Systematic review: Evidence for interventions to improve contact tracing for tuberculosis (TB) in specific groups

Background

Public Health England (PHE) has launched a national TB strategy for implementation over the next five years (2015 to 2020) and two of the ten key actions are ensuring comprehensive TB contract tracing and reducing diagnostic delay. (PHE 2015)

The main aim of TB contact tracing is to identify and assess TB contacts to 1) identify and treat cases of active TB earlier than they would otherwise be detected (prior to presentation to health services, either due to lack of symptoms or due to not actively seeking care if symptomatic) and thus reduce further onward transmission and improve treatment outcomes and 2) identify and treat cases of early and late latent TB to reduce cases of active disease. (NICE 2011)

Despite the importance of contact tracing as an element of effective tuberculosis prevention and management, there is wide variation in the contact tracing strategies employed in England and the resources available for these activities. (NICE 2011) There is also both international and UK evidence that a number of population groups at higher risk of TB are also less likely to access services than the general population and that specific interventions are therefore needed to overcome barriers to early diagnosis and treatment.(O'Mara, Marrero-Guillamón et al. 2010, Abubakar, Lipman et al. 2011)

The current national guidance from NICE on identifying and managing tuberculosis among hard-to-reach groups (NICE 2012) provides a number of evidenced based recommendations in relation to services for specific population groups but there was limited evidence at the time of the NICE commissioned reviews specifically related to effective and cost-effective contact tracing.(Rizzo, Martin et al. 2011, Rizzo, Martin et al. 2011, Rizzo, Martin et al. 2011) However the findings about barriers to both screening and management of TB more generally are potentially relevant to contact tracing which might be considered an element of both screening and management strategies. This is because it involves screening those at high risk due to contact with a case (and like any screening intervention will detect latent and asymptomatic cases) and also involved effective management strategies, because identifying and tracing contacts is only an effective intervention if those cases identified through contact tracing are then effectively treated.(Anderson, White et al. 2013, Begun, Newall et al. 2013)

In terms of evidence specifically related to identifying contacts, little specific evidence was included in the NICE reviews. One small randomised trial of different service models for drug users with TB in the US (Ricks, Hershow et al. 2015) suggested that outreach workers who were previous drug users identified more contacts for patients than public health department staff (these findings only reported within the first author's PhD thesis).(Ricks 2008)

As well as the NICE reviews cited above, there are a number of other potentially relevant papers and reviews of evidence in relation to both groups at high risk in low prevalence countries and contact tracing.(Erkens, Kamphorst et al. 2010, Fox, Dobler et al. 2011, Abubakar, Stagg et al. 2012, Fox, Barry et al. 2013) However there remains a gap in the available evidence reviews in terms of a lack

of a specific evidence synthesis to support decisions about how best to support contact tracing and how best to tailor service delivery for specific population groups.

The aim of this review is therefore to identify and synthesise evidence to support decision making by policy makers, commissioners and providers of health services about how effective and cost-effective contact tracing should be undertaken for specific population groups in the context of the current national TB strategy.

Provisional review question(s)

The review will address the following questions (based on those in the brief):

- What is the effectiveness of specific interventions designed to improve TB contact tracing (e.g.use of community outreach workers/cultural facilitators, specific interviewing techniques, home/hostel/workplace visits, home/hostel/workplace screening and follow up of contacts) in specific population groups (e.g. migrants, homeless etc)?
- What are the most cost effective strategies for TB contact tracing in specific population groups?

Where relevant evidence for specific groups is identified we will also, for those groups, explore additional questions already identified as relevant by stakeholders:

- What is the acceptability, feasibility, appropriateness and meaningfulness of specific interventions designed to improve TB contact tracing in these population groups?
- What are the barriers to, and facilitators of, delivery or uptake of contact tracing in these population groups?

The review questions are likely to be modified and more specific sub-questions identified after further consultation with stakeholders, including policy makers (DH and PHE colleagues), local commissioners of services (Local Clinical Commissioning Group and TB Strategy Group members) and service providers including infectious diseases and health protection specialists.

Scope of review (inclusion/exclusion criteria)

The focus of the project is primarily interventions to ensure effective and cost-effective contact tracing in specific groups. We propose to limit the scope to developed countries, and may also limit to countries with similar prevalence, health systems or legal frameworks to ensure that the evidence is likely to be directly generalizable to UK settings. Suggested inclusion criteria in terms of PICO (participants, interventions, comparators and outcomes) are listed below.

Participants:

Whilst the review focus is on interventions to increase screening and diagnosis in those with recent contact with a case of pulmonary TB, relevant study participants for studies exploring factors influencing implementation of interventions may also include TB patients, members of specific risk groups (with or without a diagnosis of TB or history of recent contact with a case) and staff involved in health and social care delivery and/or other services for specific groups included by the review scope.

Intervention:

Any intervention (a service model or a specific activity within a service model) which includes specifically tailored and/or targeted interventions contact tracing activity for specific population groups.

