Public Health England

NHS England

Protecting and improving the nation's health

Latent TB Testing and Treatment for Migrants

A practical guide for commissioners and practitioners

About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. It does this through world-class science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. PHE is an operationally autonomous executive agency of the Department of Health.

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Equality statement

Promoting equality and addressing health inequalities are at the heart of NHS England's and PHE's values. Throughout the development of the policies and processes cited in this document, we have:

- given due regard to the need to eliminate discrimination, harassment and victimisation, to advance equality of opportunity, and to foster good relations between people who share a relevant protected characteristic (as cited under the Equality Act 2010) and those who do not share it
- given regard to the need to reduce inequalities between patients in access to, and outcomes from, healthcare services and in securing that services are provided in an integrated way where this might reduce health inequalities

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Introduction

Tuberculosis (TB) rates in England remain high and are associated with significant morbidity, mortality and costs(1). The onset of TB can be insidious and difficult to detect with significant diagnostic delays. Late diagnoses are associated with worse outcomes for the individual and in the case of pulmonary TB, with a transmission risk to the public.

It is likely that the majority of TB cases in England are the result of 'reactivation' of latent TB infection (LTBI), an asymptomatic phase of TB, which can last for years. LTBI can be diagnosed by a single, validated blood test (interferon gamma release assay (IGRA)), and is usually treated with antibiotics, preventing active TB disease in the future. LTBI testing and treatment ('LTBI screening') of new entrants to England is supported by the National Institute of Health and Care Excellence (NICE)(2). In spite of evidence supporting clinical and cost effectiveness of LTBI screening, implementation in England has been inconsistent.

The Collaborative TB Strategy for England 2015−2020(2) recommends LTBI testing and treatment for 16 to 35 year olds who recently arrived in England from high incidence countries, where TB incidence is 150/100,000 population or over. New NHS funding has been made available to support it's implementation nationally. This guide aims to support the implementation of local LTBI testing and treatment, and provide practical advice as part of a robust local and regional TB control programme. Early diagnosis of active TB cases, best practice in management and contact tracing are essential prerequisites to the programme and should be assured before LTBI testing is put into place.

This guide brings together relevant information from NICE guidance(3), research(4) and learning from areas that have set up or piloted LTBI testing and treatment programmes(5). The guide offers practical advice on how primary care based LTBI testing and treatment could be implemented locally. It is important to note that this guide is based on currently available evidence and may change as new evidence becomes available.

Local engagement/leadership

Implementing LTBI testing and treatment programme in primary care is likely to involve changes in local, clinical and community culture and attitudes towards TB and the management of TB. Key stakeholders should be involved in the design of the local programme to ensure local ownership of this programme. Appropriate engagement is much more likely to lead to successful implementation of a local LTBI testing programme. It will be important to develop local champions to assist in wider engagement activities with ie local clinical commissioning groups (CCGs), General practitioners (GPs) and their practices, the local medical council (LMC), TB services and local communities. Key stakeholders include:

Clinical commissioning group (CCG) – is key to developing, prioritising and implementing the local programme particularly with regard to commissioning relevant additional secondary healthcare services. Where a CCG has delegated commissioning responsibilities for primary medical care, the CCG also has responsibility for agreeing local incentive or other arrangements with primary care services for the identification of patients with LTBI and carrying out testing of them. Where a CCG has joint primary medical care commissioning responsibility with NHS England, the two bodies should jointly agree arrangements with local primary care services. In carrying out these responsibilities the CCG needs to be aware of the implications for, and the impact on local TB services, of additional activity arising from diagnoses of LTBI and active TB found through this programme.

NHS England regional teams – clear arrangements between the regional teams and TB control boards on how local accountabilities for implementation of the TB strategy will operate, and how implementation will link into assurance discussions with CCGs. In localities where NHS England retains either sole or joint commissioning responsibility for primary care, the teams will also have responsibility for agreeing local incentives or other arrangements with primary care services. These would include identification of patients that are most likely to have LTBI and carrying out testing of them.

Local GPs – who are central to the delivery of the case finding programme. It would also be helpful to have identified GP champions who support the engagement of local GPs and practices. GPs also have a key role as members of their local CCG in advocating for TB to be a priority and reflected in local commissioning.

Public health local authority teams – to ensure TB is prioritised with the local authority and is reflected in relevant local programmes and strategies including joint strategic needs assessments and health and wellbeing strategies.

