making N=435

File Name: COCHRANE

Database: PROSPERO
Host: http://www.crd.york.ac.uk/NIHR_PROSPERO/
Date Searched: Tuesday, June 11th 2013
Hits: 0
Strategy:

(vaccin* or revaccinat* or immunisation or immunization or immunis* or immuniz* or inoculat*)

Notes: N/A
File Name: N/A

8 Appendix 2. Evidence tables

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Arditi et al. **Year:** 2012 **Citation:** Arditi, C., Rege-Walther, M., Wyatt, J.C., et al., 2012. Computer-generated reminders delivered on paper to healthcare professionals; effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews.* 12, 1-99. **Aim of the review:** "To evaluate the effects of	**Databases and websites searched:** Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE (and In-Process and other non-indexed citations), EMBASE, EPOC Group, Specialised Register, CINAHL (Cumulative Index to Nursing and Allied Health Literature), INSPEC **Other methods undertaken (e.g., reference checking):** Examined reference lists of key articles and relevant reviews and contacted authors of relevant reviews and studies regarding any further published or	**Included population/s:** Qualified healthcare professionals and by extension their patients **Excluded population/s:** Not reported **Setting of included studies:** Outpatient settings in USA or Canada **Characteristics of population/s:** Healthcare professionals: physicians	**Intervention/s description:** Physician reminders (more information not provided); or physician reminders alongside educational meeting; audit and feedback **Control/comparison/s / description:** Most usual care; 1 patient reminder, educational meeting, audit and feedback; 1 feedback (delayed reminder)	**Outcomes:** Vaccination (conceptualized as 'clinician compliance') **Follow-up periods:** 2 months-2 years **Methods of analysis:** Median effect size	**Outcomes:** Median improvement of 13.1% (IQR 12.2% to 20.7%) (p=0.02) (across 9 studies) **Results on inequalities:** Not reported **Sample sizes:** Patients: 395-12,467; Providers: 20-135 (not always reported) **Attrition details:** Not reported	**Limitations identified by author:** Did not consider the effectiveness of reminders as part of a multifaceted intervention. Effectiveness of reminders in improving patient outcomes could not be assessed. Using the median effect across studies as effect size limits the interpretation of the results (precision of study effect size not taken into account). Potentially limited applicability outside

reminders automatically generated through a computerized system and delivered on paper to healthcare professionals on processes of care (related to healthcare professionals' practice) and outcomes of care (related to patients' health condition)." (abstract) **Review design:** SR of RCTs and nRCTS	unpublished work **Years searched:** 1890 (for INSPEC) - June 2012 **Inclusion criteria, including study type, country:** Study design: RCTs or NRCTs; Participants: majority of participants qualified healthcare professional; Interventions: computer-generated reminders delivered on paper to healthcare professionals delivery care directly to patients; Outcome measures: dichotomous processes of care (related to healthcare professionals' practice), continuous processes of care, dichotomous outcomes of care (related to patients'	(faculty and residents), family physicians, general internist, physician's assistants, nurse practitioners, interns; Patients: patients aged 40-60; ≥ 65 years old or with any of the following clinical diagnoses: diabetes, renal failure, anaemia, congestive heart failure, asthma, or chronic obstructive pulmonary disease; diabetics; > 18 years old due for prevention services				outpatient settings in the US/Canada. Relatively low quality of evidence. May have been publication bias. **Limitations identified by review team:** Limited information on interventions. Full outcome data for each study not presented. Not entirely clear which studies were included in the vaccination grouping for the pooled effect size. **Evidence gaps and/or recommendations for future research:** Suggestions for future research on reminders:

	health condition), continuous outcomes of care **Exclusion criteria:** Intervention: computer merely used as a medium to print the reminder without any other function, reminder that targeted an intermediary (e.g. clinic receptionist, clinician manager), expert systems for facilitating diagnosis or estimating prognosis, document listing all the drugs a patient was currently taking (e.g. drug profile) or a document summarizing the medical records, with no rules applied in the computer, new clinical information collected directly from patients on a computer and given to the provider as a prompt	**External validity score:** +				report on methods (for randomization, allocation concealment, etc.) in compliance with existing reporting standards, such as the CONSORT checklist (Moher 2010); fully describe the reminder system components to allow better classification and comparisons of reminder features; report processes and outcomes of care at baseline and at follow-up; consider the probability, nature and process of contamination before designing the study; cluster randomization may or may not

	Number of studies included: 32 studies (27 RCTs, 5 nRCTs) **Number of relevant studies included:** 9					be appropriate and should not be uncritically assumed always to be a solution as it holds statistical disadvantage (larger sample size required) (Keogh-Brown 2007); if using a cluster design, use rigorous statistical methods and report all relevant data (Campbell 2007); use blind assessment of outcomes to reduce assessment bias; develop and apply better approaches, definitions, analyses and reporting of complex interventions; investigate the effectiveness of reminders in various healthcare

						delivery systems, outside North America and university-affiliated hospitals; investigate the learning effect of reminders (after the end of the intervention). **Source of funding:** Health Services Research Unit, University of Aberdeen, UK.Centre Hospitalier Vaudois and University of Lausanne, Switzerlan. Loterie Romande, Lausanne, Switzerland. Department of Community Medicine and Community Healthcare, Centre Hospitalier Universitaire

						Vaudois, Lausanne, Switzerland Research Grant.

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Boulware et al. **Year:** 2006 **Citation:** Boulware, L.E.; Barned, G.F., Wilson, R.F., et al. 2006. Value of the periodic health evaluation. *Evidence Report/Technology Assessment.* Number 136. **Aim of the review:** "1. What definitions are used for the adult PHE [periodic health evaluation] in studies of its value? 2. What is the evidence that a PHE...is associated with benefits... compared to care without a PHE...? 3. What is the	**Databases and websites searched:** MEDLINE, Cochrane, DARE, CENTRAL, HTA, EED, CINAHL **Other methods undertaken (e.g., reference checking):** Hand searching of 24 journals over 1 year; backwards citation chasing **Years searched:** Conducted February 2006; no limit by year **Inclusion criteria, including study type, country:** Studies comparing one group receiving a PHE to a group not receiving PHE; or studies of interventions to promote attendance at PHE **Exclusion criteria:**	**Included population/s:** Adults **Excluded population/s:** Children <18 years **Setting of included studies:** Limited information reported; mostly USA and patients in primary care or outpatient services **Characteristics of population/s:** Medicare patients; patients with Veterans Administration; community-dwelling adults over 70; adult	**Intervention/s description:** Periodic health evaluation (risk assessment and examination by a clinician, with provision of preventive services and/or advice, referrals etc); some studies appear to also include broader health promotion activities **Control/comparison/s / description:** Usual care	**Outcomes:** Uptake of vaccination (some self-report, some 'not') **Follow-up periods:** 1-5 years **Methods of analysis:** Tabulation and narrative synthesis	**Outcomes:** Of three RCTs, two show significant improvements on uptake outcomes (Cohen's d (95% CI): 0.10 (0.10, 0.10) and 0.35 (0.33, 0.36)), and one a negative effect (-0.22(-0.20,-0.24)); One retrospective cohort study shows a significant effect on uptake of tetanus vaccination (RR=1.72 (1.1-2.7)) but not on influenza vaccination (RR=1.01 (0.8-1.3)); Two observational pre-post studies show a positive effect on uptake outcomes (details not reported). **Results on inequalities:** Not reported **Sample sizes:** 136-2558 **Attrition details:** 4%	**Limitations identified by author:** Few large RCTs. Heterogeneity in definitions of intervention, comparisons and outcome measures. Few data on long-term health status outcomes. Potential publication bias **Limitations identified by review team:** Reasonably robust review but confusing write-up. Limited data on context of studies, and full quantitative outcome data are not given for all studies

evidence that a PHE...is associated with harms...? 4. What system-based interventions improve the receipt or delivery of the PHE (e.g., insurance premium reductions or provider reminders)?" pp1-2 **Review design:** SR of mixed study designs (trials, cohort, cross-sectional)	"Not English language No human data Meeting abstract--no full article for review Includes ONLY subjects less than 18 year of age Exposure is NOT the PHE (at least one group in the intervention must meet the minimum definition of the PHE) Article focuses on specific preventive measures ONLY without mention of the global PHE Clinical preventive services delivered only during opportunistic visit (e.g., illness or symptom-related visit) without mention of the PHE Article does not apply to any of the key questions No Original Data No eligible comparison group (not pre-post, historical control, clinical trial, or concurrent cohort)" Also: trials where	outpatients **External validity score: –**			and 33% for two of the RCTs; other studies not reported	**Evidence gaps and/or recommendations for future research:** Studies of potential harms of PHEs. Studies using intermediate clinical management outcomes, morbidity outcomes, or health behaviour outcomes. Studies of costs. Studies of broader public health outcomes. More evidence regarding intensity of interventions **Source of funding:** Agency for Healthcare Research and Quality

	both groups received a PHE **Number of studies included:** 36 **Number of relevant studies included:** (3 RCTs, 1 retrospective cohort, 2 BAs)					

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Burls et al. **Year:** 2006 **Citation:** Burls, A., Jordan, R., Barton P., et al. 2006. Vaccinating healthcare workers against influenza to protect the vulnerable--is it a good use of healthcare resources? A systematic review of the evidence and an economic evaluation. *Vaccine*.24(19), 4212–4221. **Aim of the review:** To investigate effectiveness, cost-effectiveness and factors affecting uptake of influenza vaccine among	**Databases and websites searched:** Cochrane library, CINAHL, NHSEED, HEED, DARE, MEDLINE and EMBASE (to June 2004), Internet sites [not specified], registers of trials **Other methods undertaken (e.g., reference checking):** Citation chasing, contact with experts **Years searched:** To June 2004; start date not reported **Inclusion criteria, including study type, country:** Design: any; Population: HCWs in hospitals, nursing homes or the community in contact with high-risk individuals; Intervention: Influenza	**Included population/s:** Healthcare workers in hospitals, nursing homes or the community in contact with high-risk individuals **Excluded population/s:** Not reported **Setting of included studies:** USA, Canada, Australia, UK, Europe Primary care; nursing homes/geriatric hospitals; hospitals; psychiatric facilities **Characteristics of population/s:** Not reported	**Intervention/s description:** Various combinations of letters/ reminders, information, meetings, adverts/ posters, vaccine clinics /mobile vaccination **Control/comparison/s / description:** No intervention	**Outcomes:** Uptake of influenza vaccine (unclear how measured) **Follow-up periods:** Not reported **Methods of analysis:** Tabulated and narrative synthesis	**Outcomes:** Comparative studies (N=3): one study (cluster RCT) shows no sig effect (primary healthcare 21.9% intervention, 21.0% control (p = 0.91); nursing homes 10.2% intervention, 5.6% control (p = 0.34) [presumably post-test only]). One study (cluster RCT) shows a sig improvement in uptake (OR 2.8 (1.4–5.8)). One study (before-after with control arm) shows '45% increase', sig NR. Non-comparative studies (N=4): all (4 before-after studies)show increase in uptake (range 14%-41% absolute increase), but only one sig eff (others sig NR) **Results on inequalities:** Not reported	**Limitations identified by author:** Relatively few studies **Limitations identified by review team:** Authors' conclusions are arguably too strong given limitations of the underlying evidence; best-quality study finds no sig effect of intervention. Focus of review is on populating an economic model. Limited information on populations and contexts. **Evidence gaps and/or recommendations for future**

healthcare workers, to inform an economic evaluation. **Review design:** SR of effectiveness, cost-effectiveness and survey data	vaccination; Comparator: no vaccination, placebo or vaccine unrelated to influenza; Primary outcomes (in high-risk contacts): culture or serologically confirmed influenza; all-cause mortality; mortality attributed to influenza/pneumonia; influenza-like illness; influenza-related morbidity; cost or cost-effectiveness; Secondary outcomes (in vaccinated population): effectiveness; adverse events; acceptability; uptake; methods of attaining uptake; absenteeism. **Exclusion criteria:** Not reported **Number of studies included:** 18 **Number of relevant studies included:** 7 (2	**External validity score:** +			**Sample sizes:** 268-2984 for trials; 195-5514 for non-comparative studies **Attrition details:** Not reported	**research:** More UK research on interventions to increase uptake **Source of funding:** Commissioned, and presumably funded, by the European Scientific Working Group on Influenza

	cRCTs,1 BA with control arm, 4 BAs)					

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Coker et al. **Year:** 2013 **Citation:** Coker, T. R., Windon, A., Moreno, C., et al., 2013. Well-child care clinical practice redesign for young children: A systematic review of strategies and tools. *Pediatrics.* 131 (S1), S5-S25. **Aim of the review:** "to examine tools and strategies for WCC [well-child care] clinical practice redesign for US children aged 0 to 5, focusing on changes to the structure of care (non-physician	**Databases and websites searched:** PubMed **Other methods undertaken (e.g., reference checking):** Reference chasing **Years searched:** January 1 1981-February 1 2012 **Inclusion criteria, including study type, country:** Study design: systematic review, RCT, non-RCT, observational study; Study topic: WCC clinical practice redesign; Target population aged 0–5 years; Country: developed nation; Peer reviewed and published in English **Exclusion criteria:**	**Included population/s:** Children aged 0-5 **Excluded population/s:** Children aged 4-15 months at high risk (eg, maternal poverty); teen mothers and their children; women with children aged 0-30 months; characteristics in some studies not reported **Setting of included studies: C**linical sites (more information not provided) **Characteristics of**	**Intervention/s description:** Group well children care (GWWC): families are seen for a well-child visit in a group of 4 to 6 families with similarly aged children for 60-90 minutes led by healthcare professional and includes measurement, physical examination, and immunization of each child; Physician/nurse practitioner (NP) alternating WCC visits; Social worker at 2-wk visit; Waiting-room health education by NP and trained volunteers using video and slides; HS (Healthy Steps for Young Children Program, program in which a physician and child developmental specialist provide WCC in partnership) + prenatal component or	**Outcomes:** Immunisations up-to-date for age **Follow-up periods:** Not reported **Methods of analysis:** Tabulated and narrative synthesis	**Outcomes:** 1 RCT: group well child care: 67% fully immunised and individual well child care 73% fully immunised, significance not reported; 1 RCT: 33% of intervention group fully immunised compared to 18% of control group (p =0.011); 1 study (with 6 RCT sites): adjusted ORs for being up-to-date with immunisations 1.59 (95% CI 1.27–1.98); 1 quasi-experimental comparison: adjusted ORs for being up-to-date with immunisations 1.06 (95% CI 1.02–1.09) **Results on inequalities:** Not reported, although one study directly targeted mothers living in poverty and another adolescent mothers	**Limitations identified by author:** Excluded all studies not peer-reviewed so may have missed relevant literature and is potential for publication bias. Omitted tools that did not alter the delivery of WCC services (eg, handheld patient records) and tools that focused on clinical practice redesign for only 1 WCC topic **Limitations identified by review team:** Limited reporting of study characteristics, populations, contexts. Synthesis

providers [eg, nurses, lay health educators], nonmedical locations [eg, day-care centers, home visits], and alternative formats [eg, group visits, Internet]) that may affect receipt of WCC services, child health and developmental outcomes, and overall quality of WCC" (p.S6) **Review design:** SR of various study designs (systematic reviews, RCTs, non-randomized trials, observational studies)	Evaluated a quality improvement process without identifying a specific change to care delivery; Addressed only 1 topic within WCC (eg, car-seat safety) and not WCC services more generally (eg, anticipatory guidance); Focused on changes to WCC content or screening without addressing changes in the delivery of services; Evaluated interventions designed solely to increase compliance with or use of typical WCC **Number of studies included:** 33 **Number of relevant studies included:** 4 (3 RCTs, 1 quasi-experimental comparison)	**population/s:** Not reported **External validity score:** –	HS alone **Control/comparison/s / description:** Not reported		**Sample sizes:** 220-1593 **Attrition details:** Not reported	organised by intervention type rather than outcome, so difficult to isolate results relevant to our review **Evidence gaps and/or recommendations for future research:** A review with a different set of criteria or fewer criteria for article inclusion could be helpful in giving paediatric practices a broader range of options for clinical practice improvements. Reporting intervention costs and potential cost savings and a commonly defined set of child and parent

						outcomes to help researchers build capacity for comparative studies across interventions **Source of funding:** Not reported