Groups may include those considered "hard to reach" by current services AND known to be at increased risk of TB: specific ethnic groups; prisoners and other groups in custody eg immigration detention centres; problem drug users or people with alcohol problems; homeless people or people in temporary accommodation; asylum seekers, refugees and recent immigrants; travellers; and sex workers; children at risk. *(Note that whilst we will include groups that are relevant to stakeholders in the scope, the review will be limited by whether relevant evidence is available – for example(De Vries and Van Hest 2006, Gerrish, Ismail et al. 2010).)*

Interventions may include: use of community outreach workers/cultural facilitators, specific interviewing techniques, home/hostel/workplace visits, home/hostel/workplace screening and f/u of contacts; cohort review programmes.(CDC 2006, RCN 2012). Screening interventions may include screening entire population sub groups (without "stone in the pond" approach), mobile x-ray screening following the detection of an index case, peer support workers, targeting which contacts to screen with strain typing data/WGS data. Relevant evidence may also examine specific intervention components (eg phone contacts, letters, visits) and evidence for the impact of a wider or narrower definition of "contacts" (ie increasing the extent of contact tracing to a wider pool).

Comparator: The main comparator is current provision of contact tracing in settings where it is not specifically tailored or targeted for specific population groups. The appropriateness of comparators used will need to be assessed in consultation with experts since current provision is known to vary across England and may not be explicitly documented. The review may also need to consider interactions between the costs and benefits of more effective contact tracing initiatives and other potential service changes (eg wider use of peer support workers or use of systematic screening programmes for specific groups).

Outcomes: Primary outcomes could include any measure of effect on contact tracing activity, contact management/outcomes, patient experience or costs/resource use. Resource use includes differences in staffing and staff costs as well as training. Longer term outcomes include reduction in morbidity and transmission through treatment of both active and latent infection. Specific outcomes of importance to policymakers and commissioners may include: uptake of clinical assessment/testing by contacts; number of active cases found per population assessed, number with latent TB per population tested, cost per QALY generated.

Study design: Relevant study designs include systematic literature reviews and primary studies of any design that describe or evaluate a relevant service. Relevant designs could include trials, retrospective or prospective evaluations and audits as well as other experimental and observational studies and economic evaluations. Qualitative studies of patient or staff experience and studies that report on barriers and facilitators of service development or implementation will also be included. Non-peer-reviewed evidence will be included where it includes evidence directly relevant to the review questions, for example the expert testimony provided to NICE by service providers and patients and published by NICE. (NICE 2011). We may include simulation modelling studies where based on relevant empirical data if this is needed to evaluate relative cost-effectiveness of different interventions (Begun, Newall et al. (2013).

Methods

We propose to undertake the review in two stages. We will carry out an initial mapping exercise to assess the quantity and nature of the available research evidence. We will use the results of this exercise to identify whether the initial scope, review questions and search strategies are adequate or need to be modified to ensure the review produces a relevant evidence synthesis for service commissioners and providers. The final review protocol for the second stage will therefore depend on the nature and volume of evidence identified by the mapping review.

For the mapping review, databases will include MEDLINE, EMBASE, the Cochrane Library (includes the Cochrane Database of Systematic Reviews and DARE), Web of Science (Science Citation Index and Social Science Citation Index), CINAHL and NHS EED (to identify economic evaluations) (eg.www.crd.york.ac.uk/CRDWeb/ShowRecord.asp?AccessionNumber=22011001529&UserID=0
Searches for the mapping exercise will cover the period 1990 to 2015. The search strategy will build on searches used for previous systematic reviews, in particular the review NICE reviews.

Potentially relevant initial MeSH terms may include: Tuberculosis AND contact tracing/contact investigation AND terms relating to at risk/hard to reach population groups; also terms relating to interventions listed above. For the NICE reviews, MEDLINE search terms used were “Humans” AND (“tuberculosis” OR “latent tuberculosis” OR “tuberculosis, multidrug-resistant” OR “tuberculosis, pulmonary”) AND (“models, theoretical” OR “models, biological” OR “nonlinear dynamics”). For the other databases, which did not use hierarchical keyword structures, title searches on (“TB” OR “Tuberculosis”) and “model” were used.

Combining terms like these should be sufficiently sensitive and specific to yield an initial set of relevant studies. If there is a very large volume of potentially relevant literature identified we will concentrate on identifying the key evidence of most relevance to the review question. This could involve approaches based on data mining (e.g. the ‘progressive fractions’ method); reference checking and citation searching of relevant studies; and use of literature reviews as sources of references.

Search results will be sifted by one reviewer to identify relevant literature reviews (systematic and narrative/non-systematic) and primary studies that appear to meet the inclusion criteria above.

Brief details of relevant literature will be summarised and tabulated in the form of a matrix showing the populations and interventions for which the best evidence appears to be available. Both service models and the component elements will be considered in order to produce a typology of service models and explore the impact of different components or aspects of specific interventions. The findings will be discussed with the HS&DR programme and other relevant stakeholders (e.g. NHS commissioners and clinical experts) and used to guide further evidence synthesis.

