Public Health England

NHS

Yorkshire and Humber and North East TB Control Board

A resource to support local implementation of NICE guideline 33

March 2017

Recommendations

Recommendation 1: Services across Yorkshire and Humber and the North East should adopt the 5mm TST cut-off for a positive TST.

Recommendation 2: Those involved in providing TB services, in particular TB nurses, should subscribe to Vaccine Update and check the gov.uk pages which provide up to date information on prioritisation, ordering and administration of BCG vaccine and availability of PPD.

Recommendation 3: BCG vaccine should not be administered in pregnancy or to neonates whose mothers received treatment with biological medicines (including TNF antagonists) whilst pregnant.

Recommendation 4: IGRA tests should be used to screen all new entrants for TB, including those that are part of the funded national programme and those that present or are identified opportunistically.

Recommendation 5: For screening contacts of TB, depending on local circumstances and cost-effectiveness, either or a two-step approach or one-step IGRA testing should be used. Modelling tools are available to assist with local decision making.

Recommendation 6: Contacts of non-pulmonary TB should be offered screening for LTBI.

Recommendation 7: Patients with LTBI aged 18 to 65 should be offered treatment following a risk assessment and a discussion of the benefits and risks.

Recommendation 8: Staff caring for patients with suspected or confirmed infectious TB in an in-patient setting should wear face masks (FFP 2/3), or equivalent respiratory protection, when providing direct clinical care.

Recommendation 9: PCR testing should be requested by clinicians with expertise in TB management, or in consultation with microbiologists, in the following circumstances:

- The diagnosis of TB is uncertain, and PCR confirmation would make a difference to case management
- There is a need to distinguish between MTB or non-tuberculous mycobacteria on a smear positive sample
- There is suspicion of MDR-TB
- The case is a child.

Recommendation 10: Paediatricians should follow the NG33 recommendation to use a TST cut-off of 5mm for children aged 2 to 17, but this should be audited prospectively.

Recommendation 11: Paediatricians should adopt the locally developed decision tree to support effective management of paediatric contacts.

Recommendation 12: All child contacts of any case of TB should be screened for LTBI.

1. Introduction

On 11th October 2016, in response to requests from stakeholders, the Yorkshire and Humber and North East TB Control Board hosted an event to seek clarity on the main issues raised by NICE guideline 33 (NG33) on TB. The event was well attended, with over 100 participants from a range of backgrounds and geographical areas, and a keynote presentation from one of the co-chairs of the NICE TB Guideline Development Group. An evaluation report has been produced and is available on request by contacting John.Dusabe-Richards@phe.gov.uk.

Following the event, the discussion points were used to further develop a draft implementation document that had been produced jointly by the Clinical Advisory and Paediatric Task and Finish groups of the Board, which was then subject to further scrutiny and discussion by clincians involved in the work of the Board.

This resource provides a summary of the key discussion points from the October event, and makes recommendations for commissioners and providers on implementation of NG33 in the context of Yorkshire and Humber and the North East. The resource was signed off by the TB Control Board in February 2017; membership of the Board is listed at Appendix A.

2. Event summary

2.1 Dr Renu Bindra, Chair, YHNE TB Control Board

Dr Bindra opened the session by presenting headline data from the Tuberculosis in England Annual Report.[1] The report shows a sustained reduction in TB rates nationally, with lower rates seen in both Yorkshire and Humber and the North East, and a similar downward trend for paediatric cases. However the proportion of cases of TB with social risk factors has increased, and remains a concern for the Board.

Delegates were asked to bear the following in mind during the course of the day:

"The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or service users."

"Local commissioners and/or providers have a responsibility to enable the guideline to be applied when individual health professionals and their patients or service users wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities."

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[1] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/564656/TB_annual_report_2016.pdf

(extracts from NG 33 p2).[2]

The aims of the day were summarised as:

1. An opportunity for the NICE Guideline Development Group to present the rationale/perspective behind the guideline recommendations
2. To explore and discuss the main areas of controversy
3. To consider the implications of the guidelines for both commissioners and service providers
4. To promote engagement with the task and finish groups of the TB Control Board
5. To move towards a YH and NE-wide consensus approach to NG33.

