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

Review 3b: Effectiveness and cost-effectiveness of education, information and support to increase the uptake of, or adherence to, treatment for people with active or latent TB

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FINAL REPORT

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Declaration of authors' competing interests

No authors have any competing interests.

Abbreviations used in the report

AFB	acid-fast bacilli
BA	before-after (study)
BAh	before-after (study) with historical pre-test/control
CM	case management
cRCT	cluster randomised controlled trial
CPH	Centre for Public Health (at NICE)
DOPT	directly observed preventive therapy
DOT	directly observed therapy
HMO	health maintenance organization
HIV	human immunodeficiency virus
ICER	incremental cost-effectiveness ratio
INH	isoniazid
LTBI	latent tuberculosis infection
MDR-TB	multidrug-resistant tuberculosis
NA	not applicable
NICE	National Institute for Health and Care Excellence
NR	not reported
nRCT	non-randomised controlled trial
NS	not significant
OECD	Organisation for Economic Co-Operation and Development
OR	odds ratio
PPD	purified protein derivative
QA	quality assessment
QALY	quality-adjusted life year
RCT	randomised controlled trial
Ret	retrospective
RR	risk ratio (relative risk)
SAT	self-administered therapy
SES	socio-economic status

SSA	sub-Saharan Africa
TB	tuberculosis
TST	tuberculin skin test

Contents

1 Executive summary

This report presents the findings of a systematic review commissioned by the NICE Centre for Public Health to support the development of updated guidance on tuberculosis. The review question is:

- How effective and cost-effective are strategies and interventions aimed at providing and delivering information and education about the symptoms and risk of TB, clinical management of the illness and broader social support to people affected by TB?

We searched a range of database and non-database sources. We included outcome evaluations and cost-effectiveness studies of interventions involving information or education, or social support. Quality assessment and data extraction were carried out using standardised forms from the NICE methods manual. Data were synthesized narratively.

Twenty-six studies were included in the review (25 effectiveness studies and one cost-effectiveness study). Nine studies were rated high quality (++), seven medium (+) and 10 low (–).

The findings of the studies are summarised in the evidence statements below.

Evidence statement 1: effectiveness of information and education for immigrants and refugees on TB knowledge, clinic attendance and treatment adherence

There is weak evidence from three studies that information and education for immigrants and refugees are effective in improving a range of TB-related outcomes.

There is weak evidence from one (–) US study[1] that a culturally tailored intervention, with continuity of care, is effective in increasing adherence among Latino immigrants (157 total pills taken against 129, p=0.028).

There is weak evidence from one (–) US study[2] that an educational video is effective in improving knowledge (82.3% against 56.1%, p<0.001) and self-efficacy about TB (89.7% against 72.8%, p<0.001) among immigrants and refugees attending an education centre.

There is weak evidence from one (–) Australian study[3] that an information and community media campaign promoting TB services is effective in improving knowledge about TB (significant improvement in 3 of 5 outcomes).

Applicability

The evidence is partly applicable to immigrants and refugees in the UK, as the populations in the studies may differ from those in the UK.

1 Ailinger et al., 2010 (–)
2 Wieland et al., 2013 (–)
3 Sheikh and MacIntyre, 2009 (–)

Evidence statement 2: effectiveness of educational interventions for prisoners on treatment uptake and completion

There is moderate evidence from three studies that educational interventions are effective in increasing uptake of and adherence to treatment among prisoners.

There is strong evidence from one (++) US study[1] that ongoing education for prisoners, compared to a single education session, increases attendance rates at TB clinics after release (37% against 24%, significance NR) and treatment completion rates (23% against 12%, adjusted OR 2.2 (1.04-4.72)).

There is moderate evidence from one (+) US study[2] that a single education session given by research assistants is more effective than a session given by discharge planners in increasing attendance rates at TB clinics after release (33% against 15%, RR 0.79 (0.68-0.92), p=0.001) and in increasing completion rates among those who attend the clinic (47% against 28%, p=0.049).

There is strong evidence from one (++) US study[3] that a single session of education combined with incentives for prisoners is no more effective than education alone in increasing attendance rates at TB clinics after release (25.8% against 23.3%, OR 1.43 (0.35-3.71), p=0.82).

Applicability

The evidence is partly applicable to prisoners in the UK, as the populations in the studies, and the prison settings, may differ from those in the UK.

1 White et al., 2002 (++)
2 White et al., 2005 (+)
3 White et al., 1998 (++)

Evidence statement 3: effectiveness of educational interventions for drug users on TB test reading

There is strong evidence from one (++) US study[1] that motivational education is not effective compared to usual practice in increasing return rates for TB test reading

among injecting drug or crack cocaine users (46.9% against 49.3%, adjusted OR 0.9 (0.6-1.3), p=0.547), and that education is less effective than incentives.

Applicability

The evidence is partly applicable to drug users in the UK, as the populations in the studies may differ from those in the UK.

1 Malotte et al., 1999 (++)

Evidence statement 4: effectiveness of informational interventions for healthcare workers on uptake of TB testing

There is strong evidence from one (++) Israeli study[1] that written information about the importance of TB testing is no more effective than a standard invitation in increasing the uptake of TB testing among healthcare workers (RR 0.87 (0.46–1.65)).

Applicability

The evidence is partly applicable to healthcare workers in the UK, as the populations in the studies may differ from those in the UK.

1 Taubman et al., 2013 (++)

Evidence statement 5: effectiveness of peer support interventions for homeless people on treatment completion

There is strong evidence from one (++) US study[1] that peer support and DOT is not effective in increasing treatment completion among homeless people compared with usual care and SAT (19% against 25%, significance NR) and that it is significantly less effective than incentives, follow-up calls and DOT (19% against 44%, p=0.02).

Applicability

The evidence is partly applicable to homeless people in the UK, as the populations in the studies may differ from those in the UK.

1 Tulsky et al., 2000 (++)

Evidence statement 6: effectiveness of coaching and peer support for people with latent TB infection on treatment adherence and completion

There is mixed evidence from three studies regarding coaching and peer support interventions for people with LTBI.

There is moderate evidence from one (+) US study[1] that motivational coaching and support is effective compared to an attention control or usual care for adolescents receiving LTBI treatment in increasing total medications taken (180 against 155 / 151, p=0.02), but not in increasing treatment completion (51.1% against 41.8% / 37.5%, NS).

There is strong evidence from two (1 [++] and 1 [+]) US studies[2,3] that peer support interventions are not effective for people with LTBI. One (+) study[2] focuses on adolescents and finds that peer counselling with or without incentives is not more effective than usual care in increasing treatment completion (80.3% without incentives, 84.8% with incentives, against 77.8%, NS). One (++) study[3] finds that peer support is not more effective than usual care among people receving LTBI treatment at a hospital chest clinic in increasing treatment completion (60.9% against 56.6%, RR 1.096 (0.85-1.414)).

Applicability

The evidence is partly applicable to people with LTBI in the UK, as the populations in the studies may differ from those in the UK.

1 Hovell et al., 2003 (+)
2 Morisky et al., 2001 (+)
3 Hirsch-Moverman et al., 2013 (++)

Evidence statement 7: Effectiveness of reminders and educational interventions for people receiving TB testing on return for test reading and sputum culture positivity

There is moderate evidence from two (1 [+] and 1 [–]) US studies[1,2] that reminder interventions are effective in increasing the rate of return for test reading among children receiving TB tests (91% against 54%, significance NR;[1] 61.5% against 6.2%, $p<0.001$[2]).

There is strong evidence from one (++) South Korean study[3] that written information on how to produce sputum samples is not more effective than verbal instruction in increasing rates of culture positivity (adjusted OR 0.93 (0.34-2.55), p=0.690) or the proportion of acceptable specimens (37.1% against 35.6%, p=0.812).

Applicability

The evidence is partly applicable to people receiving TB testing in the UK, as policies and guidance regarding which populations should be tested may differ from the UK.

1 Ozuah, 2001 (–)

2 Boom et al., 2000 (+)
3 Lee et al., 2013 (++)

Evidence statement 8: effectiveness of educational interventions for patients with active TB on treatment adherence

There is moderate evidence from two studies, one (+) South Korean[1] and one (+) Turkish[2], that educational interventions are effective for patients with active TB. One study[1] finds that education and reminders increase rates of treatment completion or cure (91.6% against 75%, RR 1.23 (1.12-1.36)), and another[2] that an educational programme increases attendance rates (54% against 29%, p<0.01) and adherence (80% against 42%, p<0.001).

Applicability

The evidence is partially applicable to people with active TB in the UK, as the populations in the studies may differ from those in the UK.

1 Kim et al., 2009 (+)
2 Clark et al., 2007 (+)

Evidence statement 9: effectiveness of information, education, reminders and process improvement interventions for service providers on TB knowledge, patient education practice, and TB screening

There is strong evidence from four studies that interventions including information and/or reminders for service providers are effective in improving service delivery outcomes. There is mixed evidence from four further studies regarding the effectiveness of educational interventions for service providers on knowledge outcomes.

There is strong evidence from one (++) UK study[1] that an intervention in primary care practices including education for service providers, computer reminders and monetary incentives is effective in increasing verbal screening for TB (57% against 0.4%, significance NR), the number of TSTs conducted (8.5% against 0.4%, incident rate ratio 20.6 (8.5-50.0)), and the proportion of cases of both active and latent TB identified (47% against 34%, OR 1.61(1.08–2.39) for active TB; 19% against 9%, OR 3.45 (1.51–7.87) for latent TB).

There is strong evidence from one (++) US study[2] that an educational process-improvement intervention in primary care is effective in increasing TB screening (54% against 32%, p<0.05).

There is weak evidence from one (–) US study[3] that computer reminders to clinicians are effective in increasing LTBI screening (25.2% against 8.9%, p<0.001).

There is weak evidence from one (–) US study[4] which shows mixed results for a process improvement intervention to improve TB case management on clinical practice (delivery of patient education and supervision of case managers).

There is weak evidence from two (–) UK studies[5,6] showing mixed findings on education leaflets for staff working with prisoners, drug users or homeless people on TB knowledge. There is weak evidence from one further (–) UK study[7] and one (–) US study[8] that educational interventions for hospital nursing staff are effective in increasing knowledge (88% against 28% (p=0.001) on open questions and 76% against 67% (p=0.07) on closed questions;[7] 91.8% against 80.8% (p<0.0001)[8]); however, both these studies have methodological limitations.

Applicability

Four studies in this category are from the UK; however, three of these measure knowledge outcomes only. The remainder of the evidence is partly applicable to clinicians working with people with TB in the UK, as the populations and contexts of service delivery in the studies may be different from those in the UK.

1 Griffiths et al., 2007 (++)
2 Margolis et al., 2004 (++)
3 Steele et al., 2005 (–)
4 Udeagu et al., 2007 (–)
5 Roy et al., 2011 (–)
6 Roy et al., 2008 (–)
7 Fiefield, 2007 (–)
8 Maetz et al., 1998 (–)

Evidence statement 10: cost-effectiveness of interventions for people with latent TB infection

There is moderate evidence from one study[1] that an intervention combining peer counselling and incentives has an ICER of US$209 per QALY compared with usual care. However, in a sensitivity analysis using Monte Carlo simulation, the intervention was not shown to be cost-effective in 89.75% of iterations, as it was more costly and no more effective than usual care (i.e. the intervention was dominated by usual care).

1 Kominski et al., 2007 (+)

Evidence statement 11: effectiveness of information, education and reminders for TB-related outcomes

The evidence indicates that information, education and reminders are effective in improving TB-related outcomes, although very brief interventions may not be effective.

There is moderate evidence from seven studies that informational or educational interventions (Ailinger et al., 2010 (–); Clark et al., 2007 (+); Hovell et al., 2003 (+); White et al., 2005 (+)), reminders (Ozuah, 2001 (–)), and interventions combining education and reminders (Boom et al. 2000 (+); Kim et al., 2009 (+)), are effective in promoting adherence-related outcomes in a range of populations. There is also weak evidence from two studies (Sheikh and MacIntyre, 2009 (–); Wieland et al., 2013 (–)) that educational interventions are effective in improving knowledge or attitudes.

There is evidence that such interventions are ineffective from two studies (Malotte et al., 1999 (++); Taubman et al., 2013 (++)). However, in both these studies the intervention is of minimal intensity (respectively a single 5- to 10-minute educational session, and a short letter).

Applicability

No study in this group was conducted in the UK. The evidence is partly applicable to the UK, as there may be differences in the populations or settings.

Evidence statement 12: effectiveness of support interventions for TB-related outcomes

The evidence indicates that support interventions are not effective or cost-effective for TB-related outcomes.

There is strong evidence from three studies (Hirsch-Moverman et al., 2013 (++); Morisky et al., 2001 (+); Tulsky et al., 2000 (++)) that peer support interventions are ineffective in improving adherence-related outcomes. One study (Kominski et al., 2007 (+)) also indicates that such interventions are not cost-effective; although reporting an ICER of US$209 per QALY, this study also shows that 90% of the iterations of a Monte Carlo model showed the intervention to be more costly than usual care with no added benefit.

There is mixed evidence from one study (Hovell et al., 2003 (+)) on the effectiveness of motivational coaching for adherence-related outcomes.

Applicability

No study in this group was conducted in the UK. The evidence is partly applicable to the UK, as there may be differences in the populations or settings.

Evidence statement 13: interventions for service providers

The evidence indicates that intensive interventions with service providers, integrating clinician education with other components such as reminders, incentives and process improvement, are effective in improving service delivery outcomes. However, the evidence on educational interventions alone is mixed and inconclusive.

There is strong evidence from two studies that integrated multi-component interventions with an educational element are effective in improving TB screening rates (Griffiths et al., 2007 (++); Margolis et al., 2004 (++)); one study shows more mixed results, but is of poor quality (Udeagu et al., 2007 (–)).

There is weak evidence from one study that computer-generated reminders to physicians are effective in increasing TB screening rates (Steele et al., 2005 (–)).

There is weak and mixed evidence from four studies regarding the effectiveness of education or information alone for service providers with respect to knowledge outcomes (Roy et al., 2011 (–); Roy et al., 2008 (–); Fiefield, 2007 (–); Maetz et al., 1998 (–)). No studies investigate such interventions with respect to service delivery outcomes.

Applicability

Four studies in this category are from the UK; however, three of these measure knowledge outcomes only. The remainder of the evidence is partly applicable to clinicians working with people with TB in the UK, as the populations and contexts of service delivery in the studies may be different from those in the UK.

2 Background

A range of information, education and support approaches are currently employed in practice in the UK to support the testing, diagnosis, treatment, management, prevention and control of TB among relevant groups. These are summarised (where evidence has been identified) in the separate review report (review 3a) conducted for this guidance.

Such approaches may include, for example:

- reminders to patients, which are already known to be effective (Liu et al., 2008);
- patient education and counselling schemes, either conducted by professionals or by peers, which are already known to be effective (M'Imunya et al., 2012);
- training programmes for clinicians or others involved in delivering care, including education, clinical audit or process improvement approaches; and
- general social support interventions.

This review did not include case management conducted by professionals, which is included in another review for this guidance (CPH review 2 [RQ LL & MM]), or incentives and enablers alone (which are not covered in the reviews for this guidance, but have been systematically reviewed recently (Lutge et al., 2012)).

Such interventions may apply to a range of populations and be intended to improve a range of outcomes, including:

- adherence or compliance to treatment;
- attendance at clinical appointments for treatment or test reading;
- uptake of testing or treatment;
- delivery of clinical services; etc.

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* (National Institute for Health and Clinical Excellence, 2012).

3.1 Review questions

The review question is:

- How effective and cost-effective are strategies and interventions aimed at providing and delivering information and education about the symptoms and risk of TB, clinical management of the illness and broader social support to people affected by TB?

3.2 Searching

Four approaches to identifying the evidence were used:

- specific searches in bibliographic databases covering both health and social science
- targeted online searches for grey literature
- supplementary searches to locate additional evidence not indexed on databases
- a call for evidence which gave stakeholders the opportunity to submit relevant evidence.

The search strategy was developed by an Information Specialist in NICE Guidance Information Services (gIS), and peer reviewed by another gIS Information Specialist. The initial search strategy was developed in MEDLINE (Ovid Interface), and then translated for use with other databases.

3.2.1 Search sources

3.2.1.1 Bibliographic databases

The following sources were searched for the reviews on current practice and effectiveness:

- Applied Social Sciences Index and Abstracts (ASSIA) via ProQuest
- British Library Electronic Theses Online (EThOS) via http://ethos.bl.uk
- British Nursing Index (BNI) via ProQuest
- Cumulative Index to Nursing and Allied Health (CINAHL) via Ebsco
- Cochrane Central Register of Controlled Trials (CENTRAL) via http://www.thecochranelibrary.com
- Cochrane Database of Systematic Reviews (CDSR) via http://www.thecochranelibrary.com
- Cochrane Health Technology Assessment database (HTA) via http://www.thecochranelibrary.com

- Database of Abstracts of Reviews of Effects (DARE) via http://www.thecochranelibrary.com
- Embase via OVID
- EPPI Centre Database of Education Research via http://eppi.ioe.ac.uk/webdatabases/Intro.aspx?ID=6
- EPPI Centre Trials Register of Promoting Health Interventions (TRoPHI) via http://eppi.ioe.ac.uk/webdatabases/Intro.aspx?ID=5
- Education Resource Information Center (ERIC) via ProQuest
- Health Management Information Consortium (HMIC) via OVID
- MEDLINE in Process via OVID
- MEDLINE via OVID
- OpenGrey via http://www.opengrey.eu/
- Social Care Online (SCO) via http://www.scie-socialcareonline.org.uk/
- PsycINFO via OVID
- Social Policy and Practice (SPP) via OVID
- Sociological Abstracts (SA) via ProQuest

3.2.1.2 Cost effectiveness evidence searches

A separate file of references was compiled for the cost effectiveness evidence using three methods.

1. The following sources were searched again with the validated cost effectiveness filter from the Centre for Reviews and Dissemination applied:
    - Embase via OVID
    - MEDLINE in Process via OVID
    - MEDLINE via OVID

2. ASSIA, EThOS, BNI, CINHAL, CENTRAL, CDSR, HTA, DARE, EPPI, ERIC, HMIC, OpenGrey, SCO, SPP, SA and the websites listed below were not searched again. All of the results from these resources were added to both the cost effectiveness and the effectiveness files.

3. The following resources were used to identify additional cost-effectiveness papers:
    - CEA Registry via https://research.tufts-nemc.org/cear4/
    - EconLit via Dialog
    - EconPapers via http://econpapers.repec.org/
    - Health Economic Evaluations Database (HEED) via http://onlinelibrary.wiley.com/book/10.1002/9780470510933
    - NHS Economic Evaluations Database (NHS EED) via http://www.thecochranelibrary.com

3.2.1.3 Web searching

The following websites were searched:

- Campbell Collaboration via http://www.campbellcollaboration.org/
- McMaster University Health Evidence via http://www.healthevidence.org/

- National Guideline Clearinghouse via http://www.guideline.gov/
- NICE via http://www.nice.org.uk/
- NICE Evidence Search via https://www.evidence.nhs.uk/
- Public Health Observatory via http://www.apho.org.uk/
- Public Health England via https://www.gov.uk/government/organisations/public-health-england
- Turning Research Into Practice via http://www.tripdatabase.com/
- The following subject specific websites will be used:
- African Health Forum via http://www.africanhealthforum.org.uk/index.htm
- Black Health Agency via http://www.thebha.org.uk
- British Infection Association via http://www.britishinfection.org/drupal/
- British Society for Antimicrobial Chemotherapy via http://bsac.org.uk
- British Thoracic Society via http://www.brit-thoracic.org.uk/
- Centers for Disease Control and Prevention resources on TB via http://www.cdc.gov/tb/
- Chartered Institute of Environmental Health via http://www.cieh.org/
- Cochrane Infectious Diseases Group Specialized Register via http://cidg.cochrane.org/specialized-register
- Department of Health, Social Services and Public Safety of Northern Ireland via http://www.dhsspsni.gov.uk/
- Education for Health via http://www.educationforhealth.org/
- Health Protection Scotland via http://www.hps.scot.nhs.uk/
- Health Quality Improvement Partnership via http://www.hqip.org.uk Infection Prevention Society via http://www.ips.uk.net
- Local Government Association via http://www.local.gov.uk/
- Public Health Wales via http://www.publichealthwales.wales.nhs.uk/
- Race Equality Foundation via http://www.raceequalityfoundation.org.uk
- South Asian Health Foundation via http://www.sahf.org.uk
- Stop TB UK via http://www.stoptbuk.org/
- Target Tuberculosis via http://www.targettb.org.uk/
- TB Alert via http://www.tbalert.org/

Google searches were also used (via http://www.google.co.uk/).

3.2.1.4 Supplementary searching

Two sets were selected for supplementary searching to identify effectiveness and cost effectiveness evidence, which included:

- Items identified through the call for evidence and scoping searches prior to the database searching
- Items identified as relevant to the review using records selected for inclusion through the screening process.

The supplementary searching was conducted in three ways:

- Backwards reference harvesting: studies were extracted from the bibliographies of the papers identified and added to Reference Manager if the titles were relevant and they were not methodology papers (e.g. the Cochrane Handbook).
- Forwards citation searching: the Science Citation Index and the Social Science Citation Index via Web of Science (http://apps.webofknowledge.com) were used to look for later papers citing the references of interest. All citations were added to Reference Manager
- Related item searching using PubMed - the first 100 references (sorted by relevance) were downloaded via http://www.ncbi.nlm.nih.gov/pubmed/

3.2.1.5 Search strategy

The effectiveness search strategy took the form:

- (Tuberculosis OR TB) AND (education OR information dissemination OR social support) AND (outcomes)

The cost effectiveness strategy took the form:

- (Tuberculosis OR TB) AND (education OR information dissemination OR social support) AND (validated economic filter)

See Appendix B for the full MEDLINE search strategy. Full search records for all databases are available on request.

3.2.1.6 Search limits

An English language restriction was placed on the search. A filter was used to exclude studies on animals, consistent with the other public health reviews undertaken as part of this programme of work. No filters for study type were applied, except in the cost effectiveness component of the searching. Terms were applied to remove editorials, news items and letters. Validated filters for identifying cost effectiveness evidence were applied as appropriate. Databases were searched from 1993 to the most recent records; however, as described below, at the screening stage a more recent date limit of 1998 was set.

3.2.1.7 Search results

All search results were de-duplicated in Reference Manager (Thomson, Reuters, version 12).

3.2.2 Screening

A sample of 10% of titles and abstracts was screened by two reviewers independently and differences resolved by discussion. Subsequent titles and abstracts were screened by one reviewer alone.

A 10% sample of full text records which met the inclusion criteria (including where it was unclear whether they met the criteria) were screened by two reviewers independently. Differences in screening decisions were discussed, recorded and consensus agreed, with the involvement of other reviewers as necessary. Screening decisions at full text were recorded and can be made available to the GDG as required.

3.2.2.1 Inclusion criteria

The inclusion criteria were as follows:

1) Intervention: Does the study include an outcome evaluation of a strategy or intervention providing and delivering information and/or education about:
    a. the symptoms and risk of TB
    b. clinical management of the illness
    c. broader social support for people affected by TB?

   (For this criterion, outcome evaluation was taken to include any study design including some intervention or strategy, and at least some data before and after the intervention are reported. Study designs could include controlled trials, before-after studies, retrospective or observational studies, if they report clear pre and post data.)
2) Populations:
    - Adults, young people and children who have or suspected to have **active** TB, who have **latent** TB, who are at increased risk of infection from and/or progression to active disease.

   (For this criterion, interventions aimed at clinicians to develop their practice were included, as well as public-focused interventions.)
3) Outcomes: Does the study measure change in knowledge or awareness; uptake of diagnostic testing or uptake and adherence to treatment/management of TB as an outcome?
4) Applicability: Was the study conducted in a high-income country (that is, a current OECD member)?[1]
5) Date: Was the study published in 1998 or later?

3.3 Quality assessment and data extraction

Studies were quality-assessed and data were extracted using the appropriate tools in the methods manual. All studies were quality-assessed and data-extracted by a single reviewer and then checked in detail by a second reviewer, with differences resolved by discussion.