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Eijkenaar et al. **Year:** 2013 **Citation:** Eijkenaar, F., Emmert, M., Scheppach, M., et al., 2013. Effects of pay for performance in health care: A systematic review of systematic reviews. *Health Policy.* 10(2-3), 115-130. **Aim of the review:** "to what extent has P4P [pay-for-performance] been (1) effective and (2) cost-effective? (3) Which unintended consequences of P4P have been observed? To what extent has P4P (4)	**Databases and websites searched:** Medline, Embase, ISI Web of Knowledge, the Cochrane Database of Systematic Reviews, Scopus **Other methods undertaken (e.g., reference checking):** Searched Internet via Google (specifics not provided), contacted experts, and reviewed reference lists **Years searched:** January 2000-June 2011 **Inclusion criteria, including study type, country:** 1) written in English, Spanish, or German 2) published between January 2000 and June 2011 3) systematic reviews	**Included population/s:** Not reported, but is healthcare professionals **Excluded population/s:** Not reported **Setting of included studies:** US (majority), UK, Italy, Spain, Argentina, Australia, Germany - primary care settings (majority), hospitals **Characteristics of population/s:** Not reported **External validity**	**Intervention/s description:** Increase in payment for reaching target; relatively small, implicit incentives (almost no detail provided) **Control/comparison/s / description:** Not reported	**Outcomes:** Vaccination rate **Follow-up periods:** Not reported **Methods of analysis:** Narrative, limited information in tables	**Outcomes:** 1 RCT: relatively small payments improved immunization rates by four percentage points (sig NR); 2 studies: classified as ineffective that found that increased immunization rates were largely due to better documentation, whereas other review classified them as effective; 1 RCT: mean immunization rates was six percentage points higher than the mean rate in the control group and the median change was higher in the intervention group: 10.3% versus 3.5% (sig NR); 1 RCT (increase in fees for reaching target): the mean vaccination rate was six percentage points higher in the intervention group (sig	**Limitations identified by author:** Most domains only partially covered. The included reviews lack important information on the context in which studies were conducted. Studies concentrated in US and UK. Did not systematically verify the information reported in the reviews by consulting individual studies, which may have introduced bias. **Limitations identified by review team:** Poor and inconsistent

affected inequalities in the quality of care and (5) been more successful when combined with non-financial incentives? (6) Which specific design features contribute to (un)desired effects?" (p.116) **Review design:** SR of SRs	covering at least 1 of the 6 domains of the RQ (P4P: effectiveness, cost-effectiveness, unintended consequences, inequalities, non-financial incentives, program design) **Exclusion criteria:** 1) overview articles that were not systematic reviews 2) reviews that did not address at least one of the six domains 3) reviews only aimed to identify studies evaluating the effect of implicit financial incentives and/or studies evaluating the effect of explicit financial incentives, only focused on financial incentives for patients 4) empirical studies with original quantitative or qualitative data on P4P effect(s) 5)	**score: –**			NR); 2 studies (1 RCT and 1 TS): target payments associated with higher immunization rates, but the increase was significant in only 1 study; 5% improvement overall, but much variation: positive effects found especially for immunizations, diabetes, asthma, and smoking cessation;1 RCT: neither feedback alone nor 'feedback + P4P' improved childhood immunization rates (information from text) but information from supplementary file says "one study found a four percentage point improvement in immunization rates from baseline relative to the control group"; "One study found that P4P was associated with a seven percent increase in immunization rates."	reporting on results. Extremely limited information on context (although this may be a result of poorly reported primary studies as suggested by the review authors) **Evidence gaps and/or recommendations for future research:** Improvement strategies should be implemented in the context of rigorous evaluation, using convincing control groups to disentangle the effects of the different components. Future evaluations should also assess the long-term

	reviews entirely overlapped by a subsequent review from largely the same authors 6) reviews that did not (consistently) report the methodological design of included studies **Number of studies included:** 22 reviews **Number of relevant studies included:** 8 reviews				**Results on inequalities:** Not reported in relevant studies, except in 1 which stated: "No negative effect on age, ethnic, and socioeconomic inequalities. Evidence from 28 studies suggests reductions in inequalities in the quality of care across groups rather than increases" (Table 2), but immunisation rates were not the only outcome assessed in this study **Sample sizes:** Not reported **Attrition details:** Not reported	impact on health outcomes such as complication rates, hospital readmission rates, mortality, and quality of life. Insight is required in which design features contribute to desired effects: studies need to consistently report information on the specific setting in which the program was implemented and the study was conducted **Source of funding:** Not reported

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Free et al. **Year:** 2013 **Citation:** Free, C., Phillips, G., Galli, L., et al., 2013. The Effectiveness of Mobile-Health Technology-Based Health Behaviour Change or Disease Management Interventions for Health Care Consumers: A Systematic Review. *PLOS Medicine*. 10(1), e1001362. **Aim of the review:** "to quantify the effectiveness of mobile technology-based interventions delivered to health care consumers for health behaviour change and	**Databases and websites searched:** MEDLINE, EMBASE, PsycINFO, Global Health, The Cochrane Library, NHS Health Technology Assessment Database, Web of Science **Other methods undertaken (e.g., reference checking):** Backwards citation searching **Years searched:** 1990-September 2010 **Inclusion criteria, including study type, country:** Controlled trials; any mobile technology intervention to improve health or health service use or quality; any population	**Included population/s:** Any **Excluded population/s:** Not reported **Setting of included studies:** Spain. 'Clinic', not further defined **Characteristics of population/s:** Travellers [i.e. people planning to travel] >18 years attending clinic for hepatitis A and B **External validity score:** +	**Intervention/s description:** SMS (text message) reminder. "The travellers received the SMS a few days before the date foreseen, that is, for the reminder of the second hepatitis A+B dose, within 30 d of the primary dose, and for the second hepatitis A dose and the third hepatitis A+B dose within 6 mo of the primary dose." (p.13) **Control/comparison/s / description:** No intervention	**Outcomes:** Compliance with vaccination schedule (unclear how measured) **Follow-up periods:** 'Duration' 4 months, although unclear if this was the follow-up period **Methods of analysis:** Tabulated and narrative synthesis; meta-analysis was conducted but not for results relevant to this review	**Outcomes:** RR 1.19 (95% CI 1.15–1.23) **Results on inequalities:** Not reported **Sample sizes:** 2,349 **Attrition details:** Not reported	**Limitations identified by author:** Not reported **Limitations identified by review team:** Robust review, but very broad in scope and only 1 of 75 studies relevant to our research question **Evidence gaps and/or recommendations for future research:** Studies of multi-component interventions incorporating mobile element. Studies of effectiveness of different intervention components and

management of diseases." p2 **Review design:** SR of effectiveness studies with meta-analysis	**Exclusion criteria:** "studies evaluating either mixed mobile technology and non-mobile technology based interventions in which the treatment and control group both received the mobile technology-based component or interventions in which treatments between the treatment and control groups differed in additional ways besides the components delivered by mobile technology" p.3 **Number of studies included:** 75 **Number of relevant studies included:** 1 non-randomised parallel group trial					settings, and effect of participant demographics. **Source of funding:** UK Department of Health, Global Health Division

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Glenton et al. **Year:** 2011 **Citation:** Glenton, C., Scheel, I. B., Lewin, S., et al., 2011. Can lay health workers increase the uptake of childhood immunisation? Systematic review and typology. *Tropical Medicine & International Health.* 16(9), 1044-1053. **Aim of the review:** "to assess the effects of LHW [lay health workers] interventions on the uptake of childhood immunisation and to develop a	**Databases and websites searched:** The Cochrane Central Register of Controlled Trials; MEDLINE, MEDLINE In-Process & Other Non-Indexed Citations, EMBASE, CINAHL, British Nursing Index and Archive, AMED,POPLINE, WHOLIS **Other methods undertaken (e.g., reference checking):** Searched reference lists of included papers and relevant reviews; contacted authors of relevant papers regarding any additional published or unpublished work **Years searched:** 1950-Feb 2009 (for MEDLINE)	**Included population/s:** Children under 5 (and their caregivers) **Excluded population/s:** Children over 5 **Setting of included studies:** Turkey (n=1); Ireland (n=1); USA (n=6) **Characteristics of population/s:** Children <5 and parents. Further information from each study: low-income Dominican immigrants to US; low-income families; families living in	**Intervention/s description:** "LHWs made home visits to parents, giving them information about the importance of routine childhood immunisations and encouraging them to visit clinics for child immunisation" (p.1047); 3 studies: this information was given as part of a package of information and promotion about child health (p.1047); 1 study: LHWs collaborated with nurses **Control/comparison/s / description:** Most studies: no intervention 1 study (in Turkey): LHWs making home visits were compared with midwives making home visits 1 study (in USA):	**Outcomes:** 'Immunisation up to date' or 'any immunisation'; not specified how outcomes were measured **Follow-up periods:** Not reported **Methods of analysis:** Narrative synthesis and meta-analysis (4 studies)	**Outcomes:** 4 RCTs included in meta-analysis: intervention increased the number of children whose immunisations were up to date (RR 1.19, 95% CI 1.09–1.30; P = <0.0001); 1 ITS "suggested an effect in favour of LHWs"; 1 RCT: "LHWs promoted immunisation uptake among mothers in a squatter area", "results not estimatable"; 1 RCT RR for African-Americans 1.03 (95% CI 0.91, 1.48); for Mexican-Americans 0.87 (95% CI 0.76, 0.99); 1 RCT no results presented **Results on inequalities:** Not reported **Sample sizes:** 244-3050 for RCTs; 8171 for ITS	**Limitations identified by author:** Wanted to expand on Lewin et al 2010 review by including non-RCT designs, only found two additional studies so they did not provide significant additional evidence regarding the effectiveness of LHWs for vaccination **Limitations identified by review team:** Considerable overlap with Lewin 2010. Outcome data not fully reported **Evidence gaps and/or**

typology of intervention models" (p.1045) **Review design:** SR of mixed study designs (RCTs, nRCTS, controlled BAs, ITSs) with meta-analysis	**Inclusion criteria, including study type, country:** (1) Randomised and non-randomised controlled trials, controlled before–after studies, and interrupted time series (2) intervention targeted any person, including parents or community members, and where the aim was to increase immunisation coverage among children under 5 years of age (3) intervention delivered by LHWs which aimed to increase childhood immunisation coverage LHW carrying out functions related to healthcare delivery, trained in some way in the context of the intervention, and having no formal professional or paraprofessional	a 'squatter area'; mothers living in disadvantaged area, 56% single mothers, 60% local authority housing; inner city population with high proportion of BME and who utilised public health services; inner-city area, low-income African-American or Mexican-American mothers; urban families, approx. two-thirds in receipt of Medicaid; low socio-economic status 'Negro' population. **External validity score:** +	LHWs who made home visits and phone calls over a maximum of 6 months were compared with study personnel making one home visit		**Attrition details:** Not reported	**recommendations for future research:** For many models, more high-quality studies are needed, particularly from LMICs **Source of funding:** Research Council of Norway

	certificated or degreed tertiary education); included studies where LHWs were used as a substitute for trained health professionals or in addition to health professionals **Exclusion criteria:** (1) based outside of primary health care, such as in hospitals or schools. (2) Comparisons were made between studies that delivered interventions by LHWs with no intervention and standard care, or the same intervention delivered by health professionals **Number of studies included:** 12 **Number of relevant studies included:** 8 (7 RCTs and 1 interrupted time-series)					

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Holt et al. **Year:** 2012 **Citation:** Holt, T.A., Thorogood, M. & Griffiths, F. Changing clinical practice through patient specific reminders available at the time of the clinical encounter: Systematic review and meta-analysis 27(8), 974-984. **Aim of the review:** "To synthesise current evidence for the influence on clinical behaviour of patient-specific electronically generated reminders available at the time of the clinical	**Databases and websites searched:** PubMed, Cochrane library of systematic reviews; Science Citation Index Expanded; Social Sciences Citation Index; ASSIA; EMBASE; CINAHL; DARE; HMIC **Other methods undertaken (e.g., reference checking):** Looked at reference lists of retrieved articles and past systematic reviews of similar interventions **Years searched:** 1970-February 2011 **Inclusion criteria, including study type, country:** Controlled trials of reminder interventions if the intervention was:	**Included population/s:** Patients **Excluded population/s:** Not reported **Setting of included studies:** USA and Canada, family medicine clinics **Characteristics of population/s:** People over 65 eligible for influenza vaccination (n=1); people requiring tetanus vaccination (n=1) **External validity score:** –	**Intervention/s description:** "on-screen [n=1] and paper-based [n=1] reminders provided that they were generated by electronic information specific to the individual in a health record and available at the clinical encounter" (p.975) **Control/comparison/s / description:** No reminder	**Outcomes:** Rate of influenza vaccination (n=1); proportion of patients with record of tetanus vaccination (n=1) **Follow-up periods:** Not reported **Methods of analysis:** Odds ratios; random effects meta-analysis	**Outcomes:** Likelihood of achieving the desired outcome in the presence of a reminder influenza vaccination: OR 2.41 (95% CI 1.65, 3.50) tetanus vaccination: OR 9.09 (95% CI 6.44, 12.82) Total events: OR 4.69 (95% CI 1.25, 17.53) (2 RCTs) **Results on inequalities:** Not reported **Sample sizes:** Not reported **Attrition details:** Not reported	**Limitations identified by author:** Heterogeneity of effect sizes and by difficulties in synthesising data from diverse trial designs: effect under investigation is likely to depend on the health care setting, the detailed design of the reminder, and the priorities of both clinician and patient. focussed on 'reminder' interventions and may have missed some studies of more generalised decision support systems in which reminders were a minor element lack of detail given in some trial

encounter" (p.974) **Review design:** SR and meta-analysis of controlled trials	directed at clinician behaviour; available during the clinical encounter; computer generated (including computer generated paper-based reminders); and generated by patient-specific (rather than condition specific or drug specific) data non-randomised controlled trials included if data collection from both arms was contemporaneous **Exclusion criteria:** BA studies (i.e. non-comparative) **Number of studies included:** 42 in review, 40 in meta-analysis **Number of relevant studies included:** 2 RCTs					reports over how the system actually operated in practice and what was required of the user in practical terms **Limitations identified by review team:** Only 2 studies relevant to this review. Little information on study context provided; overlap with other reviews on reminders **Evidence gaps and/or recommendations for future research:** Features of reminders, settings and users that appear to facilitate or

						obstruct response **Source of funding:** Internal sources (authors based at University of Oxford and University of Warwick)

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Houle et al. **Year:** 2012 **Citation:** Houle, S.K.D., McAlister, F.A., Jackevicius, C.A., et al., 2012. Does performance-based remuneration for individual health care practitioners affect patient care?: A systematic review. *Annals of Internal Medicine.*157(12), 889-899. **Aim of the review:** "To evaluate the effect of P4P [pay-for-performance] remuneration targeting individual health care providers" (abstract)	**Databases and websites searched:** MEDLINE, EMBASE, Cochrane Library, OpenSIGLE, Canadian Evaluation Society Unpublished Literature Bank, New York Academy of Medicine Library Grey Literature Collection **Other methods undertaken (e.g., reference checking):** Reference chasing **Years searched:** Inception- 8 June 2012 **Inclusion criteria, including study type, country:** Study design: original research studies (RCTs; interrupted time series; uncontrolled and controlled BA studies; and	**Included population/s:** Healthcare providers and their patients **Excluded population/s:** Not reported **Setting of included studies:** Not reported **Characteristics of population/s:** Physicians, diabetic patients, patients, children, patients with CHD, stroke patients (more information not provided) **External validity score: –**	**Intervention/s description:** Various bonus systems for adherence to guidelines or meeting indicators (including Quality and Outcomes Framework) **Control/comparison/s / description:** Fee-for-service; capitation; salary	**Outcomes:** Vaccination rates, vaccination up to date **Follow-up periods:** 1 year-38 months **Methods of analysis:** Narrative and tabulated synthesis	**Outcomes:** 1 RCT: change in percentage of children receiving recommended vaccinations over 1 y: control = -2.5 percentage points; intervention = 5.9 percentage points; p < 0.05; 1 RCT: change in mean influenza immunization rates over 1 y: control = 2.5 percentage points; intervention = 10.3 percentage points; p=0.03; 1 controlled BA (influenza vaccination): OR =1.79 (95% CI: 1.37–2.35) [appears to be post test only]; 1 cohort study: adjusted relative risk (when P4P bonuses based on quality or patient satisfaction scores) = 1.06 (95% CI 0.90–1.29), adjusted relative risk (when P4P bonuses based on patients' outpatient	**Limitations identified by author:** Do not look at hospital or group practices **Limitations identified by review team:** Limited information provided on study context **Evidence gaps and/or recommendations for future research:** Move beyond the simple examination of change in practice patterns to also evaluate the role of organizational factors in facilitating or impeding the implementation and effectiveness of P4P, as well as

Review design: SR of various study designs (RCTs, ITSs, controlled BAs, nRCTs, uncontrolled BAs, uncontrolled cohort studies)	controlled/uncontrolled cohort comparisons); had to compared P4P with at least 1 other payment model or compared performance before and after initiation of P4P on such quality-of-care measures as target blood pressure or glycosylated hemoglobin or such outcomes as morbidity and mortality; P4P incentives had to target individual practitioner performance and provide payment to individual health care practitioners on the basis of their achievement of quality indicators in patients under their direct care **Exclusion criteria:** P4P programs aimed at hospitals or group practices; any process				utilization or care costs) = 1.02 (0.89–1.14); 2 uncontrolled BAs (MMR immunization): a) pre-P4P = 78.1% (95% CI, 73.9%–82.1%), post-P4P = 95.6% (95% CI, 93.5%–97.7%) p < 0.001, b) pre-P4P = 83.2%, post P4P = 87.3% (year 2) and 81.8% (year 3), p = 0.061 (year 2) p < 0.001 (year 3); 1 uncontrolled BA (influenza vaccination) pre-P4P = 57.4%, post-P4P = 85.5%, p<0.05; 1 uncontrolled BA (influenza vaccination) control = 47.1%, intervention = 81.3% Difference =34.2% (CI, 33.4%- 35.0%) **Results on inequalities:** Not reported **Sample sizes:** 117 physicians; 1943-133,901 patients; two studies not reported **Attrition details:** Not	the best motivators to change professional behaviour. Other health care providers (besides physicians), such as nurses and pharmacists, are increasingly providing patient care, and research into the effect of P4P schemes with these professional groups is urgently needed. Additional high-quality research is required to fully evaluate the potential of P4P to affect patient care, outcomes, and the cost of health services **Source of funding:** No external funding; salary support provided by the

	measures not related to patient outcomes (such as documentation of patient risk factors in their chart) **Number of studies included:** 30 (4 RCTs; 5 ITSs; 3 controlled BAs; 1 nRCT; 15 uncontrolled Bas; 2 uncontrolled cohort studies) **Number of relevant studies included:** (2 RCTs, 1 controlled BA, 1 cohort study; 4 uncontrolled BAs)				reported	Interdisciplinary Chronic Disease Collaboration, Alberta Innovates—Health Solutions, Hypertension Canada, and the Canadian Institutes for Health Research