2.2 Professor Andrew Hayward, co-chair NICE TB Guideline Development Group

Professor Hayward spoke on behalf of the Guideline Development Group (GDG). He outlined the process for developing guidelines which includes defining the scope, undertaking literature reviews, commissioning economic analyses, and seeking expert testimony. Professor Hayward also explained the cost-effectiveness thresholds considered by NICE, mainly cost per QALY (£20,000 to £30,000 per QALY), and the inclusions and exclusions applying to NG33:

- Included: LTBI diagnosis and testing - in children, immunocompromised, and new entrants from high incidence countries (in the context of opportunistic case finding but **not** population level screening)
- Excluded: occupational health issues
- Excluded: BCG vaccine (except uptake).

Key areas examined:

1. **TST change in cut-off to 5mm - in summary:**

- There is little evidence for current thresholds, internationally most use a 5mm cut-off
- Most studies of the effectiveness of LTBI treatment also use a 5mm cut-off, with no different cut-off for previous BCG
- Most studies looking at the impact of previous BCG on TST sensitivity show that vaccination makes either no difference, or only a very small difference
- Economic analysis suggests the need to focus on sensitivity in favour of specificity.

[2] https://www.nice.org.uk/guidance/ng33/

2. Systematic reviews on the sensitivity and specificity of different diagnostic tests

- In children, the sensitivity of TST at ≥5mm is considerably greater than at ≥10mm, and also more sensitive than IGRA testing
- In the immunocompromised, the picture is reversed, with IGRA having higher sensitivity
- In recently arrived migrants from high incidence countries, sensitivity is also greater for TST, at the cost of lower specificity.

NICE subsequently commissioned modellers/economists at the University of Warwick to analyse cost-effectiveness of TST alone (5mm *vs* 10mm), IGRA, and sequential TST and IGRA:

- In children, TST with a 5mm cut-off, followed by IGRA testing if negative, was the most cost-effective strategy. Sensitivity analyses showed that if the cost of IGRA could be lowered to below that of TST, IGRA alone may be the most cost-effective option. Likewise, in situations where it is difficult to undertake the 2nd TST reading, IGRA alone may be more cost-effective. These nuances need to be considered within the local context
- In immunocompromised patients, IGRA testing, followed by TST if IGRA is negative, was the most cost-effective strategy. Again, if it is difficult to undertake the 2nd TST reading, IGRA alone may be more appropriate
- In migrants from high incidence countries, TST with a 5mm cut-off as a standalone test was shown to be the most cost-effective option. Adding in IGRA if TST was negative resulted in a marginal increase in QALYs gained, but at a cost above the NICE cost-effectiveness threshold (approximately £60,000 per QALY). However in situations where the probability of TST being read dropped below 76%, IGRA became the most cost-effective option. This is important in terms of considering the context in which patients are being screened. The GDG examined opportunistic screening in new migrants who are already engaged with services and therefore have a high likelihood of returning for their 2nd reading; Professor Hayward acknowledged that this may not be the case at population level or in certain areas.

3. Benefits *vs* risks

- The consequence of focussing on higher sensitivity at the cost of specificity is likely to lead to treatment of people without LTBI. Modelling has demonstrated that for every additional death from hepatitis due to drug treatment, there would be six more deaths from TB.

4. Cost-effectiveness of LTBI treatment

- Model from Imperial College, London
- Examined four age groups from 17 to 86 years

- Risk of death for older adults not treated for LTBI outweighs the risk of hepatotoxicity from LTBI treatment
- Treating all those under 65 with LTBI with Isoniazid for six months (6H), or three months combined Isoniazid and Rifampicin (3HR), would lead to net health gain of less than £20,000 per QALY compared with no treatment
- There are also benefits of treating LTBI above the age of 65, but not at an acceptable cost-effectiveness threshold
- Cost-effectiveness is highly dependent on the amount of support required (i.e. thresholds may not apply if patients require DOT).

Professor Hayward explained how the reviewed evidence has translated into guidance:

1. **LTBI screening of close contacts:**

   - Offer TST to adults aged 18-65 who are close contacts of pulmonary or laryngeal TB*
   - If TST is positive but a diagnosis of active TB is excluded, consider an IGRA if more evidence of infection is needed to decide on treatment – for example if the person needs enhanced case management or there could be adverse effects from treatment**

   **note the recommendation to screen contacts of non-pulmonary TB has been removed due to lack of evidence base, and the fact that this predominantly picks up new entrants from high incidence countries who are eligible for LTBI testing in their own right*

   ***note the use of the word **consider**; the GDG is not recommending two-stage screening for all, but views it as an appropriate strategy in certain circumstances. At a population level, TST alone is the most cost-effective test but there may be scenarios where more certainty is required.*

2. **Children and young people**

   - Only consider using IGRA alone if TST is not available or is impractical (including situations where large numbers need to be tested)
   - Close contacts of smear positive TB who are aged under 2 – commence early treatment of LTBI and step down if infection is ruled out by TST and IGRA
   - Refer those under 2 who are close contacts of smear negative TB to specialists
   - Children aged over 2 – start with TST and if negative use IGRA.