Health protection team (HPT) – based in PHE providing key data to stakeholders to support and better understand prevalence and incidence of TB in the local community and ethnic groups. This will inform decision making around prioritisation and targeting of resources for the programme.

Existing providers of TB services – to inform and support the drafting of the local LTBI treatment pathway for those who have a positive LTBI test result. The TB service will need to work with commissioners to identify and plan for increased activity arising from this programme and their cost implications. Potential additional activity is dependent on local TB rates and the demographics of the catchment population. Feedback from the City and Hackney initiative, within London, emphasised that it was crucial to have the local TB service involved in developing the referral pathway. By doing this theTB service increased its support for the programme and supported relationships within primary care with regard to improved pathways for referral and diagnostic advice.

Laboratory services – there are two arms to this. It is likely that there will be specific arrangements for the laboratory services for LTBI tests. There will be a need for the links with, and between local laboratory services and the LTBI test (IGRA) provider to inform and agree the pathway, provision and reporting of IGRA tests for primary care based LTBI testing.

Communities affected by TB – ensuring that timely and appropriate information and awareness raising activities take place in communities that are at high risk of TB. This is in parallel with the implementation of a primary care based LTBI testing programme to ensure that patients who are invited for LTBI testing are provided adequate assurance regarding the testing to ensure maximum uptake. This will require engagement with representatives from relevant communities, including agreeing test invitation letters and subsequent communication. Understanding the barriers to the uptake of the offer of LTBI testing, uptake of LTBI treatment and treatment completion is vital for the success of this programme.

Local TB control boards (TBCBs) – will be responsible for all aspects of TB control in a locality and therefore a key player for local LTBI testing and treatment implementation(2).

Outline of the programme

Who should consider an LTBI testing and treatment programme?

Initial priority should be given to local authority areas with a high TB incidence (≥20 per 100,000 population or over) or a high TB case burden to implement a systematic LTBI testing and treatment programme.

The effectiveness and cost effectiveness of LTBI testing depends on the accurate identification and targeting of eligible LTBI testing recipients(4). The clinical and cost effectiveness of LTBI testing is not dependent on UK geography, and it can also be effectively carried out in low incidence areas. However, high incidence areas have the highest burden of disease (64% of cases between 2011 and 2013) and systematic LTBI testing and treatment in these areas will have the greatest impact on reducing national TB incidence. While LTBI testing would be beneficial for all UK areas in England, particular focus should be on systematic implementation in areas with high local incidence(6). The national strategy proposes that rolling out LTBI testing should be in stages, commencing with the high incidence areas, where local ownership and infrastructure can be established.

Who should be tested for LTBI?

Individuals should be tested for LTBI if they are aged 16 to 35 years, entered the UK from a high incidence country (≥150/100,000 or SSA) within the last five years and been previously living in that high incidence country for six months or longer.

The likelihood of an IGRA positive person developing active TB varies with the likelihood that this result reflects a recently acquired TB infection. The higher the incidence rate in the country of origin and the more recent the individual's arrival in England, the higher the risk of TB re-activation. Based on evidence of cost-effectiveness(4), LTBI testing should be limited to persons who are from countries with a WHO estimated incidence of over 150 per 100,000 or from Sub-Saharan Africa(7) and who have arrived in England within the last five years. A country list, country flags and world map can be found in appendix A. The programme aims to identify and test migrants for LTBI once during their stay in England.

Drug induced liver injury caused by LTBI treatment increases with increasing age and the benefits of LTBI treatment decrease with age(8). For these reasons, this LTBI testing and treatment programme is limited to persons up to the age of 35 years in keeping with NICE guidance(3). We support the systematic application of existing

NICE recommendations to screen children or adolescents from high TB incidence countries, but the national LTBI testing programme discussed here is limited to individuals aged 16 to 35 years. This is because the highest burden of TB disease and the largest proportion of new entrants from high incidence countries are aged between 16 and 35 years.

Where should LTBI testing take place?

The optimum setting for new entrant LTBI testing is primary care. However, local services, circumstances and preferences should be taken into consideration to determine the most suitable and effective setting for local implementation of LTBI case finding.