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Jacobson Vann and Szilagyi. **Year:** 2009 **Citation:** Jacobson Vann, J.C. & Szilagyi, P. 2009. Patient reminder and patient recall systems to improve immunization rates. *Cochrane Database of Systematic Reviews.* (1). **Aim of the review:** "assess the overall effectiveness of patient reminder or recall systems, or both, in improving immunization rates; compare	**Databases and websites searched:** MEDLINE, EMBASE, PsychINFO, SociologicalAbstracts, CAB Abstracts, EPOC Register, CINAHL, PubMed **Other methods undertaken (e.g., reference checking):** Reference list of included articles and reviews; publications of abstracts, proceedings from scientific meetings, and files of study collaborators **Years searched:** Inception-2009 **Inclusion criteria, including study type, country:** Study design: RCTs, controlled BAs, and ITSs; Participants: health care personnel who deliver immunizations and	**Included population/s:** Health care personnel who deliver immunizations - children (birth to 18 years) adults who receive immunizations in any setting (academic or non-academic, developed or developing countries) **Excluded population/s:** Not reported **Setting of included studies:** "diverse settings, ranging from urban to rural, and public to private to university- based. Examples of study settings are state	**Intervention/s description:** "Each intervention type was a mechanism to inform patients or families of the need for a vaccination that is due or overdue." (p.6); letters to patients (n=22); postcards (n=9); person-to-person telephone calls (n=8); autodialer (computerised phone messages) (n=5); postcard + phone combination (n=4); tracking and outreach (n=2); provider reminders combined with patient reminders (n=6). NB: adds up to more than 47 because some studies had more than one intervention arm **Control/comparison/s / description:** Mix of	**Outcomes:** Percentage of children/adults immunised or receiving immunisation; number/percentage up to date with immunisations; immunisation rates; provider compliance with immunisation guidelines; immunisation series complete; immunisation procedures performed; immunised or proof of earlier	**Outcomes:** Overall patient reminder: Patients receiving the patient reminder/ recall interventions were more likely to have been immunized or up-to-date with immunizations compared with control subjects: pooled random effect model of 34 RCTs: OR 1.57 (95%CI: 1.41, 1.75), 10 RCTs not included due to potential unit of analysis errors median OR 3.37, 3 controlled BA studies median OR 1.57; Routine childhood immunisation: pooled random effects (15 RCTs) OR of 1.47 (95% CI: 1.28, 1.68), one eligible RCT study was excluded for a potential unit of analysis error OR 6.79 (95% CI: 4.56, 10.11); 1 CBA OR 4.11 (95% CI: 2.18, 7.76), 1	**Limitations identified by author:** Only included English-language studies. Potential publication bias, because the majority of studies were located from EPOC, MEDLINE or references from other studies. Grouped studies according to key characteristics of either the patient population or the intervention. Omitted studies with potential unit of analysis errors from meta-analysis. Lack of perfection in any study selected for inclusion in this review

the effectiveness of different types of reminder or recall interventions (e.g. postcard, letter, telephone), or a combination of both reminder and recall" (p.4) **Review design:** SR of effectiveness studies [various study designs (RCTs, controlled BAs, ITSs)] with meta-analysis	children (birth to 18 years) or adults who receive immunizations in any setting; Interventions: patient reminder or recall interventions, or both, that either reminded patients of upcoming immunizations or immunization visits that were due (reminders) or were overdue (recall) delivered in any manner; Outcomes: immunization rates, or the proportion of the target population up-to-date on recommended immunizations; accepted outcomes for either individual vaccinations or standard combinations of recommended vaccinations **Exclusion criteria:** Non-English language studies (accepted studies that had been translated into English)	health departments, health maintenance organizations (HMO), public health departments, urban teaching facilities, private practices, senior centres, rural practices, and schools" (p.7) USA (n=36); Canada (n=5); Australia (n=2); New Zealand (n=2); UK (n=1); Denmark (n=1) **Characteristics of population/s:** Children and infants (n=16); high-risk children and infants (n=4) [but unclear what this means; only 2 studies specify low-income children]; patients over 65, with chronic illness or both (n=20);	no intervention and standard practice (untargeted reminders, some personal reminders, provider reminders, etc)	immunisation receipt **Follow-up periods:** Only reported for 2 studies (1 year and 15 months, respectively) Study duration ranged: 2 weeks-2 years **Methods of analysis:** Narrative synthesis, meta-analysis	CBA The other CBA non-significant effect, (but the baseline rates between the study arms were substantially different); Childhood influenza immunisations: pooled random effects (4 RCTs) OR 2.18 (95%CI: 1.29, 3.70); Adult pneumococcal, tetanus, hepatitis B immunizations (“other adult”): 6 studies vaccination increases ranged from 1.8 to 27.4 percentage points (statistically significant in 5 studies); pooled random effects (3 RCTs adult pneumococcal, tetanus, or Hepatitis B vaccinations) OR 2.19 (95% CI: 1.21, 3.99); 3 eligible RCTs excluded due to potential unit of analysis errors median OR 13.32; Adults influenza immunisations: 18 studies changes in vaccination rates 8.5	**Limitations identified by review team:** None; well-conducted review **Evidence gaps and/or recommendations for future research:** Studies focusing on cost-effectiveness, adolescents, implementation of interventions in wider community settings; fine-tuning of interventions, studies incorporating such linkages between managed care plans' databases. Any studies that do not find improved immunizations should carefully investigate the

	Number of studies included: 47 (44 RCTs and 3 controlled BAs) **Number of relevant studies included:** 47 (44 RCTs and 3 controlled BAs)	adults (n=6); adolescents (n=1). Limited information beyond this. **External validity score:** +			percentage point decrease to 47 percentage point increase compared with the controls, with half of the comparisons exceeding a 15 percentage point increase, pooled random effects (12 RCTs) OR 1.66 (95% CI: 1.31, 2.09); 6 eligible RCTs excluded due to potential unit of analysis errors median OR 3.08; Adolescent immunisations: 1 RCT OR = 1.14 (95% CI = 0.98, 1.31); Effectiveness of different types of reminder or recall systems (6 types): (1) person-to-person telephone reminders OR = 1.92, 95% CI: 1.20, 3.07; (2) letter reminders OR = 1.79, 95% CI: 1.50, 2.15; (3) postcard reminders OR = 1.44, 95% CI: 1.09, 1.89; 1 CBA OR = 4.11 (4) autodialer OR = 1.29;	reasons for lack of improvement **Source of funding:** Initial review: CDC 2005 update: Department of Health (England) Cochrane Review Update Incentive Scheme

					95% CI: 1.09, 1.53; (5) postcard and telephone combined OR = 1.45, 95% CI: 1.11, 1.89; (6) patient reminder and recall in combination with outreach OR = 1.37, 95% CI: 0.98, 1.98; when results of four comparisons of patient reminder recall interventions combined with provider reminder were pooled, the effectiveness exceeded those of patient reminder or recall systems alone OR = 3.65, 95% CI: 1.54, 8.67; 1 CBA OR = 1.32 **Results on inequalities:** Not reported **Sample sizes:** 96-24,743 patients 1 controlled BA: 4 clinics and 9 communities **Attrition details:** Not consistently reported; reported rates range	

					8%-38%	

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Jordan et al. **Year:** 2004 **Citation:** Jordan, R., Wake, B., Hawker, J., et al. 2004. Influenza vaccination of health care workers (HCW) to reduce influenza-related outcomes in high risk patients: A Systematic review of clinical and cost-effectiveness. Department of Public Health and Epidemiology. Report Number 48. **Aim of the review:** "to review systematically the evidence on the effectiveness of protecting people	**Databases and websites searched:** Cochrane library, Medline, Embase, NHSEED, HEED, DARE **Other methods undertaken (e.g., reference checking):** Specific internet sites such as PHLS, CDC Atlanta, Internet Search Engines – including Lycos, Copernic and Yahoo, citation lists, contacting clinical experts, registers of trials found on the internet **Years searched:** 1966-January 2003 (for MEDLINE); updated Medline and Embase searches in 2004 **Inclusion criteria, including study type, country:** Population: health care workers	**Included population/s:** Health care workers within a health care setting such as a hospital or nursing home or community in contact with high-risk patients **Excluded population/s:** Not reported **Setting of included studies:** Primary health care teams, nursing homes, long-term geriatric hospital, hospital, university hospital providing primary and	**Intervention/s description:** 1. Letter +/- Public health nurse visit & promotion 2. Letters and interviews and local vaccination 3. Information sessions, posters, memos and vaccination clinics. 4. Mobile clinic 'needles on wheels' 5. Whole hospital: Adverts, newsletter personal letters; 3 Targeted departments: educational conference, visit by special health nurse 6. Educational intervention & 'Staff vaccination fair' with vaccine offered 7. In-service meetings, video tapes and pamphlets **Control/comparison/s / description:** No campaign (for the 3 studies with control)	**Outcomes:** Influenza vaccination uptake rates **Follow-up periods:** Not reported **Methods of analysis:** Narrative synthesis and tabulated synthesis	**Outcomes:** 2 cluster RCTs: 5.4% and 45% differences [at post-test?] in favour of intervention group (sig NR); 1 nRCT: effect-adjusted odds ratio of 2.8 (95% CI 1.4-5.8); 4 non-comparative BAs: range 16%-46% increase in uptake rates (sig NR for any). **Results on inequalities:** Not reported **Sample sizes:** 195-5,514 (one study not reported) **Attrition details:** Not reported	**Limitations identified by author:** None relevant to our studies **Limitations identified by review team:** Inconsistent reporting. Missing information on outcomes. Rather uncritical synthesis and discussion. Limited detail on context **Evidence gaps and/or recommendations for future research:** Not reported **Source of funding:** Report commissioned by European

at high risk of significant morbidity and mortality (particularly the elderly), by vaccinating health care workers (HCWs) including hospital staff, institutional care staff and community health staff against influenza" (p.13) RQs: "1. Does vaccinating healthcare workers protect the high risk group? 2. Is vaccination of the healthcare workers protective to the recipients? 3. Are there any appreciable adverse events associated with vaccination? 4. Will healthcare workers agree to have the vaccination? 5. What is the best	within a health care setting such as a hospital or nursing home or community in contact with high-risk patients; Intervention: influenza vaccination programme i.e. a policy of offering vaccination to healthcare workers; Comparator: no influenza vaccination programme (i.e. HCW may still be vaccinated of own accord), this may be a placebo programme; Outcomes: outcomes in high risk patients -- mortality, clinical influenza or influenza-like illness, serologically confirmed influenza rates; secondary outcomes--those affecting the vaccinated population such as adverse events, acceptability, uptake rates,	tertiary care, chronic psychiatric facility UK (n=2); Canada (n=1); Australia (n=1); Switzerland (n=1); USA (n=1) **Characteristics of population/s:** Health care workers within a health care setting such as a hospital or nursing home or community in contact with high-risk patients **External validity score:** +				Scientific Working Group on Influenza

method to achieve optimal uptake rate? 6. Is vaccination of the healthcare workers cost-effective?" (p.20) **Review design:** SR of effectiveness of interventions	absenteeism and influenza rates; Study Design: any interventional study design **Exclusion criteria:** Population: social workers **Number of studies included:** 28 (15 interventional studies and 14 observational studies; 1 study had both parts) **Number of relevant studies included:** (2 cRCTs, 1 BA with control arm, 4 BAs)					

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Kaufman et al. **Year:** 2013 **Citation:** Kaufman, J., Synnot, A., Ryan, R., et al., 2013. Face to face interventions for informing or educating parents about early childhood vaccination. *Cochrane Database of Systematic Reviews.* 5. **Aim of the review:** "To assess the effects of face to face interventions for informing or educating parents about early childhood vaccination on immunisation	**Databases and websites searched:** Cochrane Central Register of Controlled Trials; MEDLINE; EMBASE; CINAHL; PsycINFOl Global Health, Gloabl Health Library (includes WHOLIS, LILACS, other regional WHO databases) **Other methods undertaken (e.g., reference checking):** The International Clinical Trials Registry Platform (ICTRP - searched August 2012) and contacted authors to obtain further information or eligible data if available; The Grey Literature Report; OpenGrey; reference lists of all included papers and any key papers in the field; ISI Web of	**Included population/s:** Children: infants (less than 1 year) or preschool-aged children (1 to 5 or 6 years), Parents: parents, guardians or others fulfilling the parental role, alone or in groups, targeted to receive face to face information or education, and who have at least one child due or overdue for childhood vaccinations, Participants may also be expectant parents, who are individuals	**Intervention/s description:** Semi-structured home visits, each 1-2 hours long by research midwife to improve the rate of breastfeeding, immunisation and parental drug use among illicit drug-using mothers and their infants; 8 home visits occurring post-partum at weeks one, two and four, and monthly up to six months Vaccine focus: DPT, OPV, Hib and Hep B **Control/comparison/s / description:** Telephone contact at 2 months and home visit for data collection at 6 months only	**Outcomes:** Appropriate immunisation status (immunisation rates) measured through parent interviews **Follow-up periods:** Measured the outcome at six months after birth, at the conclusion of a series of multiple intervention sessions **Methods of analysis:** Narrative analysis	**Outcomes:** Negative effect on immunisation rates: RR 0.67 (95% CI: 0.33 to 1.35) **Results on inequalities:** Not reported **Sample sizes:** 152 **Attrition details:** Intervention 5%, control 12%	**Limitations identified by author:** Poor quality evidence **Limitations identified by review team:** Only 1 study has relevant outcomes extracted. Could query the decision to not extract vaccination uptake data for multi-component interventions **Evidence gaps and/or recommendations for future research:** Focus on low-literacy populations. Systematically compare the effects of common

uptake and parental knowledge" (p.8) **Review design:** SR of RCTs and cRCTs	Science (both the Social Science Citation Index and the Science Citation Index) and Google Scholar for papers that cited the studies included in the review; contacted authors of included studies and vaccination experts from the COMMVAC project advisory group and asked for additional references; asked authors of included studies to identify any economic evaluations conducted alongside the studies **Years searched:** Inception-July 2012 **Inclusion criteria, including study type, country:** Study design: RCTs and cluster RCTs; Participants: Children: infants (less than 1 year) or preschool-aged children (1 to 5 or 6 years), Parents:	or couples currently pregnant, considering adoption or otherwise expecting to become guardians of a child, Vaccine program organisers: anyone involved in the planning or implementation of immunisation programs or interventions **Excluded population/s:** Very preterm infant, the mother was an adolescent, the mother was in jail, a fetal death occurred in utero or the mother relocated outside the				combinations of interventions. Clearer and more detailed descriptions of interventions and their components **Source of funding:** Review funding: Global Health and Vaccination Research (GLOBVAC) of the Research Council of Norway Infrastructure funding for some authors: National Health and Medical Research Council (NHMRC)

	parents, guardians or others fulfilling the parental role, alone or in groups, targeted to receive face to face information or education, and who have at least one child due or overdue for childhood vaccinations, Participants may also be expectant parents, who are individuals or couples currently pregnant, considering adoption or otherwise expecting to become guardians of a child, Vaccine program organisers: anyone involved in the planning or implementation of immunisation programs or interventions; Types of interventions: face to face communication interventions directed to parents to inform or educate them	metropolitan area **Setting of included studies:** Perth, Australia in mother's home **Characteristics of population/s:** Mothers; illicit drug users; median age 27 for intervention and 25 for control; 89% Caucasian; English-speaking; 42% first-time mother; high school not completed (35.5%); High school completed (15.5%); Technical (18%); University (2%); Other (trade apprenticeship,				

	about routine childhood vaccinations delivered by anyone including physicians, nurses, or other healthcare professionals, trained volunteers, lay health workers, members of the community, peers, or health visitors; Outcomes: Immunisation status of child (ie immunisation status up-to-date, or receipt of one or more vaccines, as defined by study authors), Knowledge or understanding of vaccination, Intention to vaccinate child, Parent experience of intervention, Cost of implementing intervention, adverse effects **Exclusion criteria:** Not reported **Number of studies**	professional registration) (21%); Socioeconomic status: Total income in previous year (n = 149): < $20,000 (67.5%); $20, 000 - 40,000 (25%); > $40,000 (4%); Employment status: Full Time (21%); Part time/casual (29.5%); Not employed (46%) Children: 0-6 months **External validity score:** +				

	included: 7 studies (6 RCTs, 1 cRCTs) **Number of relevant studies included:** 1 RCT					

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Lagarde et al. **Year:** 2009 **Citation**: Lagarde. M., Haines, A., Palmer, N., et al., 2009. The impact of conditional cash transfers on health outcomes and use of health services in low and middle income countries. *Cochrane Database of Systematic Reviews*. 4. **Aim of the review:** "to assess the effectiveness of conditional monetary transfers in low and middle income countries to improve the health outcomes of populations and	**Databases and websites searched:** Databases: PubMED, EMBASE (Athens), Popline, African Healthline, IBSS (International Bibliography in Social Sciences, Athens interface),The Cochranev Central Register of Controlled Trials (CENTRAL), The Database of Abstracts of Reviews of Effectiveness and the EPOC Register (and the database of studies awaiting assessment), BLDS, ID21, ELDIS, The Antwerp Institute of Tropical Medicine database, Jstor, Inter-Science (Wiley), ScienceDirect, IDEAS(Repec), LILACS, CAB-Direct (Global Health), Healthcare Management	**Included population/s:** Potential users of health care **Excluded population/s:** Not reported **Setting of included studies:** Community setting, Mexico **Characteristics of population/s:** No information other than "selected on poverty grounds" **External validity score: –**	**Intervention/s description:** Families enrolled received two types of cash transfers: universal (dependent on attendance at health facilities for all family members) and specific (associated with school attendance of school-aged children) **Control/comparison/s / description:** Not reported	**Outcomes:** Table 4 states coverage of DPT and measles vaccination (children), but text and results state TB and measles **Follow-up periods:** 1 year **Methods of analysis:** Narrative and tabulated synthesis	**Outcomes:** 1) After 6 months: 1a) percentage of children under 12 months old (at baseline) vaccinated for TB: relative treatment effect (adjusted difference in percentage points between intervention and control): 5.2 ($p<0.01$) 1b) percentage of children 12-23 months old (at baseline) vaccinated for measles: relative treatment effect = 3.0 ($p<0.05$) 2) After 12 months: 2a) percentage of children under 12 months old (at baseline) vaccinated for TB: relative treatment effect = 1.6 (not significant) 2b) percentage of children 12-23 months old (at baseline) vaccinated for measles: relative treatment effect = 2.8	**Limitations identified by author:** Not reported **Limitations identified by review team:** Only 1 relevant study. Review specifically aimed to examine issues in LMICs **Evidence gaps and/or recommendations for future research:** Cost effectiveness studies to see if providing schools and health care facilities is a more effective allocation of public spending than cash transfers. Better understanding of

their access to health care services" (p.4) **Review design:** SR of various study designs (RCTs, cRCTs, controlled BAs, ITSs)	Information Consortium (HMIC), World Health Organization Library Information System (WHOLIS), MEDCARIB, ADOLEC, FRANCIS, BDSP, USAID database (Medline included in the appendix, but not in the list of databases searched); Websites: UNICEF, USAID and the World Bank, Partnerships for Health Reforms, Abt Associates, Management Sciences for Health (MSH), Oxford Policy Management, Save the Children, Oxfam, and a number of other networks or organisation websites such as The Private Sector Partnerships-One, the Indian Council for Research on International Economic Relations, Equinet - The Network for Equity in Health in				(not significant) **Results on inequalities:** Not reported, but interventions targeted poor families **Sample sizes:** 506 communities **Attrition details:** Not reported	the different pathways through which CCTs work. Explore other potential reasons (beyond financial incentive) that CCT may be effective. Relative effect of CCTs for different levels of incentives or different socio-economic groups **Source of funding:** Bill and Melinda Gates Foundation