3. **New entrants who present to health services and who are not part of the national screening programme**

   - Screen using TST, and if positive, offer treatment if aged <65
   - Consider BCG vaccination if TST/IGRA negative
   - Regardless of when they arrived in England, prioritise migrants from high incidence countries (>150 per 100,000) for LTBI testing.

4. **Immunocompromised**

- For the severely immunocompromised, offer TST with concurrent IGRA
- For those who are less immunocompromised, IGRA alone is an acceptable option or use concurrent TST.

5. **Treatment regimens for LTBI**

- Use 3HR or 6H according to clinical circumstances – in those <35 where hepatotoxicity is a concern use 3HR, where interactions with Rifamycins are a concern then use 6H
- For adults aged 35 to 65, offer treatment only if hepatotoxicity is not a concern.

2.3 Dr Omar Pirzada, Consultant in Respiratory Medicine, Sheffield Teaching Hospitals and Chair, YHNE TBCB Clinical Advisory Task and Finish group

Dr Pirzada presented a summary of issues raised regarding NG33 across Yorkshire and Humber and the North East, explaining that although there is overall broad agreement with the guidelines, there are a number of areas where greater clarification is required, especially when interpreting the guidelines in the local context in terms of incidence, geography, and service provision. The Clinical Advisory and Paediatric Task and Finish groups have also taken into account a number of other documents including the Collaborative TB Strategy[3] and the Green Book[4] .

For the purposes of this resource, this summary combines the main points agreed in the original joint Clinical Advisory/Paediatric document with discussions points from the NICE event and further discussion within the Task and Finish groups and the TB Control Board. Recommendations and clarifications are presented in blue text; a full list of recommendations can be found at the beginning of this resource.

Areas covered:

1. **Clarity on the definition of "vulnerable migrants"**

This applies specifically in the context of opportunistic case finding. NG33 recommends testing of all vulnerable migrants who have not previously been tested, regardless of when they arrived in the country. NG33 also includes a definition of "under-served populations"

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[3] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/403231/Collaborative_TB_Strategy_for_England_2015_2020_.pdf

[4] https://www.gov.uk/government/publications/tuberculosis-the-green-book-chapter-32

(regardless of migration status) which applies if social circumstances, language, culture or lifestyle make it difficult to:

- recognise the clinical onset of TB
- access diagnostic and treatment services
- self-administer treatment (or, in the case of children and young people, have treatment administered by a parent or carer)
- attend regular appointments for clinical follow-up.

This resource clarifies that vulnerable migrants are any migrants eligible for TB screening, regardless of when they arrived in England, who have difficulty accessing TB services or any of the other features of under-served populations listed above.

2. Clarity on TST cut-off

The Green Book still defines the cut-off for a positive TST result as 6mm, whereas Professor Hayward has explained the rationale for the adoption of the 5mm cut-off in NG33, including consistency with international practice.

This resource therefore recommends that the 5mm TST cut-off for a positive TST result should be adopted across Yorkshire and the Humber and the North East.

3. BCG vaccination status

Recently published data - that was not available to NICE at the time of publication[5] - demonstrates that a 5mm TST cut-off in vaccinated children is associated with low specificity, particularly in younger children. Further discussion on the cut-off in children is outlined below.

4. Supply and demand of BCG vaccination

There have been recent issues with the manufacture and supply of BCG, with guidance on availability and use currently available via Vaccine Update (a PHE publication). Current guidance is to use Intervax vaccine which, although not licensed for use in this country, is approved for use internationally by WHO. The MHRA has raised no objections to its use here. PHE has identified priority groups for vaccination.

This resource recommends that those involved in providing TB services, in particular TB nurses, subscribe to Vaccine Update and check the gov.uk pages which provide up to date information on prioritisation, ordering and administration of BCG vaccine for healthcare professionals.