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

3.4 Synthesis

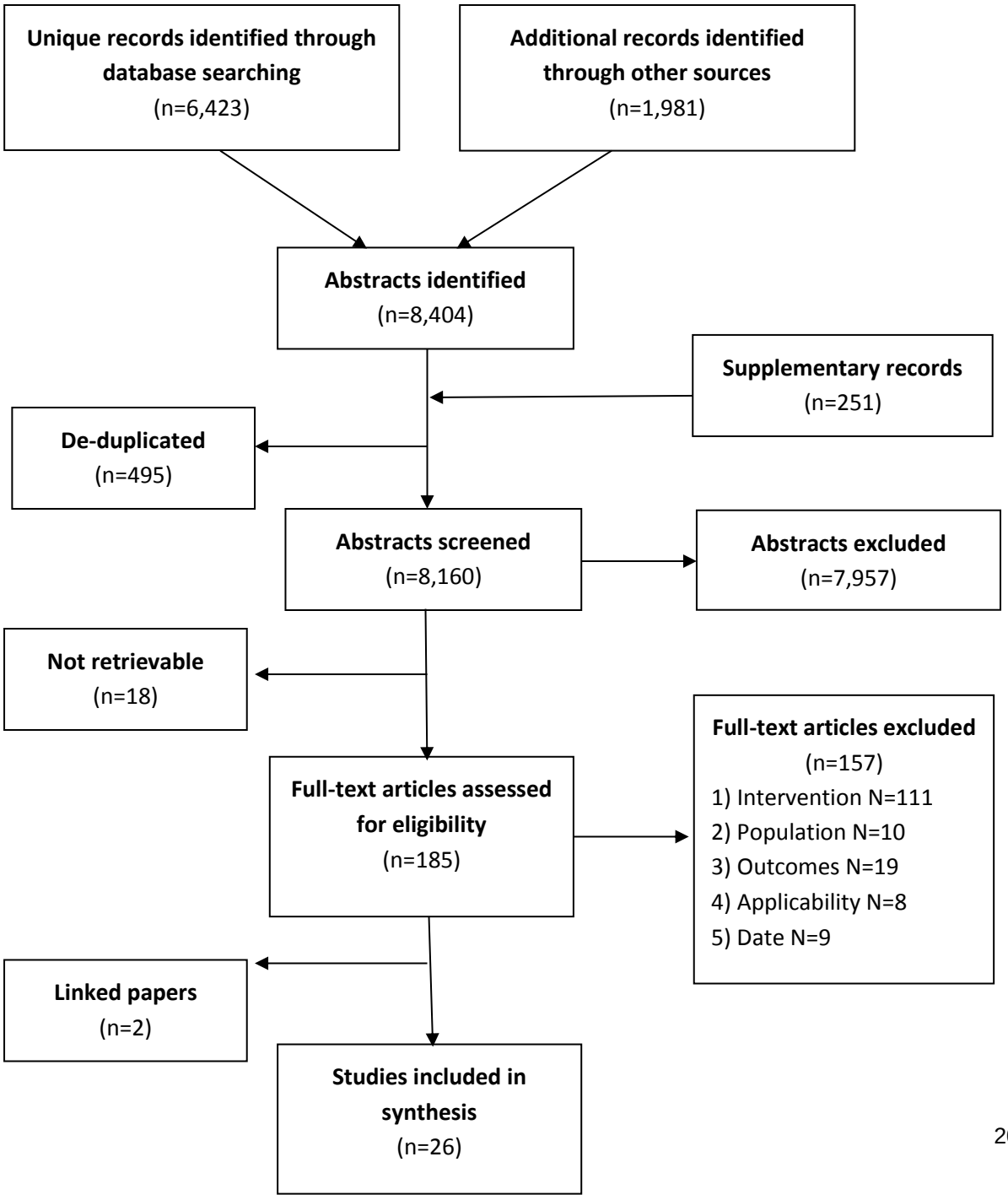
A narrative synthesis was undertaken. Due to the heterogeneity of the studies, meta-analysis was not possible.

4 Results

4.1 Flow of literature through the review

The searches returned 8,162 unique records. A total of 26 studies (25 effectiveness and one cost-effectiveness) were included in the review. Figure 1 shows the flow of literature through the review.

Figure 1. Flow of literature through the review



4.2 Results of quality assessment

The results of quality assessment for the effectiveness studies are shown in Table 1. Nine studies were rated high quality (++), 6 medium (+) and 10 low (–).

Table 1. Quality assessment of the effectiveness studies (N=25)

		Population			Method of allocation to intervention/comparison										Outcomes						Analysis						Sum-mary	
Reference	**Design**	**1.1**	**1.2**	**1.3**	**2.1**	**2.2**	**2.3**	**2.4**	**2.5**	**2.6**	**2.7**	**2.8**	**2.9**	**2.10**	**3.1**	**3.2**	**3.3**	**3.4**	**3.5**	**3.6**	**4.1**	**4.2**	**4.3**	**4.4**	**4.5**	**4.6**	**5.1**	**5.2**
Ailinger et al., 2010	BAh	+	–	–	–	++	NA	NA	+	NA	–	–	–	–	+	+	+	++	++	++	–	–	NR	–	–	–	–	–
Boom et al., 2000	Ret	+	–	+	NA	++	NA	NA	–	NA	NA	NA	+	+	+	+	+	++	NA	++	NA	NA	NR	+	+	NA	+	+
Clark et al., 2007	RCT	+	–	–	+	+	NR	NR	+	+	++	–	+	+	++	++	+	++	++	++	NR	NR	NR	+	+	–	+	–
Fiefield, 2007	BA	+	–	–	NA	+	NA	NA	–	NA	NA	+	++	+	+	+	–	–	NA	+	NA	NA	NR	++	+	++	–	–
Griffiths et al., 2007	RCT	+	+	+	++	++	++	+	+	+	++	++	++	++	+	+	++	++	+	+	++	++	++	++	++	++	++	++
Hirsch-Moverman et al., 2013	RCT	+	–	+	+	++	NR	++	+	NR	NR	++	+	–	++	++	++	++	++	++	+	++	NR	++	++	+	++	+
Hovell et al., 2003	RCT	+	–	–	+	++	NR	NR	+	NR	++	–	–	+	+	+	+	++	++	++	++	++	–	–	++	–	+	–
Kim et al., 2009	BAh	–	+	+	NA	+	NA	NA	+	NA	NA	+	–	–	++	++	+	++	++	++	++	+	NR	++	++	++	+	+
Lee et al., 2013	RCT	+	–	–	++	++	++	+	+	++	++	–	+	+	++	++	–	–	++	++	++	NR	NR	++	+	++	++	–

Maetz et al., 1998	BA	+	+	–	NA	++	NA	NA	+	NA	NA	+	+	+	–	++	–	–	NA	+	NA	–	NR	+	+	–	–	+
Malotte et al. 1999	RCT	+	–	+	+	++	NR	+	+	NR	+	NR	+	+	+	++	+	++	++	++	++	++	NR	++	+	++	++	+
Margolis et al., 2004	RCT	–	–	+	++	+	++	++	+	NR	NR	++	+	+	+	+	+	++	++	++	+	++	++	–	++	+	++	–
Morisky et al., 2001	RCT	+	+	–	+	++	NR	NR	+	NR	++	+	+	+	++	++	+	++	++	++	++	+	NR	+	++	+	+	+
Ozuah, 2001	Ret	+	–	+	NA	+	NA	NA	–	NA	NA	NA	+	+	+	+	+	++	NA	++	NA	NA	NR	+	+	–	–	+
Roy et al., 2011	nRCT	+	+	–	+	+	–	–	–	NR	+	NR	++	++	+	+	–	–	++	+	+	NA	NR	+	–	+	–	+
Roy et al., 2008	BA	+	+	+	NA	–	NA	NA	+	NA	NA	NA	++	++	+	+	–	–	NA	+	NA	NA	NR	+	++	++	–	+
Sheikh and MacIntyre, 2009	BA/ nRCT	++	+	–	NA	++	NA	NA	+	–	+	+	+	+	++	++	+	+	NA	+	–	NA	–	++	+	++	–	+
Steele et al., 2005	Ret	+	+	++	NA	–	NA	NA	++	NA	NA	NA	+	+	–	++	+	++	NA	+	NA	NA	+	+	+	–	–	+
Taubman et al., 2013	RCT	+	–	++	++	++	++	++	+	–	++	++	+	+	++	++	+	++	++	++	++	++	++	++	+	++	++	+
Tulsky et al., 2000	RCT	+	+	–	++	++	++	+	+	NR	–	NR	+	+	+	+	++	++	++	++	++	++	NR	++	+	++	++	+
Udeagu et al., 2007	Ret	++	+	–	NA	+	NA	NA	+	NA	NA	NA	+	+	+	+	–	+	NA	++	NA	NA	NR	+	+	+	–	+
White et al., 2005	BAh	+	+	–	NA	++	NA	+	+	NA	+	+	+	+	++	++	+	+	++	++	+	+	NR	++	++	+	+	+
White et al., 2002	RCT	+	+	–	++	++	++	++	+	NR	++	+	+	+	++	++	+	+	++	++	++	++	++	++	–	++	++	+
White et al., 1998	RCT	+	+	+	++	++	++	++	+	NR	+	+	+	+	++	++	+	++	+	+	++	+	–	++	++	+	++	+

Wieland et al., 2013	BA	–	+	–	NA	++	NA	NA	–	NA	NA	NA	+	+	+	+	–	+	NA	–	NA	NA	NR	+	+	+	–	–

Key to questions:

1.1 Is the source population or source area well described?
1.2 Is the eligible population or area representative of the source population or area?
1.3 Do the selected participants or areas represent the eligible population or area?
2.1 Allocation to intervention (or comparison). How was selection bias minimised?
2.2 Were interventions (and comparisons) well described and appropriate?
2.3 Was the allocation concealed?
2.4 Were participants and/or investigators blind to exposure and comparison?
2.5 Was the exposure to the intervention and comparison adequate?
2.6 Was contamination acceptably low?
2.7 Were other interventions similar in both groups?
2.8 Were all participants accounted for at study conclusion?
2.9 Did the setting reflect usual UK practice?
2.10 Did the intervention or control comparison reflect usual UK practice?
3.1 Were outcome measures reliable?
3.2 Were all outcome measurements complete?
3.3 Were all important outcomes assessed?
3.4 Were outcomes relevant?
3.5 Were there similar follow-up times in exposure and comparison groups?
3.6 Was follow-up time meaningful?
4.1 Were exposure and comparison groups similar at baseline? If not, were these adjusted?
4.2 Was Intention to Treat (ITT) analysis conducted?
4.3 Was the study sufficiently powered to detect an intervention effect (if one exists)?
4.4 Were the estimates of effect size given or calculable?
4.5 Were the analytical methods appropriate?
4.6 Was the precision of intervention effects given or calculable? Were they meaningful?
5.1 Are the study results internally valid? (i.e. unbiased)
5.2 Are the study results generalisable to the source population? (i.e. externally valid)

Key to sections 1-4:

++ The study has been designed/conducted in such a way as to minimise the risk of bias
+ Either the answer to the checklist question is not clear from the way the study is reported, or the study may not have addressed all potential sources of bias
– Significant sources of bias may persist
NR The study fails to report this particular question

NA Not applicable given the study design

Key to section 5:
++ All or most of the checklist criteria have been fulfilled; where they have not been, the conclusions are very unlikely to alter
+ Some of the checklist criteria have been fulfilled, where they have not, or not adequately described, the conclusions are unlikely to alter
– Few or no checklist criteria have been fulfilled and the conclusions are likely to alter

Key to 'Design' column:

RCT	randomised controlled trial (including cluster-RCTs)
nRCT	non-randomised controlled trial
BA	before-after (one-group non-comparative) prospective study
BAh	before-after study with prospective post-test and historical pre-test
Ret	retrospective cohort study

Cost-effectiveness studies

The results of quality assessment for the effectiveness study are shown in Table 2. The study was rated as having 'potentially serious limitations' (+).

Table 2. Quality assessment of the cost-effectiveness studies (N=1)

Reference	Applicability								Overall judgement	Study limitations											Overall assessment
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8		2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	2.11	
Kominski et al., 2007	++	++	+	+	++	–	+	NR	Partly applicable	++	++	++	+	+	++	+	–	+	–	–	Potentially serious limitations

Key to questions:

1.1 Is the study population appropriate for the topic being evaluated?
1.2 Are the interventions appropriate for the topic being evaluated?
1.3 Is the system in which the study was conducted sufficiently similar to the current UK context?
1.4 Was/were the perspective(s) clearly stated and what were they?
1.5 Are all direct health effects on individuals included, and are all other effects included where they are material?
1.6 Are all future costs and outcomes discounted appropriately?
1.7 Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?
1.8 Are costs and outcomes from other sectors fully and appropriately measured and valued?
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?
2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?
2.3 Are all important and relevant outcomes included?
2.4 Are the estimates of baseline outcomes from the best available source?
2.5 Are the estimates of relative 'treatment' effects from the best available source?
2.6 Are all important and relevant costs included?
2.7 Are the estimates of resource use from the best available source?
2.8 Are the unit costs of resources from the best available source?

2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?
2.10 Are all important parameters whose values are uncertain subjected to appropriate sensitivity analysis?
2.11 Is there any potential conflict of interest?

4.3 Findings: effectiveness

The characteristics of the studies are shown in Table 3.

Table 3. Summary of the effectiveness studies (N=25)

Ref.	Des.	QA	Country	Population	Intervention / comparison	Outcomes	Direction of effect
Ailinger et al., 2010	BAh	–	USA	Latino immigrants with LTBI	Culturally tailored education, continuity of care / usual care	Adherence	Effective
Boom et al., 2000	Ret	+	USA	Children	Medical staff re-education, patient education, patient follow-up	Testing	Effective
						Return attendance	Effective
Clark et al., 2007	RCT	+	Turkey	Patients with TB	Patient education / usual care	Attendance	Effective
						Adherence	Effective
Fiefield, 2007	BA	–	UK	Nurses	Education programme	Knowledge	Effective
Griffiths et al., 2007	RCT	++	UK	General population (primary care)	Provider education, computer reminders, equipment for TB testing, financial incentives to GPs / usual care	Verbal screening	Effective (sig NR)
						Testing	Effective
						Case identification	Effective
Hirsch-Moverman et al., 2013	RCT	++	USA	People with LTBI	Peer support / usual care	Completion	No difference
						Adherence	Unclear
Hovell et al., 2003	RCT	+	USA	Latino adoles-cents with LTBI	Adherence coaching / usual care / self-esteem counselling	Adherence	Effective
						Completion	No difference
Kim et al., 2009	BAh	+	South Korea	Patients with TB	Education, reminders	Completion	Effective
Lee et al., 2013	RCT	++	South Korea	People with suspected TB	Brochure and verbal explanation / verbal explanation	Positivity of TB culture	No difference
						Acceptable specimens	No difference
Maetz et al., 1998	BA	–	USA	Healthcare workers	Education (distance learning)	Knowledge	Effective
Malotte et al., 1999	RCT	++	USA	Drug users	Cash incentive / coupon incentive / educational	Return attendance	No difference (education group)

					counselling / no intervention		
Margolis et al., 2004	RCT	++	USA	Clinicians	Education and process improve-ment / NR	Testing	Effective
Morisky et al., 2001	RCT	+	USA	Adoles-cents with LTBI	Peer counselling / parent-participant contingency contracting / counselling + contracting / usual care	Completion	No difference
Ozuah, 2001	Ret	–	USA	Children	Reminders	Return attendance	Effective (sig NR)
Roy et al., 2011	nRCT	–	UK	Staff working with substance misusers	TB information leaflets / mental health information leaflet	Knowledge	Mixed
Roy et al., 2008	BA	–	UK	Prison and hostel staff	Information leaflets	Knowledge	Mixed
Sheikh and MacIntyre, 2009	BA / nRCT	–	Aust-ralia	Refugees	Leaflet, promotional campaign / NR	Clinic utilisation (nRCT)	Effective
						Knowledge (pre-post)	Mixed
Steele et al., 2005	Ret	–	USA	General population (primary care)	Clinician reminders	Screening	Effective
Taubman et al., 2013	RCT	++	Israel	Healthcare workers	Written information / standard invitation	PPD testing	No difference
Tulsky et al., 2000	RCT	++	USA	Homeless people	Incentives, reminders, DOPT / peer support, DOPT / usual care, SAT	Adherence	No difference (support group)
						Completion	No difference (support group)
Udeagu et al., 2007	Ret	–	USA	TB patients	Staff education and process improvement	Various care delivery outcomes	Mixed
White et al., 2005	BAh	+	USA	Prisoners with LTBI	Education by trained assistant / education by discharge planner	Attendance	Effective
						Completion	Effective
White et al., 2002	RCT	++	USA	Prisoners with LTBI	Education / incentive / usual care	Attendance	Effective (sig NR) (education

							group)
						Completion	Effective (non sig) (education group)
White et al., 1998	RCT	++	USA	Prisoners	Education and incentive / education alone	Attendance	No difference
						Completion	No difference
Wieland et al., 2013	BA	–	USA	Immigrants, refugees	Educational video	Knowledge	Effective
						Self-efficacy	Effective

The interventions evaluated in the effectiveness studies fall into two groups: those aimed primarily at patients or service users, and those aimed at clinical staff or other service providers. The former category includes 17 studies. Within these, a range of specific populations are targeted, namely:

- Immigrants and refugees (Ailinger et al., 2010 (–); Sheikh and MacIntyre, 2009 (–); Wieland et al., 2013 (–))
- Prisoners (White et al., 1998 (++); White et al., 2002 (++); White et al., 2005 (+))
- Drug users (Malotte et al., 1999 (++))
- Healthcare workers (Taubman et al., 2013 (++))
- Homeless people (Tulsky et al., 2000 (++))
- People receiving preventive treatment for latent TB infection (Hirsch-Moverman et al., 2013 (++); Hovell et al., 2003 (+); Morisky et al., 2001 (+))
- People receiving TB testing (Boom et al., 2000 (+); Lee et al., 2013 (++); Ozuah, 2001 (–))
- Patients with active or smear-positive TB (Clark et al., 2007 (+); Kim et al., 2009 (+))

The latter category includes eight studies, aimed at a range of service providers (Fiefield, 2007 (–); Griffiths et al., 2007 (++); Maetz et al., 1998 (–); Margolis et al., 2004 (++); Roy et al. 2008 (–); Roy et al., 2011 (–); Steele et al., 2005 (–); Udeagu et al., 2007 (–)).

The findings sections below are organised by these population groups.

4.3.1 Immigrants and refugees (N=3)

Ailinger and colleagues (2010 (–)) evaluated an intervention for Latino immigrants undergoing LTBI treatment at a public chest centre in Virginia, USA. The study design compared outcomes in an intervention group (N=53) with those in a usual care group taken from a random sample of historical medical records (N=131). Participants were predominantly female with a mean age of approximately 25 years; most were immigrants from Bolivia or El Salvador. The intervention was a culturally tailored educational intervention, delivered once monthly for the duration of LTBI treatment, based on ‘Latino cultural values’, delivered by a bilingual and bicultural

nurse. The intervention group also saw the same nurse each month. Usual care included monthly visits to the clinic to record the amount of treatment taken and education about latent tuberculosis infection. Adherence was measured by theself-reported total number of pills taken.

The study found that over 9 months of treatment, adherence was significantly higher in the intervention group. The mean number of doses taken in the intervention group was 157 (equivalent to 5.2 months of treatment) and 129 (equivalent to 4.3 months of treatment) for the historical group (p=0.028). It should be noted that there was substantial attrition in the intervention group for this study, which may limit the comparability of the groups (since the usual care group were taken from a random sample of records).

Wieland and colleagues (2013 (–)) evaluated an educational TB video for immigrants and refugees attending the Hawthorne Education Center in Rochester, New York. The participants (N=169) were mostly women (65%) and of diverse origins (Middle East 46%, Latin America 25%, Asia 17%, Africa 6%, Europe 5%). The study used a one-group before-after design. The intervention was a seven-minute video, based on previous focus-group research with relevant populations, which explored themes including lived experiences of TB in the US, modes of transmission, testing, differences between latent and active TB and treatment. The outcomes assessed were knowledge of TB and self-efficacy relating to TB; no behavioural outcomes were measured.

Across four knowledge items measured, scores improved significantly from 56.1% correct at pre-test to 82.3% correct after viewing the video (p<0.001). Across two elf-efficacy items, mean scores increased from 72.8% to 89.7% (p<0.001).

Sheikh and MacIntyre (2009 (–)) evaluated an intervention for the children of refugees from sub-Saharan Africa settling in Sydney, Australia. The mean age of the children in the sample was 12 years, with most parents coming from Sudan. The study used a mixed design, with a before-after element and a comparative element (see below). The intervention was an information and media campaign promoting the availability of the clinic and the importance of the services provided. Leaflets in English and community languages (Arabic, Swahili and Somali) were distributed at the clinic and the service was promoted through community leaders, refugee groups, community radio stations and other settings (e.g. churches, mosques, schools). Attendance was measured by comparing the number of refugees from sub-Saharan Africa and those from other countries attending clinics, compared to the total refugee population settled in the area; the assumption here is that refugees not from sub-Saharan Africa would not have been exposed to the intervention and hence can serve as a control, although this is methodologically questionable, given that there were probably other differences between the groups (and no pre-test data were reported for this comparison). Belief and knowledge items were also assessed through a before-after study with 3 months' follow-up (N=34).

The comparative element of the study found that a greater proportion of SSA refugees attended the clinic than non-SSA refugees after the intervention (1.32% against 0.44%, OR 3.0 (1.5-6.2), p<0.001). The before-after element of the study, investigating belief and knowledge outcomes, showed a significant improvement in perceived seriousness of measles (OR 0.19 (0.05-0.65)), knowing that germs cause TB (OR 0.17 (0.04-0.62)), and not being ashamed if a family member had TB (OR 0.11 (0.00-0.97)). There was no significant improvement in thinking sins can cause TB (OR 1.87 (0.48-7.58)) or having a preference for their child to be vaccinated (OR 0.31 (0.08-1.15)).

In summary, these studies provide indicative evidence that information and education interventions may be effective for immigrant and refugee populations. However, the studies are low-quality overall, and only one measures adherence behaviours, with the other two focused on knowledge outcomes alone.

Evidence statement 1: effectiveness of information and education for immigrants and refugees on TB knowledge, clinic attendance and treatment adherence

There is weak evidence from three studies that information and education for immigrants and refugees are effective in improving a range of TB-related outcomes.

There is weak evidence from one (–) US study[1] that a culturally tailored intervention, with continuity of care, is effective in increasing adherence among Latino immigrants (157 total pills taken against 129, p=0.028).

There is weak evidence from one (–) US study[2] that an educational video is effective in improving knowledge (82.3% against 56.1%, p<0.001) and self-efficacy about TB (89.7% against 72.8%, p<0.001) among immigrants and refugees attending an education centre.

There is weak evidence from one (–) Australian study[3] that an information and community media campaign promoting TB services is effective in improving knowledge about TB (significant improvement in 3 of 5 outcomes).

Applicability

The evidence is partly applicable to immigrants and refugees in the UK, as the populations in the studies may differ from those in the UK.

1 Ailinger et al., 2010 (–)
2 Wieland et al., 2013 (–)
3 Sheikh and MacIntyre, 2009 (–)

4.3.2 Prisoners (N=3)

White and colleagues (2002 (++)) evaluated an intervention for people screening positive for latent TB while in jail in California, USA. Participants were mostly male (89%), Latino (55%) or Black (22%), and foreign-born (66%). The study used a randomised trial design. All groups received INH treatment under DOT and one standard information session. People were randomly allocated at the start of treatment to one of 3 groups. The first intervention group (N=107) received further education once every 2 weeks while in jail to reinforce the messages given at the initial information session. The second intervention group (N=114) received a monetary incentive of US$25 in food or transport vouchers if they attended a TB clinic after release from jail. The third group (N=104) received usual care without further education or incentives. The outcomes measured were the first visit to a TB clinic within 1 month of release from jail and completion of a full course of treatment, both taken from medical records.

The study found that the educational intervention group had higher attendance rates than controls (37% against 24%). The incentive group also had higher attendance rates (37% against 24%). However, significance is not reported for these comparisons, only for an analysis which pooled both intervention groups and compared them to controls ($p<0.02$). Treatment completion rates were significantly higher in the education group than in controls (23% against 12%, adjusted OR 2.2 (1.04-4.72)), but not in the incentive group (12% against 12%, adjusted OR 1.07 (0.47-2.40)). Among those who visited the clinic, completion was non-significantly higher in the education group than controls (65% against 48%, adjusted OR 1.99 (0.63-6.22), $p=0.24$), and non-significantly lower in the incentive group than controls (33% against 48%, adjusted OR 0.43 (0.14-1.31), $p=0.14$).

White and colleagues (2005 (+)) evaluated an intervention for people screening positive for latent TB infection while in jail in California, USA. Participants were mostly (91%) male and Latino (66%) or Black (17.5%), and most were foreign-born. This study is partially linked to the earlier study by White et al. (2002): the usual care group (N=104) in the 2002 study is defined in the 2005 study as the intervention group. This intervention group is compared to a cohort of inmates (N=164) recruited at the same jail after the 2002 study was completed. This cohort is defined in the 2005 study as usual care. Both groups received a single education session at the start of the TB treatment. For the group in the 2002 study (that is, the intervention group in the 2005 study) this was from trained research assistants, and in the control group in the 2005 study this was from the jail discharge planners. The jail discharge planners were expected to complete the education session in addition to their usual duties. For 98% of the usual care group the session lasted less than 10 minutes, this compared to an average of 10-15 minutes for the sessions given by research assistants in the intervention group. The outcomes measured were attendance at a TB clinic (within 1 month of release from jail, and at any time) and treatment completion (6 months), both taken from medical records.

The study found that attendance rates were higher in the intervention group than the control group (within 30 days, 24% against 10%, RR 0.84 (0.75-0.95), p=0.002; at any time, 33% against 15%, RR 0.79 (0.68-0.92), p=0.001). The difference remained significant in a regression analysis controlling for confounders (RR 0.37 (0.18-0.75), p=0.006). Among people who attended the clinic at any time, completion was significantly higher in the intervention group than the control group (47% against 28%, p=0.049).

White and colleagues (1998 (++)) evaluated an intervention for prison inmates receiving isoniazid preventive therapy in California, USA. The population consisted of inmates who were prescribed INH in jail and then released before the course of treatment was completed. Participants were mostly male, with a mean age of 33 years; 50% were Hispanic and the majority reported having drug and alcohol problems and previous jail time. The study used a randomised trial design. Prior to release, the intervention group (N=31) received a one-to-one education session about TB and the importance of completing INH therapy. Inmates in the intervention group were also told they would receive $5 if they attended the TB clinic for INH continuation after release and provided personal details and their signature to verify their identity. The comparison group (N=30) received only the education session prior to release. The outcomes measured were attendance at the first visit to TB clinic after release from jail and completion of INH therapy. (It should be noted that although this study meets criteria for the review, it does not provide evidence on the effectiveness of education as such, since both groups received the same education session.)

There was no significant difference between groups in attendance (25.8% in the education plus incentive group against 23.3% in the education-only group, OR 1.43 (0.35-3.71), p=0.82). Treatment completion rates were also similar between groups (N=2 in each group, significance NR).