There have been a number of successful LTBI testing and treatment pilots and initiatives with most carried out in primary care(5), where acceptability has been high(9), follow up easier and uptake rates higher. The practical and logistical effort required to set up an LTBI testing programme means that it is preferable to set it up at scale ie across a whole CCG, where economies of scale could be realised rather than with individual practices. It is also important to consider working with or including neighbouring CCGs/boroughs. There are three models of provision that can be included in local proposals. These include:

- individual GP/practice based LTBI testing provision (dependent on the number of underlying TB cases and size of practice) with a phlebotomy service available in the practice
- GP practices collaborate and send their patients to one practice which has a phlebotomy service available
- GP practice assesses and refers patients for phlebotomy at a community setting.

If LTBI testing is set up in a non-primary care setting (eg in educational or congregational settings or in secondary care) it is very important that:

- data and information is collected in exactly the same way as in primary care
- the patient's GP is kept informed about the results of the LTBI testing and treatment

This allows the patient's GP to maintain an accurate record and also avoids potential 'double testing'.

How should LTBI testing be done?

LTBI testing should be performed through a single IGRA test carried out in primary care (see algorithm, appendix C). It is best to start with prospective LTBI testing (identifying eligible recipients when they first register with a GP practice) before planning retrospective LTBI testing exercises. A number of tools (including a short version of this guide) are being made available, but GP practices may wish to adapt their new patient documentation and associated electronic systems so that registrations of patients from relevant countries result in prompts to be offered the test. GP staff, including receptionists will need appropriate guidance and training for this.

GPs should also use this opportunity to test for HIV, if appropriate(10), in particular among people from countries where dual infection is common (eg Sub-Saharan Africa)(11) or other HIV high incidence areas. Localities may wish to consider combining LTBI testing with other health checks, such as for diabetes or BBVs as appropriate.

Follow the following testing guideline:

- if a new registrant meets the agreed local criteria for LTBI testing, take a blood sample and send to the IGRA test-processing laboratory as per agreed local pathway
- if new registrant has symptoms of active TB, organise immediate referral to TB services
- if the new patients are children from high-risk countries and have not received BCG vaccination they should be offered BCG as per national guidelines(12)
- record patients with a BCG scar
- record LTBI testing details on the GP system or web-based template (see below)
- inform patient of result

LTBI testing and treatment should ideally be supported by an awareness-raising programme for GPs and patients eg through written materials or community work. If patients decline to be tested, this should be recorded in their primary care records. Awareness should be raised amon practice staff to ensure they have an increased index of suspicion for TB in patients who present with any of the common signs or symptoms of TB or who have other, unexplained symptoms.

i. The test

LTBI testing should be performed with a single IGRA blood test.

There are currently three tests for LTBI, the tuberculin skin test (TST) and two different commercial interferon gamma release assays (IGRAs) – QuantiFERON-TB Gold In Tube® (QFT, Cellestis) and T-Spot.TB® (Oxford Immunotec). The mechanism of all three tests is the detection of a cellular immune response to *Mycobacterium tuberculosis*. These tests do not currently have a role in the diagnosis of active TB in primary care and patients where there is clinical suspicion of active TB should be referred for further investigation and treatment to secondary care.

IGRA tests detect the release of the cytokine interferon iamma (IFN-γ), which is produced in response to particular antigens (ESAT-6 and CFP-10), which are unique to the *M. tuberculosis* complex (and absent in Bacillus Calmette-Guerin (BCG) as well as most environmental mycobacteria). QFT is a quantitative measurement of T-lymphocyte secreted interferon-gamma through enzyme-linked immunosorbent assay (ELISA) and T-Spot. TB is an immunospot assay, which provides a direct count of mycobacterial-sensitised T-effector cells. QFT can be processed by appropriately equipped NHS or private laboratories. Both tests require a test tube, a special laboratory form and are then transported to the processing laboratory in a biohazard box. The results of the IGRA test depend on local arrangements but can be available within a week. Costs for IGRA testing will be subject to competitive procurement processes.

There is no gold standard to diagnose LTBI. The main benefit of IGRA tests is their minimal cross reactivity with non-tuberculous mycobacteria and BCG which reduces the number of false positive results, seen with the tuberculin skin test(13,14). Both IGRA tests are usually reported qualitatively (positive, negative, indeterminate) and quantitatively.

IGRA test performance depends on the test generation and setting, and a number of meta-analyses have estimated their test propertie(13,14,15).

ii. Identifying eligible new entrants for LTBI testing and treatment

Patients can either be identified for LTBI testing prospectively or retrospectively. Localities are strongly encouraged to start with prospective identification and schedule retrospective identification once local arrangements including infrastructure are robustly established and resources assured.