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[5] Seddon, JA *et al*. The impact of BCG vaccination on tuberculin skin test responses in children is age dependent: evidence to be considered when screening children for tuberculosis infection.
http://thorax.bmj.com/content/early/2016/06/22/thoraxjnl-2015-207687.abstract

5. Availability of PPD

There are currently manufacturing delays, resulting in:

- Limited supply of PPD 2TU –one pack per fortnight for NHS customers
- PPD 10TU is currently unavailable, although a delivery is expected later this year

This resource recommends that those involved in providing TB services subscribe to Vaccine Update for up to date information on availability of PPD.

6. Pregnancy and TB

Dr Pirzada drew attention to the PHE publication Pregnancy and Tuberculosis: Information for Clinicians[6] which contains information on both latent and active infection. Key questions to the Clinical Advisory Group have been around use of BCG vaccine in pregnancy. Dr Pirzada confirmed that:

- The use of live attenuated vaccines should avoided in those who are clinically immunosuppressed (PHE) and
- It is wise to avoid vaccination with BCG, particularly in the first trimester, and where possible to delay until delivery (Green Book)
- The MHRA advises avoiding BCG vaccination in neonates whose mothers received biological medicines (including TNF antagonists) whilst pregnant

This resource confirms that BCG vaccine should not be administered in pregnancy or to neonates whose mothers received treatment with biological medicines (including TNF antagonists) whilst pregnant.

7. Treating Latent TB infection on the basis of the skin test alone

This recommendation has been the subject of considerable discussion, with many clinicians across Yorkshire and Humber and the North East expressing concerns at the risk of overtreatment, especially in lower incidence areas, due to the poor specificity of TST. The recommendation is also at odds with the NHSE-funded new entrant screening programme (targeting a specific subset of the new entrant population), where IGRA is the recommended screening test of choice. Following the publication of NG33, NICE subsequently recommended considering an IGRA test if more evidence of infection is needed to decide on treatment.

Local discussion with clinicians and use of modelling tools (Appendix B and C) demonstrates that cost-effectiveness of screening for latent TB infection is dependent on a number of variables including incidence of TB, characteristics of the target group, capacity of nursing teams and their administrative support, cost of IGRA tests, and the specific challenges of our local geography.

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[6] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/487319/Pregnancy_TB-Clinicians.pdf

Taking all this information into account, this resource recommends:

- **For new entrant screening, both programmatic and opportunistic, IGRA testing as the test of choice**
- **For screening contacts of TB, depending on local circumstances and cost-effectiveness, either or a two-step approach or one-step IGRA testing can be used. Modelling tools are available to assist with local decision making.**

Furthermore, although NG33 no longer recommends screening contacts of non-pulmonary TB, many areas within Yorkshire and Humber and the North East do not have a systematic way of proactively identifying new entrants, especially following the withdrawal of Flag 4 data which will now be made available only to those areas receiving funding for the national screening programme. Local services continue to detect LTBI (and, in some cases, active disease) in contacts of non-pulmonary TB who are migrants and who otherwise would have missed screening.

This resource therefore recommends continuing to screen contacts of non-pulmonary TB.

8. New age range for treating LTBI infection

NG33 recommends increasing the upper age limit for treating patients with LTBI from 35 to 65 years. This has implications for commissioners and providers in terms of workload and treatment costs which need to be taken into account when commissioning services.

Patients with LTBI aged 18 to 65 should be offered treatment following a risk assessment and a discussion of the benefits and risks.

9. Infection control and use of FFP3 masks

NG33 recommends the use of facemasks for MDR-TB only, and use of a side room for suspected infectious or confirmed pulmonary or laryngeal TB. Locally this is a sensitive issue, and the majority of acute trusts have existing policies recommending the use of FFP2/FFP3 masks when caring for patients with infectious TB, as a means to protect staff, reassure patients and the public, and avoid outbreaks.

This resource therefore recommends that staff caring for patients with suspected or confirmed infectious TB in an in-patient setting should wear face masks (FFP2/FFP3), or equivalent respiratory protection, when providing direct clinical care.

10. Access to PCR testing

PCR is more sensitive than smear testing, and offers rapid confirmation of MTB as well as ruling out MDR-TB by rpoB gene analysis. The PHE reference laboratory (service now provided by the Birmingham laboratory) offers PCR testing with a turnaround time of 48 to 72 hours upon special request.