	Southern Africa, the Organization for Social Science Research in Eastern and Southern Africa (OSSREA), Institute of Social Studies, The Hague, the University of Southampton, the International Centre for Diarrhoeal Disease Research and the Centre for Health and Population research, Dhaka, the Boston University Institute for Economic Development, Harvard Initiative for Global Health, Cornell Food and Nutrition Policy Programme, the Institute of Development Studies (University of Sussex), the London School of Hygiene and Tropical Medicine (HEFP website), the Institute of Policy Analysis and Research (IPAR) in Kenya, the Development Policy					

	Research Unit of the University of Cape Town, the Netherlands Institute for Southern Africa **Other methods undertaken (e.g., reference checking):** Citation chasing; contacted authors of relevant papers or known experts in the fields of interest to identify additional studies, including unpublished and ongoing studies **Years searched:** 1950-2009 (for Medline) **Inclusion criteria, including study type, country:** Study design: RCT, cRCT, controlled BAs (for RCTs, cRCTs, BAs: if comparison intervention was the provision of the same type of health services (by the same providers), but					

	without offering incentives to the populations to come and use health services) or ITS (if the point in time when the intervention/change occurred was clearly defined; there were at least three or more data points before and after the intervention); low and middle income countries (as defined by World Bank); populations that would potentially utilise health services (individuals, institutions, districts, etc); intervention: direct cash transfers conditional on a certain behaviour or outcome; outcomes: changes in use of health services and changes in health outcomes, health care expenditures and outcomes reflecting changes in equity of					

	access (all measures had to be objective) **Exclusion criteria:** In-kind transfers; Unconditional transfers; Distance travelled or travel time (as an outcome); Outcomes measured by description of attitudes, beliefs or perceptions **Number of studies included:** 6 (4 RCTs, 2 controlled BAs) **Number of relevant studies included:** 1 cRCT (of which one report out of 5 reports on relevant outcomes)					

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Lam et al. **Year:** 2010 **Citation:** Lam, P., Chambers, L.W., Pierrynowski MacDougall, D.M., et al., 2010. Seasonal influenza vaccination campaigns for health care personnel: Systematic review. *Canadian Medical Association Journal.* 182(12), E542-E548. **Aim of the review:** "to determine which influenza vaccination campaign or campaign components in health care settings were significantly	**Databases and websites searched:** MEDLINE, EMBASE, CINAHL, Science Citation Index Expanded (Web of Science), Database of Abstracts of Reviews of Effects, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials and Proquest **Other methods undertaken (e.g., reference checking):** Keyed the titles of relevant articles into the PubMed "related articles" feature to identify similar reports **Years searched:** 1950-2009 (for Medline) **Inclusion criteria, including study type, country:** 1)	**Included population/s:** Healthcare personnel **Excluded population/s:** Not reported **Setting of included studies:** Long-term care facilities (n=5), hospitals (n=7) and primary health care settings (n=1; study also had long-term care facility included); USA, Canada, UK, Germany, Switzerland **Characteristics of population/s:** Non-hospital	**Intervention/s description:** Non-hospital settings: education or promotion, improved access to the vaccine, legislation or regulation, and/or role models; Hospital settings: education or promotion, improved access to the vaccine, measurement with feedback, and legislation or regulation detail on each intervention provided in Table 2 **Control/comparison/s / description:** Varied: no intervention; general letter, free vaccination, routine information, promotional material, vaccination cart Table 2 with specifics for each intervention	**Outcomes:** Influenza vaccination rates outcomes; ascertained through self-reporting and reporting by the vaccine provider (non-hospital based studies), tracking by the vaccine provider and/or mandatory self-reporting (hospital based studies) (specifics for each intervention in Table 2) **Follow-up periods:** Not reported	**Outcomes:** Non-hospital settings (4 cRCTs and 1 BA, 9 comparisons): 8 of the 9 campaigns the health care personnel in the intervention groups were more likely to be vaccinated than those in the control groups (for successful campaigns RRs ranged from 1.80 (95% CI: 1.33-2.43) - 8.05 (95% CI 6.30-10.30); unsuccessful campaign (cRCT) RR 1.04 (95% CI 0.81-1.35); Campaigns with more components had higher risk ratios (i.e., favouring the intervention group). Hospital settings (7 studies—2 RCTs, 3 BAs with controls, 2 ITSs, 16 comparisons): mixed results: 3 of 8 (from 1 BA and 1 RCT) comparisons involving educational or	**Limitations identified by author:** Inability to pool data across studies because of heterogeneity in study methods and campaign components. Study methods had several risks of bias that might have generated misleading results, such as lack of comparable baseline characteristics across study groups. Did not assess the impact of pandemic influenza programs **Limitations identified by review team:**

associated with higher rates of influenza vaccination among staff" (p.E542) **Review design:** SR of effectiveness studies (various study designs: RCTs, cluster RCTs, controlled before-and-after studies and interrupted time series designs)	intervention: influenza vaccination campaigns for health care personnel (organized efforts to promote greater vaccination coverage among staff members 2) had to report the percentage or number of health care personnel who received the influenza vaccine as an outcome measure 3) randomized controlled trials, cluster randomized controlled trials, controlled before-and-after studies (at least one comparison group, with one observation point before and another point after implementation of the intervention) and interrupted time series (clear time point at which the intervention was implemented; minimum of five pre-intervention	setting: physicians, nurses, nursing assistants, housekeeping staff, technicians, other professionals and administrators; Hospital setting: medical residents, nurses, physicians, other professionals, administrators, housekeeping staff and volunteers. No demographic or other information **External validity score:** +		**Methods of analysis:** Narrative synthesis and tabulated results	promotional campaigns alone the results showed sig intervention effect (for successful campaigns RRs ranged from 1.11 (95%CI 1.02-1.21) - 2.71 (95% CI 1.53-4.81)); 1 BA showed sig adverse effect (RR 0.86 (0.80-0.92)); 4 showed no sig effect (from 2 RCTs) (RRs from 1.03 (0.80-1.32) - 1.78 (0.80-3.96)); 2 of 3 comparisons involving campaigns with educational or promotional components combined with improved access to the vaccine staff in the intervention group were more likely to be vaccinated than those in the control group (for successful campaigns, RRs: 1.64 (95% CI 1.49-1.80) and 1.20 (95% CI 1.11-1.30) (from 2 BAs); for unsuccessful campaign (1 BA) RR 1.13 (95% CI 0.98-1.31) ; 2 ITSs studies legislation	Methodologically sound review. Limited information on population or context **Evidence gaps and/or recommendations for future research:** Need rigorously designed studies assessing the effect of various campaign components **Source of funding:** Ontario Ministry of Health and Long-Term Care Additional support: Élisabeth Bruyère Research Institute, The Ottawa Hospital, the Ottawa Hospital Research Institute, the Canadian Center for Vaccinology, the University of

	observations must have been recorded or, for studies with a shorter duration, a minimum of three pre- and post-intervention points must have been recorded) **Exclusion criteria:** 1) studies that did not describe the study population or did not report ascertainment of vaccination status 2) studies involving other vaccines (other than seasonal influenza) **Number of studies included:** 12 (2 RCTs, 4 cRCTs, 4 BAs with a control, 2 ITSs) **Number of relevant studies included:** 12 (2 RCTs, 4 cRCTs, 4 BAs with a control, 2 ITSs)				or regulation components were integrated into the overall campaigns: where staff completed a mandatory electronic declination form vaccination coverage increased to 55% (previous 9 years rates ranged from 21% to 38%), when unvaccinated personnel were required to wear masks vaccination rates increased from 33% to 52% (significance not reported) All RRs presented in Figure 2, p.E547 **Results on inequalities:** Not reported **Sample sizes:** 141-7,747 **Attrition details:** Not reported	Ottawa and the Canadian Institutes of Health Research (CIHR) First author: Frederick Banting and Charles Best Canada Graduate Scholarship from CIHR; also enrolled in Ontario Training Centre in Health Services and Policy Research (partially funded by CIHR)

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Lau et al. **Year:** 2012 Citation: Lau, D., Hu, J., Majumdar, S. R., Storie, D. A., Rees, S. E., Johnson, J. A., 2010. Interventions to improve influenza and pneumococcal vaccination rates among community-dwelling adults: a systematic review and meta-analysis. *Annals of Family Medicine 10*(6):53-546. **Aim of the review:** "We systematically reviewed the effectiveness of quality improvement interventions for	**Databases and websites searched:** Medline, EMBASE, Cochrane Library, Scopus, Web of Science, AARP Ageline, PsychInfo, Social Policy and Practice, and CINAHL **Other methods undertaken (e.g., reference checking):** Searched references from previous reviews and included studies **Years searched:** Inception-August 2010 **Inclusion criteria, including study type, country:** 1) English language studies 2) published in peer-reviewed journals 3) elderly adults or adults with chronic diseases 4) quality improvement	**Included population/s:** Elderly adults or adults with chronic diseases **Excluded population/s:** Various **Setting of included studies:** Academic primary care practices (n=41), community practices (n=21), managed care organizations (n=13), Medicare-affiliated organizations (n=11), Veterans Affairs medical centres (n=8), few	**Intervention/s description:** Audit and feedback (n=13); Case management (n=6); Clinician education (n=18); Clinician reminders (n=40); Community engagement (n=3); Continuous quality improvement (or similar) (n=9); Delivery site change (n=9); Financial incentive (clinicians) (n=4); Financial incentive (patients) (n=4); Patient outreach (n=72); Team change (n=26); Visit structure change (n=1) NB: detailed description of all 77 studies in Appendix A **Control/comparison/s / description:** Majority 'usual care'	**Outcomes:** Pneumococcal and/or influenza vaccination rates (unclear how ascertained) **Follow-up periods:** 1 week-4.5 years (most, but not all studies' follow-up periods reported) **Methods of analysis:** Random effects meta-analyses	**Outcomes:** Pooled odds ratio for effectiveness of all quality improvement interventions for either vaccination was 1.61 (95% CI, 1.49-1.75; P <.001; I2 = 85% - influenza vaccination: pooled across all interventions (65 studies, 93 comparisons) OR was 1.46 (95% CI, 1.35-1.57; I2 = 81%) -effect of quality improvement interventions on influenza vaccination rates (ORs and 95% CIs): a) community engagement (2 comparisons from 1 CCT and 1 cluster CBA) 3.00 (1.28-7.03); b) visit structure change (1 comparison from 1 CCT) 2.44 (1.42-4.20); c) financial incentives-patient (5 comparisons from 3 CCTs and 1 cluster RCT) 1.98 (1.54-	**Limitations identified by author:** Potential publication bias, which may have led our pooled odds ratios to be overly optimistic. Did not address the economic value of the interventions. Included studies may not generalize well to nonelderly adults or adults not in a physician's care. Highly inclusive approach toward meta-analysis (had problems with high prevalence of design or reporting flaws in the included studies and many pooled estimates contained residual

increasing the rates of influenza and pneumococcal vaccinations among community-dwelling adults" (p.538) **Review design:** SR and MA of effectiveness studies	intervention 5) featured a parallel control group 6) reported influenza or pneumococcal vaccination rates 7) community setting 8) sufficient data to estimate log odds ratios (ORs) and standard errors **Exclusion criteria:** Studies taking place in acute or long-term care (hospitals, nursing homes) **Number of studies included:** 77 (56 RCTs or quasi-RCTs; 7 controlled before-after studies; 12 observational studies) [only adds up to 75] **Number of relevant studies included:** 77 (56 RCTs or quasi-RCTs; 7 controlled before-after studies; 12 observational studies) [only adds up	studies at non-clinical sites such as senior centres or workplaces US (n=82), Canada (n=9), UK (n=6) **Characteristics of population/s:** Elderly alone (n=54), elderly and high-risk non-elderly patients (n=27) **External validity score:** +			2.56); d) audit and feedback (4 comparisons from 2 cluster RCTs and 1 prospective cohort) 1.83 (1.28-2.61); e) case management (4 comparisons from 2 RCTs, 1 CCT, 1 retrospective cohort) 1.66 (0.81-3.43); f) clinical reminders (30 comparisons from 8 cluster RCTs, 4 CCTs, 3 RCTs, 2 prospective cohorts, 3 retrospective cohorts, 1 cluster prospective cohort, 2 CBAs, 1 cross-over cluster RCT) 1.53 (1.26-1.85); g) financial incentives-clinical (3 comparisons from 1 CCT, 1 RCT, 1 CBA) 1.52 (1.20-1.93); h) team change (20 comparisons from 3 retrospective cohorts, 1 prospective cohort, 1 CBA, 3 CCTs, 6 cluster RCTs, 4 RCTs, 1 cluster prospective cohort) 1.44 (1.16-1.79); i) patient outreach (59	heterogeneity) **Limitations identified by review team:** Write-up gives limited detail on intervention content or populations; in some cases this is recoverable from evidence tables, but can't be readily reintegrated into the synthesis **Evidence gaps and/or recommendations for future research:** Develop and evaluate more potent approaches and to better understand how and why they work **Source of funding:**

	to 75]				comparisons from 16 CCTs, 8 RCTs, 2 retrospective cohorts, 1 prospective cohort, 9 cluster RCTs, 3 CBAs, 1 cluster CBA, 1 cluster prospective cohort) 1.42 (1.30-1.55); j) delivery site change (6 comparisons from 3 cluster RCTs, 1 CCT, 1 CBA) 1.32 (1.14-1.52); k) continuous quality improvement (2 comparisons from 1 cluster RCT and 1 cluster CBA) 0.99 (0.94-1.04); l) clinical education (8 comparisons from 1 RCT, 3 cluster RCTs, 1 CBA, 1 cluster CBA, 1 prospective cohort) -pneumococcal vaccination: pooled across all interventions (35 studies, 48 comparisons) OR was 2.01 (95% CI, 1.72-2.36; I2 = 72%). -effect of quality improvement interventions on pneumococcal	Studentships, salary awards, and operating grants from Alberta Innovates – Health Solutions, Canadian Institute of Health Research (Institute of Nutrition, Metabolism, and Diabetes), and the Canada Research Chairs; first author: MD/PhD studentships from the Canadian Institutes of Health Research (CIHR) and Alberta Innovates – Health Solutions (AIHS); second author: AI-HS; last author: AI-HS and holds a Canada Research Chair in Diabetes Health Outcomes; grant from Alberta Health and

					vaccination rates (ORs and 95% CIs): a) financial incentives-clinical (1 comparison from 1 RCT) 7.43 (2.25-24.53); b) visit structure change (1 comparison from 1 CCT) 2.25 (1.30-3.92); c) clinical reminders (27 comparisons from 10 cluster RCTs, 2 prospective cohorts, 3 CCTs, 2 RCTs, 2 cluster CBAs, 1 retrospective cohort, 1 CBA) 2.13 (1.50-3.03); d) team change (14 comparisons from 3 RCTs, 5 cluster RCTs, 2 CCTs, 1 prospective cohort, 1 retrospective cohort) 2.09 (1.48-2.95); e) continuous quality improvement (2 comparisons from 1 cluster RCT and 1 cluster CBA) 1.86 (0.66-5.21); f) patient outreach (26 comparisons from 6 CCTs, 5 cluster RCTs, 3 RCTs, 1 cluster CBA, 1	Wellness and a CIHR Team Grant to the Alliance for Canadian Health Outcomes Research in Diabetes (ACHORD), sponsored by the CIHR Institute of Nutrition, Metabolism and Diabetes

					cluster prospective cohort, 1 retrospective cohort, 2 prospective cohorts, 1 CBA) 1.80 (1.54-2.11); g) community engagements (2 comparisons from 1 CCT and 1 cluster prospective cohort) 1.78 (1.00-3.17); h) delivery site change (1 comparison from 1 prospective cohort) 1.66 (1.59-1.74); i) clinical education (7 comparisons from 1 CCT, 2 prospective cohorts, 2 cluster CRCTs, 1 RCT) 1.54 (1.19-1.99); j) case management (3 comparisons from 1 CCT, 1 RCT, 1 retrospective cohort) 1.49 (1.05-2.13); k) audit and feedback (3 comparisons from 2 cluster RCTs, 1 prospective cohort) 1.18 (0.57-2.45) NB: results of meta-analyses within substrata of patient	

					outreach and team change also available, as well as numbers needed to treat **Results on inequalities:** Not reported **Sample sizes:** 107-134,791 (most, but not all studies' sample sizes reported) **Attrition details:** Not usually specified, but available for some studies in Appendix B	

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Lewin et al. **Year:** 2010 Citation: Lewin, S., Munabi-Babigumira, S., Glenton, C., et al., 2010. Lay health workers in primary and community health care for maternal and child health and the management of infectious diseases. *Cochrane database of Systematic Reviews.* 3. **Aim of the review:** "To assess the effects of lay health worker interventions [LHW] in primary and community health care on	**Databases and websites searched:** CENTRAL (including EPOC and Consumers and Communications Group trial registers); MEDLINE; MEDLINE In-Process; EMBASE; AMED; British Nursing Index; CINAHL; POPLINE; WHOLIS **Other methods undertaken (e.g., reference checking):** Reference lists of included studies and relevant reviews; contact with authors of included studies; studies citing included studies (on SCI / SSCI) **Years searched:** 1950-February 2009 (for MEDLINE) **Inclusion criteria, including study type, country:** Study type: RCTs; Type of	**Included population/s:** Any LHW delivering services to any population **Excluded population/s:** Not reported **Setting of included studies:** Outreach / home visiting (n=6); primary care (n=1) USA (n=5), Turkey (n=1), Ireland (n=1) **Characteristics of population/s:** All conducted with low-SES populations. Further detail from individual	**Intervention/s description:** Home visiting, reminders for vaccination, various social and practical support, guidance on accessing services and preventive health. One intervention also involved working with primary care physicians. All interventions also involved training of LHWs to deliver intervention **Control/comparison/s / description:** Most usual care / no intervention; some routine reminders	**Outcomes:** Vaccination schedule up-to-date **Follow-up periods:** 3-24 months **Methods of analysis:** Narrative synthesis and random-effects meta-analysis	**Outcomes:** Pooled effect size (6 RCTs): RR 1.23, 95% CI 1.09 to 1.38; P = 0.0006. (One RCT excluded from this analysis as did not present data.) **Results on inequalities:** All studies conducted in disadvantaged populations **Sample sizes:** 244-3,050 **Attrition details:** Not reported for most studies	**Limitations identified by author:** Poor database indexing for these interventions may have missed relevant studies. Definitions may be arguable. Considerable heterogeneity in some meta-analyses **Limitations identified by review team:** Methodologically sound review. Overlap with other LHW reviews **Evidence gaps and/or recommendations for future research:** Evaluate which

maternal and child health and the management of infectious diseases." (p6) **Review design:** SR of RCTs	healthcare provider: any lay health worker [LHW] (paid or voluntary) including community healthworkers, village healthworkers, birth attendants, peer counsellors, nutrition workers, home visitors; Population: all; Type of intervention: any delivered by a LHW and intended to improve maternal or child health or the management of infectious diseases; Outcomes: health behaviours, healthcare outcomes, adverse effects, service utilisation, process of care, satisfaction with care, costs, social outcomes **Exclusion criteria:** Any intervention delivered by a formally trained health professional, patient support groups	studies: children <2, most from a mobile Dominican immigrant community in the US; low-income urban people; squatter families; mothers from a low-SES area, most not employed and living in local authority housing; people aged >65, most low-SES and ethnically diverse; children aged 1-14 mo, most Black inner-city, using federally funded health services; children mean 8.5 mo, ethnically diverse, two-				components of multi-component interventions are effective. Evaluate different forms of LHW training; compare LHWs to health professionals. Various methodological recommendations **Source of funding:** Research Council of Norway; German Technical Development; WHO; EU-funded AFDOT project; Medical Research Council of South Africa

	only, teacher- or peer-led programmes in schools, interventions delivered by trained family members; LHWs in non-primary level institutions; 'head-to-head' comparisons of different LHW interventions, multi-component interventions without a comparison allowing assessment of the LHW component **Number of studies included:** 82 RCTs **Number of relevant studies included:** 7 RCTs	thirds in receipt of Medicaid **External validity score:** +				