In summary, two of the three studies of educational interventions for prisoners are largely irrelevant to the review question - one (White et al. 1998 (++)) because both groups received the same educational intervention, and one (White et al. 2005 (+)) because it compares different modes of providing education. Neither of these studies thus provides evidence of the effectiveness of education as such. However, one study (White et al. 2002 (++)) provides reasonably robust evidence of the effectiveness of an educational intervention for prisoners on adherence outcomes.

Evidence statement 2: effectiveness of educational interventions for prisoners on treatment uptake and completion

There is moderate evidence from three studies that educational interventions are effective in increasing uptake of and adherence to treatment among prisoners.

There is strong evidence from one (++) US study[1] that ongoing education for prisoners, compared to a single education session, increases attendance rates at TB clinics after release (37% against 24%, significance NR) and treatment completion rates (23% against 12%, adjusted OR 2.2 (1.04-4.72)).

There is moderate evidence from one (+) US study[2] that a single education session given by research assistants is more effective than a session given by discharge planners in increasing attendance rates at TB clinics after release (33% against 15%, RR 0.79 (0.68-0.92), p=0.001) and in increasing completion rates among those who attend the clinic (47% against 28%, p=0.049).

There is strong evidence from one (++) US study[3] that a single session of education combined with incentives for prisoners is no more effective than education alone in increasing attendance rates at TB clinics after release (25.8% against 23.3%, OR 1.43 (0.35-3.71), p=0.82).

Applicability

The evidence is partly applicable to prisoners in the UK, as the populations in the studies, and the prison settings, may differ from those in the UK.

1 White et al., 2002 (++)
2 White et al., 2005 (+)
3 White et al., 1998 (++)

4.3.3 Drug users (N=1)

Malotte and colleagues (1999 (++)) evaluated an intervention for injecting drug or crack cocaine users in California, USA. Participants were mostly male (78%) and African-American (63%). The study used a randomised trial design. All participants received $5, a tuberculosis skin test and an appointment for test reading; patients who were more than 4 hours late for their test-reading appointment were tracked by outreach workers. Participants in the first intervention group (N=217) were given $10 and reminded to return for their skin test reading. In the second intervention group (N=217), patients were given coupons for a supermarket worth $10. In the third intervention group (N=218), participants could choose between receiving bus passes or coupons for a fast-food restaurant to the value of $10. In the fourth intervention group (N=211) participants received a 5- to 10-minute motivational education session, using a counselling approach. The control group (N=215) were told about the importance of returning for test reading, but they received neither an incentive nor educational session. The outcome measured was on-time return (within 96 hours) for skin test reading.

The study found that rates of return were not significantly different in the motivational education group compared to controls (46.9% against 49.3%, adjusted OR 0.9 (0.6-1.3), p=0.547). However, in all the incentive groups, return rates were significantly higher than controls (cash 94.9% against 49.3%, OR 19.2 (9.9-37.3), adjusted OR 19.9 (10.2-38.7), p<0.001; grocery coupons 85.7% against 49.3%, OR 6.2 (3.9-9.8), adjusted OR 6.4 (4.0-10.2), p<0.001; fast food / travel coupons 82.6% against 49.3%, OR 4.9 (3.1-7.6), adjusted OR 5.1 (3.3-8.0), p<0.001).

Evidence statement 3: effectiveness of educational interventions for drug users on TB test reading

There is strong evidence from one (++) US study[1] that motivational education is not effective compared to usual practice in increasing return rates for TB test reading among injecting drug or crack cocaine users (46.9% against 49.3%, adjusted OR 0.9 (0.6-1.3), p=0.547), and that education is less effective than incentives.

Applicability

The evidence is partly applicable to drug users in the UK, as the populations in the studies may differ from those in the UK.

1 Malotte et al., 1999 (++)

4.3.4 Healthcare workers (N=1)

Taubman and colleagues (2013 (++)) evaluated an intervention for healthcare workers in Israel who were invited annually to receive the PPD test. The sample was 60% female; 60% were Jewish and 40% were Arabic. Most (63%) were nurses and the remainder physicians. The study used a randomised trial design with two groups. The control group (N=96) received a standard single-line letter without explanation asking the participant to receive the PPD test. The intervention group (N=197) received a letter that explained the severity of TB infection and the importance of the test. The outcome was the proportion of healthcare workers who were tested.

Full outcome data were not presented, but the authors state that there was no significant difference between the groups (RR 0.87 (0.46–1.65)).

Evidence statement 4: effectiveness of informational interventions for healthcare workers on uptake of TB testing

There is strong evidence from one (++) Israeli study[1] that written information about the importance of TB testing is no more effective than a standard invitation in increasing the uptake of TB testing among healthcare workers (RR 0.87 (0.46–1.65)).

Applicability

The evidence is partly applicable to healthcare workers in the UK, as the populations in the studies may differ from those in the UK.

1 Taubman et al., 2013 (++)

4.3.5 Homeless people (N=1)

Tulsky and colleagues (2000 (++)) evaluated an intervention for homeless adults receiving preventive therapy for TB in California, USA. Participants had a mean age of 37 years and were predominantly male (86%) and minority ethnic (African American 52%, Hispanic or other 27%, White 21%). Two-thirds of participants slept on the street or in a shelter, and one-third in temporary accommodation. The study used a randomised trial design with three groups. In the first intervention group (N=43), patients received DOPT, an incentive of $5 at each visit, and follow-up phone calls or letters if doses were missed. In the second intervention group (N=37), patients also received DOPT, and had a peer health adviser who provided the dose, watched the patient take the medication and checked for side effects. The peer health adviser also accompanied the patient to appointments and attempted to trace them if a dose was missed. The control group (N=38) received usual care, including self-administered therapy. The outcomes assessed were treatment completion (6 months) and treatment duration.

The findings showed that the peer adviser group had worse completion rates than usual care (19% against 26%, significance not reported). The incentive group had non-significantly higher completion rates than usual care (44% against 26%, p=0.11), and significantly higher rates than the peer adviser group (44% against 19%, p=0.02). Similar results were reported for months of isoniazid dispensed (incentive 5 months, peer adviser 2 months, control 2 months; I1 vs I2 p=0.005, I1 vs control p=0.04, I2 vs control significance NR) and for the probability of receiving at least three months of therapy (incentive 71% (59%-86%), peer adviser 42% (29%-61%), control 45% (31%-64%). Regression analyses were also presented, but these combine the peer adviser group with the usual care group and compare them to the incentive group, and so are not relevant to this review.

Evidence statement 5: effectiveness of peer support interventions for homeless people on treatment completion

There is strong evidence from one (++) US study[1] that peer support and DOT is not effective in increasing treatment completion among homeless people compared with usual care and SAT (19% against 25%, significance NR) and that it is significantly less effective than incentives, follow-up calls and DOT (19% against 44%, p=0.02).

Applicability

The evidence is partly applicable to homeless people in the UK, as the populations in the studies may differ from those in the UK.

1 Tulsky et al., 2000 (++)

4.3.6 People with LTBI (N=3)

Hovell and colleagues (2003 (+)) evaluated an intervention for Latino adolescents with latent TB infection attending middle or high school in California, USA. The mean age of the sample was 15.6 years, 56% were male, and 65% were foreign-born (most of these were Mexican). The study used a randomised trial design with both a usual-care control group and an attention control (i.e. a group who received an intervention with different content, to control for any effect of the extra 'attention' given to the intervention group). The intervention group (N=92) received coaching from bilingual Latino college students, in five face-to-face sessions and seven telephone sessions over 6 months. The coaching focused on LTBI treatment and the setting of adherence goals. Coaches also offered assistance with medical appointments and transport. In the usual-care control group (N=96), adolescents received monthly evaluations and new prescriptions, but no further intervention. The attention control group received self-esteem counselling (N=98) from bilingual college students. Similar counselling procedures were used with this group as with the intervention group, but no advice was given about TB. The outcome measured was treatment adherence, defined as self reported number of pills taken in the last 30 days; urine tests were also conducted as a check on the validity of the self-report outcome, but were not reported separately.

At the intermediate time point (6 months), the intervention group had taken a mean of 129 pills, as against 112 in the attention control group and 113 in the usual care group ($p=0.007$); at 9 months, the intervention group had taken 180 pills as against 155 in the attention control and 151 in the usual care group ($p=0.02$). Regression analysis indicated that the effect remained significant when controlling for alcohol use ($p<0.01$), and that the intervention accounted for 3% of observed variance in outcomes over and above demographic, family, cognitive and peer variables ($p<0.01$). Overall, 51.1% of coached participants completed treatment, as opposed to 41.8% and 37.5% of participants in the attention control and usual care groups. This latter difference was not statistically significant between groups.

Morisky and colleagues (2001 (+)) evaluated an intervention in adolescents with latent TB infection attending public clinics in California, USA. Participants were mostly Hispanic and foreign-born, and of middle or high school age. The study used a randomised trial design with four groups. The first intervention group received peer counselling (N=199). Peer counselling sessions took place at least every two weeks,

and focused on attendance and adherence and related concerns. The second intervention group (N=203) focused on 'contingency contracting', in which parents and adolescents agreed an incentive if the adolescent adhered to therapy. The third intervention group (N=197) received both peer counselling and contingency contracting. The fourth group (N=194) was a control group, and received usual care including some health education and physical health assessment. The outcome measured was completion of treatment.

Participants were followed up for 6 months. The proportions completing care were 80.3%, 76.4%, 84.8% and 77.8% in the peer counselling, incentives, combined and usual care groups respectively. No statistically significant differences between groups were reported.

Hirsch-Moverman and colleagues (2013 (++)) evaluated an intervention at a hospital chest clinic in New York City, USA. Eligible participants were those recommended for latent tuberculosis infection (LTBI) treatment and over the age of eighteen. The mean age of participants was 40 years and the majority were male (70%); most were minority ethnic (35% African American, 36% African-born and 20% Latino) and one-third reported having been homeless. The study had a relatively low recruitment rate (57%), which may impact on generalisability. The study used a randomised trial design. Patients allocated to the intervention group (N=128) received a peer-based support programme. Peer workers aimed to meet with patients in the intervention group weekly. They facilitated patients' access to services, assisted with patient-provider communication, coached patients on adherence to treatment and provided emotional support. The control group (N=124) received usual care, including access to standard clinical services and self-administered isoniazid treatment. The outcome assessed was completion of LTBI treatment (6 months); adherence (measured by self-report, attendance and electronic pill bottles) was also measured, but data were not fully reported.

Treatment completion was not significantly different between groups (60.9% in the intervention group against 56.6% in the control group, RR 1.096 (0.85-1.414)). Regression analysis controlling for demographics and risk factors also found no significant difference (adjusted RR 1.04 (0.85-1.26), p=0.704). The authors report that a repeated measures analysis on the adherence outcome, controlling for confounders, showed a significant difference in favour of the intervention group (9.7% difference, p=0.043), but full data were not presented and the analysis was unclear and arguably not specified *a priori*.

In summary, the evidence on coaching and peer support for people with LTBI is mixed overall. Two reasonably robust studies find such interventions to be ineffective (Morisky et al. 2001 (+); Hirsch-Moverman et al. 2013 (++)), and one (Hovell et al. 2003 (+)) finds them to be effective for increasing the total number of medications taken, but not for treatment completion (although there is a non-significant trend towards improved completion). There is no obvious explanation for this variation in

terms of population, setting or intervention implementation or intensity (while the peer counsellors in Morisky et al. appear to have received little training, those in Hirsch-Moverman received substantial training).

Evidence statement 6: effectiveness of coaching and peer support for people with latent TB infection on treatment adherence and completion

There is mixed evidence from three studies regarding coaching and peer support interventions for people with LTBI.

There is moderate evidence from one (+) US study[1] that motivational coaching and support is effective compared to an attention control or usual care for adolescents receiving LTBI treatment in increasing total medications taken (180 against 155 / 151, p=0.02), but not in increasing treatment completion (51.1% against 41.8% / 37.5%, NS).

There is strong evidence from two (1 [++] and 1 [+]) US studies[2,3] that peer support interventions are not effective for people with LTBI. One (+) study[2] focuses on adolescents and finds that peer counselling with or without incentives is not more effective than usual care in increasing treatment completion (80.3% without incentives, 84.8% with incentives, against 77.8%, NS). One (++) study[3] finds that peer support is not more effective than usual care among people receving LTBI treatment at a hospital chest clinic in increasing treatment completion (60.9% against 56.6%, RR 1.096 (0.85-1.414)).

Applicability

The evidence is partly applicable to people with LTBI in the UK, as the populations in the studies may differ from those in the UK.

1 Hovell et al., 2003 (+)
2 Morisky et al., 2001 (+)
3 Hirsch-Moverman et al., 2013 (++)

4.3.7 *People receiving testing for TB (N=3)*

Ozuah (2001 (–)) evaluated an intervention in an inner-city community health centre which aimed to increase adherence to tuberculosis test reading in children. The population served by the centre was mainly Hispanic (55%) or African American (44%), and low-SES (44% had no health insurance and 47% were covered by Medicaid), although it is unclear if this was also true of the study sample. In the pre-intervention period patients (N=3,402) were simply told to return in 48 to 72 hours for test reading. In the post-intervention period patients (N=4,124) were told to return in 48 hours, and were called or sent a postal reminder if they did not attend by midday

on the specified day. The outcome measured was return for test reading (at 72 hours).

The study found that return rates increased after the intervention (91% against 54%), but the significance level of this finding was not reported.

Lee and colleagues (2013 (++)) evaluated an intervention in people with suspected tuberculosis being seen at a tertiary referral hospital, in Seoul, South Korea. Participants were mostly male (72%) with a median age of 56 years. The study used a randomised trial design with two groups. Participants in the intervention group (N=41) received verbal instruction and a brochure with pictorial and written information about how to provide a sputum sample. This covered when to take the sample, how to expectorate the sputum and when to send the sample to the hospital. The control group (N=36) received only the verbal instruction, not the brochure. The outcomes measured were positivity rate of TB culture, positivity rate of acid-fast bacilli (AFB) smears and the proportion of acceptable specimens for the evaluation of bacterial pneumonia. No patient-related outcomes were measured in the study.

The study found no statistically significant differences in any outcome (positivity rate of TB cultures, 33.1% against 35.6%, p=0.690, adjusted OR 0.93 (0.34-2.55); positivity rate of AFB smear 24.2% against 26.9%, p=0.637; proportion of acceptable specimens 37.1% against 35.6%, p=0.812).

Boom and colleagues (2000 (+)) evaluated an intervention at a children's hospital primary care practice in Pennsylvania, USA. The mean age of participants was 69.2 months (no further information on sample characteristics was reported). The study used a retrospective before-after design. The intervention evaluated in the study includes elements of service provider training as well as patient education, but is included under the latter heading here. The intervention included training for clinicians (physicians, residents and nurses) about screening recommendations and proper test placement and interpretation techniques. Patients' families received written and face-to-face education about TSTs and were encouraged to return to TST test reading within 48-72 hours after test placement. Finally, a follow-up system was put in place, utilising phone calls and letters, to encourage patients to return for test reading. The outcomes measured were numbers of TSTs placed and return rate for TST test reading.

The findings show a small but statistically significant increase in the number of TSTs placed (pre N=611 (18%) against post N=704 (21.5%), p=0.005), and a large and significant increase in the return rate for TST testing (pre 6.2%, post 61.5%, p<0.001). (Subgroup analyses appeared to show increases across all insurance types (Medicaid HMO, Medicaid, private and self-pay) and age groups, but statistical significance was reported only cross-sectionally for these analyses and not in terms of differential intervention effectiveness.)

In summary, there is evidence that reminder systems for patients can increase rates of return for test reading, although there are some methodological limitations in the evidence (Ozuah 2001 (–); Boom et al., 2000 (+)). (The study by Lee et al. (2013 (++)) is largely irrelevant to this review, and in any case only compares two modalities of delivering information.)

Evidence statement 7: Effectiveness of reminders and educational interventions for people receiving TB testing on return for test reading and sputum culture positivity

There is moderate evidence from two (1 [+] and 1 [–]) US studies[1,2] that reminder interventions are effective in increasing the rate of return for test reading among children receiving TB tests (91% against 54%, significance NR;[1] 61.5% against 6.2%, $p<0.001$[2]).

There is strong evidence from one (++) South Korean study[3] that written information on how to produce sputum samples is not more effective than verbal instruction in increasing rates of culture positivity (adjusted OR 0.93 (0.34-2.55), p=0.690) or the proportion of acceptable specimens (37.1% against 35.6%, p=0.812).

Applicability

The evidence is partly applicable to people receiving TB testing in the UK, as policies and guidance regarding which populations should be tested may differ from the UK.

1 Ozuah, 2001 (–)
2 Boom et al., 2000 (+)
3 Lee et al., 2013 (++)

4.3.8 Patients with active TB (N=2)

Kim and colleagues (2009 (+)) evaluated an intervention in people with smear-positive TB attending private teaching hospitals in South Korea. The study design compared a single prospective intervention group with two retrospective cohorts, one receiving usual care in the same private hospitals in which the intervention took place, and the other receiving usual care in a random sample of public sector hospitals; data for both usual-care cohorts were taken retrospectively from medical records. In the intervention group (N=172) patients saw a physician and received weekly or monthly self-administered LTBI treatment. A public health nurse provided education, appointment reminders, and open consultations to resolve any problems with treatment. The private sector control cohort (N=172) received usual care from the physician as for the intervention group, but without the involvement of the public health nurse. The public sector control cohort (N=1,027) received self-administered treatment with brief health education and motivation activities from TB workers. The

outcomes measured were cure (defined by negative smear or culture) and treatment completion at six months.

Outcomes were measured after the completion of 6 months of treatment. Statistically significant differences were reported between the groups for treatment success (defined as either cure or treatment completion). The proportion of patients for whom treatment was a success on this definition was 91.6% in the intervention group, 75% in the usual care private cohort (RR 1.23 (1.12-1.36)) and 80.5% in the usual care public cohort (RR 1.11 (1.05-1.17)). Considering patients cured, the proportions were 58.7%, 33.1% and 79.3% for the intervention, usual care private cohort and usual care public cohorts respectively. The difference between the intervention group and the usual care private cohort was statistically significant favouring the intervention group (RR 1.77 (1.38-2.27)), but in the other comparison where the difference favoured the usual care public group (RR 0.72 (0.63-0.82)). Considering patients completed (but not cured), the proportions were 32.9%, 41.9% and 1.2% for the intervention, usual care private cohort and usual care public cohorts respectively. There were no statistically significant differences between the two private sector groups (RR 0.79 (0.60-1.04)). The difference between the intervention group and usual care public cohort was statistically significant favouring the intervention (RR 26.02 (14.54-46.56)).

Clark and colleagues (2007 (+)) evaluated an intervention for people receiving first-line treatment for newly diagnosed tuberculosis, in a hospital in Istanbul, Turkey. All participants were male, with a mean age of 37.8 years. The study used a randomised trial design. The intervention group (N=56) received education from a pharmacist, both written and face-to-face, before being discharged. The education covered information about treatment and adverse effects. The control group (N=58) received usual care. The outcomes measured were attendance at follow-up visit and treatment adherence (measured both by urine test and by percentage of prescribed medication remaining), at 6 months.

The study showed significantly higher numbers of patients attending all scheduled appointments in the intervention group than in controls (54% against 29%, $p<0.01$). Adherence, as measured by urine test, was also higher in the intervention group (80% against 42% all tests positive, $p<0.001$). There was no significant difference in the proportion of medications consumed (88.7% against 85.8%, NS).

In summary, these studies provide indicative evidence that educational interventions can be effective in improving adherence behaviours among people with active TB.

Evidence statement 8: effectiveness of educational interventions for patients with active TB on treatment adherence

There is moderate evidence from two studies, one (+) South Korean[1] and one (+) Turkish[2], that educational interventions are effective for patients with active TB. One

study[1] finds that education and reminders increase rates of treatment completion or cure (91.6% against 75%, RR 1.23 (1.12-1.36)), and another[2] that an educational programme increases attendance rates (54% against 29%, p<0.01) and adherence (80% against 42%, p<0.001).

Applicability

The evidence is partially applicable to people with active TB in the UK, as the populations in the studies may differ from those in the UK.

1 Kim et al., 2009 (+)
2 Clark et al., 2007 (+)

4.3.9 Interventions for service providers (N=8)

Roy and colleagues (2011 (–)) evaluated an education leaflet for staff working with substance misusers in the UK. The participants worked for a crime reduction charity, in various roles involving offenders after release from prison or people who misuse substances; most were drug intervention programme workers (54%) or substance misuse workers (12%). The study used a non-randomised, controlled trial design. Participants in the intervention group (N=57) received an education leaflet entitled 'Substance Mis-Use and TB'. In the control group, the participants (N=27) received a leaflet entitled 'Mental Health and Substance Mis-Use', which provided no information about TB. Participants were asked to complete pre and post questionnaires (these were sent by email along with the leaflet). The outcomes assessed were knowledge of TB symptoms, need for referral, treatment issues and the needs to provide support and general awareness to clients. No behavioural outcomes were measured in the study.

The study findings were reported only in terms of within-group changes in each group; no analyses compared the two groups. Overall the results were mixed, with significant improvements in the intervention group on less than half of the outcomes. There were mixed results on knowledge of symptoms of TB (significant improvements in 4 of 9 outcomes in the intervention group, in 0 of 9 outcomes in the control group). There were no significant changes on understanding the need for referral (significant improvements in 0 of 4 outcomes in the intervention group, in 0 of 4 outcomes in the control group). There were mixed outcomes on knowledge of TB treatment issues (significant improvements in 2 of 6 outcomes in the intervention group, in 0 of 6 outcomes in the control group). There were mixed outcomes on support needs and general awareness (significant improvements in 3 of 6 outcomes in the intervention group, in 0 of 6 outcomes in the control group).

Roy and colleagues (2008 (–)) evaluated an educational leaflet for prison officials and homeless hostel staff in the UK. Just over half of participants (55%) were prison staff, and the remainder (45%) were staff from homeless hostels. The study used a one-group before-after design. The intervention consisted of educational leaflets

about TB, tailored to participants' roles. Participants completed pre and post questionnaires about background TB knowledge, awareness of symptoms of TB, UK TB guidance and how to support clients, and practice where UK guidance is lacking. No behavioural outcomes were measured.

The study found mixed results. General TB knowledge (e.g. that it is infectious and curable) did not improve significantly, mainly because levels were already high at pre-test (significant improvement in 0 of 4 outcomes). The outcomes on knowledge of symptoms were mixed (significant improvement in 4 of 9 outcomes). There were significant improvements in knowledge about supporting clients and staff (significant improvement in 4 of 5 outcomes), but not in addressing areas were guidelines are lacking (significant improvement in 0 of 2 outcomes).

Udeagu and colleagues (2007 (–)) evaluated a process improvement intervention designed to improve case management practices in New York City, USA. The study design was a retrospective before-after study using patient case records (N=131 at pre-test, N=314 at post-test). The intervention was based on an evaluation of the service, which identified a number of deficiencies including late and incomplete patient interviews and poor documentation of case management. The intervention included educational materials for staff and patients, the production of guidelines and standards, and educational workshops for staff. The outcomes assessed related to the quality of data and documentation, to whether case managers addressed several specific points in their interviews with patients (transmission and pathogenesis, length of treatment, development of resistance, patient's knowledge of diagnosis, importance of monthly follow-up, offered DOT, importance of DOT, availability of TB services), and to whether case managers' supervisors addressed specific points.

The study showed mixed results on the delivery of patient education in CM interviews (significant improvements in 5 of 8 outcomes) and on the supervision of case managers (significant improvements in 1 of 3 outcomes). There were significant improvements in the documentation of interview dates. The time from patient identification to interview decreased from 7.8 days (range 0-140) to 2 days (range 0-198).

Griffiths and colleagues (2007 (++)) evaluated an intervention in primary care in Hackney, London, an ethnically mixed and socio-economically deprived area. The study design used was a cluster-randomised controlled trial, with randomisation at the level of GP practices. A total of 50 practices were included at baseline, with outcomes measured on all new patients registering with those practices over a two-year period (a total sample of N=93,970).The included population was ethnically mixed (approx. 43% white, 23% black, 10% Asian), and included a substantial number of new immigrants (approx. 260 per practice registered over the study period).

The main focus of the intervention was on promoting screening for TB. A specialist nurse and researcher GP carried out educational visits to intervention practices to promote TB screening and raise awareness of guidelines, and made a follow-up phone call after the visit (ongoing telephone support was also available). This component of the intervention was based on the social influence theory of behaviour change. Reminders were also incorporated into intervention practices' computer systems. Practices were also provided with equipment for TB testing and financial incentives for carrying out tests (£7 each). The outcomes measured were rates of verbal screening for TB at health checks, TSTs conducted, and cases of active and latent TB detected.

The study found that the rate of verbal screening for TB among patients attending health checks was higher in intervention practices than in controls (57% against 0.4%, significance NR). There were also more TSTs conducted (8.5% against 0.4%, incident rate ratio 20.6 (8.5-50.0)), and a higher proportion of cases of both active and latent TB identified in primary care (47% against 34%, OR 1.61 (1.08–2.39) for active TB; 19% against 9%, OR 3.45 (1.51–7.87) for latent TB).

Steele and colleagues (2005 (–)) evaluated a computer system generating physician reminders in Colorado, USA. The study authors utilised a random sample of newly registered patients at two community health centres. For the population registering during the study period, the mean age was 49 years; 64% of patients were female and 71% were Hispanic. Half of the population lacked health insurance and 73% had at least one risk factor for latent tuberculosis infection (LTBI), as defined by the Centers for Disease Control. In the population that met criteria for TB screening, almost all patients were Hispanic (94%) and uninsured (90%). The study utilised a retrospective before-after design. A total of 146 records were examined in the pre-intervention phase (out of 683 who met the criteria for LTBI assessment), and 103 in the post-intervention period (out of 610 who met the criteria for LTBI assessment). The intervention consisted of a computer system that generated paper reminders for physicians for all patients who were under 40 years old and born in a high-risk country. The reminder prompted staff to perform assessment to determine if screening for LTBI was required. Physicians also received a web-based tool to document their assessments. The outcome assessed was appropriate LTBI screening conducted.