Clinicians should therefore request PCR testing if:

- **The diagnosis of TB is uncertain, and PCR confirmation would make a difference to case management**
- **There is a need to distinguish between MTB or an atypical mycobacterium on a smear positive sample**
- **There is suspicion of MDR-TB**
- **The case is a child.**

2.4 Dr Fiona Shackley, Paediatrician, Sheffield Children's Hospital, and Dr Marieke Emonts, Great North Children's Hospital. Co-chairs YHNE TBCB Paediatrics Task and Finish Group

1. New 5 mm TST cut off irrespective of BCG

NG33 recommends TST for children aged between 2 and 17 years who have been in close contact with people with pulmonary or laryngeal TB. The TST is considered positive at 5mm or larger, regardless of BCG history.

Dr Shackley and Dr Emonts discussed some of the key issues raised by this recommendation. Children are at much higher risk of progression to active disease than adults, and this risk is greatest in younger children. The 5mm TST cut-off is associated with increased sensitivity, simplifies interpretation of results, and is the cut-off used internationally. Comparative studies have, however, been unable to identify a definite benefit of TST over IGRA, although IGRA is less reliable in younger children. The lower cut-off is less specific in young children.

At a consensus meeting of TB paediatricians across the UK in June 2016, it was agreed that paediatricians should follow the NG33 recommendation, but that there was a need for a prospective audit of outcomes and implications. A formal response to NICE regarding this recommendation is currently in progress.

Paediatricians should therefore follow the NG33 recommendation to use a TST cut-off of 5mm for children aged 2 to 17, but this should be audited prospectively.

Dr Shackley and Dr Emonts presented a decision tree (Appendix D) for children aged between 2 and 17 which includes the option of performing an IGRA test at the end of treatment to determine whether the child was truly infected, and to provide a baseline result in event of future exposure (given that being exposed is a risk factor for being exposed again). They also presented a decision tree for children aged under 2 years (Appendix E) who have been in close contact with people with pulmonary or laryngeal TB; management of these children should be entirely paediatric-led. Note it is recognised that not all TB nurses have official paediatric registration: TB nurses are considered to provide care for entire families, including children, and this should be recognised.

This resource recommends that the decision trees be adopted for use across Yorkshire and Humber and the North East to support effective management of paediatric contacts.

2. Screen only close contacts of (smear positive) pulmonary or laryngeal TB

There is national consensus amongst paediatricians to offer screening to children who are contacts of *any* potentially infectious case of pulmonary TB, whether this is smear positive, culture positive, or a clinical diagnosis. Likewise there is agreement to continue to screen paediatric contacts of cases of non-respiratory TB.

All child contacts of any case of TB should therefore be screened for LTBI.

3. Paediatric migrants from high incidence countries

The national LTBI screening programme does not apply to those aged under 16, and is based on IGRA testing. However there is lack of clarity in NG33 regarding the 5mm cut-off in this population (as opposed to screening close contacts), although NG33 does clarify that both children and adults from countries with incidence greater than 150 per 100,000 should be screened. Further guidance is awaited.

Appendix A

Members of the YHNE TB Control Board

Name	Role	Organisation
Renu Bindra	Chair, YHNE TBCB	PHE Yorkshire and Humber
Paul Davison	Co-chair, YHNE TBCB	PHE North East
Louise Coole	Consultant Epidemiologist	PHE
Miles Denton	Lead Public Health Microbiologist	PHE Yorkshire and Humber
Tim Collyns	Consultant Microbiologist	Leeds Teaching Hospitals NHS Trust
Gillian Laurence	Head of Clinical Strategy	NHSE Yorkshire and Humber
Vicky Dutchburn	Head of Strategy, Business Planning & Service Improvement	Greater Huddersfield CCG
Ian Cameron	Director of PH (Y&H)	Leeds City Council
Edward Kunonga	Director of Public Health	Middlesbrough Council
Sarah Bowman-Abouna	Director of Adult Services	Stockton Council
John Watson	Consultant Respiratory Medicine	Leeds Teaching Hospitals NHS Trust
Chris Stenton	Consultant Respiratory Medicine	Newcastle Upon Tyne Hospitals NHS Trust
James Macfarlane	Consultant Respiratory Medicine	Newcastle Upon Tyne Hospitals NHS Trust
Omar Pirzada	Consultant Respiratory Medicine	Sheffield Teaching Hospitals NHS Trust
Matthias Schmid	Consultant Infectious Diseases	Newcastle Upon Tyne Hospitals NHS Trust
Fiona Shackley	Consultant Paediatric Infectious Diseases	Sheffield Children's NHS Trust
Marieke Emonts	Consultant in Paediatric Infectious Diseases	Newcastle Upon Tyne Hospitals NHS Trust
Sandy Moffit	General Practitioner	The University Health Centre, Huddersfield
Cathy Mullarkey	TB nurse	Leeds Community Healthcare
Meg Goodrick	TB nurse	City Healthcare Partnership
Carole Maclean	TB nurse	South Tyneside NHS Trust
Matt Day	Consultant in Public Health Specialised Commissioning	PHE Yorkshire and Humber
Ruth Granger	Health Protection Manager	Sheffield City Council
Helen McAuslane	Consultant in Health Protection	PHE Yorkshire and Humber
Simon Howard	Consultant in Health Protection	PHE North East
Linda McGowan	Commissioning Manager	NHS Leeds South and East CCG
John Dusabe-Richards	TBCB Programme Manager	PHE Yorkshire and Humber
Mike Mandelbaum	Chief executive	TB Alert