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Moxey et al. **Year:** 2003 Citation: Moxey, A., O'Connell, D., McGettigan, P., et al., 2003. Describing treatment effects to patients: how they are expressed makes a difference. *Journal of General Internal Medicine*. 18(11), 948-959. **Aim of the review:** "To examine the effect of information framing on treatment decisions" **Review design:** SR of RCTs and non-randomised trials	**Databases and websites searched:** MEDLINE, PsycINFO, CINAHL **Other methods undertaken (e.g., reference checking):** Reviewed reference lists; "Social Science Citation Index and Science Citation Index were examined for articles citing prominent authors who had published articles on framing." **Years searched:** 1966 - August 2002 for MEDLINE **Inclusion criteria, including study type, country:** 1) Published in English; 2) Assigned participants to a framing condition, such as positive (or gain) versus negative	**Included population/s:** All **Excluded population/s:** Not reported **Setting of included studies:** Not reported **Characteristics of population/s:** Not reported **External validity score:** –	**Intervention/s description:** Positively framed information **Control/comparison/s / description:** Not reported	**Outcomes:** Immunisation rates **Follow-up periods:** Not reported **Methods of analysis:** Tabulation, narrative synthesis, random-effects meta-analysis	**Outcomes:** "No effect", full outcome data NR **Results on inequalities:** Not reported **Sample sizes:** Not reported **Attrition details:** Not reported	**Limitations identified by author:** Non-English-language studies excluded. Pooled effect size could not be produced for most questions. Graphical information not included. **Limitations identified by review team:** Tangential to our review question. Very limited information on study methods, contexts, populations or outcomes **Evidence gaps and/or recommendations for future research:** More

	(or loss) frames. Randomized, nonrandomized, and within-subject comparisons were included; 3) Used a verbal or numerical frame format. Articles analyzing the effect of graphical displays on decision making were excluded; 4) Described patients and/or volunteers making either real or hypothetical personal treatment decisions or evaluation **Exclusion criteria:** Not reported **Number of studies included:** 40 **Number of relevant studies included:** 1 RCT					research with behavioural outcomes; various methodological recommendations **Source of funding:** National Health and Medical Research Council (NHMRC) of Australia; University of Newcastle, Australia

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Ndiaye et al. **Year:** 2005 Citation: Ndiaye, S.M., Hopkins, D.P., Shefer, A.M., et al., 2005. Interventions to improve influenza, pneumococcal polysaccharide, and hepatitis B vaccination coverage among high-risk adults: A systematic review. *American Journal of Preventive Medicine*. 28(5S), 248-279. **Aim of the review:** "to evaluate the evidence on effectiveness of [...] interventions to improve vaccination	**Databases and websites searched:** MEDLINE, EMBASE, PsychLit, Sociological Abstracts, CABHealth, HealthSTAR, AIDSLINE, Occupational Safety and Health Database, Educational Research Index [ERIC], PsycINFO, Dissertation Abstracts, and Conference Papers Index **Other methods undertaken (e.g., reference checking):** Not reported **Years searched:** 1980-August 2001 **Inclusion criteria, including study type, country:** (1) published between 1980 and August 2001 as a journal article in English; (2) they	**Included population/s:** Population at risk (defined as people with a range of chronic illnesses or other medical indications; healthcare workers; Alaska Natives and some American Indian populations; people travelling to high-prevalence areas; students; work or family contacts of high-risk individuals; IDUs; MSM; people with >1 sexual partner in previous six months; prisoners; clients and staff	**Intervention/s description:** Clinic-based client education; client reminder systems; client or family incentives; provider reminder systems; provider assessment and feedback; multi-component interventions **Control/comparison/s / description:** Primarily usual care	**Outcomes:** Receipt/rate of vaccinations (some self-report, some unclear how measured) **Follow-up periods:** 2 months-10 years **Methods of analysis:** Narrative analysis and tabulated results	**Outcomes:** Clinic-based client education (n=2): 1 cRCT increases of 2 and 10 percentage points (2 different interventions) in proportion screened or vaccinated for hepatitis B; 1 RCT RR 5.28 (2.8 –9.93) for receipt of pneumococcal vaccinations -client reminder systems (1 RCT): self-reported vaccination for influenza improved by 3.7 percentage points - community education: no studies found -client or family incentives (1 nRCT): hepatitis B vaccination amongst injection drug users: OR 8.43 (3.95–18.0) – vaccination requirements, reducing out-of-pocket costs, expanding access in healthcare settings: no studies found -provider	**Limitations identified by author:** Evidence on effectiveness was not stratified by targeted vaccine or by targeted indications. Conceptual categories adopted for this review consolidate the evidence on effectiveness (or ineffectiveness) of the specific interventions within that category. Category-based conclusions on effectiveness support a significantly greater number of specific intervention combinations

coverage in targeted populations (those with risk factors that make them particularly susceptible to a disease" (p.248) **Review design:** SR of effectiveness of interventions	evaluated an intervention to deliver influenza, pneumococcal polysaccharide, or hepatitis B vaccinations in a population at risk, or included information on risk populations (subsets) as part of a larger vaccination effort; and (3) outcome measurements included changes in vaccination coverage **Exclusion criteria:** Not reported **Number of studies included:** 35 (15 RCTs, 3 cRCTs, 2 non-randomised trials, 2 cluster non-randomised trials, 3 retrospective cohort studies, 6 time series studies, 4 other designs with concurrent	of institutions for the developmentally disabled) **Excluded population/s:** Not reported **Setting of included studies:** US (n=29), Canada (n=3), Netherlands (n=2), Switzerland (n=1) academic clinics/hospitals, family practice clinics **Characteristics of population/s:** Patients with various chronic conditions; hospital inpatients; physicians and healthcare workers; IDUs; some study			reminder systems (n=7,4 RCTs, 2 retrospective cohorts, 1 TS) all influenza or pneumococcal polysaccharide vaccines; median improvement in vaccination coverage of 17.9 percentage points (range -1 to 72) - provider education: no studies found -provider assessment and feedback (1 TS) vaccination coverage among at-risk patients improved by 32 percentage points for influenza vaccine and 18 percentage points for pneumococcal polysaccharide vaccine - multicomponent interventions (n=23): a) interventions combined within a single category of community demand (1 RCT) change in percentage points +13.6; b) interventions combined within a single category of provider- or system-	than were demonstrated in the qualifying studies **Limitations identified by review team:** Methodologically sound. Limited information on context of interventions. 'High-risk' does not always discriminate medical indications (e.g. chronic diseases) from behavioural or socio-demographic indications. Intervention categories are counter-intuitive [have been rearranged somewhat from evidence tables for this review]. **Evidence gaps**

	comparison group) **Number of relevant studies included:** 35 (15 RCTs, 3 cRCTs, 2 non-randomised trials, 2 cluster non-randomised trials, 3 retrospective cohort studies, 6 time series studies, 4 other designs with concurrent comparison group)	populations defined as 'high-risk patients' but not further specified; limited demographic information provided **External validity score:** +			based (n=1, other design with concurrent comparison) change in percentage points +11; c) interventions combined across two conceptual categories community demand and provider-or system-based (n=5, 1 retrospective cohort, 1 RCT, 1 TS, 1cRCT, 1 other design with concurrent comparison) change in percentage points +3.7 (range -2 to +28.9); d) interventions combined across two conceptual categories: community demand and enhanced access (n=9, 6 RCTs, 2 other designs with concurrent comparison, 1 TS) median change in percentage points +14 (range +3.1 to +46); e) interventions combined across two conceptual categories: provider- or system-based and enhanced access (n=3, 1 TS, 1 group non-	**and/or recommendations for future research:** Numerous areas for future research discussed including: future research questions, economic efficiency and implementation **Source of funding:** Presumably the CDC

					randomised trial, 1 RCT) median change in percentage points +27.8 (range -0.5 to 31); f) interventions combined across all three conceptual categories (n=4, 1 group non-randomised trial, 1 TS, 1 cRCT, 1 individual non-randomised trial) median change in percentage points +22.8 (range -5.9 to +67) significance only reported for some individual studies (see Appendix A) **Results on inequalities:** Not reported **Sample sizes:** 78-24,743 **Attrition details:** Reported only sporadically	

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Tuckerman et al. **Year:** 2009 **Citation:** Tuckerman J, Rajesh S, Oeppen C, Balachander N, Bancsi A, Jacklin P, Banerjee J, Clegg A, Mugglestone M. (2009). Reducing differences in the uptake of immunisations (including targeted vaccines) in children and young people aged under 19 years: systematic review of effectiveness and cost-effectiveness evidence. London: National Collaborating Centre for Women[1]s and	**Databases and websites searched:** Databases: Medline, Embase, Cumulative Index to Nursing and Allied Health Literature, PsycINFO, Sociological Abstracts, Applied Social Science Index and Abstracts, Educational Resources Information Centre, Cochrane Library (Cochrane Database of Systematic Reviews and the Database of Abstracts of Reviews of Effectiveness,) EPPI-Centre databases, Campbell Collaboration, Econlit, Health Economics Evaluation Database, Health Technology Assessment, NHS Economic Evaluation Database Websites: American Academy of Pediatrics, Canadian Coalition for	**Included population/s:** Children and young people aged under 19 years (and by extension, if target population included parents/carers of children and young people aged under 19 years, health professionals and practitioners with a responsibility for children and young people aged under 19 years, or the young people themselves) **Excluded population/s:** Not reported	**Intervention/s description:** Reminder/recall systems: written reminders (letters, postcards), telephone reminders (personal or automated) or a combination of written and telephone reminders; Home-visit interventions: healthcare professional or trained community support worker visiting parents in their homes to discuss immunisation; Client or family incentives: payments (financial benefits) are linked to immunisation and schemes where parents are provided with personalised cards for tracking immunisations; Vaccination programmes in school (or day care):	**Outcomes:** Vaccination rates/up-to-date with vaccinations for various vaccines (DTP, OPV, Hib, Hep B, BCG, MMR, universal vaccination schedule in Australia, polio, varicella); cost-effectiveness **Follow-up periods:** Up to 8 years **Methods of analysis:** Narrative analysis	**Outcomes:** 1) Reminder/recall systems: 1a) mixed evidence from 3 RCTs of effectiveness of reminder/recall interventions targeting children < 2 years not up-to-date with the recommended vaccination schedule: 1st (postal reminder) NS difference in the proportion of babies up-to-date with primary immunisations or MMR; 2nd (reminder postcards plus telephone) mixed results depending on the age of the child (sig improvements in children over 12 months, NS is children 7-9 months); 3rd (automated telephone messages or letters alone or in combination) improved vaccination uptake 1b)	**Limitations identified by author:** Lack of sufficient evidence in some areas interventions were frequently evaluated using designs that were more prone to bias and/or confounding. Timeliness of the research reported (in terms of its relevance to the current context of immunisation in the UK) was somewhat limited. Quality of cost-effectiveness studies was generally poor. General lack or recognition (or reporting) of the role of population immunity in

Children[1]s Health (NCC-WCH). **Aim of the review:** "to provide a systematic review of evidence relating to effectiveness and cost effectiveness of interventions that seek to reduce differences in the uptake of immunisations in children and young people aged under 19 years" (p.40) **Review design:** SR of effectiveness and cost-effectiveness studies	Immunization Awareness and Promotion, Canadian Pediatric Society, Centers for Disease Control and Prevention, Department of Health, DIPEX-personal experiences of health and illness, European Centre for Disease Prevention and Control, Eurosurveillance, Evidence for Social Policy and Practice Co-ordinating Centre, Health Evidence Bulletins Wales, Health Protection Agency, Health Protection Scotland, Immunisation Advisory Centre, Immunise Australia, Intute (previously OMNI), National Centre for Immunisation Research and Surveillance, NHS Quality Improvement Scotland, NHS Wales,	**Setting of included studies:** USA, Australia, UK, Canada, Ireland, Switzerland, Finland, Italy hospitals, schools, primary care centres, homes, communities **Characteristics of population/s:** Children under 2; children 2-7; young people; babies of teenage black and minority ethnic group mothers; babies of low socio-economic status families; children not up-to-date with immunisation schedule; babies of black and minority ethnic	legislative interventions requiring children to show proof of vaccination status for entry to school; routine checking of immunisation status by school nurses; delivery of vaccinations in the school setting; and educational initiatives that seek to inform studies on vaccine-preventable diseases; Provider-based interventions: education and training about vaccinations (e.g. in relation to the universal [routine] immunisation schedule and targeted vaccines such as Hep B and BCG), reminders to GPs about children who are overdue for immunisations and service redesign; Provision of child vaccination information to service providers; Opportunistic		mixed evidence from 3 RCTs of effectiveness of reminder/recall interventions targeting children aged 2-7 years not up-to-date with the recommended vaccination schedule: 1st and 2nd (telephone and postal reminders either alone or together) significantly more likely to be immunised or brought up-to-date; 3rd (postal reminders) not effective 1c) 1 RCT review of medical records plus delivery of automated reminder telephone calls to families of young people aged 11-14 years who were behind on vaccinations: significantly improved Hep B vaccination uptake, NS increase in uptake of Td booster uptake 1d) 1 RCT baby clinic for black, adolescent first-time mothers focusing on immunisations with	determining cost effectiveness of interventions. All cost-effectiveness studies conducted in USA so may have limited applicability to UK setting **Limitations identified by review team:** All studies described individually with large amounts of detail, overall hard to extract useful data on effectiveness for the entire group of studies **Evidence gaps and/or recommendations for future research:** Gaps in evidence: maintaining and improving information systems for recording

	Public Health Organization of Canada, Scottish Intercollegiate Guidelines, Network Vaccine Education Center, Philadelphia Children's Hospital, World Health Organization **Other methods undertaken (e.g., reference checking):** Asked experts in the field (asked for published or unpublished studies); asked registered stakeholder organisations to submit evidence - Asked members of PHIAC to submit evidence **Years searched:** Open-2008 (but articles prior to 1988 excluded thereafter) **Inclusion criteria, including study type,**	group families; babies of teenage mothers; babies of illicit drug users; school-aged children; healthcare providers; children/young people under 17; hospitalised children **External validity score:** +	vaccinations; National immunisation programmes; Multi-component interventions: most common components being patient tracking, reminder/recall, information/education and outreach work/home visits **Control/comparison/s / description:** Frequently no intervention, but varied		reminder calls and letters after missed appointments significantly increased the proportion of children who were up-to-date for immunisations 1e) mixed evidence from 3 RCTs of effectiveness at increasing immunisation uptake of reminder/recall interventions targeting families of low socio-economic status: 1st (reminder postcards/follow-up cards/calls if appointment missed) significantly increased the number of babies up-to-date with immunisations; 2nd (postcard and telephone reminders) significantly increased vaccination coverage in babies who were not up-to-date at baseline, NS difference in overall vaccination coverage rates; 3rd (computer-	immunisation coverage. Process evaluation outcomes; polio vaccine delivered specifically as IPV. Economic evaluations of interventions designed to improve uptake of DTP, Hib, PCV, MenC or BCG; economic evaluations of interventions in UK to support uptake of immunisations **Source of funding:** National Institute for Health and Clinical Excellence

	country: Population: children and young people aged under 19 years (and by extension, if target population included parents/carers of children and young people aged under 19 years, health professionals and practitioners with a responsibility for children and young people aged under 19 years, or the young people themselves); Intervention: interventions seeking to reduce differences in the uptake of universal or targeted immunisations in children and young people aged under 19 years; Comparator: compared interventions of interest with a no-intervention control or another intervention; Outcomes: increased				generated telephone calls) NS difference in number of children vaccinated within 1 month of call 1f) mixed evidence 2 RCTs and 1 NRCT of effectiveness of universal reminder/recall interventions for children aged under 2 years: 1st and 2nd (1 RCT and 1 nRCT, postcards or computer-generated telephone messages) improved uptake of DTP, OPV, Hib and MMR; 3rd RCT (health message or a message reminding parents that vaccination was compulsory) had NS impact on vaccine coverage 2) Home-visit interventions: 2a) 1 RCT home vaccination service for children who were behind on the recommended immunisation schedule significantly improved vaccination coverage 2b) community-	

	or decreased rates of immunisation and differential impact across population subgroups; increased or decreased rates of initiation and/or completion of the recommended immunisation schedule within the recommended timeframe (initiation/completion of age-appropriate immunisations); cost effectiveness of interventions to reduce differences in the uptake of immunisations and variations in cost effectiveness depending on how close the target population was to optimal uptake; impact on barriers to the uptake of immunisations; adverse or unintended outcomes of interventions to				outreach home visits: 1 BA study significantly improved children's vaccination coverage; 1 RCT (several visits and advise/support) as effective at ensuring age-appropriate immunisations regardless of whether it is delivered on a one-to-one basis or a group basis 2c) 1 RCT (community outreach home visits and nurse visits for pregnant black and minority ethnic group) increased vaccination rates (significance levels not reported) in babies at 12 months 2d) 1 RCT (intensive home visits for pregnant adolescents) significantly improved vaccination uptake at age 12 months; at 24 months intervention group less likely than control group to be up-to-date with immunisations (but	