The study found a significant impact of the reminder system (LTBI screening conducted for 25.2% of eligible patients in the intervention phase, compared to 8.9% in the pre-intervention period, $p<0.001$).

Maetz and colleages (1998 (–)) evaluated an intervention for people working with people with TB, or people at high risk of TB, in the USA. Approximately two-thirds of the participants were nurses, with the remainder including a range of health workers; most were employed by state or local agencies. The study used a single-group before-after design. Participants (N=3,452) took part in a distance learning TB

education course. The course included a written self-study course and five interactive online conferences. The course was based on materials developed by the Centers for Disease Control and included topics about transmission and pathogenesis of TB, epidemiology, diagnosis, treatment and infection control. The conferences reviewed the self-study modules and incorporated exercises, case studies and interviews and interactive questions and discussions. The outcome was TB knowledge before and after the course (approximately 2 months apart), although it is unclear exactly what questions were asked. There was a high drop-out rate from the course (32%) and only completers appear to be included in the analysis.

The study found that participants' knowledge significantly improved after taking the course (91.8% against 80.8%, $p<0.0001$). Subgroup analyses indicated similar increases across different professional groups, employer groups and levels of experience.

Margolis and colleagues (2004 (++)) evaluated a medical education intervention aimed at clinicians in North Carolina, USA. Forty-four non-university affiliated and non-public-funded paediatric and family practices were included. In the intervention practices, 26% of patients were on Medicaid, compared to 32% in the control group practices. The study used a randomised trial design with an intervention and a control group. In the intervention group (N=22 practices), practices received continuing medical education, including mini-lectures, and assistance in implementing office systems designed to better deliver preventive care. Specifically, the practices utilised the plan-do-study-act (PDSA) cycle of process improvement, which included setting performance goals, changing office routines and staff training. The intervention was delivered by two nurse-doctor teams. No description of the control practices (N=22 practices) was provided. The outcome assessed was TB screening conducted, which was assessed by reviewing randomly sampled clinic records.

The study found a significant effect on the rate at which TB screening was conducted (54% in the intervention practices against 32% in the control practices, $p<0.05$).

Fiefield (2007 (–)) evaluated an intervention for senior nursing staff working at a hospital in Greater Manchester, UK. The sample characteristics are not described. The study used a single-group before-after design. Nurses working directly with patients in a variety of areas within the hospital completed a 3 month TB education programme (N=10). The training included 8 half-day teaching sessions describing the natural history of TB, its epidemiology, diagnostic procedures, sites of disease, treatments and screening, a one-day placement at an infectious diseases unit and a half-day placement with a TB nurse. The outcome was knowledge of TB, measured as responses to true and false statements and open-ended questions (the exact questions were not reported). The same questionnaire was delivered twice once at the start of the intervention and again at the penultimate teaching session, approximately 2 months later.

The study found that there was a significant increase in knowledge after the intervention on the open-ended questionnaire (88% against 28%, p=0.001), but only a borderline significant increase on the closed questions (76% against 67%, p=0.07).

In summary, the interventions included in this section cover a wide range, from intensive multi-component interventions to very brief educational interventions. There is reasonably good evidence that the more intensive interventions, which integrate educational interventions for clinical staff with broader support and goal-setting in an integrated theory-informed programme, are effective in improving service delivery outcomes such as the number of LTBI screening tests conducted (Griffiths et al., 2007 (++); Margolis et al., 2004 (++)). There is indicative evidence for the effectiveness of computer-generated reminder systems within clinical practice, although this comes from one methodologically limited study (Steele et al., 2005 (–)). The briefer educational interventions have only been evaluated with respect to knowledge outcomes, rather than service delivery outcomes, and the findings are not promising (there are also substantial methodological limitations with this evidence).

Evidence statement 9: effectiveness of information, education, reminders and process improvement interventions for service providers on TB knowledge, patient education practice, and TB screening

There is strong evidence from four studies that interventions including information and/or reminders for service providers are effective in improving service delivery outcomes. There is mixed evidence from four further studies regarding the effectiveness of educational interventions for service providers on knowledge outcomes.

There is strong evidence from one (++) UK study[1] that an intervention in primary care practices including education for service providers, computer reminders and monetary incentives is effective in increasing verbal screening for TB (57% against 0.4%, significance NR), the number of TSTs conducted (8.5% against 0.4%, incident rate ratio 20.6 (8.5-50.0)), and the proportion of cases of both active and latent TB identified (47% against 34%, OR 1.61(1.08–2.39) for active TB; 19% against 9%, OR 3.45 (1.51–7.87) for latent TB).

There is strong evidence from one (++) US study[2] that an educational process-improvement intervention in primary care is effective in increasing TB screening (54% against 32%, p<0.05).

There is weak evidence from one (–) US study[3] that computer reminders to clinicians are effective in increasing LTBI screening (25.2% against 8.9%, p<0.001).

There is weak evidence from one (–) US study[4] which shows mixed results for a process improvement intervention to improve TB case management on clinical practice (delivery of patient education and supervision of case managers).

There is weak evidence from two (–) UK studies[5,6] showing mixed findings on education leaflets for staff working with prisoners, drug users or homeless people on TB knowledge. There is weak evidence from one further (–) UK study[7] and one (–) US study[8] that educational interventions for hospital nursing staff are effective in increasing knowledge (88% against 28% (p=0.001) on open questions and 76% against 67% (p=0.07) on closed questions;[7] 91.8% against 80.8% (p<0.0001)[8]); however, both these studies have methodological limitations.

Applicability

Four studies in this category are from the UK; however, three of these measure knowledge outcomes only. The remainder of the evidence is partly applicable to clinicians working with people with TB in the UK, as the populations and contexts of service delivery in the studies may be different from those in the UK.

1 Griffiths et al., 2007 (++)
2 Margolis et al., 2004 (++)
3 Steele et al., 2005 (–)
4 Udeagu et al., 2007 (–)
5 Roy et al., 2011 (–)
6 Roy et al., 2008 (–)
7 Fiefield, 2007 (–)
8 Maetz et al., 1998 (–)

4.4 Findings: cost-effectiveness

This section presents the findings for the review of cost-effectiveness. Table 4 summarizes the overall characteristics of the one identified study.

Table 4. Characteristics of the cost-effectiveness studies (N=1)

Reference	QA	Population	Intervention / comparator	Outcomes
Kominski et al., 2007	+	Adolescents with LTBI	Peer counselling, parent-participant contingency contract, combination / usual care	Cost per QALY

A single cost-effectiveness study was included (Kominski et al., 2007 (+)). This study reported a cost-effectiveness analysis of an intervention in adolescents screening positive for latent TB attending public clinics in California, USA. The published paper reports the cost-effectiveness analysis of the RCT by Morisky and colleagues (2001

(+)), which is discussed in the review of effectiveness above. The economic model is described as a 5 stage Markov model with 1 year transition states (although it appears to be more akin to a decision tree model). It was developed using TreeAge. The time horizon was life with discounting of costs and benefits of 3%. The perspective used was described as 'societal,' although it is also stated that only healthcare costs were included. The economic model is based on the RCT by Morisky et al. (2001), although there are some discrepancies between the effectiveness findings reported by Kominski et al. and those reported in the main RCT report. Kominski et al. find that peer counselling combined with incentives was borderline significant (p=0.051) compared with usual care, while both peer counselling and incentives alone were not significant; thus only the combined group are included in the model. However, the figures reported by Kominski et al. are inconsistent with those reported by Morisky et al.; the latter report also does not find the combined intervention to attain significance or near-significance.

Data for resource use and costs, as well as effectiveness on adherence and completion outcomes, were obtained directly from the RCT by Morisky et al. (subject to the caveat above). Utility values for the model health states were either assumed or taken from the literature. Sensitivity analyses were completed around the efficacy of drug therapy, cost of treating active TB and cost of drug therapy, TB case rate, TB fatality rate, all-cause mortality, hepatotoxicity, hepatitis fatality rate, cost of treating IPT induced hepatitis, utility values for each health state and discount rates (although full data for these were not reported). The Markov results were confirmed using a Monte Carlo simulation of 10,000 trials.

The results of the Monte Carlo simulation suggested that over a lifetime the combined peer counselling and incentives group produced slightly more QALYs per person (24.3968 versus 24.2006) with slightly higher average TB-related costs ($808 versus $767) than the usual care group. The ICER was $209 per QALY gained (incremental costs $41 and incremental QALYs 0.1962). The Markov results were not reported. The findings were reported to be consistent for all one-way sensitivity analyses (data were not presented). The study reported that the analysis of the scatterplot of the 10,000 ICERs produced in the Monte Carlo simulation indicated that in 89.75% of the trials, costs were higher in the combined peer counselling and incentives group with no QALY gain or fewer absolute QALYs accrued (i.e. the combined peer counselling and incentives group would be dominated by usual care). For 10.25% of trials, costs and QALYs were higher in the combined peer counselling and incentives group than in usual care. In these instances the ICERs were below $50,000 per QALY gained.

Evidence statement 10: cost-effectiveness of interventions for people with latent TB infection

There is moderate evidence from one study[1] that an intervention combining peer counselling and incentives has an ICER of US$209 per QALY compared with usual

care. However, in a sensitivity analysis using Monte Carlo simulation, the intervention was not shown to be cost-effective in 89.75% of iterations, as it was more costly and no more effective than usual care (i.e. the intervention was dominated by usual care).

1 Kominski et al., 2007 (+)

4.5 Findings: summary by intervention type

This section provides supplementary evidence statements breaking down the evidence by type of intervention (rather than by population, as above). The evidence has been divided as follows:

- information, education and reminders;
- support interventions;
- interventions for service providers.

Evidence statement 11: effectiveness of information, education and reminders for TB-related outcomes

The evidence indicates that information, education and reminders are effective in improving TB-related outcomes, although very brief interventions may not be effective.

There is moderate evidence from seven studies that informational or educational interventions (Ailinger et al., 2010 (–); Clark et al., 2007 (+); Hovell et al., 2003 (+); White et al., 2005 (+)), reminders (Ozuah, 2001 (–)), and interventions combining education and reminders (Boom et al. 2000 (+); Kim et al., 2009 (+)), are effective in promoting adherence-related outcomes in a range of populations. There is also weak evidence from two studies (Sheikh and MacIntyre, 2009 (–); Wieland et al., 2013 (–)) that educational interventions are effective in improving knowledge or attitudes.

There is evidence that such interventions are ineffective from two studies (Malotte et al., 1999 (++); Taubman et al., 2013 (++)). However, in both these studies the intervention is of minimal intensity (respectively a single 5- to 10-minute educational session, and a short letter).

Applicability

No study in this group was conducted in the UK. The evidence is partly applicable to the UK, as there may be differences in the populations or settings.

Evidence statement 12: effectiveness of support interventions for TB-related outcomes

The evidence indicates that support interventions are not effective or cost-effective for TB-related outcomes.

There is strong evidence from three studies (Hirsch-Moverman et al., 2013 (++); Morisky et al., 2001 (+); Tulsky et al., 2000 (++)) that peer support interventions are ineffective in improving adherence-related outcomes. One study (Kominski et al., 2007 (+)) also indicates that such interventions are not cost-effective; although reporting an ICER of US$209 per QALY, this study also shows that 90% of the iterations of a Monte Carlo model showed the intervention to be more costly than usual care with no added benefit.

There is mixed evidence from one study (Hovell et al., 2003 (+)) on the effectiveness of motivational coaching for adherence-related outcomes.

Applicability

No study in this group was conducted in the UK. The evidence is partly applicable to the UK, as there may be differences in the populations or settings.

Evidence statement 13: interventions for service providers

The evidence indicates that intensive interventions with service providers, integrating clinician education with other components such as reminders, incentives and process improvement, are effective in improving service delivery outcomes. However, the evidence on educational interventions alone is mixed and inconclusive.

There is strong evidence from two studies that integrated multi-component interventions with an educational element are effective in improving TB screening rates (Griffiths et al., 2007 (++); Margolis et al., 2004 (++)); one study shows more mixed results, but is of poor quality (Udeagu et al., 2007 (–)).

There is weak evidence from one study that computer-generated reminders to physicians are effective in increasing TB screening rates (Steele et al., 2005 (–)).

There is weak and mixed evidence from four studies regarding the effectiveness of education or information alone for service providers with respect to knowledge outcomes (Roy et al., 2011 (–); Roy et al., 2008 (–); Fiefield, 2007 (–); Maetz et al., 1998 (–)). No studies investigate such interventions with respect to service delivery outcomes.

Applicability

Four studies in this category are from the UK; however, three of these measure knowledge outcomes only. The remainder of the evidence is partly applicable to

clinicians working with people with TB in the UK, as the populations and contexts of service delivery in the studies may be different from those in the UK.

5 Discussion

5.1 Summary of findings

The evidence indicates that educational and reminder interventions to promote adherence to TB or LTBI treatment are effective. These findings are in line with previous systematic reviews of education and reminder interventions in similar populations (Liu et al., 2008; M'Imunya et al., 2012).

The evidence indicates that broader support interventions are not effective in promoting adherence.

The evidence on service provider interventions indicates that interventions such as reminders, clinician education and process improvement are effective in improving TB screening rates. However, the findings regarding the effectiveness of educational or informational interventions for service providers on knowledge outcomes are more mixed.

5.2 Limitations

5.2.1 Limitations of the review

This review was carried out using systematic methods, with extensive searching, *a priori* inclusion criteria, and full quality assessment and data extraction according to the NICE methods manual. However, there may be some limitations.

We included a range of study designs including non-comparative and retrospective designs. The variation in study design should be taken into account in interpreting the findings. We were also inclusive with respect to the outcomes measured. Findings which relate to knowledge or attitudinal outcomes cannot be assumed to be relevant to behavioural outcomes (such as adherence).

We excluded studies published before 1998. While this helps to make the evidence in the review more relevant to current practice, it means that a substantial body of older evidence was excluded.

We excluded studies of views and barriers, such as qualitative research.

We were unable to carry out meta-analysis or other quantitative synthesis, and only conducted a narrative synthesis of the evidence.

5.2.2 Limitations of the evidence base

The coverage of the evidence base with respect to intervention type is fairly broad, ranging from simple reminder interventions through to more extensive support programmes. The separate review of case management interventions also conducted for this guidance (review 2) covers other approaches, in particular support interventions delivered by professionals. Nonetheless, there may be some relevant interventions not covered by the review.

There is very little cost-effectiveness evidence on the interventions covered by this review; we located only a single study, and that has considerable methodological limitations.

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7 Appendix A. Evidence Tables

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Ailinger RL, Martyn D, Lasus H, et al. **Year:** 2010 **Citation:** The effect of a cultural intervention on adherence to latent tuberculosis infection therapy in Latino immigrants. *Public Health Nursing 27* (2):115-120 **Country of study:** USA **Aim of study:** To evaluate the effect of a cultural intervention on	**Source population/s:** Latino immigrants in the US **Eligible population:** Latino immigrants attending a public health chest clinic in an urban county of Virginia, US. Clients were invited to participate in the study by the PI, a PHN anthropologist, or an interventionist nurse trained in the intervention. The intervention group was a convenience sample. The comparison group was a random sample of historical records of Latino immigrants who had been treated the previous year at the same clinic. Two refusals (% unclear). **Selected population:** NR **Excluded population:** "33 of the 86 patients were excluded from the study for various reasons, including pregnancy, medical advice, and side	**Method of allocation:** N/A **Intervention/s description**: INH treatment was delivered as part of a culturally specific intervention. The intervention was based on Latino cultural values and was designed by the study primary investigator. It consisted of (1) visits to the same nurse each month (2) an enquiry at the start of each visit about the patients family (3) a common Latino proverb (''It is better to prevent than to lament'') was stated at each visit, was used as a logo and was incorporated into small gifts that were given to patients. (4) educational materials were adapted to a lower literacy level and incorporated photographs (5) the intervention was delivered by a bilingual and	**Outcomes:** Adherence (measured by the "number of pills reported by the clients, documented in the medical record" over 8 months (p118) – i.e. self report) **Follow up periods:** 9 months **Method of analysis:** t-test	**Results for all relevant outcomes:** Number of doses taken: pre 129, post 157 (p=0.028); equivalent to 5.2 months vs 4.3 months **Attrition details:** Unclear; attrition and exclusion not clearly separated in report (N=53 of a total of N=86 were included in analysis)	**Limitations identified by author:** Attrition; no control group; small sample size **Limitations identified by review team:** Non-comparative design. Limited detail on pre-test (usual care). Self-report outcomes only. Differences between pre and post samples. High levels of attrition may substantively bias findings – approx. 1/3 of intervention group were excluded from analysis, probably those who were less compliant, whereas pre-test was random sample of all patients **Evidence gaps and/or recommendations for future research:** Evaluate similar interventions with RCT design and objective measures of adherence

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
increasing adherence to latent tuberculosis infection therapy among Latino immigrants **Study design:** BAh **Quality Score:** – **External validity:** –	effects"; however, elsewhere (p119) this is referred to as 'attrition' **Sample characteristics:** Mean age pre 26, post 25 Mean years in US pre 4.7, post 3.8 Mean education (years) pre 10.2, post 10.7 Gender pre Female 59% Male 41% post Female 72% Male 28% Occupations Mothers of children pre 43% post 38% Unskilled pre 22% post 35% Others were either semi-skilled, skilled or students Majority of patients came from Bolivia or El Salvador	bicultural nurse who incorporated appropriate cultural non verbal communication. **Control/comparison/s description:** Usual care was nine monthly clinic visits to monitor side effects, record the number of doses of INH taken (as reported by the patient), and teaching about LTBI therapy **Sample sizes:** pre N=131, post N=53 (in analysis, of a total N=86 enrolled) **Baseline comparisons:** More women and more unskilled workers and fewer students at post test. A greater proportion of the post sample were from Bolivia (38% vs 19%) with fewer from El Salvador and Peru. Significance of differences not given. **Study sufficiently powered?** Not stated			**Source of funding:** National Institutes of Health

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Boom JA, Hughes C, Brown T, et al. **Year:** 2000 **Citation:** Improving compliance with tuberculin skin inter-pretation in children. *Ambulatory Child Health* 6(1), 3-10. **Country of study:** USA **Aim of study:** To evaluate the effect of a quality improvement initiative which utilised educational interventions combined with a phone follow-up program on the rate of return for	**Source population/s:** Children served by a children's hospital primary care practice in Philadelphia, Pennsylvania. Patients in catchment area deemed to be at high risk of exposure to TB. Urbanised area. **Eligible population:** All children seen at well-child care clinic visits. **Selected population:** Included children with a TST placed. **Excluded population:** NR **Sample characteristics:** Mean ages of children tested: 69.2 ± 42.1 months; other patient demographics NR	**Method of allocation:** NA **Intervention/s description:** Three components: 1) Re-education of all medical staff regarding TST screening. Physicians and residents received 1-week series of lectures on prevalence and risk factors for TB / recommendations for TST screening. Nurses reviewed TST screening recommendations, proper Mantoux test placement and interpretation techniques. 2) Education of patients' families. Received TB education sheet. Examining physician re-emphasized the need for a TST and briefly reviewed the TB education sheet. Nursing staff reiterated importance of returning in 48–72 hours for TST interpretation when placing TST. Appointment made for follow-up if family was unaware (or were unable) they needed to return to have the test read. 3) Follow-up program for	**Outcomes:** Number of TSTs placed Return rate for TST test reading; return rates by insurance type, distance, provider type and age range **Follow up periods:** 3 months **Method of analysis:** t-test, chi-square	**Results for all relevant outcomes:** TSTs placed: Pre: 611 (18%) Post: 704 (21.5%) p=0.005 Return rate for TST test reading: Pre: 38/611 (6.2%) Post: 433/704 (61.5%) p<0.001 Patients that returned within 96 hours of TST placement: pre NR, post 46% Return rates by type of insurance: Medicaid HMO: pre: 18/426 (4.2%), post: 306/518 (59.1) Medicaid: pre: 17/111 (15.3%), post: 45/80 (56.3) Private: pre: 11/69 (16%), post: 73/92 (79.3%) Self-pay: pre: 2/5 (40%), post: 9/14 (64.3%) Return rates by distance: Near: pre: 26/381 (6.8%), post: 256/414 (61.8%) Far: pre: 12/230 (5.2%), post: 171/281 (60.9%) Return rates by provider type:	**Limitations identified by author:** Lack of a control group. Number of TSTs that were not placed if prior agreement for return for TST interpretation was not established is unknown. The generalisability of this study is limited by the extended return time allowed for TST interpretation. The generalisabilty of this study also is limited by the frequency of TST placement in our study population; patient compliance with returning for TST interpretation might be different if less frequent testing was required. **Limitations identified by review team:** Limited information on population characteristics. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** "No organization has a direct financial interest in this manuscript's subject matter

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
tuberculin skin test (TST) interpretation **Study design:** Ret **Quality Score:** + **External validity:** +		children who had TSTs placed. Three reminder phone calls to return for testing. If family did not return, a letter was sent to the family reminding them that any subsequent school forms would be considered incomplete without appropriate documentation of TST results. The family's physician was also notified that the patient failed to return. Families could return for up to 14 days after TST placement to have test read. **Control/comparison/s description:** No clear consistent practice policy existed regarding the need of patients to return for TST interpretation. **Sample sizes:** **Total** (TSTs placed): 315 **Pre-intervention**: 611 **Post-intervention**: 704 **Baseline comparisons:** NA **Study sufficiently powered?** NR		Resident: pre: 22/326 (6.7%), post: 161/292 (55.1%) Attending: pre: 12/251 (4.8%), post: 220/333 (66.1%) Return rates by age range: <60 months: pre: 17/299 (5.7%), post: 199/335 (59.4) 60-72 months: pre: 3/65 (4.6%), post: 41/72 (57%) >72 months: pre: 18/256 (7%), post: 193/297 (65%) [NB total denominator for pre-intervention adds up to 620, which is more than the stated total sample size] **Attrition details:** N/A, dropouts considered as non-attenders	or research material."

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Clark PM, Karagoz T, Apikoglu-Rabus S, et al. **Year:** 2007 **Citation:** Effect of pharmacist-led patient education on adherence to tuberculosis treatment. *American Journal of Health Systems Pharmacy* *64*(5): 497-506 **Country of study:** Turkey **Aim of study:** To evaluate a pharmacist-led education programme to increase adherence to TB treatment **Study design:** RCT	**Source population/s:** Patients newly diagnosed with TB receiving first-line treatment. **Eligible population:** Consecutive patients admitted to and hospitalised in the Surreyyapasa Centre for Chest Diseases and Thoracic Surgery, Istanbul, between August 2001 and February 2002. **Selected population:** Patients were selected from male wards. Other criteria and recruitment rate NR **Excluded population:** Patients with recurrent MDR-TB, mental or psychiatric conditions, cognitive dysfunction or literacy problems. **Sample characteristics:** Mean age 37.8 years Married 71% Male 100%	**Method of allocation:** Random **Intervention/s description:** Oral and written patient education by the clinical pharmacist shortly before discharge in addition to routine medical care. Education materials include information about proper use, important points to watch for and adverse events. **Control/comparison/s description:** Routine medical care. Treatment received as an inpatient for 2 months before discharge. Further treatment received as an outpatient for 18 weeks. **Sample sizes:** Intervention N=56 Control N=58 Total N=114 **Baseline comparisons:** NR **Study sufficiently powered?**	**Outcomes:** Attendance at scheduled follow up (% of visits attended as outpatient) Adherence (urine test) Medication counting (number of pills remaining subtracted from the number of pills prescribed) **Follow up periods:** 6 months **Method of analysis:** Chi square T test	**Results for all relevant outcomes:** Clinic attendance: Intervention 0% 4/56 (7%) 33% 4/56 (7%) 66% 18/56 (32%) 100% 30/56 (54%) [This is the % attendance at the clinic, i.e. 4 out of 56 people attended the clinic no times, a further 4 out of 56 attended 33% of scheduled visits, etc.] Control 0% 3/58 (5%) 33% 9/58 (16%) 66% 29/58 (50%) 100% 17/58 (29%) Difference between groups p<0.05 Differences between 100% attendance p<0.01 Positive urine test for isoniazid: Intervention 0% 4/51 (8%) 25% 0 33% 2/51 (4%) 50% 3/51 (6%)	**Limitations identified by author:** Medication consumed relied on patient recall and returning empty bottles. **Limitations identified by review team:** All male sample. Baseline characteristics not reported. Attrition is unclear. Limited information on intervention content or setting. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** NR

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Quality Score: + **External validity:** –		NR		83% 1/51 (2%) 100% 41/51 (80%) Control 0% 21/52 (40%) 25% 1/52 (2%) 33% 1/52 (2%) 50% 7/52 (14%) 83% 0 100% 22/52 (42%) Difference between groups p=0.001 Differences between 100% positive p<0.001 (These % figures are % of test results positive) Medication consumed: 88.7% intervention group 85.8% control group NS **Attrition details:** NR – unclear if 0% attrition or analysis is completers only. There are 3 people in the control group who appear to have attended at follow up but not provided a urine test.	