Appendix B

NICE modelling tool

NICE have produced a ‘Costing Template’ tool to estimate the cost impact of implementing the NICE TB guidance for your adult population, this is available at:

https://www.nice.org.uk/guidance/ng33/resources

The tool uses assumptions based on national data and clinical expert views, however, it allows users to amend these and input their own assumptions to take account of local circumstances.

A costing report is also available via this link. This provides some background on the assumptions used in this costing model and also highlights further factors that should be considered when using this template.

Appendix C

Local modelling tool: IGRA versus Mantoux/IGRA testing to diagnose latent TB

NICE have analysed the relative benefits of using IGRA alone and Mantoux/IGRA as tools for identifying latent TB. They recognise that both are effective:

"These results indicate that Mantoux test/IGRA and IGRA alone are both cost-effective testing options and that depending on the test accuracies used either option could be the optimum choice"

and that the relative cost-effectiveness of the two approaches varies depending on circumstances, principally:

(a) the prevalence of latent TB in the population under test

"Below a prevalence of about 10% none of the testing strategies is cost-effective. At intermediate levels of prevalence (between about 10% and 40%), the two-stage Mantoux test /IGRA strategy is cost effective. Above 40% IGRA on its own is the most cost-effective option"

(b) the relative cost of the two tests

"If cost of IGRA lowered below TST then IGRA alone becomes most cost effective" (Hayward slide 15)

(c) The likelihood of a Mantoux test being read

"If < 88% of TST are read then IGRA alone becomes most effective option". (Hayward slide 15)

(d) and, although not discussed clearly the specificity of the Mantoux test in BCG-immunised individuals.

The costs of the tests are given as £17.28 for TST and £28.73 for Quantiferon. Nursing time is given as £12.25 per visit in relation to treatment though it is not clear that this is included in the latent TB analysis. Administrative costs are given as at £135 per visit for treatment though these are clearly not included in the analysis of costs for diagnosing latent TB as if they were any procedure that involved two visits would inevitably cost more than one which involved a single visit.

The other key figures included in the NICE model are:

- The percentage of those screened with latent TB 29%
- Sensitivity of TST 73%
- Sensitivity of Quantiferon 69%
- Percentage of Quantiferon +ve if TST +ve 68%
- Specificity of TST 49%

- Specificity of Quantiferon 61%

It is not clear that these figures apply locally for 2 main reasons:

(a) The costs are likely to be greater in a low prevalence area than in a high prevalence area as economies of scale are lost.
(b) The sensitivity and specificity figure used nationally do not necessarily apply locally where there is a low prevalence of Tb and a high BCG uptake rate.

I have developed a model for local use that tries to follow the approach taken in NICE but allows the input variables to be changed to take into account local considerations.

There is no doubt that when NICE figures are used i.e.

- 51% of TST +ve in the screened population
- 39% of IGRAs +ve in the screened population
- 68% of IGRAs +ve if TST +ve
- Nursing/ admin cost per visit £12.25

the 2 stage testing works out cheaper and more effective.

The analysis is highly dependent on the nursing/administrative costs. If these are costed at £50 per visit which I think is more realistic then the one-stage IGRA is the more cost- effective. The break-even point is about £40 nursing/administrative costs per clinic visit.