We will also seek unpublished evidence of “good practice” and innovative initiatives in contact tracing, both from PHE sources and, if feasible, directly from NHS service providers. We will explore where relevant grey literature existing eg from charities such as TbALert (www.tbalert.org).

Evidence synthesis
We will undertake a synthesis of the key evidence identified by the mapping review. We anticipate that this stage of the project will take up to three months depending on the extent of the relevant evidence identified and included.

The searches performed for the mapping exercise will be extended to identify any additional studies (e.g., qualitative or descriptive papers) meeting the inclusion criteria. Searches will not be limited by language. However, resource constraints mean that only English-language publications will be included in the review. Any potentially relevant publications in other languages, and any implications of omitting them from the review, will be noted. In addition, we will undertake the following to identify key evidence for the review:

- Liaison with topic experts
- Citation searching on included papers and any other key papers identified by topic experts
- Scanning lists of studies included in systematic reviews included in the mapping exercise
- Browsing of selected web sites
- Searches of older literature (pre-1990) if considered necessary based on expert advice.

Selection of studies for inclusion (scanning of titles/abstracts and full text publications) will generally be carried out by one reviewer. In cases of doubt, a second reviewer will independently examine the full text. Any disagreements will be resolved by discussion and consensus, with reference to a third reviewer if necessary.

Included experimental or observational studies will be assessed for quality using relevant tools (e.g. Cochrane risk of bias tool for clinical trials, Newcastle–Ottawa scale for observational studies.) Data will be extracted using forms set up in advance and piloted on a small number of studies. Data extraction and quality assessment will be checked by a second reviewer. Any discrepancies will be resolved by discussion and consensus, with reference to a third reviewer if necessary.

Given the nature of the topic and the likely evidence base, we expect to perform a narrative synthesis by type of population group and/or intervention. Quantitative synthesis by meta-analysis will be done if appropriate and feasible. The synthesis will provide an analysis of the quality of evidence and the strength of conclusions which can be drawn from current studies.

Relationship to the wider contact tracing evidence base: The review will identify any parallels/common issues and themes in relation to the wider evidence base for contact tracing for other infectious diseases that are suggested in the TB literature. Whilst the transmission routes and risk groups are likely to be different for other infectious conditions, there may well be common themes such as the role of stigma and other social issues as barriers to identifying and treating contacts for both TB and some other infectious diseases (STIs/HIV/Hepatitis). Therefore, subsequent to the scoping, we would consider whether it would be worthwhile to look at reviews done for other conditions which use contact tracing, to see what lessons may be learned and applied to TB.

In addition to reviewing the evidence around individual programmes or interventions, we will seek to assess potential implications for the services overall.

Draft timeline (depends on decisions about broader mapping review versus focused review)

Activity	Start	Finish
Prepare draft protocol	1 September	30 September
Review of protocol by HSDR team	1 October 2015	15 October2015
Protocol sign-off (phone conference to be arranged as required)	16 October 2015	23 October2015
Literature searching and mapping exercise	24 October 2015	31 December2015
Define and agree scope and protocol for review	2 January 2016	14 January 2016
Additional literature searches, follow-up of references; citation searching etc.	15 January 2016	15 March 2016
Further evidence synthesis	7 March 2016	20 May 2016
Analysis and report writing	3 May 2016	16 June 2016
Delivery of draft report	17 June 2016	

ScHARR team

Lead reviewer: Sue Baxter
Reviewers: Maxine Johnson/Duncan Chambers
Information specialist/reviewer: Louise Preston
Health economics/modelling: Pete Dodd
Senior lead: Liddy Goyder
Chief Methodologist: Andrew Booth

Advisory group

DH: Kypros Menicou (TB policy lead); Dr Alison Daykin (Research Manager, New and Emerging Infections)

PHE: Dr Ibrahim Abubakar (Head of TB); Lucy Thomas (Head of TB surveillance); Surinder Tamne (Senior TB Specialist Nurse). Anne Brice (PHE Knowledge & Information Manager) and Lorna Burns (TB Information Specialist lead); Suzanna Mathews (HP consultant, Y&H), Andrew Lee (HP consultant and Research Lead, Y&H),

Local commissioners/specialists: Dr Susan Hird, (Public Health consultant, Sheffield CCG & TB Strategy Group); Dr Alicia Vedio (Infectious Diseases consultant, Sheffield Teaching Hospitals and Sheffield TB Strategy Group);

Other potential contacts to be invited to join Advisory Group:
Emilia Vynnycky (PHE -expertise in TB modelling) and Peter White (modelling for the NICE guidelines and Deputy Director of HPRU at Imperial.) ; Paul Collini, Infection & Immunity, STH/UoS; Andy Naisby, Sheffield TB Community Lead Specialist Nurse; representatives of TB Strategy Group (national cross-department group); PHRU Respiratory Infections lead; National Infections Service leads.

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