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Fiefield D **Year:** 2007 **Citation:** *Improving Nurse Education in the Control and Prevention of Tuberculosis*. Unpublished MSc thesis, Manchester Metropolitan University **Country of study:** UK **Aim of study:** to evaluate the implementation of an intervention to increase knowledge of tuberculosis and how to prevent nosocomial transmission within the hospital setting	**Source population/s:** Nurses in the UK **Eligible population:** Senior nursing staff based at the Greater Manchester Acute Hospital Trust **Selected population:** The nurses were selected by the Director of Nursing all were E grade and above. "The Director selected nurses from different areas of the Trust: Medicine, Surgery, ICU, Care of the Elderly, Maternity, Outpatients and Bed Management". **Excluded population:** NR **Sample characteristics:** NR	**Method of allocation:** N/A **Intervention/s description:** 3-month programme combining formal and participatory elements including theory and practice. The training included: "• 8 half day sessions covering natural history, epidemiology, diagnostic procedures, sites of disease, treatments and screening. • A 1 day placement at the Infectious Disease Unit at North Manchester. • ½ day placement with the TB nurse". **Control/comparison/s description:** N/A **Sample sizes:** N=11 **Baseline comparisons:** N/A	**Outcomes:** TB knowledge (exact questions NR) **Follow up periods:** Appears to be ~2 months (length of educational programme) **Method of analysis:** T test	**Results for all relevant outcomes:** TB knowledge: Correct answers in TB true-and-false questionnaire Pre 67% Post 76% p=0.07 Correct answers in TB open-ended questionnaire Pre 28% Post 88% p=0.001 **Attrition details:** N=1 (for course)	**Limitations identified by author:** Training costly and time-consuming, and not focussed on raising awareness among all staff. **Limitations identified by review team:** Non-comparative design. Small sample. No information on sampling or recruitment, probably open to bias. No information on sample. Same questionnaire pre and post, so learning would be expected from repeat exposure. Only knowledge outcomes (and unclear e.g. if nurses transmitted knowledge to colleagues) **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** Health Protection Agency; Greater Manchester Acute Hospital Trust

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Study design: BA **Quality Score:** – **External validity:** –		**Study sufficiently powered?** NR			

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Griffiths C, Sturdy P, Brewin P et al. **Year:** 2007 **Citation:** Educational outreach to promote screening for tuberculosis in primary care: a cluster randomised controlled trial. *Lancet 369* (9572), 1528-1534. **Country of study:** UK **Aim of study:** To evaluate a programme to promote screening for TB in primary care **Study design:** RCT	**Source population/s:** General population attending primary care in Hackney, London **Eligible population:** Recruitment (at practice level) all but one practice in Hackney were invited to participate (the other one was a pilot for the study). Recruitment by researchers, by letter. Individual patients were recruited on an opt-out basis, i.e. they were shown information about the study by practice receptionists, and were assumed to consent to participation if they did not object. 96% of eligible practices agreed to participate; participation numbers not reported for individual patients **Selected population:** Newly registered patients with all GP practices in Hackney **Excluded population:** None **Sample characteristics:** Mean age: intervention (I) 29, control (C) 26 Gender (% male): I 47%, C 46%; Ethnicity: I 45% white, 22%	**Method of allocation:** Cluster randomised by GP practice (N=50). Randomisation used a minimisation method with respect to several aspects of the practice. **Intervention/s description:** Educational visits to practices by a specialist nurse and GP to promote TB screening and raise awareness of relevant guidelines, with follow-up phone call (educational programme based on social influence theory). Incorporation of reminders into practice computer systems. Provision of equipment for TB testing. Telephone support from specialist nurse. Financial incentives to practices for TB tests (£7 each). **Control/comparison/s description:** Usual care **Sample size at baseline:** N=50 practices, N=93,970 patients Intervention N=25	**Outcomes:** Attendance at registration health check [not directly relevant] N verbally screened for TB TSTs conducted Cases identified **Follow up periods:** Unclear; data were collected from June 2002 - Sept 2004, but timing of intervention implementation with respect to this is not clearly reported. **Method of analysis:** Poisson regression, adjusted for cluster randomisation	**Results for all relevant outcomes:** Attendance at health check: I 52% (N=23,573), C 47% (N=23,051), sig NR Verbally screened for TB: I 57% (N=13,478), C 0.4% (N=84), sig NR TSTs conducted: I 8.5%, (N=1,996), C 0.4% (N=84), incident rate ratio 20.6 (8.5–50.0) Cases of active TB: I 47% (66/141), C 34% (54/157), adjusted OR 1.68 (95% CI 1.05–2.68) without adjustment for clustering; 1.61 (1.08–2.39) with adjustment for clustering Cases of latent TB: I 19% (11/58), C 5/68 (9%), adjusted OR 3.00 (0.98–9.20) without adjustment for clustering; 3.45 (1.51–7.87) with adjustment for clustering **Attrition details:** Two pairs of practices merged in the study period.	**Limitations identified by author:** Insufficient power to measure impact on proportion of cases identified, rather than changes in identification rate. Not everyone registers in primary care or attends health checks. **Limitations identified by review team:** Methodologically robust study. Some minor flaws in reporting (e.g. follow-up time). **Evidence gaps and/or recommendations for future research:** Evaluate programmes using more effective means of testing; evaluate effectiveness and cost-effectiveness of programmes with different types of screening method, settings and targeted populations. **Source of funding:** UK Department of Health

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Quality Score: ++ **External validity:** ++	black, 9% Asian, C 42% white, 24% black, 10% Asian; Number of immigrants per practice (mean): I N=248, C N=272.	practices, N=44,986 patients Control N=25 practices, N=48,984 patients **Baseline comparisons:** No significant differences at practice level with respect to: number of doctors; % patients attending registration checks; practices registering new patients at trial outset (open lists); practice nurse; whether approved for training doctors; whether had an EMIS computer system; list size; N of patients; ethnicity of patients; N of new immigrants registering; rank of multiple deprivation [unclear how measured]; sex of patients; age of patients. **Study sufficiently powered?** Yes			

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Hirsch-Moverman Y, Colson PW, et al. **Year:** 2013 **Citation:** Can a peer-based intervention impact adherence to the treatment of latent tuberculosis infection? *International Journal of Tuberculosis and Lung Disease* 17(9), 1178-1185. **Country of study:** USA **Aim of study:** To assess the effectiveness of a peer-based intervention on adherence to and completion of latent	**Source population/s:** Persons with latent tuberculosis infection (LTBI) receiving treatment at the Harlem Hospital Chest Clinic in New York City. Area has high prevalence of TB. Urban area. **Eligible population:** All patients seen at the Harlem Hospital Chest Clinic. **Selected population:** Included patients who were recommended for LTBI treatment and aged 18 or over. Percentage refused to participate or missed: 192/444 or 43.2% [163 refused (44% too busy, 26% no interest, 21% other reasons, 8% no reason) and 29 were missed] **Excluded population:** Those receiving directly observed treatment (DOT) for LTBI. **Sample characteristics:** Mean age: 40 years old Male: 70.4% Race: 34.8% African American, 19.6% Latino, 36.4% African	**Method of allocation:** 1:1 random allocation **Intervention/s description:** Patients paired with peer workers (previously completed LTBI or anti-tuberculosis treatment at Harlem Hospital; had 4-week training program including role-playing exercises, informational sessions and observation). Peers attempted to meet one-on-one with assigned subjects at least once a week. They provided health care and social service system navigation, liaised with patients and health workers to enhance patient-provider communication, educated and coached patients on adherence, and provided social and emotional support. **Control/comparison/s description:** Usual care (self-administered 9-month isoniazid (INH) treatment and access to standard clinical services)	**Outcomes:** Completion of LTBI treatment. Adherence (not fully reported) (assessed every month by self-reported missed doses, electronic monitoring devices (MEMS® caps) and clinic attendance records; self-reported adherence was given priority) **Follow up periods:** 6 months **Method of analysis:** Intent-to-treat. Pearson's $\chi 2$ or Fisher's exact test for categorical variables and Student's t-test for continuous variables	**Results for all relevant outcomes:** Treatment completion: I 60.9%, C 56.6%. Risk ratio 1.096 (0.850–1.414) Two multivariate models presented. (1) Binomial regression model on treatment completion outcome including marital status, age, nationality and history of mental illness, showing adjusted RR of 1.04 (0.85–1.26) in favour of intervention (p=0.704). (2) Repeated measures analysis on monthly adherence data (full data for this outcome not separately reported), showing a 9.7% difference in adherence in favour of the intervention group (p=0.043). **Attrition details:** I: 3/128 (2.3%); C: 2/124 (1.6%)	**Limitations identified by author:** Completion data abstracted from clinic medical charts and not ascertained through participant interviews. Participants in both study groups had considerably higher treatment completion rates than non-study participants who received LTBI treatment in the same clinic during the study period, which may have reduced the power to detect an intervention effect. Self-reporting may have been subject to social desirability bias in face-to-face interviews. **Limitations identified by review team:** Potential selection bias. Extensive multivariate analysis which is arguably not well specified *a priori*. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** National Heart, Lung, &

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
tuberculous infection (LTBI) treatment. **Study design:** RCT **Quality Score:** ++ **External validity:** +	(foreign-born), 9.2% other Ever homeless: 33.3% Prior LTBI treatment: 6.1%	**Sample sizes:** **Allocation:** **Total:** 252 **Intervention:** 128 **Control:** 124 **Follow-up:** **Total:** 247 **Intervention:** 125 (3 lost) **Control:** 122 (2 lost) **Analysis:** **Total:** 250 **Intervention:** 128 **Control:** 122 (2 ineligible for study) **Baseline comparisons:** No significant baseline differences **Study sufficiently powered?** NR			Blood Institute, National Institutes of Health

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Hovell MF, Sipan CL, Blumberg EJ, et al. **Year:** 2003 **Citation:** Increasing Latino adolescents' adherence to treatment for Latent Tuber-culosis Infection: A controlled trial. *American Journal of Public Health 93* (11):1871-7 **Country of study:** USA **Aim of study:** to determine whether counseling/ coaching, compared to attention control or usual medical care,	**Source population/s:** Latino adolescents (age 12-19) in the USA **Eligible population:** Adolescents (12-19) who attended middle or high schools with a large proportion of Latino students in the San Diego-Tijuana area, and who exhibited induration reactions of at least 10 mm (or had previously tested positive but had not completed treatment). Recruitment 'sequential' by telephone. 56% of eligible (302/535) recruited, 53% (286/535) included in analysis. **Selected population:** Interested in obtaining INH treatment, no contraindications, spoke English or Spanish, and planned to remain in the San Diego–Tijuana area for 12 months **Excluded population:** NR **Sample characteristics:** Of the N=286 analysed: Mean age 15.6, 55.6% male, 64.7% foreign-born (all except 1 in Mexico), 52.5% bicultural. About 76% of participants had	**Method of allocation:** Random (methods not described). **Intervention/s description:** **Adherence coaching:** Coaches were bilingual Latino college students. All were trained and super-vised to provide education concerning TB infection and treatment. Monthly case review meetings were held to discuss issues relating to specific participants. Coaching began with an overview of LTBI treatment and the setting of adherence goals. Subsequent sessions involved an interview regarding treatment adherence and a discussion of changes that could be made to enhance adherence. Coaches praised successful adherence and suggested that participants use cues (e.g., taking INH when brushing their teeth). Coaches encouraged participants to obtain	**Outcomes:** INH adherence (self-report; urine tests were also conducted, but these were a validity check rather than a separate outcome, and results are not clearly reported). Treatment completion (defined as taking 180 pills within 9 months) **Follow up periods:** 9 months **Method of analysis:** 1. ANOVA 2. ANCOVA adjusting for alcohol use as a possible confounding variable. 3. Multivariate regression procedures to control for various demographic and social factors. The authors state that intent-to-treat procedures were	**Results for all relevant outcomes:** Mean total number of pills taken: Intervention (adherence coaching) 129.27 at 6 months, 179.93 at 9 months Attention control (self-esteem coaching) 112.02 at 6 months, 155.37 at 9 months Usual care 113.09 at 6 months, 150.98 at 9 months Significant effect for intervention against both other groups at both time points: p=0.007 at 6 months, p=0.02 at 9 months Intervention effect remained significant (p<0.01) controlling for alcohol use Regression model indicates that intervention accounts for 3% of observed variance in pill taking (p<0.01), over and above demographic, cognitive, family, and peer-related variables Treatment completion: Intervention (adherence coaching) 51.1% Attention control (self-esteem coaching) 41.8% Usual care 37.5% (non	**Limitations identified by author:** All adherence measures liable to bias. **Limitations identified by review team:** Some minor limitations in reporting (particularly attrition). **Evidence gaps and/or recommendations for future research:** Further outcome evaluations using similar combinations of outcome measures. Cost-effective analyses of interventions for LTBI among immigrants and ethnic minority people at risk **Source of funding:** National Heart, Lung and Blood Institute, the Alliance Healthcare Foundation and the University wide AIDS Research Program, University of California.

could increase adherence to INH treatment regimens among Latino adolescents with LTBI **Study design:** RCT **Quality Score:** + **External validity:** –	no insurance coverage Mothers and fathers had completed approximately 7 years of education.	assistance from family and friends. In addition, they assisted with physician appointments and, sometimes, with transportation. Five 30-minute, in-person sessions (conducted in participants' homes, at clinics, or at other locations) and seven 15-minute telephone sessions were conducted over 6 months. **Control/comparison/s description:** **Self-Esteem Counseling (attention control)** Bilingual Latino college students served as self-esteem counselors. Adolescents were encouraged to discuss problems affecting their self-esteem. Shaping procedures similar to those employed in adherence coaching were used. However, the self-esteem counselors provided no advice regarding TB. **Usual care:** Care from community clinics 300 mg of INH per day for 6 to 9 months. Adolescents returned to the clinic monthly for	used.	significant, but study was not powered with respect to this outcome) **Attrition details:** NR	

		evaluations and new prescriptions, or they were provided 3 months of medication and returned when they needed a prescription refill or had experienced symptoms or side effects **Sample sizes: Total** N=286 N=92 in the adherence (intervention) group. N=98 in the self esteem counselling (attention control) group N=96 in the usual care group **Baseline comparisons:** No statistically significant difference were identified between groups wrt age, gender, place of birth, acculturation **Study sufficiently powered?** Not stated. For completion rates it is stated that there was insufficient power to detect a difference.			

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Kim HJ, Bai GH, Kang MK et al. **Year:** 2009 **Citation:** A public-private collaboration model for treatment intervention to improve outcomes in patients with tuberculosis in the private sector. *Tuberculosis and Respiratory Diseases 66*(5):349-357 **Country of study:** South Korea **Aim of study:** to evaluate the impact of a public-private collaboration model for strengthening	**Source population/s:** New smear-positive patients in Korea being treated in the private sector. **Eligible population:** For post-test (intervention) group: Respiratory departments of eight private teaching hospitals, selected for high number of cases. Recruitment by public health nurse case-worker. Participation rate 100%. Pre-test (control) groups: (1) selected from case records at each hospital retrospectively; (2) new smear-positive cases in 30 randomly selected public hospitals (appears to be also from records, but unclear). Limited details on sampling for either of these. **Selected population:** 'all eligible cases' for post-test group, but unclear what this means. NR for pre-test groups **Excluded population:** NR **Sample characteristics:** For the 2 private sector groups:	**Method of allocation:** N/A **Intervention/s description:** Both groups received standard care with SAT. In post (intervention) group, public health nurse conducted education focusing on tuberculosis and the importance of routinely taking medication were initially explained to patients. Appointment reminders using telephone calls and prompt phone calls for missed appointments; open consultations. Nurses conducting intervention were trained in case management methods. **Control/comparison/s description:** For the private-sector control group: usual care without the involvement of a public health nurse. Public sector control group received health education,	**Outcomes:** Cure (defined as negative smear or culture after six months of treatment and on at least one previous occasion) Completion (defined as treatment for six months or more, without confirmation of cure or failure) **Follow up periods:** 6 months or more (length of drug treatment) **Method of analysis:** Rate ratio and multivariate analyses	**Results for all relevant outcomes:** Cure or completion: Intervention 153 (91.6%) Control private 129 (75.0%) RR 1.23 (95% CI: 1.12-1.36) Control public 848 (80.5%) RR 1.11 (95% CI: 1.05- 1.17) Cured: Intervention 98 (58.7%) Control private 57 (33.1%) RR 1.77 (95% CI 1.38-2.27) Control public 835 (79.3%) RR 0.72 (95% CI 0.63-0.82) Completed: Intervention 55 (32.9%) Control private 72 (41.9%) RR 0.79 (95% CI 0.60-1.04) Control public 13 (1.2%) RR 26.02 (95% CI: 14.54-46.56) Multivariate analyses (controlling for treatment group, hospital location and gender): treatment group (intervention) and hospital location (in Seoul) associated with treatment success. **Attrition details:** N=5 in intervention group (treated for <6 months by end of study; others N/A (record review)	**Limitations identified by author:** Follow-up test rate higher in intervention group, which may have contributed to higher completion rate. Physicians not blinded. **Limitations identified by review team:** Limited information on sampling or recruitment. No information on characteristics of controls. Intervention groups had interviews during study period which may have affected outcomes. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** Korea Health 21 R&D Project, Ministry of Health & Welfare

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
health education and case holding activities with public health nursing in the private sector **Study design:** BAh **Quality Score:** + **External validity:** +	Pre 106/172 male, mean age 48.2 years. Post 93/172 male, mean age 48.8 years. Characteristics of the public sector group are not described.	motivation and case-holding activities fromTB health workers. **Sample sizes:** Post (intervention) N=172 Private control N=172 Public control N=1027 **Baseline comparisons:** No significant differences between groups in age and sex. Differences in other variables not reported. Differences between public and and private groups not described. **Study sufficiently powered?** NR			

Study Details	Population and setting	Intervention/ comparator	Outcomes and methods of analysis:	Results	Notes
Authors: Kominski GF, Varon SF, Morisky DE, et al. **Year:** 2007 **Citation:** Costs and cost-effectiveness of adolescent compliance with treatment for latent tuberculosis infection: results from a randomized trial. *Journal of Adolescent Health 40*(1):61–8 **Aim of study:** to assess the costs and cost-effectiveness of an incentive-based tuberculosis programme designed to promote adolescents' compliance with treatment for latent TB infection **Type of economic analysis:** CEA	**Source population/s:** Adolescents in the US **Setting:** Two clinics in Los Angeles County; one run by the Los Angeles Country Dept of Health, the other was run by the City of Long Beach Dept of Health. Both were taking part in an RCT (see data extraction of Morisky et al., 2001). **Data sources:** Resource use and costs: IPT treatment costs were obtained directly from the RCT (Morisky), including costs for those who completed therapy in each treatment group as well as costs for those who failed to complete the 6-month	**Intervention/s description:** **1. Peer counselling (PC)** Adolescents who had previously completed therapy were recruited as peer counsellors. Peer counsellors contacted partcipants by telephone and saw participants at least every two weeks. Sessions establishe rapport, emphasised importance of attendance and adherence, behavioral and normative beliefs and problems and concerns. **2. Parent –participant contingency contract intervention (CC)** Parents and adolscents negotiated an incentive provided by the parent if the adolescent adhered to therapy (including keeping appointments, and taking medication). A schedule of incentives was set (inc clothing, special meals, eating	**Outcomes:** Cost per QALY **Time horizon:** Life time (1 year transition states over 100 years) **Discount rates:** 3% (reported sensitivity analyses at 0%-7%, but results NR) **Perspective:** healthcare - "The cost-effectiveness analysis was conducted from a societal perspective, so we attempted to capture total lifetime TB-related health care costs." (p64) **Measures of uncertainty:** 1. Efficacy of IPT 2. Cost of treating active TB 3. Cost of ITP 4. TB case rate	Average costs PC $277 CC $326 PC + CC $341 usual care $199 (p = 0.001 between groups) Completion PC 75.4% CC 73.9% PC+CC 83.8% Usual care 75.9% (NS, although PC+CC vs usual care is borderline sig at p=0.51) NB. These results are different from those reported by Morisky et al. (q.v.) in the effectiveness report **Primary analysis:** Markov results not given Monte Carlo (only PC+CC compared to usual care): PC+CC 24.40 QALYs, $808 lifetime costs Usual care 24.20 QALYs, $767 total costs ICER of PC+CC = $209 per	**Limitations identified by author:** NR **Limitations identified by review team:** Perspective unclear. Effectiveness results differ from those reported in Morisky and this is not explained. Results of sensitivity analyses not presented. Utility values are mostly assumed. Study is extrapolated from 6 months' data to a lifetime. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** National Heart, Lung, and Blood Institute; Agency for Health Care Research and Quality

Study Details	Population and setting	Intervention/ comparator	Outcomes and methods of analysis:	Results	Notes
Economic perspective: Healthcare **Quality score:** + **Applicability:** + [NB the underlying data for this study are from Morisky et al., 2001, q.v.]	IPT. Utilities: The utilities are authors' assumptions or taken from the Harvard Centre for risk analysis Effectiveness: Adherence and completion taken from the RCT. Effectiveness of IPT taken from a published study of IPT in people over 35. **Sample characteristics:** mean age 15.2 years, females 51%, Hispanic American 77.8%, Asian 9.4%, African American 8.1%. Approximately 20% had been born in the US. Approximately 50% were middle school level, 45% high school and 5% primary school.	out, movies). **3. Combined (PC + CC)** Interventions 1 and 2 were combined. **Comparator/control/s description:** **4. Usual care** Services and treatment that were usually provided including health education from clinic staff and assessment of physical health in response to the TB medication **Sample sizes:** N=794 in the trial PC n=199 CC n = 203 PC+CC n = 197 Usual care n = 195	5. TB fatality rate 6. All cause mortality 7. Hepatotoxicity of IPT 8. Hepatitis fatality rates 9. Cost of treating IPT induced hepatitis 10. Utility values for each health state 11. Discount rates **Modelling method:** (1) First model described as a 5 stage Markov model [although looks like a decision tree]. (2) Markov results confirmed using a Monte Carlo simulation of 10,000 trials.	QALY **Secondary analysis:** Findings reported to be consistent for all one-way sensitivity analyses, but data not presented The analysis of the scatterplot of the 10,000 ICERs produced in the Monte Carlo simulation: 89.75% of cases had IC > 0 and IE = 0 [i.e. extra cost for no extra effectiveness]; 2.96% had IC > 0 and IE < 0; 7.23% had IC > 0, IE > 0, and ICER < 50,000; and .06% had IC < 0 and IE < 0. [NB this is from Table 4; the text is different]	

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Lee YJ, Shin S, Roh EY, et al. **Year:** 2013 **Citation:** The effectiveness of a brochure describing an acceptable method of sputum collection for tuberculosis testing. *International Journal of Tuberculosis and Lung Disease 17*(12):1587-9 **Country of study:** South Korea **Aim of study:** to evaluate the effectiveness of an educational brochure on sputum collection techniques	**Source population/s:** Patients with suspected TB **Eligible population:** Patients with suspected pulmonary TB at a tertiary referral hospital **Selected population:** Unclear **Excluded population:** Recent use of fluoroquinolone (within 1 month), haemoptysis >50 ml/day, inability to spontaneously expectorate sputum, refusal to participate and existing prescription for treatment for PTB. **Sample characteristics:** Median age 56 Male 72%	**Method of allocation:** Random assignment based on computer-generated list, with allocation concealment **Intervention/s description:** Verbal explanation as given to the control group (see below) plus a brochure illustrating the 3 points pictorially and in writing. **Control/comparison/s description:** A verbal explanation on how to expectorate a good sputum specimen. "1) collection of morning sputum (after rinsing the mouth) for 3 consecutive days, 2) collection of expectorated sputum from the lungs after productive cough, and 3) refrigeration of the sample and mailing it to the hospital within 2–3 days." **Sample sizes:**	**Outcomes:** Positivity rate of TB culture Positivity rate of acid-fast bacilli (AFB) smears Proportion of acceptable specimens for the evaluation of bacterial pneumonia **Follow up periods:** Collection of sputum over 3 days mailing to hospital within 2-3 days. **Method of analysis:** T test, Mann Whitney, Chi Square, Fishers exact, Logistic regression	**Results for all relevant outcomes:** Positivity rates of TB culture (samples) Intervention 33.1% (N=41) Control 35.6% (N=37) p=0.690, adjusted odds ratio [aOR] 0.93, 95% confidence interval [CI] 0.34–2.55. Positivity rates of TB culture (patients) Intervention 36.6% (N=15) Control 44.4% (N=16) p = 0.483 Positivity rates of AFB smear (samples) Intervention 24.2% (N=30) Control 26.9% (N=28) p=0.637 Positivity rates of AFB smear (patients) Intervention 31.7% (N=13) Control 33.3% (N=12) p=0.536 Proportion of acceptable specimens for bacterial pneumonia evaluation (Gram stain grade 4 or 5) intervention 37.1% control 35.6%;	**Limitations identified by author:** Possibly insufficient power. Possible selection bias. No visual inspection of sputum samples **Limitations identified by review team:** Small sample. Some aspects of methods NR (sampling, attrition). Not described whether there were any patients who sent no samples. No patient-related outcomes reported. Outcomes reported relate to sample quality. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** NR; no conflicts of interest declared

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
for TB patients **Study design:** RCT **Quality Score:** ++ **External validity:** –		N=77 total participants N=41 intervention N=36 control (N=228 samples obtained) **Baseline comparisons:** No significant differences in gender, age or risk factors **Study sufficiently powered?** NR		P = 0.812 **Attrition details:** NR	

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Maetz HM, Walton W, Smith M et al. **Year:** 1998 **Citation:** "A satellite primer on tuber-culosis:" A collaboration in distance education. *Journal of Public Health Management Practice 4*(5): 46-55 **Country of study:** USA **Aim of study:** [implicitly] to evaluate the implementation of an education programme on TB for health personnel **Study design:** BA	**Source population/s:** Entry-level TB workers in the mainland USA **Eligible population:** Target population included outreach workers in TB, HIV and sexually transmitted disease programmes as well as people working in settings serving people with a high risk of TB. **Selected population:** Unclear **Excluded population:** Unclear **Sample characteristics:** Participants included nurses (69%), outreach workers (4%), public health assistants (2%), disease investigators (8.5%), allied health technicians (1.5%), other (15%). Employers were state/local agencies (approximately 66%), federal (2.5%), hospitals or clinics (18%), other (10%).	**Method of allocation:** N/A **Intervention/s description:** A print based self-study course enhanced with satellite conferences. Curriculum was based on a five-module print based study course developed by CDC. A series of 5 satallite conferences were developed to enhance the self study modules, scheduled at one or two week intervals over two months. 1. introduction, transmission and pathogenesis of TB 2. Epidemiology of TB 3. Diagnosis 4. Treatment 5. Infectiousness and infection control Conferences reviewed modules and incorporated exercises, case studies and interviews and	**Outcomes:** TB knowledge (exact instrument unclear) **Follow up periods:** ~2 months **Method of analysis:** T test	**Results for all relevant outcomes:** TB knowledge (mean) Pre 80.8% Post 91.8% p<0.0001 Knowledge by subgroup: Nurses (N=1686) pre 82% post 93% (p<0.0001) Outreach workers (N=109) pre 74% post 83% (p<0.0001) PH assistants (N=47) pre 75% post 84% (p<0.0001) Disease investigators (N=216) pre 82% post 91% (p<0.0001) Allied health technicians (N=33) pre 78% post 89% (p<0.0001) Changes in the 'other' categories and 'not specified' categories were statistically significant at the same level. Based on experience:	**Limitations identified by author:** Primary target audience was entry-level TB workers but the majority of the participants had more than 12 months' experience **Limitations identified by review team:** Non-comparative design. Unclarity around sampling and outcome measures. High attrition rate. Limited information on sample. Only knowledge outcomes **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** Association of Schools of Public Health, Centers for Disease Control (CDC) and Prevention, Agency for Toxic Substances and Disease Registry Cooperative Agreement

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Quality Score: – **External validity:** +		interactive questions and discussions People completing the course received a certificate of participation. **Control/comparison/s description:** N/A **Sample sizes:** N=3,452 **Baseline comparisons:** N/A **Study sufficiently powered?** NR		Less than 12 months experience (N=838) % with passing score pre 77% post 97% More than 12 months experience (N=1523) % with passing score: pre 88% post 99% [a p-value of p<0.0000001 is reported underneath these data, but it is ambiguous which comparison this is referring to] **Attrition details:** 68.3% (N=2,359) completed the course including post test. Attrition was reasonably even across each of the professional groups with the exception of the 'other' group.	