Prospective identification aims to offer LTBI testing to eligible recipients when they first register with a GP practice. Logistically this is easier because eligibility can be determined at new patient registration and the LTBI testing process can be combined with other primary care based registration health checks. This makes uptake more likely. It is worth noting that a rigorous prospective identification process would have achieved LTBI testing of all eligible people by year 5. Prospective alternatives to this type of identification would be LTBI testing at community venues, self-referral and a GP or primary care based 'hub', which provides the service on behalf of other practices. While these are all valid models, the preferred model is identification at GP registration.

Retrospective identification aims to offer LTBI testing to patients who are already registered with a GP. There are several options for this outlined below. In addition areas may wish to identify relevant persons who are not registered with GPs, and this would be possible with the mechanism addressed in the third bullet point below:

- trawling the GP register. Experience from pilots have demonstrated that this is possible, though labour-intensive in the short term as key determinants of eligibility (such as country of birth or time since entry to the UK) are not usually recorded. The patient has then to be approached directly to complete the patient record and receive the invitation, based on available information, such as age and ethnicity. The Ealing and Brent experience has shown that uptake can be increased through direct telephone contact in addition to written invitations
- identifying patients who register with a GP for the first time in the UK (flag 4). These data are held nationally or at larger local levels and would require additional work to determine eligibility, based on an initial algorithm augmented with direct patient contact
- identifying patients who have recently entered the UK and undergone pre-entry screening for active pulmonary TB. The data for these patients is currently collected at national level and work is under way to make the data available to the locality of proposed residence

Retrospective identification for LTBI testing requires careful planning and resourcing and should be implemented as a 'mop up' exercise, once prospective identification has been successfully implemented and embedded.

iii. Combining LTBI testing with other health checks

In migrants where TB-HIV co-infection is common (eg sub Saharan Africa), an HIV test should be performed concurrently with the IGRA. Other potential co-morbidities should also be considered and LTBI testing may be combined with other 'health checks' such as testing for blood borne viruses.

Several conditions may co-exist with LTBI and may increase a person's likelihood of TB, including HIV infection, alcoholic liver disease, malnutrition, diabetes mellitus, renal dialysis and immunosuppressive therapies(16). Persons living with HIV (PLWH) are 20 to 37 times more likely to develop active TB(17) and globally 1.1 million TB cases occur annually among PLWH. They are also more likely to die from TB and worldwide at least 320,000 TB deaths in 2012 were among PLWH. All patients with active TB should be offered an HIV test(3) and in keeping with BHIVA guidance (11), persons undergoing LTBI testing should have an HIV test if they are at risk of co-infection, either because of their country of origin (eg sub-Saharan Africa) or because of other significant factors, such as their lifestyle. In addition, other medical conditions, which would influence the treatment pathway, should be excluded, such as underlying immunosuppression, pulmonary or liver disease.

Combining LTBI testing with a GP registration health check may provide opportunities to check for other relevant diseases, such as hepatitis B and C, but these additional tests are currently outside the scope of the LTBI testing programme. LTBI positive patients will require the exclusion of active TB before initiating LTBI treatment. This clinical work-up includes routine bloods including LFTs and inflammatory markers and chest X-ray to ensure the absence of pulmonary TB and could be initiated in primary care.

iv. What happens with active TB cases?

Patients identified with active TB disease should be referred to their local TB service and treated as per existing local protocol for active TB. Immediate referral should be considered for patients with signs and symptoms of active, infectious TB disease, such as pulmonary TB.

Practice staff should be aware of the symptoms of active TB and have a low threshold of referral of suspected cases to the local TB service. The symptoms include:

- persistent cough >3 weeks
- coughing blood (haemoptysis)
- fever

- night sweats
- significant weight loss
- unexplained fatigue
- enlarged lymph nodes (particularly cervical nodes)

Further investigation and management of active TB should be carried out in keeping with NICE guidelines(3).

v. How are LTBI positive patients managed?

A clinical work up including routine bloods, liver function tests, hepatitis and HIV serology, and a chest X-ray are required prior to treatment initiation. Patients with a negative IGRA test should be informed and given information on the signs and symptoms of TB disease.

Notification of tests results will be according to local arrangements and likely similar to arrangements for other test notifications. GP practices should have appropriate arrangements in place for them to be aware when a patient who has been tested fails to re-attend in order to receive the results. Local protocols should identify the actions to be taken in these circumstances.