	reduce differences in the uptake of immunisations; views and experiences of children, young people, parents/carers, health professionals and/or practitioners in relation to immunisation and interventions to reduce differences in the uptake of immunisations; process outcomes (characteristics of interventions), including content, method, timing and place of delivery, duration and length of follow-up, professional involvement, parental involvement, community involvement and cost); differences in expected mortality and morbidity between immunised and unimmunised groups, including data				large loss-to-follow up) 2e) 1 RCT (regular home visits to new mothers who were illicit drug users NS increase age-appropriate vaccination rates of newborns at 2, 4 or 6 months 3) Client or family incentives: 3a) mixed evidence from three studies of effectiveness of client/family (dis)incentives at increasing uptake of immunisations in children of low-income families: 1st RCT One RCT (linking receipt of benefit payments to proof of up-to-date immunisation) significantly increased immunisation rates; 2nd RCT and 3rd NRCT Conversely, two studies (welfare benefits or a personalised calendar) no improvement in vaccination uptake 3b) 1 case-control study: children significantly more likely to be	

	on health-related quality of life of children and young people having contracted a disease being immunised against; barriers and levers to implementation of interventions to reduced differences in uptake of immunisations; Study designs: systematic reviews and meta-analyses, RCTs, NRCTs, cohort studies, controlled before and after studies, before and after studies, interrupted time series, case-control studies, cross-sectional, longitudinal studies/surveys, qualitative research, process or outcome evaluations, cost effectiveness analyses, cost benefit analyses, cost consequence analyses, cost minimisation analyses,				immunised if parents were aware of, and had applied for, two national Government-funded immunisation-linked incentive schemes (maternity immunisation allowance and child care benefit) 4) Vaccination programmes in school (or day care 4a) 1 RCT (letters and follow-up phone calls) for pre-school children not up-to-date with their vaccinations was effective at increasing uptake of immunisations (but large loss-to-follow up) 4b) 5 studies (2 BAs, 2 cohorts, 1 cross-sectional) that policies requiring vaccinations for school or day care entry are effective at increasing immunisation coverage: 1st BA significant increase in MMR and Hep B vaccination; 2nd BA NS increase in	

	or costing studies **Exclusion criteria:** 1) published before 1988 were excluded 2) non-English articles 3) articles published as abstracts only 4) articles not held by the British Library 5) population: target population of those receiving immunisations was children and young people in developing countries or people aged at least 19 years 6) interventions: setting of national immunisation strategies, policies, priorities and targets selective vaccination of young people at occupational risk of infection; selective vaccination of children and young people travelling to countries with increased prevalence of infectious agents;				immunisation; 3rd and 4th cohort studies found increase in Hep B coverage (but not other vaccinations in one study); 5th cross-sectional found in states with day care entry requirements, significantly more children had received three or more doses of Hep B vaccine compared with states without an entry requirement; 1 cohort study policy was effective at reducing differences in coverage between different ethnic groups; 1 BA legislation requiring schools to ask that school immunisation certificates be provided as evidence of immunisation at the time of enrolment did not increase the number of students providing the certificate, although in those that did provide	

	selective vaccination of children and young people clinically at risk of infection with vaccine-preventable diseases as a result of underlying medical; interventions seeking to increase uptake of single-antigen vaccines for measles, mumps and rubella 7) Where sufficient high-quality and up-to-date evidence considered to be generalisable to the UK was found for a particular aspect of the review, older studies and/or those based on weaker methodological designs were excluded 8) Articles that reported neither intervention studies nor outcomes relating to views and experiences of children, young people, parents/carers, health professionals and/or					certificates the proportion that were completely immunised increased significantly 4c) 1 cRCT (school Hep B education programme) did not increase uptake of Hep B vaccine 5) Provider-based interventions: 5a) 4 studies (1 ITS and three BAs; education and training for health professionals in implementation of targeted neonatal BCG vaccination policies) were effective at increasing the proportion of at-risk neonates that received timely vaccination 5b) 2 studies (1 ITS 1and 1 BA; provider reminder systems) effective at increasing the proportion of at-risk babies who receive BCG vaccination and the proportion of babies of low-income families that receive routine primary vaccinations	

	practitioners **Number of studies included:** 155 **Number of relevant studies included:** 103				(DTP/OPV) within recommended timeframe 5c) 1 cRCT ('continuing medical education' programme) did not significantly improve age-appropriate immunisation rates compared with control clinics (but likely confounding in study) 5d) 1 BA study (implementation of a physician leadership model) significantly increased the proportion of babies aged up to 24 months who were up-to-date with the recommended vaccination schedule 5e) 1 cohort study (provider continuity) significantly more likely to be up-to-date with the recommended immunisation schedule by ages 7 and 12 months 5f) lack of quantitative evidence on the effectiveness of interventions that focus	

					on provision of provider incentives for increasing immunisation uptake; 8 studies (all BA) assessing the impact of national multi-component incorporating provision of immunisation-linked provider incentives found that the campaign resulted in higher practice coverage rates and an increase in age-appropriate vaccination coverage 6) Provision of child vaccination information to service providers 6a) 2 studies (1 RCT and 1 BA) provision of immunisation status information alone, for children at-risk of being unimmunised or behind on the recommended immunisation schedule is not effective at increasing immunisation uptake; 1st RCT (non-directive phone call) NS no significant difference	

					in the proportion of children aged under 2 years who were brought up-to-date with their immunisation schedule; 2nd BA (provision of detailed immunisation history to senior social service managers) for all looked after children registered with an authority was ineffective at increasing uptake of primary, pre-school and school-leaving booster vaccinations in these children 7) Opportunistic vaccinations 7a) 2 studies (1 RCT and 1 NRCT) of effectiveness of GP-based opportunistic vaccination for increasing vaccine uptake; 1st RCT (marking notes with vaccine requirements for appointments for children aged 0-2 years) NS difference; 2nd NRCT (active identification	

					and vaccination of all children requiring vaccinations at every clinic visit) significant increases in the percentage of children age-appropriately immunised with intervention 7b) 7 studies (5 BAs, 1 RCT, 1 cohort) hospital-based opportunistic immunisation strategies are effective for increasing uptake of recommended vaccinations in children admitted to hospital; 1st RCT (hospital sent letter to primary care provider or vaccinated before discharge) found fewer children remained under-immunised after discharge, but NS; 2nd and 3rd BAs (hospital-based vaccination) for children (aged 0-2 years) who were either under-immunised or from predominantly low-income families	

					significantly increased the proportion of children who were age-appropriately immunised and reduced the number of missed opportunities for vaccination; 4th BA (training of health professionals and vaccination of under-immunised children) number of vaccinations provided significantly increased in paediatric wards, but not emergency departments; 5th and 6th BA (hospital-based vaccination) some children were successfully brought up-to-date with the recommended vaccination schedule, one study found that some carers refused; 7th cohort (hospital-based vaccination) for pre-school children not up-to-date with the recommended immunisation schedule	

					on admission to the emergency department significantly decreased on discharge after hospital-based vaccination, at 6th months difference NS 7c) 2 NRCTs (verbal reminder, sometimes follow-up letter to primary care provider) for parents of children identified on admission to hospital as being not up-to-date with the recommended immunisation schedule was effective at encouraging vaccination within 30 days 7d) 1 cohort study (Hep B vaccination offered at school) results in higher uptake compared with offering them in community settings during weekends and evenings 7e) 1 ITS (offer Hep B vaccination) for all injecting drug users (aged 16-20 years) who were inmates of youth offender institutions	

					and prisons, significantly increased uptake 8) National immunisation programmes 8a) 9 studies show evidence that multicomponent national immunisation campaigns are effective at increasing uptake of vaccinations; 8 BAs of campaigns showed higher practice coverage rates and an increase in age-appropriate vaccination coverage; 1 BA (MMR campaign) increased MMR vaccination coverage from 87.4% to 96.4%; 1 study (design not specified) coverage improved more in areas with low socio-economic status compared with areas with high socioeconomic status and, that coverage improved along a gradient from highly accessible areas to those that were more	

					remote 9) Multicomponent interventions: 9a) 1 cohort study (multicomponent intervention) for children not up-to-date with vaccinations significantly increased completeness rates for the recommended vaccination series; completeness rates for those in the intervention group were also significantly higher for those who received a home visit 9b) 1 RCT (multicomponent intervention) not effective in increasing vaccination rates 9c) strong evidence from 10 studies that targeted multicomponent community-based interventions are effective at increasing uptake of childhood immunisations; 4 RCTs and 4 BAs (targeted multi-component intervention) increased	

					the number of children who were up-to-date with the recommended vaccination series or who received vaccinations, at least in the short term (6 months to 1 year); 1 cRCT targeting children from black, low-income families, significantly improved uptake of immunisations to age 9 months, NS difference at 12 months but large loss-to-follow up; 1 NRCT One NRCT looked at two strategies amongst Vietnamese-American parents and both significantly increased uptake of Hep B vaccine compared; mixed evidence on the long-term effectiveness of community-based outreach interventions at increasing immunisation uptake: 1 RCT with 7 year follow-up found NS difference between intervention and control groups in	

					the proportion of children that had received MMR or the school booster, although subsequent children of mothers in the intervention group were significantly more likely to have completed polio and Hib immunisations; Two RCTs (multi-component interventions) significantly improved up-to-date vaccination coverage rates 9d) 1 RCT (multicomponent programme) for babies of black and minority ethnic group families did not improve immunisation rates 9e) 2 studies show that targeted multicomponent programmes based on enhancing access to vaccination services in combination with reminder/recall interventions is effective at increasing uptake of	

					immunisations; 1st cRCT for children of low-income families in need of vaccinations was effective at increasing the proportion of babies up-to-date with immunisations; 2nd ITS for children who were further behind in immunisations significantly increased immunisation rates in city and suburban settings from baseline after 3 years, although after 6 years the increase was no longer statistically significant 9f) 1 BA study significantly increased uptake after the postal reminders were sent of DTP and Hib among children aged more than 6 months living in a deprived area 9g) 1 BA study for homeless and runaway young people was effective at increasing the proportion who completed the	

					recommended three-dose Hep B vaccination schedule; 1 cohort study for 137 rural families was not effective at increasing vaccination uptake in these children 10) cost-effectiveness of reminder/recall systems 10 a) 8 studies concluded that reminder/recall systems, and especially automated systems, were cost effective, but with significant limitations in the studies (therefore, a lack of evidence in relation to cost effectiveness of reminder/recall systems for reducing differences in the uptake of immunisations in the UK) 11) cost-effectiveness of multicomponent interventions: 11a) lack of evidence in relation to cost effectiveness of multicomponent	

					interventions targeted to reduce differences in the uptake of immunisations in low-income population subgroups in the UK NB: have not reported results for specific groups of vaccinations (e.g. MMR), have focused instead on the different types of interventions **Results on inequalities:** Frequently describe the results for low-income and/or minority groups (these have been reported in the results where appropriate) **Sample sizes:** 30-1.78 million **Attrition details:** Varied drastically study to study	

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Scott et al. **Year:** 2011 **Citation:** Scott, A., Sivey, P., Ait Ouakrim, D., et al., 2011. The effect of financial incentives on the quality of health care provided by primary care physicians. *Cochrane database of Systematic Reviews.* 9. **Aim of the review:** **"**to examine the effect of changes in the method and level of payment on the quality of care provided by primary care physicians (PCPs)" (p.1)	**Databases and websites searched:** Medline, Embase, Cinhal, PsycINFO, EconLit, PAIS, EPOC Group Specialised Register, The Cochrane Library, all sections including DARE (Database of Abstracts of Reviews of Effectiveness) and the Cochrane Database of Systematic Reviews (CDSR), Cochrane Central Register of Controlled Trials (CENTRAL), Internet-based economics and health economics working paper collections, including RePEc (Research Papers in Economics) and the Social Science Research Network (ERN), Literature from	**Included population/s:** GP practices; medical groups **Excluded population/s:** Not reported **Setting of included studies:** UK (n=1); California, USA (n=1) **Characteristics of population/s:** GP practices under the General Medical Services (GMS) scheme; large medical groups contracting with a large Californian health plan (Pacificare Health Systems); no other	**Intervention/s description:** GPs could choose to directly contract with local health organisations and to switch from capitation to salaried contracts (Personal Medical Services) ; bonuses for targets met/exceeded **Control/comparison/s / description:** Control GPs stayed under General Medical Services (GMS) scheme, a standard national contract; not reported for second study	**Outcomes:** Childhood immunisation rate (collected in first study through patients using a validated instrument, other study not reported) **Follow-up periods:** Not reported for first study; 17 quarters **Methods of analysis:** Narrative synthesis and tabulated results	**Outcomes:** 1 controlled BA, childhood immunisation: intervention (pre)=98.59 (sd=2.25), control (pre) =94.03 (sd=5.48), intervention (post)= 95.96 (sd=2.24), control (post)= 92.48 (sd=6.10), Absolute difference = 3.48, relative % change = 3.76%, absolute change from baseline intervention = -2.63% control = -1.55%, difference in absolute change from baseline = -1.08%. 1 controlled BA and ITS, childhood immunisation rate: Difference in trend (ITS): Intervention group 1 (QIP) = -0.471 (s.e.=0.385), intervention group 2 (IHA1+QIP2) = -1.092 (s.e.=0.485), difference in absolute change	**Limitations identified by author:** The use of a different geographic area as the control group may have meant that that populations of patients and physicians and availability of health care services (and other factors) could be different and be correlated with changes in the trends over time (second study). Only medical groups that had data for the entire period were included in analyses, thus suggesting the possibility of selection

Review design: SR of various study designs (RCTs, controlled BAs, ITSs)	websites of key organisations: UK - National Primary Care Research & Development Centre, NHS Service Delivery and Organisation R&D Programme, NHS Centre for Reviews and Dissemination; USA - Commonwealth Fund, Robert Graham Centre; Europe - European Observatory on Health Systems and Policy; Canada - Canadian Health Services Research Foundation (CHSRF); Australia - Primary Health Care Research Information Service (PHCRIS). **Other methods undertaken (e.g., reference checking):** International and Australian Government policy documents, commissioned reports;	information reported **External validity score: –**			from baseline (CBA): intervention group 1 (QIP) = 3.155 (s.e.= 1.365), intervention group 2 (IHA1+QIP2) = 2.078 (s.e.=1.196) **Results on inequalities:** Not reported **Sample sizes:** 20 GP practices (10 intervention; 10 control), 172 large medical groups **Attrition details:** Not reported	bias (second study) **Limitations identified by review team:** Well conducted review. Only two studies of relevance to review question. **Evidence gaps and/or recommendations for future research:** More rigorous study designs need to be used that account for the selection of physicians into incentive schemes. Studies should also examine the potential unintended consequences of incentive schemes by having a stronger

	position papers and policy statements of professional bodies or associations identified through key informants and policy contacts; previous research conducted by the review authors, personal contacts in the area, professional and academic experts in the field, an advisory committee of experts from Australia, US, UK, and Canada; citation chasing **Years searched:** 2000-August 2009 (for Medline) **Inclusion criteria, including study type, country:** Interventions: intervention changes the amount or level of payment (dose-response), intervention changes the method of payment between one					theoretical basis, a broader range of outcomes, and conducting more extensive subgroup analysis. Studies should more consistently describe i) the type of payment scheme at baseline or in the control group, ii) how payments to medical groups were used and distributed, and iii) the size of the new payments as a percentage of total revenue **Source of funding:** Australian Primary Health Care Research Institute

	of the following: a. payment per unit of time (salary, sessional payment), b. payment for each service, visit, treatment, or episode provided (fee-for-service), c. payment for each patient enrolled or registered with the PCP (capitation), d. payment for improvements in 'quality' (performance pay), intervention changes who is paid (e.g. from an individual to a group or team). study design, participants, outcome measure and multi-faceted interventions; Outcomes: quality of care provided by PCPs that were related to patients' health and well-being (including patient-reported measures; measures of satisfaction; clinical indicators;					

	Intermediate clinical and physiological indicators); Study designs: RCTs, quasi-randomised controlled trials; controlled BAs, ITSs); Participants: primary care physicians, primary care teams, patients being treated by primary care physicians or teams, or both **Exclusion criteria:** Outcomes: health professional processes and outcomes, utilisation and healthcare costs **Number of studies included:** **Number of relevant studies included:** 2 (1 controlled BA, 1 controlled BA and ITS (difference-in-difference) combined study design)					

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Selph et al. **Year:** 2013 **Citation:** Selph, S.S., Bougatsos, C., Blazina, I., et al., 2013. Behavioral interventions and counseling to prevent child abuse and neglect: A systematic review to update the U.S. Preventive Services Task Force recommendation. *Annals of Internal Medicine.*158(3), 179-190. **Aim of the review:** "To review new evidence on the effectiveness of behavioural interventions and counselling in health care settings	**Databases and websites searched:** Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, MEDLINE, PsycINFO **Other methods undertaken (e.g., reference checking):** Reviewed reference lists of papers and, using Scopus, reviewed citations of key studies **Years searched:** January 2002 - June 2012 **Inclusion criteria, including study type, country:** "We included trials of the effectiveness of behavioural interventions and counselling to reduce	**Included population/s:** Parents/caregivers of young children **Excluded population/s:** None **Setting of included studies:** USA, New Zealand Primary care, maternity services, community health services **Characteristics of population/s:** Pregnant adolescents in one study; 'predominantly welfare-dependent' in one study; 'predominantly	**Intervention/s description:** A range of intervention components including: screening for abuse/neglect; training of professionals; social work interventions; home visiting; parent support and education; case management. **Control/comparison/s / description:** Usual care	**Outcomes:** Vaccination visits; up-to-date with vaccinations; delayed vaccinations **Follow-up periods:** 1-3 years **Methods of analysis:** Tabulation and narrative synthesis	**Outcomes:** Immunization clinic visits: one trial shows mixed results (sig effect at age 9 mo (I 2.2 mean visits, C 1.64), not at 1 y (I 2.44, C 2.0)) Current with immunizations: one trial shows no effect (I 93%, C 92%), one sig NR (I 77%, C 87%) Delayed immunizations: one trial shows sig effect (I 3%, C 10%) **Results on inequalities:** All studies focused on disadvantaged populations. **Sample sizes:** 101-558 **Attrition details:** >20%	**Limitations identified by author:** Not reported **Limitations identified by review team:** No major limitations **Evidence gaps and/or recommendations for future research:** Clinic-based interventions. Interventions with a focus on partner violence. Further studies of risk screening methods including biomedical tests. Studies of older children. Data on adverse effects **Source of funding:** US

for reducing child abuse and neglect and related health outcomes, as well as adverse effects of interventions." (abstract) **Review design:** SR of RCTs	exposure to abuse or neglect or improve health outcomes. Studies were eligible for inclusion if they enrolled children without obvious signs or symptoms of abuse or neglect, used a method to identify families or children at risk that was applicable to primary care, evaluated an intervention that primary care clinicians could access or provide referral for, measured outcomes related to abuse or neglect, and compared outcomes between intervention and non-intervention groups." (p180) Exclusion criteria: "We excluded studies focused on clinician education, methods to increase screening rates, and perceptions and attitudes of	African American and living in poverty' in one study; 'low-income urban population' in one study. **External validity score:** +				Agency for Healthcare Research and Quality

	physicians and other clinicians, as well as studies of public awareness campaigns or other interventions not applicable to primary care settings and studies of interventions directed at perpetrators." (p180) **Number of studies included:** 11 RCTs **Number of relevant studies included:** 4 RCTs					