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Malotte CK, Hollingshead JR, Rhodes F **Year:** 1999 **Citation:** Monetary versus nonmonetary incentives for TB skin test reading among drug users. *American Journal of Preventive Medicine* 16(3), 182-188. **Country of study:** USA **Aim of study:** To compare the effects of monetary versus nonmonetary incentives and a theory-based educational intervention on return for TB	**Source population/s:** Injecting drug or crack cocaine users in Long Beach, California (urban area). **Eligible population:** September 1995-September 1997 recruited drug users through either street outreach or word of mouth (limited information beyond this). **Selected population:** Included: drug users (self-report validated by inspection for needle track marks, and urine testing for opiates and cocaine). Percentage agreed to participate: NR **Excluded population:** Participants in any other of the researchers' HIV or TB prevention studies **Sample characteristics:** Age: 18-30: 15.6% 31-40: 48.4% 41-50: 29.7% 51-67: 6.3% Race/ethnicity:	**Method of allocation:** Randomly assigned 1 of 5 categories (exact procedure not reported); interview and $5 given prior to randomisation. After randomisation all patients received a tuberculin skin test (TST) and had appointments made for test reading. All patients who were more than 4 hours late for test reading were tracked by outreach workers who were trained in measuring PPD induration. **Intervention/s description:** All participants given $5 before randomisation, and TST conducted after randomisation. I1: participants offered $10 to return for skin test reading I2: participants received grocery store coupons worth $10 I3: participants chose either bus passes or coupons for a fast-food chain restaurant, worth $10 I4: participants received a	**Outcomes:** Return on time for skin test reading **Follow up periods:** 96 hours **Method of analysis:** Intention-to-treat. Chi-square, ANOVA, univariate and multivariate logistic regression	**Results for all relevant outcomes:** Return for skin test reading by treatment condition and unadjusted and adjusted odds ratio (control group as reference): I1 (cash): 94.9%; OR 19.2 (9.9-37.3), aOR 19.9 (10.2-38.7; p<0.001) I2 (grocery store coupons): 85.7%; OR 6.2 (3.9-9.8), aOR 6.4 (4.0-10.2; p<0.001) I3 (fast food coupons/bus passes): 82.6%; OR 4.9 (3.1-7.6), aOR 5.1 (3.3-8.0; p<0.001) I4 (motivational education): 46.9%; unadjusted OR NR, aOR 0.9 (0.6-1.3; p=0.547) C: 49.3% I1 significantly higher than I2 (p=0.002) and I3 (p<0.001). **Attrition details:** NR, dropouts were considered as non-attenders	**Limitations identified by author:** Results may not be generalisable to all drug users. Relatively small group sizes. **Limitations identified by review team:** Limited detail on source population. Main focus of study is effectiveness of incentives, not education or support. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** National Institute on Drug Abuse

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
skin test reading in a sample of newly recruited active injection and crack cocaine users **Study design:** RCT **Quality Score:** ++ **External validity:** +	African American: 63.3% Caucasian: 21.3% Latino: 7.5% Native American: 2.4% Not classified: 5.1% Gender: Male: 77.6% Female: 22.4% Prior TB exposure: No: 87.8% Yes: 9.8% Don't know: 2.3% Self-reported current drug use (prior 90 days): Injection only: 10.9% Crack only: 77.0% Crack and injection: 12.1%	5- to 10-minute motivational education session (information about TB and individual counselling format was used to focus each participant on the behavioural beliefs and subjective norms that were most related to their behavioural intention to return for skin test reading) **Control/comparison/s description:** Participants informed of the importance of having their skin tests read and encouraged to return, but they did not receive either education or incentives. **Sample sizes:** Total: n=1,078 I1: n=217 I2: n=217 I3: n=218 I4: n=211 C: n=215 **Baseline comparisons:** No statistically significant differences among treatment conditions for any demographic, drug			

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
		use, or cognitive variables. **Study sufficiently powered?** NR			

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Margolis PA, Lannon CM, Stuart JM, et al. **Year:** 2004 **Citation:** Practice based education to improve delivery systems for prevention in primary care: randomised trial. *BMJ 328*(7436): 388 **Country of study:** USA **Aim of study:** To evaluate the effectiveness of continuing medical education and process improvement to improve delivery of preventive care to children	**Source population/s:** Clinicians delivering preventive care to neonates and young children **Eligible population:** All paediatric and family practices in two regions of North Carolina, USA near research team. 44/88 of eligible practices recruited (15 refused, 5 not asked because sample size achieved, 24 excluded for other reasons) **Selected population:** Criteria were: sufficient newborns enrolled each month to achieve sample size requirements; not part of an academic institution or a publicly funded health centre; and, in the region near the University of North Carolina, annual Medicaid billing in excess of $50 000. Practices meeting criteria were sampled randomly, stratified by type of practice (paediatric vs family practice), number of newborns enrolled each month, and annual Medicaid billing. At patient level, sampling of clinical records was random, and children between 24-30	**Method of allocation:** Computer-generated randomisation **Intervention/s description:** Intervention used practice based continuing medical education and process improvement methods to support the implementation of "office systems" for delivery of preventive care. The intervention lasted 12 months and was based on the plan-do-study-act (PDSA) cycle of process improvement. Practices formed improvement teams; received academic detailing and mini-lectures; selected performance improvement goals and strategies; used repeated PDSA cycles to adapt approaches to office routines; and staff training focusing on the new roles. The intervention was carried out by two nurse-doctor teams. Researchers contacted intervention practices by telephone every 2-3 months.	**Outcomes:** TB screening conducted (assessed by review of random sample of clinical records) [Other preventive service delivery (non-TB), not extracted here] **Follow up periods:** 30 months **Method of analysis:** Logistic regression with linear and quadratic effects for post-implementation time. Models fitted using maximum likelihood approach. Intention to treat analysis.	**Results for all relevant outcomes:** At 30 months: I 54%, C 32% ($p<0.05$) Outcomes for other time points are presented only in graphical format for TB outcomes. The following are estimates based on this. Also note that implementation phase lasted 12 months and time points after this are follow-up: Baseline: I 34%, C 30% 6 months: I 34%, C 31% 12 months: I 34%, C 31% 18 months: I 48%, C 32% 24 months: I 55% ,C 32% **Attrition details:** 5/44 practices (11%) = 1/22 in intervention group + 4/22 in control group	**Limitations identified by author:** Small practices excluded. Clinicians may not have judged procedures necessary. Documentation of outcomes may be incomplete. Cannot distinguish effects of different intervention components (audit and feedback). **Limitations identified by review team:** Limited information on patient population. **Evidence gaps and/or recommendations for future research:** Explore how to produce further increases in reliability of care. **Source of funding:** US Agency for Healthcare Research and Quality, US Bureau of Maternal and Child Health, North Carolina Division of Medical Assistance, North Carolina Area Health Education Centers, Robert Wood Johnson Foundation

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Study design: RCT **Quality Score:** ++ **External validity:** –	months old who had been seen ≥3 times were eligible. **Excluded population:** NR **Sample characteristics:** Percent children on Medicaid: I 26%, C 32%. No other variables reported for patient population, only practices	**Control/comparison/s description:** NR **Sample sizes:** Total N=44 practices Intervention N=22 Control N=22 **Baseline comparisons:** No significant differences wrt practice size, clinicians' experience, other practice characteristics **Study sufficiently powered?** "The estimated power of the study to detect a difference of 20% between intervention and control practices was 80% with a type I error of 0.05 (two tailed), using methods that accounted for within-practice clustering of the study data"			Generalist Faculty Scholars Program

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Morisky DE, Malotte, CK, Ebin V et al. **Year:** 2001 **Citation:** Behavioral interventions for the control of tuberculosis among adolescents. *Public Health Reports* *116*(6):568-74. **Country of study:** USA **Aim of study:** to test the effectiveness of two inter-ventions – peer counselling and contingency contracting (incentives) on adolescent adherence to treatment for latent TB infection	**Source population/s:** Adolescents in the US **Eligible population:** Two clinics in Los Angeles County; one run by the Los Angeles Country Dept of Health, the other by the City of Long Beach Dept of Health. Eligible adolescents were invited to participate in the study. Recruitment was after the first clinic appointment before receiving treatment. Most had been previously screened as a requirement for school entry. [no further details given]. **Selected population:** NR **Excluded population:** NR **Sample characteristics:** mean age 15.2 years, females 51%, Hispanic American 77.8%, Asian 9.4%, African American 8.1%. Approximately 20% had been born in the US. Approximately 50% were middle school level, 45% high school and 5% primary school.	**Method of allocation:** Random, methods NR **Intervention/s description:** **1. Peer counselling** Adolescents who had previously completed therapy were recruited as peer counsellors. Peer counsellors contacted partcipants by telephone and saw participants at least every two weeks. Sessions established rapport, emphasised importance of attendance and adherence, behavioral and normative beliefs and problems and concerns. **2. Parent –participant contingency contract intervention** Parents and adolescents negotiated an incentive provided by the parent if the adolescent adhered to therapy (including keeping appointments, and taking medication). A schedule of incentives was set (inc clothing, special meals,	**Outcomes:** Self-efficacy for medicine taking behaviour, mastery, self esteem, medicine taking behaviour (measured using a 3 item scale with patient reporting whether they had missed medication), and completion of treatment (measured from clinical records). **Follow up periods:** 6 months **Method of analysis:** Intention to treat, otherwise NR	**Results for all relevant outcomes:** Only outcome reported wrt effectiveness of intervention is completion – others are incompletely reported and only reported as observational analyses of predictors. Completion: Peer counselling 80.3% Contracting 76.4% Combined 84.8% Usual Care 77.8% (NS) [Slightly different completion rates are reported in the cost effectiveness analysis (Kominski et al., 2007): 75%, 74%, 84%, 76% respectively. In that paper the difference between combined and usual care is given as p=0.051.] **Attrition details:** NR. It can be seen from the text that not all outcomes reported had measurements from all participants. It is unclear which is this is due to attrition, and which from participants not completing measures but remaining in the study.	**Limitations identified by author:** Particpants were interviewed 3 times during the study and provided with monetary incentives; these might have affected adherence. It is unclear whether the adolescents actually received the incentives from their parents. Some participants had difficulty understanding the Spanish translations of the response scales **Limitations identified by review team:** Some unclarity in methods (sampling, data analysis, attrition). Not all outcome measures appear to be reported. The bulk of the analysis is observational, with effectiveness findings only briefly described. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** National Heart, Lung and Blood Institute.

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Study design: RCT **Quality Score:** + **External validity:** +		eating out, movies). **3. Combined** Interventions 1 and 2 were combined. **Control/comparison/s description:** **4. Usual care** Services and treatment that were usually provided including health education from clinic staff and assessment of physical health in response to the TB medication **Sample sizes:** N=794 in the trial Peer counseling n=199 Contracting n = 203 Combined n = 197 Usual care n = 195 **Baseline comparisons:** No statistically significant differences in baseline age, sex, education and ethnicity are reported. **Study sufficiently powered?** Not stated			

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Ozuah PO **Year:** 2001 **Citation:** A successful strategy for increasing the adherence to tuberculosis test reading in high-risk children. *Archives of Pediatrics and Adolescent Medicine* 15(7), 856. **Country of study:** USA **Aim of study:** To describe a successful strategy for increasing adherence to tuberculosis test reading in high-risk children. **Study design:**	**Source population/s:** Inner-city community health centre where patients were indigent minorities **Eligible population:** Recruitment not described **Selected population:** All patients receiving at tuberculin skin test **Excluded population:** NR **Sample characteristics:** Children registered at the clinic (unclear if this refers to the sample, and which time point): 55% Hispanic, 44% African American, 50% female, 44% no health insurance, 47% covered by Medicaid	**Method of allocation:** NA **Intervention/s description:** July 1996-July 1998: instructed all patients who received skin tests to return in 48 hours for testing reading (or following Monday for Friday tests); patients who did not return by the middle of the specified day were called and instructed to come that day or the next. Patients without telephones received a postcard instructing them to return for re-testing. **Control/comparison/s description:** January 1994-January 1996: instructed all patients who received skin tests to return in 48-72 hours for test reading **Sample sizes:** **Total (skin tests received):** n=7526 **Pre-intervention:** n=3402 **Post-intervention:** n=4124 **Baseline comparisons:**	**Outcomes:** Adherence to return for test reading **Follow up periods:** 2 years at practice level; 72 hours at individual level **Method of analysis:** Descriptive statistics	**Results for all relevant outcomes:** Return for test reading: Pre-intervention: 54% at 72 hours Post-intervention: 59% at 48 hours, 91% at 72 hours **Attrition details:** NA	**Limitations identified by author:** NR **Limitations identified by review team:** Very brief report; very limited information on population, context or methods **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** NR

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Ret **Quality Score:** – **External validity:** +		NA **Study sufficiently powered?** NR			

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Roy A, Abubakar I, Chapman A, et al. **Year:** 2011 **Citation:** A controlled trial of the knowledge impact of tuberculosis information leaflets among staff supporting substance misusers: Pilot study. *PLoS One* 6(6): e.20875. **Country of study:** UK **Aim of study:** To evaluate the effectiveness of an educational intervention to raise awareness about TB among professionals	**Source population/s:** Staff who support persons who misuse substances in the UK **Eligible population:** Staff working for 'Crime Reduction Initiatives' (CRI) charity in three areas of London (Ealing, Hounslow, and Camden), Brighton, Eastbourne, Stockton, Bognor and Regis. All staff who met inclusion criteria were invited to participate (N=150). Recruited January-May 2008. **Selected population:** 64% agreed to participate (remainder did not respond to initial email). Inclusion criteria: staff working with offenders following release from prison and those affected by substance misuse **Excluded population:** NR **Sample characteristics:** Staff background: Drug intervention programme workers: 54% Substance misuse workers: 12% Case workers: 5% Project workers: 5%	**Method of allocation:** Manager divided unordered list of eligible staff in two (non-random, non-blinded) All eligible staff received an email with a pre-questionnaire; told to answer it, then read the leaflet (either intervention or control) and then answer the post-questionnaire **Intervention/s description**: 'Substance Mis-use and TB' leaflet: information on TB transmission, likelihood of developing TB, symptoms and management, compli-cations of alcohol/drug misuse, supporting TB treatment, and risks for staff members **Control/comparison/s description:** 'Mental Health and Substance Mis-use' with no information on TB; additional details about leaflet content NR **Sample sizes:** Total questionnaires	**Outcomes:** Knowledge about TB in 4 domains (reported as below, the exact questions are not always clear): Knowledge of symptoms: itchiness; persistent fever; night sweating; unusual tiredness; stomach cramping; weight loss; cough for long; coughing up blood; bone fracture Understanding the need for referral: do nothing; specialist services / GP; transfer to another hostel; contact Public Health Lab Knowledge of treatment issues: TB curable; client responsible medication; length of treatment; monitoring progress; interaction medications; medication charges	**Results for all relevant outcomes:** Knowledge of symptoms of TB (percentage of correct answers) Itchiness: I: pre 100%, post 98%, change -2% (95% CI -7 to 3) p=1.0; C: pre 81%, post 81%, change 0% (95% CI -14% to 14%) p=1.0 Persistent fever: I: pre 56%, post 87%, change 31% (95% CI15% to 47%) p=0.0002; C:pre 52%, post 52%, change 0% (95% CI -18% to 18%) p=1.0 Night sweating: I: pre 53%, post 89%, change 36% (95% CI 21% to 52%) p<0.0001; C: pre 44%, post 48%, change 4% (95% CI -7% to 14%) p=1.0 Unusual tiredness: I: pre 65%, post 82%, change 16% (95% CI 21% to 34%) p= 0.08; I: pre 52%, post 44%, change -7% (95% CI -21% to 6%) p=0.50 Stomach cramping: I: pre 96%, post 93%, change -4% (95% CI -12% to 5%) p=0.62; C: pre 85%, post 90%, change 4 (95% CI -12% to 20%), p=1.0 Weight loss: I: pre 58%, post 93%, change 34% (95% CI 17% to 52%) p= 0.0002; C:	**Limitations identified by author:** Did not assess long-term knowledge or changes in behaviour. Participants were aware that they would complete questionnaire. Not random allocation. Self-report outcomes which may introduce social desirability bias in intervention group. **Limitations identified by review team:** Design is highly open to bias as noted by authors. Data are analysed only within-group. **Evidence gaps and/or recommendations for future research:** RCTs of similar interventions measuring health status outcomes **Source of funding:** Department of Health and Health Protection Agency in England.

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
working with those affected by substance misuse **Study design:** nRCT **Quality Score:** – **External validity:** +	Criminal justice intervention group workers: 5% Social workers: 3.5% Nurses: 3.5% Staff involved in protection of sex workers: 3.5% Harm minimisation worker: 1.75% Structured programme worker: 1.75% Arrest referral team member: 1.75% Mental and community health worker: 1.75%	returned: N=96 Participants who returned both pre-leaflet and post-leaflet questionnaires: N=82 (included in final analysis) I: N=57 C: N=27 **Baseline comparisons:** Similar (but significance NR) on self-reported TB knowledge and experience **Study sufficiently powered?** NR	Understanding the need to provide support and general awareness: infectious form of TB; meaning of DOT; support DOT; client's background; colleagues – risk of TB; sharing items **Follow up periods:** immediately after intervention **Method of analysis:** Descriptive statistics. McNemar's exact test for matched pairs. Fisher's exact test	67%, post 63%, change -3 (95% CI -14% to 7.1%) p=1.0 Cough for long: I: 73%, post 82%, change 9% (95% CI -7% to 25%) p=0.33; C: pre 74%, post 74%, change 0% (95% CI -14% to 14%) p=1.0 Coughing up blood: I: pre 78%, post 98%, change 20% (95% CI 8% to 32%), p=0.001; C: pre 85%, post 89%, change 4% (95% CI -7% to 14%) p=1.0 Bone fracture: I: pre 96%, post 96%, change 0%(95% CI -9% to 9%) p=1.0; C: pre 96%, post 96%, change 0%(95% CI -3% to 3%) p=1.0 Understanding of the need for referral (percentage of correct answer): Do nothing: I: pre 92%, post 98%, change 5%(95% CI -2% to 13%) p-0.25; C: pre 96%, post 100%, change 4%(95% CI -7% to 14%) p=1.0 Specialist services/GP: I: pre 89%, post 87%, change -2% (95% CI -11% to 8%) p=1.0; C: pre 89%, post 89%, change 0%(95% CI -18% to 18%) p=1.0 Transfer to another hostel: I: pre 100%, post 98%, change -	

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
				2%(95% CI -7% to 3%) p-1.0; C: pre 93%, post 100%, change 7%(95% CI -6% to 21%) p=0.50 Contact public health lab: I: pre 60%, post 74%, change 14%(95% CI -2% to 31%) p=0.10; C: pre 74%, post 74%, change 0%(95% CI -14% to 14%) p=1.0 Knowledge of treatment issues: TB curable: I: pre 81%, post 100%, change 18%(95% CI 6% to 30%) p=0.002; C: pre 67%, post 70%, change 4% (95% CI -12% to 20) p=1.0 Client responsible medication: I: pre27%, post 44%, change 16%(95% CI -1% to 33%) p=0.08; C: pre 22%, post 26%, change 4%(95% CI -12% to 20%) p=1.0 Length of treatment: I: pre 42%, post 73%, change 31% (95% CI 14% to 47%) p=0.005; C: pre 33%, post 41%, change 7%(95% CI -6% to 21%) p=0.05 Monitoring progress: I: pre 42%, post 47%, change 5%(95% CI -11% to 22%) p=0.63; C: pre 44%, post 44%, change 0%(95% CI -4% to	

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
				4%) p=1.0 Interaction medications: I: pre 85%, post 93%, change 7% (95% CI -3% to 18%) p=0.22; C: pre 89%, post 85%, change -3% (95% CI -20% to 12%) p=1.0 Medication changes: I: pre 100%, post 98%, change -2% (95% CI -7% to 3%) p=1.0; C: pre 96%, post 100%, change 4% (-7% to14%) p=1.0 Understanding the need to provide support and general awareness: Infectious form of TB: I: pre 85%, post 96%, change 11% (95% CI -2% to 24%) p=0.11; C: pre 93%, post 96%, change 4% (-7% to 14%) p=1.0 Meaning of DOT: I: pre 9%, post 36%, change 27% (12% to 43%) p=0.0007; C: pre 0%, post 7%, change 7% (-6% to 21%) p=1.0 Support DOT: I: pre 18%, post 62%, change 44% (29% to 59%) p<0.0001; C: pre 4%, post 0%, change -4% (95% CI -14% to 7%) p=1.0 Client's background: I: pre 64%, post 71%, change 7% (95% CI -8% to 22%) p=0.42; C: pre 81%, post 89%, change	

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
				7% (95% CI -6% to 21) p=0.5 Colleagues - risk of TB: I: pre 54%, post 69%, change 14% (95% CI -3% to 32%) p=0.11); C: pre 56%, post 63%, change 7% (95% CI -14% to 29%) p=0.68 Sharing items: I: pre 73%, post 87%, change 14% (95% CI 2% to 27%) p=0.02; C: pre 70%, post 70%, change 0% (95% CI -18% to 18%) p=1.0 **Attrition details:** NR	

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Roy A, Abubakar I, Yates S, et al. **Year:** 2008 **Citation:** Evaluating knowledge gain from TB leaflets for prison and homeless sector staff: the National Knowledge Service TB pilot. *European Journal of Public Health* 18(6), 600-3 **Country of study:** UK **Aim of study:** To evaluate the impact of the resources developed by the NKS Tuberculosis Pilot on TB knowledge **Study design:**	**Source population/s:** Prison/youth offender, remand institution staff and homeless hostel staff in the UK. **Eligible population:** Staff from a prison and a young offender institution and remand centre in Southeast England; responded to calls for volunteers (additional information not provided). Staff and managers from hostels who attended a 'Health Spotlight Event' organized by Homeless Link. **Selected population:** Percentage agreed to participate: 100% **Excluded population:** NR **Sample characteristics:** Prison staff: 55% (of whom 28% had worked in healthcare sector) Homeless sector staff: 45% (of whom 4% had worked in healthcare sector)	**Method of allocation:** N/A **Intervention/s description:** Participants were given leaflets of information about TB. The titles were: *TB and homelessness: Guidance for homeless sector staff* (for homeless sector staff); *TB and homelessness: Guidance for homeless service managers* (for homeless sector managers); *TB: Guidance for prison officials* (for prison officials) **Control/comparison/s description:** N/A **Sample sizes:** Total: N=51 **Baseline comparisons:** N/A **Study sufficiently powered?** NR	**Outcomes:** Knowledge of: background information on TB; awareness of symptoms of TB; guidance and options available for supporting clients; areas of knowledge/practice were guidelines are lacking **Follow up periods:** immediately after reading leaflet **Method of analysis:** McNemar's test for matched pairs	**Results for all relevant outcomes:** percentage of correct answers: Background information on TB: Which form of TB is infectious? pre: 100%, post: 100%, change: 0, p=1.0 Do you think TB is curable? pre: 97%, post: 100%, change 2% (95% CI -4% to 8%), p=1.0 What would you do if a prisoner in your care is diagnosed with TB? pre: 100%, post: 100%, change: 0%, p=1.0 Prisoner/client may be admitted to hospital till treatment is finished: pre: 77%, post: 75%, change: -2%, p=1.0 Awareness of symptoms of TB: Persistent fever: pre: 55%, post: 100%, change: 45% (95% CI 27% to 63%); p=0.00001 Heavy sweating: pre: 65%, post: 98%, change: 33% (95% CI 15% to 49%), p=0.0003 Unusual tiredness: pre: 70%, post: 98%, change: 27% (95% CI 10% to 44%), p=0.0018 Loss of weight: pre: 73%, post: 95%, change: 23% (95% CI	**Limitations identified by author:** Small sample size. Survey sessions in artificial setting (staff might not usually read leaflets so carefully). Potential bias in participation of prison officials (only those who volunteered to take part). Unmeasured confounders. Only short-term knowledge increase measured. **Limitations identified by review team:** Limited description of leaflet content. Questions not entirely clear. Non-comparative design. Knowledge outcomes appear to correspond directly to information content and so have limited relevance to behaviour or practice. **Evidence gaps and/or recommendations for future research:** Randomised, controlled trials of educational leaflets. **Source of funding:** Department of Health in