LTBI test positive, HIV test negative persons should be offered either three months of rifampicin and isoniazid combination therapy or six months of isoniazid monotherapy. Routinely, LTBI treatment is provided in secondary care. Local arrangements will determine to what extent TB/LTBI work-up is carried out in primary care or secondary care respectively.

While there are ongoing research projects and pilots looking at the feasibility, effectiveness and cost effectiveness of treating patients with LTBI in primary care the Collaborative TB Strategy for England recommends that LTBI positive cases should be referred to TB services for treatment.

Referral and treatment protocols for newly diagnosed LTBI cases, will need to be agreed with all relevant local parties to ensure consistent referral. The protocol should include:

- a requirement that treatment should be initiated and supported by a recognised secondary care TB service
- that a patient's risk assessment must be completed as part of the (usually) secondary care assessment to assess the likelihood of treatment completion
- the circumstances in which treatment can be monitored in primary care or another non-specialist setting (eg if the patient is already under the care of another specialty)

- where treatment is not carried out and monitored in secondary care, trigger points are in place throughout the pathway that highlight when a patient should be re-referred to the specialist TB service. This includes clinical issues (eg drug toxicity) and treatment noncompliance

Commissioners, in liaison with their local TB control board, should work with providers to ensure that there is clarity on local arrangements with respect to the above.

NICE guidelines contain detailed recommendations for persons with LTBI in the UK(3).

1. All HIV-negative persons aged 16 to 35 years old, who are found to have LTBI through migrant testing, should be offered chemoprophylaxis, either with six months isoniazid or three months of isoniazid/rifampicin combination therapy.
2. HIV-positive persons of all age groups with LTBI should be offered six months of isoniazid.
3. Children with LTBI (positive TST or IGRA) and who have not been BCG-vaccinated should also be offered chemotherapy if they are aged 1 to 15 years old. The pathway is more complex for children, particularly for very young age groups and the test properties for IGRA are less clear. NICE only recommends chemoprophylaxis for children under 1 year old if they have been contacts of patients with smear-positive pulmonary TB. Systematic LTBI testing and treatment of children is currently not in the scope of the national LTBI testing programme.
4. All individuals who are eligible for chemotherapy but decline should be given information and advice about what to do should they develop symptoms of TB.

NICE does not recommend chemoprophylaxis for any individuals above the age of 35 years old, unless they are healthcare workers or have an underlying illness with a high risk of reactivation (eg HIV). One reason for this age cut off is that the risk of hepatoxicity increases with age(8). The population-based LTBI testing guide therefore only covers those aged 16 to 35 years. It is possible that this may change in the future, when new evidence becomes available.

How is LTBI testing and treatment paid for?

Specific funding has been made available for LTBI testing and treatment. The funding has three components:

1. The national or regional procurement of IGRA tests, including laboratory processing and transport (couriers using biohazard appropriate boxes and processes) with interim local arrangements in the initial period of the programme
2. The management and treatment of LTBI, including necessary further investigations will be initially funded through the normal tariff process with development of a specific LTBI tariff for TB services in secondary care during 2015/16
3. Local incentive schemes for the primary care based LTBI testing. While the nature of the service and the incentive is for CCGs to determine locally in agreement with TB control boards and local GPs, as an example, existing local models include a small payment for each patient tested (£5), and larger payments for those with LTBI (£20) and active TB (£100). Robust identification, testing and referral mechanisms as well as good data entry will form the basis of this remuneration

A number of local areas including City and Hackney, and Hammersmith and Fulham initiatives within London, have successfully used financial incentives to encourage primary care take up of LTBI testing.

Local LTBI testing and treatment budgets will be informed by local CCG TB case numbers and rates and allocated to lead CCGs embedded in regional TBCBs. While TBCBs will have relative autonomy of resource allocation within their areas, guidance will be issued on proposed allocation to localities. The initial start-up of the programme may require pump priming using the first quarter budget and from the second quarter it is expected that expenditure will be remunerated according to standard NHS terms and conditions, ie in arrears upon production of evidence of outcomes and expenditure.

What are the data return requirements?

Data is essential for quality assurance and evaluation of the programme. Good quality and timely data returns are a contractual requirement within the LTBI testing and treatment programme.