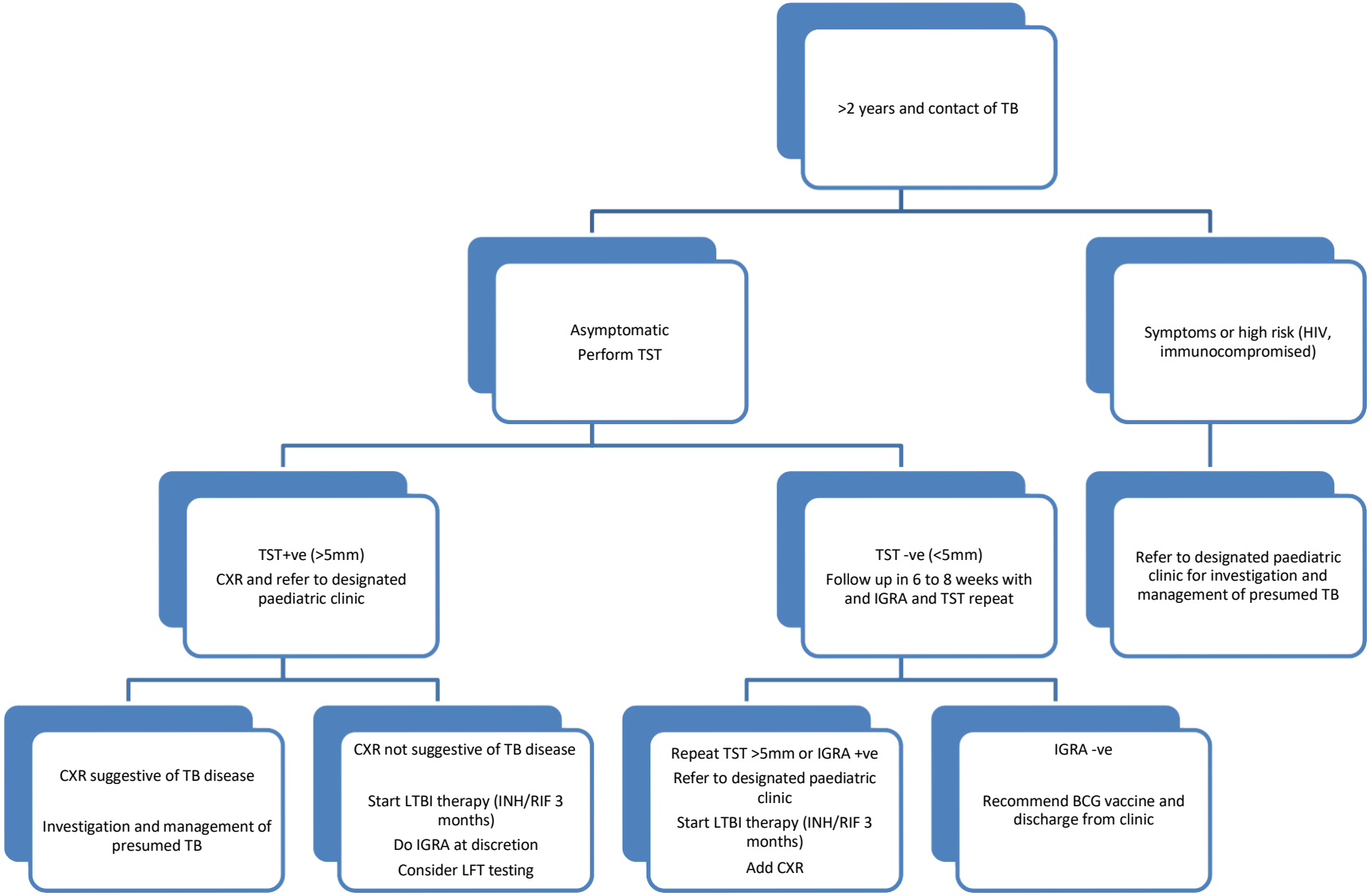
The figures from our local TB database are quite different from the NICE figures i.e.

- 39% of TST +ve in the screened population
- 19% of IGRAs +ve in the screened population
- 51% of IGRAs +ve if TST +ve

If these figures are used then one-stage IGRA testing is cheaper unless the nursing/administration costs are reduced to less than £10 per visit. At £50 per visit the 2 stage tests costs an average of £300 vs £247 for IGRA alone.

Chris Stenton, February 2017

Appendix D: Decision tree for the management of paediatric contacts aged 2 to 17 years



Appendix E: Decision tree for the management of paediatric contacts aged <2 years