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
BA **Quality Score:** – **External validity:** +				6% to 39%), p=0.0074 Coughing blood: pre: 76%, post: 94%, change: 17% (95% CI 0% to 33%, p=0.0574 Persistent cough: pre: 89%, post: 98%, change: 9% (95% CI -3.6 to 21%), p=0.2188 Itch: pre: 6%, post: 2%, change: 4% (95% CI 3.3% to 11%), p=0.5 Unexpected bone fracture: pre: 2%, post: 4% change: -1.9% (95% CI -10% to 6%), p=1.0 Stomach cramps: pre: 0, post: 4%, change: -3.9% (95% CI -11% to 3.3%), p=0.5 Guidance and options available for supporting clients: How long would the treatment need to be given: pre: 68%, post: 100%, change: 32% (95% CI 16% to 48%), p=0.0001 What should happen if a prisoner in your care has TB: pre: 32%, post: 100%, change: 68% (95% CI 47% to 88%), p=0.00001 How can you help medical services? pre: 37%, post: 92%, change: 55% (95% CI 28% to 83%), p=0.0007 What should happen if a client in your care has TB? Pre:	England

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
				77%, post: 90%, change: 13% (95% CI -10% to 37%), p=0.3438 Areas of knowledge/practice where guidelines are lacking: The prisoner/client should not share items such as bed-linen, crockery and utensils: pre: 70%, post: 79%, change: 9% (95% CI -4% to 22%), p=0.2188 What should happen if a prisoner in your care is diagnosed with TB? pre: 78%, post: 88%, change: 10% (95% CI -5% to 24%), p=0.22 **Attrition details:** 0%	

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Sheikh M, MacIntyre CR **Year:** 2009 **Citation:** The impact of intensive health promotion to a targeted refugee population on utilisation of a new refugee paediatric clinic at the children's hospital at Westmead *Ethnicity & Health 14*(4): 393-405 **Country of study:** Australia **Aim of study:** To evaluate a targeted promotion campaign for a new health service for refugees, and	**Source population/s:** Children of refugees from sub-Saharan Africa receiving screening for TB. **Eligible population:** "All newly arrived SSA [sub-Saharan African] families presenting to the clinic from June 2005 to May 2006". The clinic was a new clinic for refugee children established at The Children's Hospital at Westmead, Sydney. **Selected population:** SSA families within five years of arrival. Recruitment rate NR. (Note that utilisation rates are taken from clinic records, while belief outcomes are by interview) **Excluded population:** Not given **Sample characteristics:** Mean age of children 12 years 15 female parents and 19 male parents were interviewed had a total of 97 children Parents' country of birth: 19 Sudan, 6 Burundi, 3 Liberia, 2 Ethiopia, 2 Sierra Leone, 1 Rwanda and 1 DRC	**Method of allocation:** N/A **Intervention/s description:** A campaign to promote the availability of services to families from SSA. Development of a leaflet with health promotion messages outlining importance of health checks and the availability of such services. A map and directions to the hospital as well as contact information was provided. The sheet was available in English and also translated into Arabic, Swahili and Somali. Promotional campaign for the service through community leaders, current refugee resources and other social institutions: migrant resource centre, ethnic community radio, community functions, churches/mosques, community leaders, adult learning centres, schools in	**Outcomes:** Clinic utilisation (SSA vs non SSA at population level) Health beliefs (SSA pre vs SSA post) **Follow up periods:** 3 months **Method of analysis:** Odds ratios	**Results for all relevant outcomes:** Clinic attendance SSA: 34/2571 Non SSA 12/2742 OR 3.0 (95% CI:1.5-6.2), $p < 0.001$ (Authors interpret this as intervention-control comparison, given that non-SSAs were not targeted, but this is questionable; 2571 and 2742 equal the number of SSA and non SSA refugees settled under the humanitarian programme in metropolitan Sydney from 2003 to 2005) Health beliefs: 'Measles is a serious disease' Pre 44% (15/34) Post 81% (25/31) OR: 0.19 95% CI: 0.05-0.65 $p<0.0001$ 'Germs can cause (Tuberculosis) TB' Pre 47% (16/34) Post 84% (26/31) OR 0.17 95% CI: 0.04-0.62 $p<0.0001$ 'Would NOT be ashamed if family member had TB' Pre 76% (26/34) Post 97% (30/31)	**Limitations identified by author:** Small sample size may have compromised power. Cannot determine if campaign will improve long term health outcomes. Some concepts may not translate well into community languages. **Limitations identified by review team:** Clinic attendance outcome is of limited value (since groups likely differed in other ways, and no pre-test data are reported; also, some non-SSA families may have been exposed to intervention). Intervention had already started at 'pre' test. **Evidence gaps and/or recommendations for future research:** Further research to determine long term benefits **Source of funding:** NR for study (service funded by New South Wales government)

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
study role of social connection in refugees' service use **Study design:** BA/nRCT **Quality Score:** – **External validity:** +	[The authors report recruiting a non-African sample of parents as well (N=12), but no data appear to be reported from these.)	selected suburbs Leaflets also given to parents of children attending the centre. **Control/comparison/s description:** Usual care without the campaign (for non SSA families) **Sample sizes:** N=34 families **Baseline comparisons:** NR **Study sufficiently powered?** Not reported		OR 0.11 95% CI 0.00-0.97 p=0.02 'Sins can cause TB' Pre 26% (9/34) Post 16% (5/31) OR 1.87 95% CI 0.48-7.58 p=0.31 'Preference for child to receive vaccination' Pre 62% (21/34) Post 84% (26/31) OR 0.31 95% CI 0.08-1.15 p<0.05 [NB the p-value and the CI for this last outcome are inconsistent] **Attrition details:** 9% (3/34)	

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Steele AW, Eisert S, Davidson A, et al. **Year:** 2005 **Citation:** Using computerized clinical decision support for latent tuberculosis infection screening. *American Journal of Preventive Medicine 28*(3): 281-4 **Country of study:** USA **Aim of study:** To evaluate a clinical decision support tool for increasing LTBI screening **Study design:** Ret	**Source population/s:** People accessing public healthcare in USA **Eligible population:** Patients registered at two community health centres in Denver, USA. Of population served by centres, 40% uninsured and 70% minority ethnic. All patients registered at selected practices during study period were eligible. **Selected population:** Random sample of records audited (no further details on random sampling) **Excluded population:** None **Sample characteristics:** For total population registering in study period: mean age 49; 64% female; 71% Hispanic; 50% uninsured; 73% had ≥1 LTBI risk factor by CDC guidelines, 49% had clinical risk factor For patients meeting criteria for screening tool: 94% Hispanic, 90% uninsured. No information on actual	**Method of allocation:** N/A **Intervention/s description:** Computer system generated physician reminders (on paper) for all patients born in high-risk country and <40 years old, alerting clinical staff to perform further assessment for LTBI screening. Guided web-based tool for physicians to document assessment. **Control/comparison/s description:** N/A (no information on practice in pre-intervention phase) **Sample sizes:** Pre N=146 (out of N=683 who met criteria for screening tool, N=4,683 total patients) Post N=103 (out of N =610 who met criteria, N=4,135 total) **Baseline comparisons:** N/A **Study sufficiently powered?**	**Outcomes:** LTBI screening conducted, based on clinical records **Follow up periods:** Post-intervention data covered 12 weeks; total study covered 6 months **Method of analysis:** NR	**Results for all relevant outcomes:** LTBI screening conducted: pre 8.9% (13/146), post 25.2% (26/103); p<0.001 **Attrition details:** N/A	**Limitations identified by author:** Short duration **Limitations identified by review team:** Non-comparative design. Part of intervention was facilitating keeping of clinical records on screening, so post data may not be strictly comparable to pre data. **Evidence gaps and/or recommendations for future research:** Investigate LTBI treatment as well as screening. Evaluate long-term sustainability of intervention **Source of funding:** Agency for Healthcare Research and Quality

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Quality Score: – **External validity:** +	sample, although assume similar to above as sampling was random	Unclear – stated that record sampling was based on power, but actual calculation NR			

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Taubman D, Titler N, Edelstein H, et al. **Year:** 2013 **Citation:** Providing detailed information about latent tuberculosis and compliance with the PPD test among healthcare workers in Israel: A randomized controlled study. *Journal of Epidem-iology and Global Health* *3*(4):253-60 **Country of study:** Israel **Aim of study:** to examine whether providing	**Source population/s:** Healthcare workers in Israel **Eligible population:** Study was conducted at Ha'emek Medical Center serving a population of 500,000 with an incidence of TB of 26 cases per 100,000 hospitalizations. **Selected population:** All health care workers in selected site who were annually invited to get a PPD test. Participants were not informed that a study was taking place **Excluded population:** HCWs with a prior history of a positive skin test **Sample characteristics:** Female 60% Jewish 60% Arabic 40% Nurses 63% Physicians 37% Mean age 38.6 years	**Method of allocation:** Computer-generated blocked randomization schedule with random assignment at a ratio of 2:1. **Intervention/s description:** Letter explaining the severity of TB infection, the importance of the test for hospital employees, and the possibility of exposure to TB without immediate presence of symptoms. **Control/comparison/s description:** Usual practice - a single-line letter without explanation. The letter in both groups informed HCWs where and when they could be vaccinated. **Sample sizes:** N=293 total N=197 intervention N=96 control **Baseline comparisons:** No significant differences	**Outcomes:** Compliance with PPD testing **Follow up periods:** 12 weeks at cohort level **Method of analysis:** Relative risks and multivariate logistic regression	**Results for all relevant outcomes:** Compliance: RR 0.87 (95% CI, 0.46–1.65). **Attrition details:** N/A, dropouts considered as non-compliant	**Limitations identified by author:** Small sample size. Researchers not blinded to allocation. Only one study site. **Limitations identified by review team:** Generally robust study. Full outcome data NR. Some possibility of contamination between groups. **Evidence gaps and/or recommendations for future research:** Evaluate other strategies for promoting adherence among HCWs **Source of funding:** Global Public Health Initiative, University of Michigan School of Public Health

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
additional information about latent TB and the PPD test to the TB screening invitation letter increases test compliance among HCWs in Israel **Study design:** RCT **Quality Score:** ++ **External validity:** +		wrt gender, ethnicity, profession and age **Study sufficiently powered?** Yes: power of 80% to detect 15% change in compliance			

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Tulsky JP, Pilote L, Hahn JA et al. **Year:** 2000 **Citation:** Adherence to isoniazid prophylaxis in the homeless: A randomized controlled trial. *Archives of Internal Medicine* 160(5), 697-702. **Country of study:** USA **Aim of study:** To test 2 interventions to improve adherence to isoniazid preventive therapy for tuberculosis in homeless adults.	**Source population/s:** Homeless adults in San Francisco, California. Population with high rate of ongoing TB transmission. Urban area. **Eligible population:** 1991-1994 San Francisco General Hospital screened sample of homeless or marginally-house adults for TB and HIV. Recruited subjects from emergency shelters, free meal lines and low-cost residential hotels. All patients who returned for HIV and TB skin test results within 1 week of being interviewed were evaluated for inclusion in this study. Final year of study subjects also recruited from TB screenings (carried out by San Francisco Department of Public Health Division of TB Control) in low-cost residential hotels in inner-city San Francisco. **Selected population:** 14% refused to participate Inclusion criteria: positive TST result or credible history of prior positive TST result but no follow-up in previous 6 months;	**Method of allocation:** Block method of randomisation; patients made blinded selection of labelled coins from a bag. **Intervention/s description:** I1 (monetary incentive): bi-weekly directly observed preventive therapy (DOPT) at a study site with 900-mg isoniazid for 6 months and a $5 monetary incentive for each visit. Reminder letters or phone calls if dose missed. I2 (peer advisor): b-weekly directly observed preventive therapy (DOPT) with 900-mg isoniazid and case management by a peer health advisor. Peer health advisor provided the dose and observed patient take it, checked for side effects, accompanied patients to monthly refill appointment. Spent allotted amount of time looking for patient if dose missed. All peer advisors had been homeless or were	**Outcomes:** Completion of 6 months of isoniazid treatment Number of months of isoniazid dispensed Probability of receiving at least three months isoniazid therapy **Follow up periods:** 6 months **Method of analysis:** Wilcoxon rank sum tests, chi-square or Fisher's exact test, log-rank test	**Results for all relevant outcomes:** Completion (6 months): I1 (incentive) 44%, I2 (peer adviser) 19%, control 26% (I1 vs I2 p=0.02, I1 vs control p=0.11, I2 vs control significance NR). (The authors also report the following 'by log-rank test': I1 vs I2 p=0.01, I1 vs control p=0.04, I2 vs control NS; this appears to be a distinct analysis, but this is not entirely clear.) I1 vs combined I2+control: unadjusted OR 2.70, adjusted OR controlling for other factors 2.57, 95% CI 1.11-5.94, p=0.03. Median number of months of isoniazid dispensed: I1: 5 months, I2: 2 months, control: 2 months (I1 vs I2 p=0.005, I1 vs control p=0.04, I2 vs control significance NR) Probability of receiving at least three months isoniazid therapy: I1: 71% (95% CI: 59%-86%) I2: 42% (95% CI: 29%-61%) Control: 45% (95% CI: 31%-64%)	**Limitations identified by author:** NR **Limitations identified by review team:** Study participants were those who had returned for TB/HIV test reading, so may be more likely to adhere than general homeless population. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** NR

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Study design: RCT **Quality Score:** ++ **External validity:** +	fluency in English or Spanish. Patients whose isoniazid treatment was delayed past the first visit to the TB clinic pending further evaluation included if isoniazid was eventually dispensed. **Excluded population:** Patients currently receiving prophylaxis or treatment for TB disease; HIV-positive individuals; patients who started treatment for active TB during the first TB clinic visit. **Sample characteristics:** Median age: 37 years Gender: 86% male Ethnicity: 52% African American; 21% White, 27% Hispanic or other Residence: 67% street or shelter; 33% hotel, apartment or other	homeless in the previous year. **Control/comparison/s description:** Usual care: unobserved, self-administered daily doses of 300-mg isoniazid; 1 month supply given with instructions on daily dosing and return re-fill appointments scheduled monthly for 6 months. Note: there was a change in protocol to offer all subjects $5 incentive to keep initial appointments at TB clinic. Only those who were randomised to the monetary incentive group continued receiving the $5 incentive during the dispensing of isoniazid. 27 subjects were recruited after this change and there were no significant different in patient demographics or adherence behaviour. **Sample sizes:** **Total:** n=118 **I1 (monetary incentive):** n=43 **I2 (peer advisor):** n=37		**Attrition details:** NR, dropouts were counted as non-completers	

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
		C: n=38 **Baseline comparisons:** No significant differences in demographic or behavioural variables between three arms. **Study sufficiently powered?** NR			

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Udeagu C-CN, Dorsinville MS, Munsiff SS, et al. **Year:** 2007 **Citation:** Evaluation of case manage-ment in tuber-culosis control: A three-year effort to improve case management practices in New York City **Country of study:** USA **Aim of study:** To assess prevalence of lapses in CM practices and changes in CM practice after an intervention to improve them **Study design:**	**Source population/s:** TB patients receiving case management in NYC (and their case managers). **Eligible population:** In the 2002 sample, patient records were selected, but it is unclear by which criteria. In 2004 sample, all patient records with TB confirmed in the first quarter of 2003 were included. **Selected population:** N/A (patient record review) **Excluded population:** NR **Sample characteristics:** 2002 sample: 69% confirmed TB cases, 49% sputum that was AFB smear-positive, 17% HIV positive 2004 sample: 99% confirmed TB cases, 52% sputum that was AFB smear-positive, 19% HIV positive Demographics of patient population NR, and limited information on case managers	**Method of allocation:** N/A **Intervention/s description:** Following initial evaluation, results and guidelines (on acceptable levels of activities, documentation and supervision) were distributed to all case managers and supervisors. A range of improvement strategies including patient interview audit tool designed by working group, peer observation, updated protocols, and procedure reviews were implemented **Control/comparison/s description:** N/A **Sample sizes:** Pre (2002): N=131 records Post (2004): N=314 records **Baseline comparisons:** Signficantly higher number of patients in post group had TB confirmations **Study sufficiently**	**Outcomes:** Documentation of interview dates Timeliness of interviews Patient education carried out by case manager (on specific topics: transmission and pathogenesis, length of treatment, development of resistance, patient's knowledge of diagnosis, importance of monthly follow-up, offered DOT, importance of DOT, availability of BTBC services) Data quality: number of patient records with no supervisor's note, completeness of forms, accuracy of information **Follow up periods:** Two years at cohort level **Method of analysis:**	**Results for all relevant outcomes:** Documentation of interview dates: Pre 66%, post 88%, p=0.0000 [*sic*] Timeliness of interviews (median): Pre 7.8 days (range 0-140), post 2 days (0-198) Case manager addressed: Transmission and pathogenesis: Pre 78%, post 81%, p=0.41 Length of treatment: Pre 35%, post 35%, P=0.98 Development of resistance: Pre 36%, post 61%, p<0.001 Patient's knowledge of diagnosis: Pre 35%, post 36%, p=0.84 Importance of monthly follow-up: Pre 24%, post 51%, p=0.001 Offered DOT: Pre 64%, post 77%, p<0.001 Importance of DOT: Pre 32%, post 74%, p<0.001 Availability of BTBC services: Pre 16%, post 59% p<0.001 Record of supervision: Number of patient records with no supervisor's note: Pre 50%, post 31%, p<0.0001 Completeness of forms: Pre	**Limitations identified by author:** Different for the two evaluations [unclear what this means]. No systematic evaluation of CM practices prior to 2002, which limits the interpretation of the evaluations **Limitations identified by review team:** Retrospective design. Limited information on patient demographics/ characteristics or on the case managers. Some unclarity around sampling. Data quality may have improved as a result of the intervention, making pre and post results not comparable **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** Centers for Disease Control and Prevention

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Ret **Quality Score:** – **External validity:** +		**powered?** NR	Chi-squared tests or Fisher's exact tests.	15%, post 14%, p=0.73 Accuracy of information: Pre 8%, post 11%, p=0.28 **Attrition details:** N/A	

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: White MC, Tulsky JP, Menendez E, et al. **Year:** 2005 **Citation:** Improving tuberculosis therapy completion after jail: translation of research to practice. *Health Education Research 20*(2):163-174 **Country of study:** USA **Aim of study:** to compare rates of first visit to the TB clinic after release from jail, as well as completion of therapy, in inmates with LTBI who participated in	**Source population/s:** Jail inmates in the US **Eligible population:** The first cohort are the participants of White 2002 who received the single education session (described as usual care in White et al., 2002), and who were released before completion of therapy. See further details in White et al., 2002 The second cohort are inmates with LTBI in 2002–2003, who received a single education by Jail Discharge Planners and were released from jail before treatment completion. 379 inmates were treated with INH, 157 of these were missed or released. 222 received the education session. **Selected population:** See White 2002 for the RCT selection process. The selection of the usual care group in this study is not described, it is those people seen as part of usual care by the discharge planners. **Excluded population:**	**Method of allocation:** N/A **Intervention/s description:** 6 months of isoniazid therapy with DOT while in jail, a daily review of electronic medical records by the study team and a standard information session delivered by trained research assistants to inmates who began treatment for LTBI (including treatment information, adverse effects, availability of free care after release, information about the location of, hours and transport to the TB clinic, and encouragement). **Control/comparison/s description:** 6 months of isoniazid therapy with DOT while in jail + Discharge Planners were given the same training as was received in the RCT. Each Discharge Planner was educated once.	**Outcomes:** Visit to TB clinic within first month after release Completed TB therapy **Follow up periods:** 6 months (completion) **Method of analysis:** univariate analyses and logistic regression	**Results for all relevant outcomes:** First visit to clinic within 30 days of release RCT group 25/104 (24%) Usual care: 16/164 (10%) p = 0.002 RR 0.84, 95% CI 0.75–0.95 First visit to clinic any time after release RCT group 34/104 (33%) Usual care 25/164 (15%) p= 0.001 RR 0.79, 95%CI 0.68–0.92 In logistic regression (unclear exactly what variables were controlled for), usual care remained less likely to go to clinic (RR 0.37, 95% CI 0.18–0.75, p = 0.006). Completion (among those who visited at any time) RCT group 16/34 (47%) Usual care 7/25 (28%) p=0.049 **Attrition details:** **In the usual care group** Of those who received education: Sent to other facility (n=15) Off INH (n=11)	**Limitations identified by author:** Differences in refusal rates suggest selection bias. Inmates may not have believed they could refuse. 30-day interview in study group may have boosted outcomes **Limitations identified by review team:** Retrospective design and substantial differences between groups. Unclear who was visited by discharge planners and if there was any selection at this stage. **Evidence gaps and/or recommendations for future research:** Studies of diffusion of research findings in jails [not relevant to this review] **Source of funding:** Agency for Healthcare Research and Quality

White 2002 versus inmates who were counseled and educated using the same protocol, but delivered by jail health workers. A second aim of the study was to examine the nature of the educational sessions, and to describe characteristics of the protocol that was adopted by jail personnel. **Study design:** BAh **Quality Score:** + **External validity:** + [NB: this study includes the study arm that received a single education session in	See White 2002 for the RCT selection process. The selection of the usual care group in this study is not described in detail. **Sample characteristics:** Male 91% Latino 66% Black 17.5% Mean age 31.1 years 67.5% born outside US Time in jail on INH median 43 days Time between education session and starting INH median 7.5 days (this was 2.5 days in the RCT cohort and 9.0 days in the usual care group).	Following training, the list of inmates who were prescribed therapy for LTBI was given to Discharge Planners, who made efforts to meet with inmates and provide the education session within their work schedules. **Sample sizes:** N=222 received education from jail discharge planners (164 of these were still on INH on release), N=188 received the education as part of White 2002 (104 of these were still on INH on release). **Baseline comparisons:** A higher proportion of inmates in usual care were missed for education because they were released or sent to other facilities. A lower proportion of inmates was sent to other facilities after education in the usual care group. The study group did not include inmates who refused participation, while the inmates in the usual care group included those who might have refused participation [if they had		Finished INH in jail (n=32) Of those who attended a first TB clinic after release: 1 moved or was referred elsewhere, 11 self stopped and were lost to follow up. **I**n the group from the RCT: Of those who received education: Sent to other facility (n=51) Off INH (n=19) Finished INH in jail (n=14) Of those analysed and had a first visit at a TB clinic 13 self stopped and were lost to follow up, 3 were taken off treatment for side effects, and 1 was still on treatment	

White 2002 and compares this to a 'historical' control who received usual care. The two studies are therefore not independent]		been asked]. Statistically significant baseline differences were also observed for ethnicity, time in jail while on INH, and time between starting INH and receiving the education. **Study sufficiently powered?** NR			

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: White MC, Tulsky JP, Goldenson J et al. **Year:** 2002 **Citation:** Randomised controlled trial of interventions to improve follow-up for latent tuber-culosis infection after release from jail. *Archives of Internal Medicine 162*(9):1044-50 **Country of study:** USA **Aim of study:** to study the effects of 2 interventions (education and incentives) on visit to TB clinic within 1 month of release and completion of	**Source population/s:** Jail inmates in the US **Eligible population:** Inmates who were screened and found to have LTBI, eligible for and agreed to begin therapy in jail, and released from jail while still undergoing therapy. All consecutive eligible inmates were approached for recruitment; those not released before the completion of treatment were not included in the final sample. **Selected population:** Those not excluded **Excluded population:** Inmates who did not speak English or Spanish or who were determined by the sheriff's personnel to be violent or by the jail mental health staff to have serious psychiatric illness. Also inmates with known HIV. **Sample characteristics:** Male approx 89% Median age approx 29 Ethnicity Latino approx 55% Black approx 22%	**Method of allocation:** Random using ordered sealed envelopes **Intervention/s description:** 6 months of isoniazid therapy with DOT while in jail + a daily review of electronic medical records by the study team and a standard information session to inmates who began treatment for LTBI (including treatment information, adverse effects, availability of free care after release, information about the location of, hours and transport to the TB clinic, and encouragement). Plus one of the below: 1. Education provided every 2 weeks while in jail to reinforce messages in the first session 2. Monetary incentive of $25 in food or transport vouchers provided at the first visit to the TB clinic, but no further contact while	**Outcomes:** First visit to a TB clinic within 1 month after release from jail Completion of a full course of therapy **Follow up periods:** 6 months (for completion outcome) **Method of analysis:** Bivariate analyses and logistic regression. Intention to treat	**Results for all relevant outcomes:** First clinic visit after release: Education 37% (40/107) Incentive 37% (42/114) Control 24% (25/104) Two intervention groups pooled were significantly higher than control (p=0.02); significance of separate intervention groups NR Completion (ITT): Education 23% (24/107) Incentive 12% (14/114) Control 12% (12/104) adjusted OR for education vs control 2.2 (95% CI 1.04-4.72) adjusted OR for incentive vs control 1.07 (95% CI 0.47-2.40) Completion among people who visited the TB clinic: Education 65% (24/37) Incentive 33% (14/42) control 48% (12/25) adjusted OR for education vs control 1.99 (0.63-6.22) adjusted OR for incentive vs control 0.43 (0.14-1.31) Logistic regression indicated a significant effect (p<0.01) for group allocation on	**Limitations identified by author:** A third of participants in the education group were released before they had received any education sessions. Study population limited to English- or Spanish-speaking inmates, but in San Francisco more than half of people treated for LBTI were Pacific Islanders **Limitations identified by review team:** The exclusion criteria likely excluded a significant proportion of the jail population. Pooled analysis of intervention groups gives a misleading (and hard-to-interpret) impression of significance, and looks somewhat *post hoc*. **Evidence gaps and/or recommendations for future research:** NR **Source of funding:** National Institute for Nursing Research

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
TB therapy **Study design:** RCT **Quality Score:** ++ **External validity:** +	White approx 5% Asian approx 5% Foreign birth approx 66% Alcohol or other drug problem 55% Education median in years approx 11 Stable housing before jail approx 83% Average release time = 48.6 days after starting therapy (median 34 days) One third reported having someone who could support them in taking treatment. [These have been roughly averaged from the individual trial arm data reported]	in jail. **Control/comparison/s description:** 3. Usual care but neither intervention (e.g. no further contact after the first session while in jail and no incentive for going to the TB clinic after release. **Sample sizes:** Total N=325 education N=107 incentive N=114 control N=104 **Baseline comparisons:** No significant differences by study group wrt age, gender, ethnicity, employment, risk factors etc. **Study sufficiently powered?** Calculations indicated that 86 participants were needed in each arm to detect a 20% difference in adherence.		completion, after controlling for stable housing, time in the USA and intention to complete – but neither intervention on its own was significant (education p=0.24, incentive p=0.14) **Attrition details:** N=3 in the education group had treatment discontinued between the first visit to the TB clinic and the completion of therapy.	