High quality data returns and regular reporting are essential for the monitoring and evaluation of the LTBI testing and treatment programme. The data form part of the information requirements for implementation of the TB Strategy in order to continually

monitor the programme's progress and evaluate it against the indicators (see Box 1). This will include information on those who were offered LTBI testing, people who took up testing and the results of LTBI testing and treatment adherence. The data reports will also be used as a basis for remuneration. Patient identifiable details will allow matching of this data to the national enhanced TB surveillance system (ETS), where active cases are recorded and thus serve quality assurance and evaluation purposes. Data for routine reporting will be anonymised.

Box 1. National and regional indicators for LTBI testing and treatment ('LTBI screening')

1. The number of local authorities that have a systematic new entrant LTBI testing and treatment initiative in place
2. Proportion of eligible new entrants covered by LTBI testing and treatment programmes who accept LTBI testing
3. Proportion of individuals who complete LTBI treatment among those who start treatment

Efforts have been made to ensure that the burden of data collection is small, through limiting the number of variables and through smart software solutions. However, in order to ensure a small data entry burden, it is also essential that GPs only carry out LTBI testing within the eligibility criteria of the programme.

The initial data entry will be completed by GP practices. This will form part of the requirements of the service specification for the LTBI testing service commissioned from GPs. Bespoke templates have been or will be developed for EMIS Web, SystemOne and Vision. Screen shots for the data entry in EMIS Web are included (appendix E), followed by screenshots showing the process of activating the template within the system (appendix F). The processing and sequential uploading of data onto the PHE database will be done by the local organisation that usually analyses GP data (usually the commissioning support unit, see flow chart). However, the LTBI database will also have a possibility for data entry using a web-based form. This could be used for LTBI testing that takes place outside the primary care setting (eg in an educational setting), or for practices that are not using any of the three main GP computer systems, or for treatment and management data through secondary care.

The data must be entered in a robust, timely, complete and careful manner. Many data variables are already present in GP systems (such as age, sex, ethnicity) and there will be a limited list of additional variables. All data items are Read-coded in the back-end of the GP system, although templates are made user friendly by allowing tick boxes.

This data surveillance and reporting system has been approved by local and national information governance leads as well as the PHE Chief Knowledge Officer and the

PHE Caldicott guardian. Data transfer and storage is done in keeping with routine PHE policies, to the highest level of information governance standards. The legal ability for PHE to collect patient identifiable data is based in regulation 3 of section 251 (National Health Service Act 2006). The act comes with the obligation to communicate to patients how their information is processed and utilised ('fair processing notice'), along with instructions for patients who want to request that their data is erased. In addition, we are currently exploring a small local pilot of obtaining verbally consented data (marked by a specific Read code) to be able to evaluate the effect of consenting on data validity.

Monitoring the LTBI programme will involve comparing LTBI testing and treatment data from different locations across the UK. Using patient-level data in such comparisons will allow for PHE to identify and report on what is going well and provide information about potential difficulties, where this is happening, and why. This information will be fed back to the locally responsible TB control boards, with recommendations on improving the local programme to ensure its effectiveness and outcomes. The data will also inform how resources should be allocated, based on where the highest need versus uptake is shown to be, after LTBI testing and treatment has started. It will also be used to highlight where uptake is low, so that specific issues can be addressed with relevant population-based solutions.

LTBI testing and treatment of migrants is an effective and cost effective strategy to reduce the active TB burden. However the extent of its effect in the UK programme under 'real life' conditions is unknown and currently based on controlled trials, modelling and previous local LTBI testing pilots(4). For the purpose of evaluation, the data will provide evidence for the efficiency and effectiveness of LTBI testing and treatment and will be used to demonstrate the financial and public health impact of such an intervention. Without the collection of detailed, relevant and high quality data, it will be impossible to monitor and evaluate the LTBI testing and treatment programme and ensure that the benefits outweigh risks of this programme.

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Abbreviations and definitions

LTBI: Latent TB infection is when a person has the bacteria that cause TB in their body but they are not causing any disease or symptoms, ie the bacteria are asleep or dormant. There is a chance that the bacteria may cause disease in the future.

LTBI testing: used synonymously with LTBI screening. Refers to the systematic identification of eligible migrants for the purpose of treatment for LTBI in order to prevent TB re-activation.

New migrant: In this document this refers to persons who entered the UK from a high TB incidence country within the last five years.