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Shojania et al. **Year:** 2011 **Citation:** Shojania, K.G., Jennings, A., Mayhew, A., et al., 2011. The effects of on-screen, point of care computer reminders on processes and outcomes of care. *Cochrane Database of Systematic Reviews.* 1. **Aim of the review:** 1. Do on-screen computer reminders effectively improve processes or outcomes of care? 2. Do any readily identifiable elements of on-screen reminders influence their	**Databases and websites searched:** MEDLINE, EMBASE, CENTRAL, CINAHL, EPOC database **Other methods undertaken (e.g., reference checking):** Backwards citation chasing **Years searched:** Up to July 2008 **Inclusion criteria, including study type, country:** Study type: randomised or quasi-randomised trial; Participants: physicians or physician trainees; Intervention: computer reminder to clinician at the point of care; Outcomes: Any process of care or clinical (health status) outcomes	**Included population/s:** Physicians (as target of intervention) **Excluded population/s:** Non-physician health professionals **Setting of included studies:** Hospitals (N=4), primary care (N=1), ambulatory care (N=1); USA (n=5), Australia (n=1) **Characteristics of population/s:** Not reported **External validity score: –**	**Intervention/s description:** Computer reminders at the point of care to notify clinicians about eligibility for preventive care and/or guidelines for management of chronic disease **Control/comparison/s / description:** Not reported	**Outcomes:** Prescription of recommended vaccines **Follow-up periods:** Not reported **Methods of analysis:** Narrative synthesis and pooling by taking median absolute improvement over studies	**Outcomes:** Pooled median absolute improvement (interquartile range): Using median outcome from each study: 3.8% (0.5% to 6.6%) Using best outcome from each study: 4.8% (0.5% to 7.8%) **Results on inequalities:** None **Sample sizes:** 363-10,507 patients **Attrition details:** 11.1% and 19% for two studies; review authors report information unavailable for the others	**Limitations identified by author:** Heterogeneity and incomplete reporting w/r/t intervention content; use of median effect for analysis may be problematic. **Limitations identified by review team:** Vaccination is not the main focus of the review. Limited data on context and population, and full outcome data are not reported for the studies (only the pooled effect). Some overlap with other included reviews.

effectiveness (e.g. inclusion of patient-specific information as opposed to generic reminders for a given condition, requiring a response from users). 3. Do any readily identifiable elements of the targeted activity (e.g. chart documentation, test ordering, medication prescribing) **Review design:** SR of RCTs	Exclusion criteria: Population: dentists, pharmacists, nurses, or other health professionals; Intervention: reminder not available within routinely used computer system **Number of studies included:** 28 RCTs **Number of relevant studies included:** 6 RCTs					**Evidence gaps and/or recommendations for future research:** Factors relating to greater success of interventions **Source of funding:** Ottawa Hospital Research Institute; University of Ottawa; Canadian Institutes of Health Research; Canadian Foundation for Innovation; Government of Canada Research Chair in Patient Safety and Quality Improvement; UK National Institute for Health Research; Scottish Government Health Directorate

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Souza et al. **Year:** 2011 **Citation:** Souza, N.M., Sebaldt, R.J., Mackay, J.A., et al., 2011. Computerized clinical decision support systems for primary preventive care: a decision-maker-researcher partnership systematic review of effects on process of care and patient outcomes. *Implementation Science.* 6. 87. **Aim of the review:** Do CCDSSs [computerized clinical decision support systems] improve process of	**Databases and websites searched:** MEDLINE, EMBASE, Ovid's Evidence-Based Medicine Reviews (includes Cochrane Database of Systematic Reviews, ACP Journal Club, Database of Abstracts of Reviews of Effects (DARE), Cochrane Central Register of Controlled Trials (CENTRAL/CCTR), Cochrane Methodology Register (CMR), Health Technology Assessments (HTA), and NHS Economic Evaluation Database (NHSEED)), Inspec **Other methods undertaken (e.g., reference checking):** Backwards citation chasing, citation chasing from relevant	**Included population/s:** Any **Excluded population/s:** None **Setting of included studies:** USA, UK, Canada Most primary care or community clinics (N=10); some hospital inpatient care (N=3); one study reported to be in a rural area; no other information **Characteristics of population/s:** Older people in one study, children and adolescents in	**Intervention/s description:** Computerized systems to remind clinicians to conduct various preventive care activities, including vaccinations **Control/comparison/s / description:** Most usual care	**Outcomes:** Vaccination uptake (unclear how measured; appears to be based on medical records); up-to-date with vaccinations; correct vaccine decisions by clinician **Follow-up periods:** 2 months - 2 years (not fully reported) **Methods of analysis:** Tabulated and narrative synthesis	**Outcomes:** Influenza vaccine: one trial shows sig effect, two show no sig effect, one sig NR, one mixed. Pneumococcal vaccine: four trials show sig effect, two show no sig effect. Tetanus vaccine: two trials show sig effect. Up-to-date with vaccinations: one trial shows no sig effect. Correct vaccine decisions: one trial shows no sig effect **Results on inequalities:** No relevant data; one study presents subgroup analyses by age and one by teaching vs. non-teaching practice **Sample sizes:** 12-275 clinicians; 740-12,989 patients **Attrition details:** Not	**Limitations identified by author:** Interventions are multi-component so effects cannot be ascribed to computerized support system alone. Control groups may have received some training and diluted effects. Limitations in reporting of primary studies **Limitations identified by review team:** No major limitations. Vaccination is not the main focus of the study, and relevant outcomes are not clearly reported (vaccination is not synthesized

care or patient outcomes for PPC [primary preventive care], and what are the costs, safety, and provider satisfaction with CCDSS for PPC? **Review design:** SR of RCTs	reviews, searching McMaster KT+ and Evidence Updates databases, searching for conference proceedings **Years searched:** 1974 - Jan 2010 (across all iterations of the review) **Inclusion criteria, including study type, country:** "We included RCTs (including cluster RCTs) published in any language that compared the effects of care with a CCDSS for PPC, used by healthcare providers, with care without a CCDSS. Outcomes included processes of care and patient outcomes. ... For PPC interventions, patients had to be free from the illness to be prevented (e.g., a specific strain of influenza) but could	one study; no other information reported **External validity score:** –			reported	separately for studies with multiple outcomes / aims). Poor reporting of participants' characteristics **Evidence gaps and/or recommendations for future research:** Data on adverse effects and costs of intervention **Source of funding:** Canadian Institutes of Health Research

	be seen in any setting, including acute healthcare." (p3) **Exclusion criteria:** "CCDSSs that provided only computer-aided instruction, performed actions unrelated to clinical decision making (e.g., CCDSSs for diagnostic performance against a gold standard), or evaluated CCDSS users' knowledge or performance in clinical simulations were excluded. We excluded studies where PPC interventions were merged with a complex set of other interventions (e.g., chronic disease management) and those that did not focus on PPC (e.g., screening of medical errors)." (p3) **Number of studies**					

	included: 41 **Number of relevant studies included:** 13 RCTs					

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Thomas et al. **Year:** 2010 **Citation:** Thomas, R.E., Jefferson, T., Lasserson, T.J. 2010. Influenza vaccination for healthcare workers who work with the elderly: Systematic review. *Vaccine.* 29(2), 344-356. **Aim of the review:** To assess "the effects of vaccinating HCWs on the incidence of serologically proven influenza, influenza-like-illness (ILI) and its complications in elderly residents in long-term facilities" (p345)	**Databases and websites searched:** CENTRAL (including the Cochrane Acute Respiratory Infections Group's Specialised Register and DARE); MEDLINE; MEDLINE In-Process; EMBASE; Biological Abstracts; Science Citation Index (incl Biosis Previews and Current Contents). **Other methods undertaken (e.g., reference checking):** Citation chasing **Years searched:** 1966-September 2009 for MEDLINE **Inclusion criteria, including study type, country:** Population: HCWs, seniors ≥60; Intervention: influenza vaccination of HCWs;	**Included population/s:** Healthcare workers working with older people (>=60 y) **Excluded population/s:** Not reported **Setting of included studies:** UK, France Nursing homes for older people (mean ages of home populations 83 and 86) **Characteristics of population/s:** Not reported **External validity score:** +	**Intervention/s description:** Policy of staff vaccination led by lead nurse, posters, leaflets, vaccination clinics; promotional campaign with posters and leaflets, plus face-to-face meetings with all staff by researchers **Control/comparison/s / description:** Routine information on influenza vaccination	**Outcomes:** Percentage of staff vaccinated **Follow-up periods:** 5 months for one study, not reported for the other **Methods of analysis:** Tabulated and narrative synthesis	**Outcomes:** In one study, I 570/1610 vaccinated (35.4%), C 84/1674 (5.0%); in the other, I 678/989 (68.6%), C 323/1015 (31.8%). Significance NR for this outcome. **Results on inequalities:** Not reported **Sample sizes:** 2,004-3,284 **Attrition details:** Not reported	**Limitations identified by author:** Not reported **Limitations identified by review team:** The review question is tangential to ours; two studies happen to have relevant data reported, but significance is not reported. Limited information on participants **Evidence gaps and/or recommendations for future research:** "We did not find studies that combined interventions and tested them for synergism: vaccination of

Review design: SR of RCTs and cohort studies	Comparisons and Outcomes: serologically proven influenza, pneumonia, admissions and deaths from pneumonia in seniors cared for by vaccinated vs. non-vaccinated HCWs; Study designs: RCT or non-randomised designs, all languages; all study periods and study durations; published or unpublished **Exclusion criteria:** None **Number of studies included:** 5 (4 RCTs, 1 cohort) **Number of relevant studies included:** 2 cRCTs					HCWs and patients; automatic vaccination of patients unless they "elect out"; rewards and incentives for HCWs to be vaccinated; handwashing; use of face masks; rapid detection of influenza cases in HCWs and patients by nasal swabs; isolation of individuals, rooms and wards; prevention of visits by relatives and casual visitors; asking HCWs with ILI not to present for work; aggressive monitoring for deterioration in co-morbidities such as COPD or CHF, and avoiding new admissions."

						(p354) **Source of funding:** Cochrane Collaboration (at least in part)

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Thomas et al. **Year:** 2011 **Citation:** Thomas, R.E., Russell, M., Lorenzetti, D. 2011. Interventions to increase influenza vaccination rates of those 60 years and older in the community. *Cochrane database of Systematic Reviews.* 7. **Aim of the review:** "To assess effects of interventions to increase influenza vaccination rates in those 60 or older." (abstract) **Review design:** SR of RCTs with meta-analysis	**Databases and websites searched:** CENTRAL, MEDLINE, EMBASE, AgeLine, ERIC, CINAHL; Cochrane Acute Respiratory Infections Group's Specialized Register **Other methods undertaken (e.g., reference checking):** Web of Science Cited Reference Search and PubMed Related Articles; backwards citation chasing; Meta-register of Clinical Trials; ProQuest Dissertations and Theses; contact with authors of included studies **Years searched:** 1950-July 2010 **Inclusion criteria, including study type,**	**Included population/s:** Any population aged 60 or over **Excluded population/s:** None **Setting of included studies:** USA, Canada, Australia, UK, Denmark, New Zealand, Puerto Rico, Spain Participants' homes (post, telephone, home visits); primary care or family health clinics **Characteristics of population/s:** Liiving in the community, seniors over 65,	**Intervention/s description:** Client reminder and recall vs no intervention; 1.2. Tailored letter / phone call vs no intervention; 1.3. Client reminder and recall (telephone call from senior plus educational brochure) compared to usual publicity; 1.4. Client reminder and recall (letter + leaflet) compared to letter; 1.5. Client reminder and recall (customized letter) compared to form letter; 1.6. Client reminder and recall (telephone invitation) compared to invitation to patient when "dropped in" to clinic; 1.7. Client-based education (nurses or pharmacists educated and nurses vaccinated patients) compared to no intervention; 1.8.	**Outcomes:** Influenza vaccination rates (unclear how measured, but stated that self-report outcomes were excluded; appears to be from clinic records) **Follow-up periods:** 2 months-2 years **Methods of analysis:** Narrative synthesis and random-effects meta-analysis	**Outcomes:** 1.1. Client reminder and recall vs no intervention (11 RCTs): near-sig effect (OR 1.21 [0.99, 1.48]) 1.2. Tailored letter / phone call vs no intervention (13 RCTs): sig effect (OR 1.53 [1.33, 1.76]) 1.3. Client reminder and recall (telephone call from senior plus educational brochure) compared to usual publicity (1 RCT): sig effect (OR 3.33 [1.79, 6.22]) 1.4. Client reminder and recall (letter + leaflet) compared to letter (1 RCT): no sig diff (OR 0.84 [0.26, 2.70]) 1.5. Client reminder and recall (customized letter) compared to form letter (1 RCT): no sig diff (OR 1.25 [0.39, 4.04]) 1.6. Client reminder and recall (telephone invitation)	**Limitations identified by author:** Studies in languages other than English, French, German, Italian, Portuguese and Spanish were not included **Limitations identified by review team:** Somewhat limited detail provided on patient characteristics, otherwise well conducted review **Evidence gaps and/or recommendations for future research:** Generally, further higher-quality research on all the intervention types

	country: Study type: RCTs; Population: people aged 60 or over, living in institutions, temporarily in institutions such as emergency departments or hospitals, or in the community; Intervention: any intervention, including demand-focused (e.g. reminders, media campaigns), enhancing access to services, provider- or system-focused, or societal; Outcome: rates of vaccination, excluding studies with only self-reported outcomes **Exclusion criteria:** Studies reporting only serological outcomes with no intervention to increase vaccination - Studies with only self-reported outcomes **Number of studies**	seniors over 75, seniors over 65 with a chronic illness, current or retired federal employees over 65 enrolled in Blue Cross & Blue Shield Government-wide Service Benefit Plan, persons over 65 referred to a public health nurse, psychiatrists with patients over 65, individuals over 70 with functional impairment or admission to hospital or bereavement in past 6 months, Medicare beneficiaries aged 65 to 79, physicians with diabetic	Client-based education (health risk appraisal plus influenza vaccination) compared to no intervention; 1.9. Client-based education (nurses educated and vaccinated patients) compared to nurses educated patients; 2.1. Group visits of patients to physician and nurse compared to usual care; 2.2. Home visit compared to invitation to attend influenza vaccination clinic; 2.3. Home visit with encouragement to receive influenza vaccination, compared to home visit with safety intervention; 2.4. Home visit by nurse with encouragement to receive influenza vaccination, plus care plan developed with physician, compared to no intervention; 2.5. Free influenza vaccine compared to invitation		compared to invitation to patient when "dropped in" to clinic (1 RCT): sig effect (OR 2.72 [1.55, 4.76]) 1.7. Client-based education (nurses or pharmacists educated and nurses vaccinated patients) compared to no intervention (2 RCTs): sig effect (OR 3.29 [1.91, 5.66]) 1.8. Client-based education (health risk appraisal plus influenza vaccination) compared to no intervention (1 RCT): sig effect (OR 2.17 [1.70, 2.77]) 1.9. Client-based education (nurses educated and vaccinated patients) compared to nurses educated patients (1 RCT): sig diff (OR 152.95 [9.39, 2490.67]) 2.1. Group visits of patients to physician and nurse compared to usual care (1 RCT): sig effect (OR 24.85 [1.45, 425.32]) 2.2. Home visit compared to invitation	studied. Several more specific points, e.g. composition of multidisciplinary teams or size of incentives. Better validation of outcome measures **Source of funding:** No funding received

	included: 44 (18 cRCTs, 26 RCTs) **Number of relevant studies included:** 44 (18 cRCTs, 26 RCTs)	patients, 'high-risk' patients, seniors over 65 discharged from hospital with diagnoses of cardiovascular, pulmonary, renal, metabolic/nutritional, neurological or malignant diseases, not previously vaccinated, aged 65 or older with coronary heart disease, diabetes or had a splenectomy, military retirees or dependents **External validity score:** +	to be vaccinated but patient pays; 2.6. Free influenza vaccine compared to no intervention; 3.1. Reminder (to physician) compared to no reminder; 3.2. Reminder (to hospital staff to vaccinate patient) compared to letter to GP on day of discharge; 3.3. Reminder to physician about all patients compared to reminder about half patients; 3.4. Posters in clinic displaying influenza vaccination rates to encourage doctors to compete, plus postcards to patients, compared to no intervention; 3.5. Posters in clinic displaying influenza vaccination rates to encourage doctors to compete, plus postcards to patients, compared to poster displaying vaccination		to attend influenza vaccination clinic (2 RCTs): sig diff (OR 1.30 [1.05, 1.61]) 2.3. Home visit with encouragement to receive influenza vaccination, compared to home visit with safety intervention (1 RCT): no diff (OR 0.98 [0.64, 1.50]) 2.4. Home visit by nurse with encouragement to receive influenza vaccination, plus care plan developed with physician, compared to no intervention (1 RCT): sig eff (OR 8.15 [3.28, 20.29]) 2.5. Free influenza vaccine compared to invitation to be vaccinated but patient pays (2 RCTs): sig eff (OR 2.36 [1.98, 2.82]) 2.6. Free influenza vaccine compared to no intervention (2 RCTs): sig eff (OR 5.43 [2.85, 10.35]) 3.1. Reminder (to physician) compared	

			rates; 3.6. Facilitator encouragement of prevention manoeuvres including influenza vaccination compared to no intervention; 3.7. Educational reminders, academic detailing and peer comparisons to physicians compared to mailed educational materials; 3.8. Chart review and feedback to physician plus benchmarking to vaccination rates achieved by top 10% of physicians, compared to chart review and feedback; 3.9. Educational outreach + feedback to practice teams vs. written feedback to practice teams; 3.10. Payment to physicians **Control/comparison/s / description:** Most no intervention / usual care; some studies compare different		to no reminder (3 RCTs): no sig eff (OR 1.28 [0.73, 2.25]) 3.2. Reminder (to hospital staff to vaccinate patient) compared to letter to GP on day of discharge (1 RCT): no sig eff (OR 1.70 [0.51, 5.70]) 3.3. Reminder to physician about all patients compared to reminder about half patients (1 RCT): sig diff (OR 2.47 [1.53, 3.99]) 3.4. Posters in clinic displaying influenza vaccination rates to encourage doctors to compete, plus postcards to patients, compared to no intervention (1 RCT): sig eff (OR 2.03 [1.86, 2.22]) 3.5. Posters in clinic displaying influenza vaccination rates to encourage doctors to compete, plus postcards to patients, compared to poster displaying vaccination rates (1 RCT): no sig diff (OR	

			types of intervention (e.g. different formats of reminder)		1.06 [0.95, 1.19]) 3.6. Facilitator encouragement of prevention manoeuvres including influenza vaccination compared to no intervention (3 RCTs): no sig eff (OR 5.51 [0.56, 53.78]) 3.7. Educational reminders, academic detailing and peer comparisons to physicians compared to mailed educational materials (1 RCT): no sig diff (OR 1.13 [0.80, 1.58]) 3.8. Chart review and feedback to physician plus benchmarking to vaccination rates achieved by top 10% of physicians, compared to chart review and feedback (1 RCT): sig diff (OR 3.43 [2.37, 4.97]) 3.9. Educational outreach + feedback to practice teams vs. written feedback to practice teams (1 RCT): sig less eff (OR 0.77 [0.72, 0.81]) 3.10.	