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: White MC, Tulsky JP, Reilly P, et al. **Year:** 1998 **Citation:** A clinic trial of a financial incentive to go to the tuberculosis clinic for isoniazid after release from jail. *International Journal of Tuberculosis and Lung Disease* 2(6), 506-512. **Country of study:** USA **Aim of study:** To compare a $5 cash incentive plus standardised TB education with standardised	**Source population/s:** Inmates prescribed INH (isoniazid) preventive therapy in San Francisco, California. **Eligible population:** New jail inmates screened for TB and prescribed INH therapy. Recruited by research personnel after being screened for TB and agreeing to take INH. Percentage agreed to participate: NR **Selected population:** Consenting inmates on INH therapy. 1 jail in an urbanised area. **Excluded population:** Inmates who did not speak English or Spanish; inmates sequestered from jail population because of mental illness or violence. N=18 were excluded because not released from prison. **Sample characteristics:** All but one study subjects male. Mean age 33 years. 50% Hispanic. Majority reported drug and alcohol problems,	**Method of allocation:** Sealed envelopes in which group assignment was indicated using a table of random numbers. **Intervention/s description:** Research assistant provided one-to-one education about TB and importance of continuing INH to prevent TB; answered any questions about TB and medication. Inmates told they would receive $5 if they attended the TB clinic for INH continuation after release. Provided signatures and personal details for identity verification. $5 provided if inmate attended clinic after release and provided personal details and signature. **Control/comparison/s description:** Education session as described for intervention group. **Sample sizes:** Total: 79 Intervention: n=31	**Outcomes:** First visit to TB clinic after release from jail. Completion of INH therapy. **Follow up periods:** NR **Method of analysis:** chi-square; Fisher's test; t-test	**Results for all relevant outcomes:** Visit to clinic: I 25.8% (8/31), C 23.3% (7/30). OR 1.43 (0.35-3.71) p=0.82 INH completion: I n=2, C n=2; sig NR **Attrition details:** NR	**Limitations identified by author:** NR **Limitations identified by review team:** Small sample size. Some limitations in reporting. All participants received education (and there is only one time point), so the study does not provide evidence regarding effectiveness of education as such. **Evidence gaps and/or recommendations for future research:** Evaluate whether a larger incentive would be more effective **Source of funding:** Academic Senate of the University of California, San Francisco

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
TB education alone in encouraging released inmates to make a first visit to a TB clinic **Study design:** RCT **Quality Score:** ++ **External validity:** +	stable housing before jail and no partner. Nearly 80% had been in jail previously; median total jail time of one year.	Control: n=30 **Baseline comparisons:** No differences reported. **Study sufficiently powered?** Not sufficiently powered. A sample size of 40 was required for each group based on estimates that provision of standard education would increase completion of a first visit to 12% of the historical rate of 3%, and that the intervention would increase the completion rate to 15%.			

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
Authors: Wieland ML, Nelson J, Palmer T, et al. **Year:** 2013 **Citation:** Evaluation of a tuberculosis education video among immigrants and refugees at an adult education center: A community-based participatory approach. *Journal of Health Communication 18*(3); 343-353. **Country of study:** USA **Aim of study:** To design and evaluate a tuberculosis education video in an adult education	**Source population/s:** New immigrant and refugee adults served by the Hawthorne Education Center (HEC), Rochester, NY **Eligible population:** Unclear – intervention implemented in all classes in the centre, but no information on sampling or recruitment for the study **Selected population:** NR **Excluded population:** NR **Sample characteristics:** Characteristics of learners who participated in evaluation: Age: 18-24: 17% 25-34: 34% 35-44: 22% 45-54: 15% ≥55: 9% Female: 65% Region of birth: Middle East 46% Latin America: 25% Asia: 17% Africa: 6% Europe: 5%	**Method of allocation:** NA **Intervention/s description:** 7-minute video exploring 5 major themes: (1) personal experiences with TB in the US (2) Modes of trans-mission of TB (3) TB testing (4) Differences between latent and active TB and implications for testing and treatment; (5) principles of treatment for latent and active TB. Video had been developed through focus group discussions and piloted prior to viewings. **Control/comparison/s description:** N/A **Sample sizes:** Learners: N=169 Teachers: N=14 (not relevant to this review) **Baseline comparisons:** N/A **Study sufficiently powered?** NR	**Outcomes:** Knowledge of TB (4 questions: Is tuberculosis in the US? Is TB caused by germs? Do people with TB always feel sick? Can TB be treated with medicines?) Self-efficacy with regards to TB, assessed by two questions (Do you know who to ask for help about TB? Do you know how to get tested for TB?) **Follow up periods:** Immediately after viewing video **Method of analysis:** Descriptive statistics; paired t tests; t test or one-way analysis of variance	**Results for all relevant outcomes:** Knowledge of TB, correct answers: Overall: pre 56.1%; post 82.3% p<0.001 Is TB in the US: pre 59.2%; post 88.8% p<0.001 Is TB caused by germs: pre 69.8%; post 96.5% p<0.001 Do people with TB always feel sick: pre 29.6%; post 50.9% p<0.001 Can TB be treated with medicines? pre 65.7%; post 92.9% p<0.001 Self-efficacy: Overall: pre 72.8%; post 89.7% p<0.001 Do you know who to ask for help about TB? pre 66.3%; post 88.2% p<0.001 Do you know how to get tested for TB: pre 79.3%; post 91.1% p=0.001 **Attrition details:** NR	**Limitations identified by author:** Did not compare acceptability or educational outcomes between a video produced in this manner versus a traditional TB education video. Lack of control group, although the timing of post testing precludes the possibility of significant additional influences on TB attitudes and knowledge beyond those delivered by the intervention. Lack of long-term follow-up on maintenance of knowledge and self-efficacy. Health-seeking behaviours as they relate to TB were not evaluated. **Limitations identified by review team:** Probably not generalizable to general immigrant population. Knowledge outcomes only. Some unclarity in methods (esp. sampling). **Evidence gaps and/or recommendations for future research:** NR **Source of funding:**

Study Details	Population and setting	Method of allocation to intervention/control	Outcomes and methods of analysis:	Results	Notes
learning centre **Study design:** BA **Quality Score:** – **External validity:** –					National Institutes of Health

8 Appendix B. Selected search strategies

8.1 MEDLINE

This Appendix shows the MEDLINE search strategy. The strategy was adapted for use with other databases; NICE have a full list of all search strategies which is available on request.

Database: MEDLINE
Host: OVID
Data Parameters: 1946 to October Week 5 2013
Date Searched: 13 November 2013
Strategy:

Database(s): **Ovid MEDLINE(R)** 1946 to October Week 5 2013

Search Strategy:

#	Searches	Results
1	exp tuberculosis/	158035
2	(Tuberculosis or TB).ti,ab,kw.	146465
3	1 or 2	195511
4	health education/	52909
5	exp tuberculosis/ed	22
6	health promotion/	54018
7	Patient Education as Topic/	71271
8	exp Programmed Instruction as Topic/	11852
9	Education/	18604
10	Models, Educational/	7738
11	Education, Distance/	2639
12	Education, Nonprofessional/	74
13	Education, Continuing/	7829
14	Faculty/	6765
15	Universities/	25566
16	exp Curriculum/	64394
17	Patient Education Handout/	4002

18	Health Communication/	503
19	Teaching materials/	5923
20	Teaching/	42427
21	Pamphlets/	3204
22	exp Audiovisual aids/	87007
23	hotlines/	2287
24	exp telecommunications/	61958
25	communications media/	635
26	communication/	62358
27	exp marketing/	30625
28	Advertising as Topic/	12968
29	Persuasive Communication/	2960
30	exp microcomputers/	16345
31	User-Computer Interface/	30742
32	Social Networking/	647
33	internet/	52875
34	computer communication networks/	12938
35	cellular phone/	4257
36	Consumer Health Information/	1752
37	exp counseling/	33773
38	behavior therapy/	24025
39	cognitive therapy/	16118
40	reminder systems/	2388
41	social support/	52033
42	Voluntary health agencies/	3999
43	Peer Group/	14386
44	Voluntary Workers/	7207
45	Mentors/	7328
46	Libraries/	1546
47	Library materials/	110
48	Information services/	15394

49	Library Services/	1024
50	Information Dissemination/	10402
51	access to information/	4019
52	Information Centers/	947
53	Information Services/	15394
54	Information Literacy/	100
55	Information Seeking Behavior/	603
56	token economy/	933
57	Reimbursement, Incentive/	3125
58	((counsel$ or educat$ or informat$ or communicat$ or advice) adj3 (provid$ or deliver$ or receiv$ or access$ or offer or utiliz$ or utilis$ or implement$ or intervention$ or preventive or preventative or disseminat$ or provision$)).ti,ab.	195922
59	((tb or tuberculosis or patient$ or parent$ or famil$ or relative$ or carer$ or caregiver$ or care-giver$ or spous$ or husband$ or wife$ or wive$ or partner$ or consumer$ or outreach or health) adj3 (counsel$ or educat$ or informat$ or communicat$ or pamphlet$ or handout$ or hand-out$ or hand out$ or booklet$ or leaflet$ or support$ or need$ or advice$ or advis$ or literacy or literature or video$ or audio$ or web$ or website$ or poster or posters or publication$ or remind$ or curriculum$ or curricula$ or teach$ or trainer$ or training or tracer or tracing)).ti,ab.	319897
60	((lifestyle$ or behavior$ or behaviour$) adj3 (counsel$ or therapy or therapies or educat$ or informat$ or communicat$ or pamphlet$ or handout$ or hand-out$ or hand out$ or booklet$ or leaflet$ or support$ or need$ or advice$ or advis$ or literacy or literature or video$ or audio$ or web$ or website$ or poster or posters or publication$ or remind$ or curriculum$ or curricula$ or program$ or intervention$)).ti,ab.	50019
61	((outreach or written or printed or oral or campaign or resource or disseminat$) adj1 information).ti,ab.	3713
62	((brief or opportunist$ or concise or short or direct or lifestyle or written or oral or verbal or personali?ed or individuali?ed or motivational) adj2 (advice or counsel$ or negotiation$ or guidance or discussion$ or encouragement or intervention$ or program$ or meeting$ or session$ or interview$)).ti,ab.	24831
63	(marketing or advertis$ or publicis$ or publiciz$ or publicity or mass media or media campaign$ or communication$ media).ti,ab.	33244
64	(internet$ or social media or social network$ or facebook or twitter or blog$ or SMS or short messaging service$ or smartphone$ or mobile app or mobile apps or mobile	37926

	application$).ti,ab.	
65	((mobile or cell$ or smart) adj (phone$ or telephone$)).ti,ab.	4537
66	((laptop or palm or handheld or tablet or pda or pc) adj2 comput$).ti,ab.	1780
67	((text$ adj2 messag$) or texting).ti,ab.	888
68	(supportive expressive adj3 therap$).ti,ab.	59
69	((outreach or support or case or social or lay or allied or link or social care or socialcare or peer or treatment or voluntary or volunteer$ or mentor$) adj3 (worker$ or professional$ or practitioner$ or advocate$ or advocacy or personnel or staff or service provi$ or partner$ or network$)).ti,ab.	44566
70	(tbag or tb action group$).ti,ab.	6
71	((financial or material or monetary or money or cash or social or economic or voucher$) adj3 (support$ or incentive$ or reimburs$)).ti,ab.	32602
72	((social$ or pastoral$ or emotional$ or stress$ or psychiatric$ or psychological$ or psychosocial$ or psycho social$ or psychotherap$ or mental$ or supportive$) adj3 (care$ or support$ or service$ or program$ or intervention$)).ti,ab.	133869
73	((shared or informed) adj3 (decision$ or choice$)).ti,ab.	8794
74	(library or libraries).ti,ab.	106291
75	(information adj3 (center$ or centre$ or service$ or seeking)).ti,ab.	10873
76	or/4-75	1354531
77	3 and 76	8137
78	exp Health Personnel/	368274
79	Nurse's Practice Patterns/	845
80	Physician's Practice Patterns/	42148
81	professional-family relations/	11825
82	professional-patient relations/	21576
83	nurse-patient relations/	29958
84	physician-patient relations/	61109
85	exp professional role/	65446
86	((general or family) adj2 (practice$ or practitioner$)).ti,ab.	74083
87	(pharmacist$ or nurse$ or gp or physician$ or doctor$).ti,ab.	534824
88	(health care worker$ or (health care adj2 service provi$) or (health-care adj2 provi$)).ti,ab.	33603

89	or/78-88	950912
90	Faculty, Dental/	1973
91	Faculty, Medical/	9819
92	Faculty, Nursing/	8183
93	Education, Premedical/	688
94	exp Schools, Health Occupations/	35942
95	exp Education, Dental/	16872
96	exp Education, Medical/	128676
97	exp Education, Nursing/	70099
98	exp Education, Pharmacy/	6038
99	exp Education, Public Health Professional/	557
100	education, Professional, Retraining/	1189
101	clinical competence/	64729
102	academic detailing.ti,ab.	334
103	((educat$ or training) adj3 (program$ or intervention$ or meeting$1 or session$1 or strategy$ or workshop$ or visit$1 or outreach$ or course$1 or material$1 or initiative$ or curriculum or curricula)).ti,ab.	94224
104	or/90-103	354866
105	89 and 104	136210
106	exp Health Personnel/ed	46964
107	105 or 106	160638
108	3 and 107	476
109	77 or 108	8354
110	motivation/	50494
111	Health Knowledge, Attitudes, Practice/	74028
112	attitude of health personnel/	91735
113	Awareness/	14461
114	Attitude to Health/	74177
115	health literacy/	1516
116	Patient Compliance/	48423
117	Patient Acceptance of Health Care/	32011

118	Medication Adherence/	7345
119	patient dropouts/	6919
120	treatment refusal/	10835
121	exp treatment outcome/	664723
122	time to treatment/	382
123	program evaluation/	47345
124	Stress, Psychological/	87570
125	Educational Measurement/	28006
126	social stigma/	1444
127	social adjustment/	21269
128	Adaptation, Psychological/	74791
129	anxiety/	53229
130	fear/	23268
131	exp social discrimination/	527
132	Health Services Accessibility/	52076
133	exp tuberculosis/mo	3099
134	exp tuberculosis/di	34366
135	diagnosis/	16626
136	mortality/	34965
137	((lifestyle$ or behavior$ or behaviour$) adj3 (change$ or changing or modification$ or modify$ or modifies)).ti,ab.	51012
138	((attitude$ or opinion$ or belief$ or perception$ or aware$ or personal view$ or knowledge$ or adjustment$ or coping or cope) adj3 (increas$ or improv$ or enhance$ or encourag$ or support$ or promot$ or optimiz$ or optimis$ or change$ or changing or modification$ or modify$)).ti,ab.	77406
139	(uptake or up-take or (up adj1 tak$) or takeup or take-up or motivat$).ti,ab.	336062
140	(mortality or diagnosis or diagnose$ or adher$ or nonadheren$ or (non adj1 adher$) or access or refus$ or compliance or comply$ or compli$ or concordan$ or default$ or dropout$1 or drop out$1 or interrupt$ or complet$ or persist$ or finish$ or (follow$ adj1 up$1)).ti,ab.	3863360
141	((shame$ or embarrass$ or fear$ or stress$ or anxiety$ or anxious or stigma or discriminat$ or concern or concerns) adj3 (lower$ or inhibit$ or impede$ or delay$ or	82949

	constrain$ or decreas$ or reduc$ or discourage$ or prevent$ or detect$ or treat$ or change$ or changing or modification$ or modify$)).ti,ab.	
142	(treatment$ adj3 delay$).ti,ab.	12359
143	(miss$ adj2 (appointment$ or observation$)).ti,ab.	526
144	or/110-143	5023655
145	109 and 144	5013
146	limit 145 to english language	4233
147	limit 146 to yr="1993 -Current "	3834
148	remove duplicates from 147	3301
149	exp animals/ not humans/	4058478
150	148 not 149	3237
151	(cow or cows or cattle or bovine or calves or badger or badgers or hedgehog or hedgehogs or mice or mouse or rat or rats).mp.	3045057
152	150 not 151	3188
153	letter/ or historical article/ or comment/ or editorial/	1529603
154	152 not 153	3097

Database: MIP
Host: OVID
Data Parameters: **Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations** November 12, 2013
Date Searched: 13 November 2013
Strategy:

Database(s): **Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations** November 12, 2013

Search Strategy:

#	Searches	Results
1	(tuberculosis or tb).ti,ab,kw.	9684
2	((counsel$ or educat$ or informat$ or communicat$ or advice) adj3 (provid$ or deliver$ or receiv$ or access$ or offer or utiliz$ or utilis$ or implement$ or intervention$ or preventive or preventative or disseminat$ or provision$)).ti,ab.	17057
3	((tb or tuberculosis or patient$ or parent$ or famil$ or relative$ or carer$ or caregiver$ or care-giver$ or spous$ or husband$ or wife$ or wive$ or partner$ or consumer$ or outreach or health) adj3 (counsel$ or educat$ or informat$ or communicat$ or pamphlet$ or handout$ or hand-out$ or hand out$ or booklet$ or leaflet$ or support$ or need$ or advice$ or advis$ or literacy or literature or video$ or audio$ or web$ or website$ or poster or posters or publication$ or remind$ or curriculum$ or curricula$ or teach$ or trainer$ or training or tracer or tracing)).ti,ab.	23400
4	((lifestyle$ or behavior$ or behaviour$) adj3 (counsel$ or therapy or therapies or educat$ or informat$ or communicat$ or pamphlet$ or handout$ or hand-out$ or hand out$ or booklet$ or leaflet$ or support$ or need$ or advice$ or advis$ or literacy or literature or video$ or audio$ or web$ or website$ or poster or posters or publication$ or remind$ or curriculum$ or curricula$ or program$ or intervention$)).ti,ab.	4617
5	((outreach or written or printed or oral or campaign or resource or disseminat$) adj1 information).ti,ab.	243
6	((brief or opportunist$ or concise or short or direct or lifestyle or written or oral or verbal or personali?ed or individuali?ed or motivational) adj2 (advice or counsel$ or negotiation$ or guidance or discussion$ or encouragement or intervention$ or program$ or meeting$ or session$ or interview$)).ti,ab.	2337
7	(marketing or advertis$ or publicis$ or publiciz$ or publicity or mass media or media campaign$ or communication$ media).ti,ab.	2878
8	(internet$ or social media or social network$ or facebook or twitter or blog$ or SMS or short messaging service$ or smartphone$ or mobile app or mobile apps or mobile application$).ti,ab.	4305

9	((mobile or cell$ or smart) adj (phone$ or telephone$)).ti,ab.	647
10	((laptop or palm or handheld or tablet or pda or pc) adj2 comput$).ti,ab.	192
11	((text$ adj2 messag$) or texting).ti,ab.	207
12	(supportive expressive adj3 therap$).ti,ab.	7
13	((outreach or support or case or social or lay or allied or link or social care or socialcare or peer or treatment or voluntary or volunteer$ or mentor$) adj3 (worker$ or professional$ or practitioner$ or advocate$ or advocacy or personnel or staff or service provi$ or partner$ or network$)).ti,ab.	3645
14	(tbag or tb action group$).ti,ab.	3
15	((financial or material or monetary or money or cash or social or economic or voucher$) adj3 (support$ or incentive$ or reimburs$)).ti,ab.	2508
16	((social$ or pastoral$ or emotional$ or stress$ or psychiatric$ or psychological$ or psychosocial$ or psycho social$ or psychotherap$ or mental$ or supportive$) adj3 (care$ or support$ or service$ or program$ or intervention$)).ti,ab.	9943
17	((shared or informed) adj3 (decision$ or choice$)).ti,ab.	825
18	(library or libraries).ti,ab.	8129
19	(information adj3 (center$ or centre$ or service$ or seeking)).ti,ab.	710
20	or/2-19	65997
21	1 and 20	490
22	((general or family) adj2 (practice$ or practitioner$)).ti,ab.	3913
23	(pharmacist$ or nurse$ or gp or physician$ or doctor$).ti,ab.	32178
24	(health care worker$ or (health care adj2 service provi$) or (health-care adj2 provi$)).ti,ab.	2309
25	or/22-24	36286
26	((educat$ or training) adj3 (program$ or intervention$ or meeting$1 or session$1 or strategy$ or workshop$ or visit$1 or outreach$ or course$1 or material$1 or initiative$ or curriculum or curricula)).ti,ab.	7412
27	25 and 26	1782
28	1 and 27	12
29	21 or 28	492
30	((lifestyle$ or behavior$ or behaviour$) adj3 (change$ or changing or modification$ or modify$ or modifies)).ti,ab.	4205
31	((attitude$ or opinion$ or belief$ or perception$ or aware$ or personal view$ or	6648

	knowledge$ or adjustment$ or coping or cope) adj3 (increas$ or improv$ or enhance$ or encourag$ or support$ or promot$ or optimiz$ or optimis$ or change$ or changing or modification$ or modify$)).ti,ab.	
32	(uptake or up-take or (up adj1 tak$) or takeup or take-up or motivat$).ti,ab.	21152
33	(mortality or diagnosis or diagnose$ or adher$ or nonadheren$ or (non adj1 adheren$) or access or refus$ or compliance or comply$ or compli$ or concordan$ or default$ or dropout$1 or drop out$1 or interrupt$ or complet$ or persist$ or finish$ or (follow$ adj1 up$1)).ti,ab.	259035
34	((shame$ or embarrass$ or fear$ or stress$ or anxiety$ or anxious or stigma or discriminat$ or concern or concerns) adj3 (lower$ or inhibit$ or impede$ or delay$ or constrain$ or decreas$ or reduc$ or discourage$ or prevent$ or detect$ or treat$ or change$ or changing or modification$ or modify$)).ti,ab.	6562
35	(treatment$ adj3 delay$).ti,ab.	856
36	(miss$ adj2 (appointment$ or observation$)).ti,ab.	79
37	or/30-36	286843
38	29 and 37	280
39	limit 38 to english language	267
40	(cow or cows or cattle or bovine or calves or badger or badgers or hedgehog or hedgehogs or mice or mouse or rat or rats).mp.	73428
41	39 not 40	260

8.2 Supplementary searching

Nine articles identified during the database searching were used for the supplementary searching. As detailed above, UK studies were priotised for this purpose.

Fiefield D (2007) *Improving Nurse Education in the Control and Prevention of Tuberculosis*. MSc Practice Development (Health Protection) Phase ll Manchester Metropolitan University Faculty of Community Studies Law and Education.
Griffiths C, Sturdy P, Brewin P et al. (May 2007) Educational outreach to promote screening for tuberculosis in primary care: a cluster randomised controlled trial. Lancet 369 (9572): 1528-1534
Hall J, Bethell S, Helleren S et al. (2010) Evaluation of TB peer educators essential partners in metropolitan TB control. Thorax 65: A5
Hall J, Story A (2009) An authentic voice - TB peer educators. FEANSTA Homeless in Europe, Autumn 2009 20-22
Roberts A, Leaback D, Milburn H (2008) Raising public awareness of tuberculosis: a new method of teaching children and their parents. Thorax 63 (Suppl 7): A157
Roy A, Abubakar I, Yates S et al. (Dec. 2008) Evaluating knowledge gain from TB leaflets for prison and homeless sector staff: the National Knowledge Service TB pilot. European Journal of Public Health 18 (6): 600-603
Roy A, Abubakar I, Chapman A et al. (2011) A controlled trial of the knowledge impact of tuberculosis information leaflets among staff supporting substance misusers: pilot study. PLoS ONE [Electronic Resource] 6 (6): e20875
Roy A, Catchpole M, Rodrigues LC, Abubakar I (2013). Providing information to support tuberculosis control: National Knowledge Service Tuberculosis Pilot. Unpublished draft report.
Shetty N, Shemko M, Abbas A (Mar. 2004) Knowledge, attitudes and practices regarding tuberculosis among immigrants of Somalian ethnic origin in London: a cross-sectional study. Communicable Disease & Public Health 7 (1): 77-82