					Payment to physicians (2 RCTs): sig eff (OR 2.22 [1.77, 2.77]) **Results on inequalities:** Not reported (limited information on participant characteristics other than age, gender and health status **Sample sizes:** 117-134,773 **Attrition details:** Not fully reported (attrition not reported if ITT analysis was conducted)	

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Turnball and Osborn. **Year:** 2012 **Citation:** Turnbull, C. & Osborn, D.A. 2012. Home visits during pregnancy and after birth for women with an alcohol or drug problem. *Cochrane Database of Systematic Reviews*. 1. **Aim of the review:** "To determine the effects of home visits during pregnancy and/or after birth for women with a drug or alcohol problem." (abstract) **Review design:** SR	**Databases and websites searched:** CENTRAL, MEDLINE, Embase, CINAHL, PsycINFO; Cochrane Pregnancy and Childbirth Group Trials Register (which includes hand searching of journals and conference proceedings) **Other methods undertaken (e.g., reference checking):** Backwards citation chasing; contact with experts **Years searched:** 1966 to November 2011 for MEDLINE **Inclusion criteria, including study type, country:** Study method: random or quasi-random allocation; Population:	**Included population/s:** Pregnant/postpartum women with a drug or alcohol problem **Excluded population/s:** Not reported **Setting of included studies:** Participants recruited from teenage pregnancy clinic in one study (NR in the other); intervention setting was participants' homes **Characteristics of population/s:** In one study, women using illegal drugs (no	**Intervention/s description:** Regular home visits by midwives, who gave advice on a range of health / parenting issues and links to other services **Control/comparison/s / description:** In one study, controls had a telephone contact at 2 months and a home visit at 6 months; in the other, usual care (routine postnatal support, counselling and information services including standard domiciliary home-visit services)	**Outcomes:** Vaccination rates (unclear how measured) **Follow-up periods:** ~6 months **Methods of analysis:** Narrative synthesis and fixed-effects meta-analysis	**Outcomes:** No significant difference in incomplete vaccination schedule at six months (pooled RR 1.09, 95% CI 0.91 to 1.32) **Results on inequalities:** Not reported specifically, although populations of both studies were likely disadvantaged **Sample sizes:** 136-154 mother-infant pairs (for relevant studies) **Attrition details:** One study 5% I, 12% C; the other 5% I, 13% C	**Limitations identified by author:** Cultural differences in populations and differences in settings may affect results **Limitations identified by review team:** No methodological limitations. Vaccination is not the main focus of the review. Two studies, both relatively small. **Evidence gaps and/or recommendations for future research:** Further large trials with longer follow-up. Studies of women's views. Various

of RCTs with meta-analysis	pregnant or postpartum women with alcohol or drug problem (defined as 80 g/day alcohol or binge drinking, any illicit drug use, or prescription drug abuse); Intervention: home visits by doctors, nurses, social workers, counsellors or trained lay people; Outcome: range of outcomes including drug/alcohol-related outcomes, pregnancy and puerperium outcomes, child health status and health service use, child educational and psychosocial outcomes, maternal health status, health service use and psychosocial outcomes **Exclusion criteria:** Crossover trials **Number of studies included:** 7 (6 RCTs, 1 quasi-RCT)	further information); in the other study, pregnant women aged <18, who had high rates of alcohol (69-79%) and illegal drug use (51%-61%) **External validity score:** +				recommendations regarding trials of specific intervention types/components **Source of funding:** Not reported

	Number of relevant studies included: 2 RCTs					

Review details	Review search parameters	Review population and setting	Intervention/s	Outcomes and method of analysis	Results	Notes
Authors: Williams et al. **Year:** 2011 **Citation:** Williams, N., Woodward, H., Majeed, A., et al. 2011. Primary care strategies to improve childhood immunisation uptake in developed countries: systematic review. *JRSM Short Reports*. 2(10), 81. **Aim of the review:** "How can primary care practitioners in developed countries improve preschool immunization uptake?" p2 **Review design:** SR of intervention	**Databases and websites searched:** MEDLINE, EMBASE, PsycInfo, Cochrane, OpenSIGL **Other methods undertaken (e.g., reference checking):** Citation chasing, contact with experts, identification of grey literature [unclear how conducted] **Years searched:** Inception to June 2010 **Inclusion criteria, including study type, country:** RCT, nRCT, BA or ITS studies; children <5 years; 'developed' countries; studies reporting the increase in the proportion of the target population who were up to date with standard	**Included population/s:** Children <5 y are the population of interest (obviously most interventions are targeted at parents/caregivers and/or service providers) **Excluded population/s:** >5 y **Setting of included studies:** USA, UK, Australia, Ireland, Finland Most in primary care or paediatric outpatient settings; some specialist vaccination	**Intervention/s description:** 1. Reminder and recall (mainly postal / telephone reminders); 2. Parental education; 3. Patient-held records; 4. Provider-based interventions, incl. bonuses / enhanced fees, reminders, various forms of educational or training interventions, or changes to services (e.g. walk-in clinics) **Control/comparison/s / description:** Most usual care	**Outcomes:** On-time / age-appropriate vaccinations (unclear how measured) **Follow-up periods:** Not clearly reported; 'study period' up to 4 years **Methods of analysis:** Tabulation and narrative synthesis	**Outcomes:** 1. Reminder/recall interventions (N=22). Of RCTs (N=19), 6 show sig positive effect (comparative effect sizes 8%-24%), 4 no sig effect, 7 mixed effects, and 2 sig NR. Of nRCTs (N=3), 2 show sig positive effect, 1 no sig effect. "Fourteen (34%) of the 41 intervention arms showed a statistically significant (P < 0.05) increase in immunisation rates [i.e. within-group] ... Overall, these studies reported a median point change of 11% (mean 10%, range –11% to 24%)." 2. Parental education (N=2). Both studies show no sig effect. 3. Patient-held records (N=1). No sig effect. 4. Provider-based interventions (N=13). Of RCTs (N=5), 2 show	**Limitations identified by author:** Exclusion of non-English-language studies **Limitations identified by review team:** Robust review process. Authors' interpretations of findings are arguably over-optimistic given mixed findings and limitations of the evidence base, and some conclusions (e.g. on subgroup differences) do not appear to be supported by data. **Evidence gaps and/or recommendations for future**

effectiveness	recommended universal vaccinations; studies published in English **Exclusion criteria:** Full-text unavailable; studies without original data **Number of studies included:** 46 (26 RCTs, 11 BAs, 9 controlled intervention trials) **Number of relevant studies included:** 46 (26 RCTs, 11 BAs, 9 controlled intervention trials)	clinics or well-baby clinics **Characteristics of population/s:** Not all provide information other than age (range between birth - 5y), but of those that do: low-SES or disadvantaged (N=13); ethnically diverse or predominantly minority ethnic (N=5); predominantly white (N=1); under-immunised or behind schedule (N=3). **External validity score:** +			mixed results, 2 no effect, and 1 sig NR. Of nRCTs (N=4), 2 show sig positive effect, 1 no effect, and 1 sig NR. Of one-group studies (N=4), 3 show sig positive effect, 1 no effect. Overall, median [within-group?] change reported as 7% for provider reminder/recall, 8% for provider education, and 19% for feedback. 5. Multi-component interventions (N=8). One nRCT shows no sig effect. Of one-group studies (N=7), 3 show sig positive effect, 4 sig NR. Overall median [within-group?] change reported as 15%. **Results on inequalities:** Not clearly reported. Several studies did target low-SES and/or BME population **Sample sizes:** Mostly not reported; those that	**research:** Differences in uptake between socioeconomic groups **Source of funding:** NIHR; Imperial [College London] Centre for Patient Safety and Service Quality

					are reported range 222-3,015 **Attrition details:** Not reported	

9 Appendix 3. Call for evidence

Stakeholder Organisation	Full Reference	Inclusion/Exclusion
Royal College of General Practitioners	Lutge, E.E., Wiysonge, C.S., Knight, S.E., and Volmink, J., 2012. Material incentives and enablers in the management of tuberculosis. *The Cochrane Library,* 1.	EX1: study does not concern vaccination to prevent disease in humans
Royal College of General Practitioners	M'Imunya, J.M., Kredo, T., and Volmink, J., 2012. Patient education and counselling for promoting adherence to treatment for tuberculosis. *The Cochrane Library,* 5.	EX1: study does not concern vaccination to prevent disease in humans
Royal College of General Practitioners	Gallardo, C.R., Rigau Comas, D., Valderrama Rodríguez, A., Roqué i Figuls, M., Parker, L.A., Caylà, J., and Bonfill Cosp, X., 2012. Fixed-dose combinations of drugs versus single drug formulations for treating pulmonary tuberculosis. *The Cochrane Library,* 5.	Not relevant to this review
Royal College of General Practitioners	Steingart, K.R., Sohn, H., Schiller, I., Kloda, L.A., Boehme, C.C., Pai, M., and Dendukuri, N., 2013. Xpert® MTB/RIF assay for pulmonary tuberculosis and rifampicin resistance in adults. *The Cochrane Library,* 1.	Not relevant to this review
Royal College of General Practitioners	Sharma, S.K., Sharma, A., Kadhiravan, T., and Tharyan, P., 2013. Rifamycins (rifampicin, rifabutin and rifapentine) compared to isoniazid for preventing tuberculosis in HIV-negative people at risk of active TB. *The Cochrane Library,* 7.	Not relevant to this review
Royal College of General Practitioners	Adamu, B., Abdu, A., Abba, A.A., Borodo, M.M., and Tleyjeh, I.M., 2010. Antibiotic prophylaxis for preventing post solid organ transplant tuberculosis. *The Cochrane Library,* 7.	Not relevant to this review
Royal College of General Practitioners	Sinclair, D., Abba, K., Grobler, L., and Sudarsanam, T.D., 2011. Nutritional supplements for people being treated for active tuberculosis. *The Cochrane Library,* 11.	Not relevant to this review
Royal College of General Practitioners	Ziganshina, L.E., Titarenko, A.F., and Davies G.R., 2013. Fluoroquinolones for treating tuberculosis (presumed drug-sensitive). *The Cochrane Library,* 6.	Not relevant to this review
Royal College of General Practitioners	Arentz, M., Horne, D.J., and Walson, J.L. , 2011. Treatment of drug-resistant tuberculosis in patients with HIV-1	Not relevant to this review

	infection. *The Cochrane Library,* 12.	
Royal College of General Practitioners	Rosa, B., Cavalcanti, R.V., Alves da Cunha, A.J.L, Fernandes de Paulo, R., Medronho, R.A., and Atallah, A.N., 2012. TMC207 for treatment of people with pulmonary tuberculosis. *The Cochrane Library,* 10.	Not relevant to this review
Royal College of General Practitioners	Fox, G.J., Dobler, C.C., and Marks, G.B., 2011. Active case finding in contacts of people with tuberculosis. *The Cochrane Library,* 9.	EX1: study does not concern vaccination to prevent disease in humans
Royal College of General Practitioners	Marrone, M., Venkataramanan, V., Goodman, M., and Mase, S., 2011. Surgical interventions for treating multidrug and extensively-drug resistant pulmonary tuberculosis. *The Cochrane Library,* 2.	Not relevant to this review
Royal College of General Practitioners	Royce, S., Anglemyer, A., Horvath, T., McCarthy, E., Rutherford, G., Baggaley, R., Suthar, A., and Negussie, E., 2013. Tuberculosis clinics providing or referring for antiretroviral therapy (protocol). PROSPERO 2013:CRD42013004238.	Not relevant to this review
Royal College of General Practitioners	Mulder, C., Erkens, C.G.M., Kouw, P.M., Huisman, E.M., Meijer, V., Wieneke, M.V., Borgdorff, M.W., and, van Leth, F., 2012. Missed opportunities in tuberculosis control in The Netherlands due to prioritization of contact investigations. *European Journal of Public Health*. 22(2), 177-182.	EX1: study does not concern vaccination to prevent disease in humans
Royal College of General Practitioners	Nicol, M.P., Workman, L., Isaacs, W., Munro, J., and Black, F., 2011. Accuracy of the Xpert MTB/RIF test for the diagnosis of pulmonary tuberculosis in children admitted to hospital in Cape Town, South Africa: a descriptive study *Lancet Infectious Diseases*. 11(11), 819-824.	Not relevant to this review
Royal College of General Practitioners	Department of Health., 2011. Tuberculosis: the disease, its treatment and prevention. London: Department of Health.	EX2: leaflet is not a systematic review
Royal College of General Practitioners	van Rie, A., Westreich, D., and Sanne, I., 2011. Tuberculosis in patients receiving antiretroviral treatment: incidence, risk factors and prevention strategies. *Journal of Acquired Immune Deficiency Syndromes*. 56(4), 349-355.	EX1: study does not concern vaccination to prevent disease in humans
Royal College of General Practitioners	Basu, S., Stuckler, D., Bitton, A., Glantz, S, A., 2011. Projected effects of tobacco	EX1: study does not concern vaccination to prevent

	smoking on worldwide tuberculosis control: mathematical modelling analysis. *British Medical Journal.* 343(d5506).	disease in humans
Royal College of General Practitioners	Glaziou, P., Floyd, K., Korenromp, E.L., and Sismanidis, C., 2011. Lives saved by tuberculosis control and prospects for achieving the 2015 global target for reducing tuberculosis mortality. *Bulletin of the World Health Organization*. 89(8): 573-582.	EX1: study does not concern vaccination to prevent disease in humans
Royal College of General Practitioners	Bothamley, G.H., Kruijshaar, M.E., and Kunst, H., 2011. Tuberculosis in UK cities: workload and effectiveness of tuberculosis control programmes. *BMC Public Health.* 11(896).	EX1: study does not concern vaccination to prevent disease in humans
Royal College of General Practitioners	Cayla, J.A., and Orcau, A., 2011. The control of tuberculosis in large cities in developed countries: an organisational problem. *BMC Medicine.* 127.	EX1: study does not concern vaccination to prevent disease in humans
Royal College of General Practitioners	Malmborg, R., Mann, G., and Squire, S.B., 2011. Systematic assessment of the concept and practice of public-private mix for tuberculosis care and control. *International Journal for Equity in Health* 2011. 10(49).	EX1: study does not concern vaccination to prevent disease in humans
Royal College of General Practitioners	World Health Organisation., 2011. Collaborative framework for care and control of tuberculosis and diabetes. Geneva: World Health Organisation.	EX1: study does not concern vaccination to prevent disease in humans
Royal College of General Practitioners	World Health Organisation., 2011. Global tuberculosis control 2011. Geneva: World Health Organisation.	EX2: study is not a systematic review
Royal College of General Practitioners	Abubakar, I., Lipman, M., Anderson, C., Davies, P., and Zumla, A., 2011. Tuberculosis in the UK: time to regain control. *BMJ*. 343(7818):293-296.	EX2: study is not a systematic review
TB Alert	WHO Working Group on Health Promotion., 1998. Health Promotion Evaluation: recommendations to policy makers. Report of the WHO European Working Group on Health Promotion Evaluation. Copenhagen: World Health Organisation.	EX1: study does not concern vaccination to prevent disease in humans
TB Alert	Community Health Educators Project (CHEP), West Leeds Healthy Living Network	No report
TB Alert	Gypsy and Traveller Peer Health Educator's Project, West Leeds Healthy Living Network	No report

10 Appendix 4. Quality appraisal example

Study identification		Arditi, C., Rège-Walther, M., Wyatt, J.C., Durieux, P., Burnand, B., 2012. Computer-generated reminders delivered on paper to healthcare professionals: Effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews*.
Guidance topic		Tuberculosis: clinical diagnosis and management of tuberculosis, and measures for its prevention and control (update)
Checklist completed by		Theo Lorenc
SCREENING QUESTIONS		
In a well-conducted systematic review:		**In this review this criterion is met (yes, no, unclear):**
1	Does the review address an appropriate and clearly-focused question that is relevant to 1 or more of the guidance topic's key research question/s?	No *Vaccination is not a main focus of this review*
2	Does the review include types of study/s relevant to the key research question/s?	Yes *Included RCTs and nRCTs*
3	Is the literature search sufficiently rigorous to identify all the relevant studies?	Yes *Reasonably sensitive terms and range of sources*
4	Is the study quality of included studies appropriately assessed and reported?	Yes *Cochrane 'risk of bias' tool*
5	Is an adequate description of the analytical methodology used included, and are the methods used appropriate to the question?	Yes *Synthesis well described and appropriate*