Local TB control boards (TBCBs): A newly established structure, established through the TB strategy for England(2) to strengthen the coordination and oversight of all aspects of TB control in their area. The TBCBs will bring together key stakeholders from the clinical, public health, commissioning and voluntary sectors and will be responsible for all aspects of TB control in a Public Health England Centre area and. They will be a key player to oversee local LTBI testing and treatment implementation.

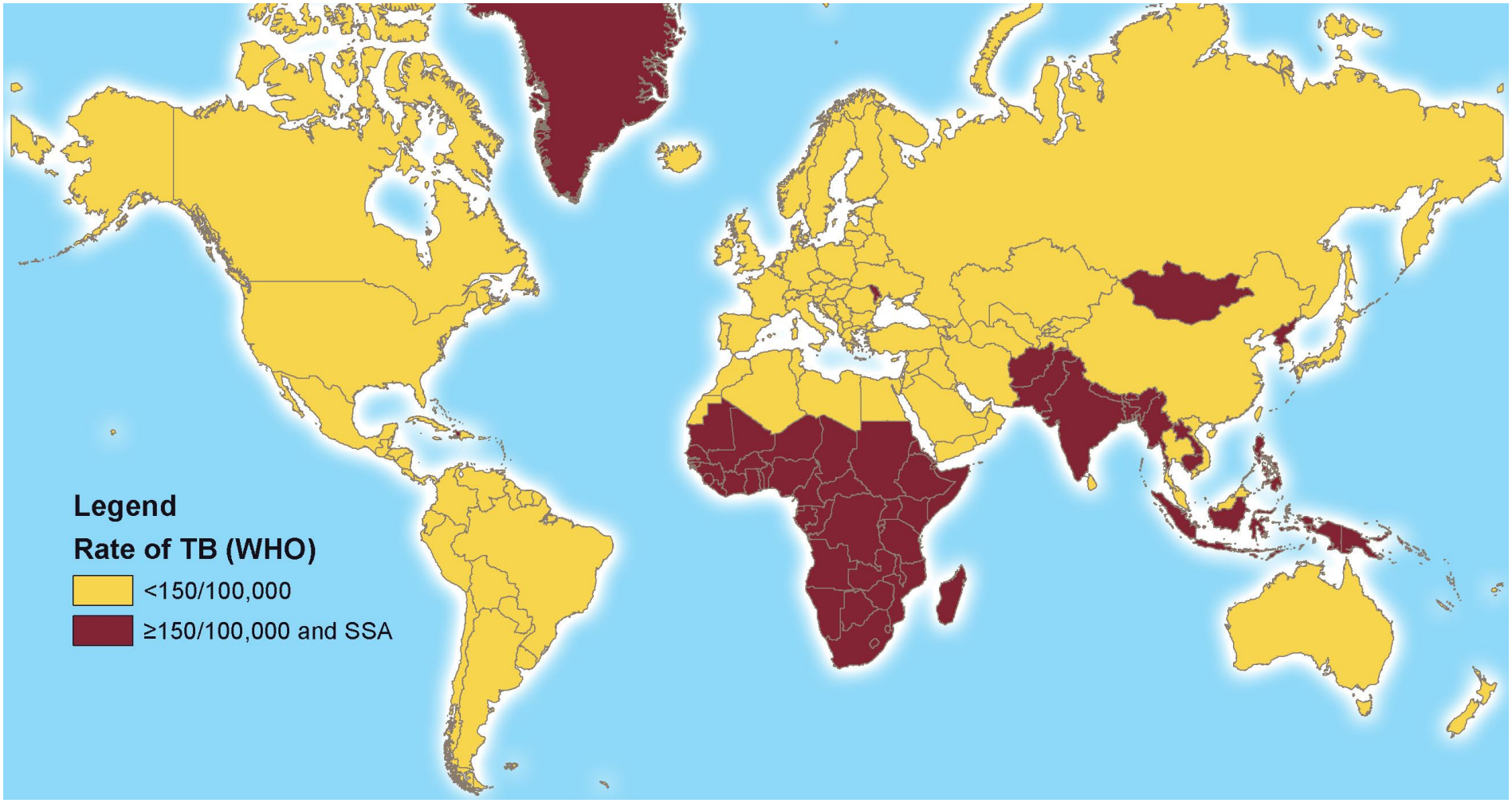
Appendices

Appendix A: Countries of origin eligible for LTBI testing and treatment

(Estimated TB incidence rate ≥150 per 100,000 population in 2013 or Sub-Saharan Africa)(6)

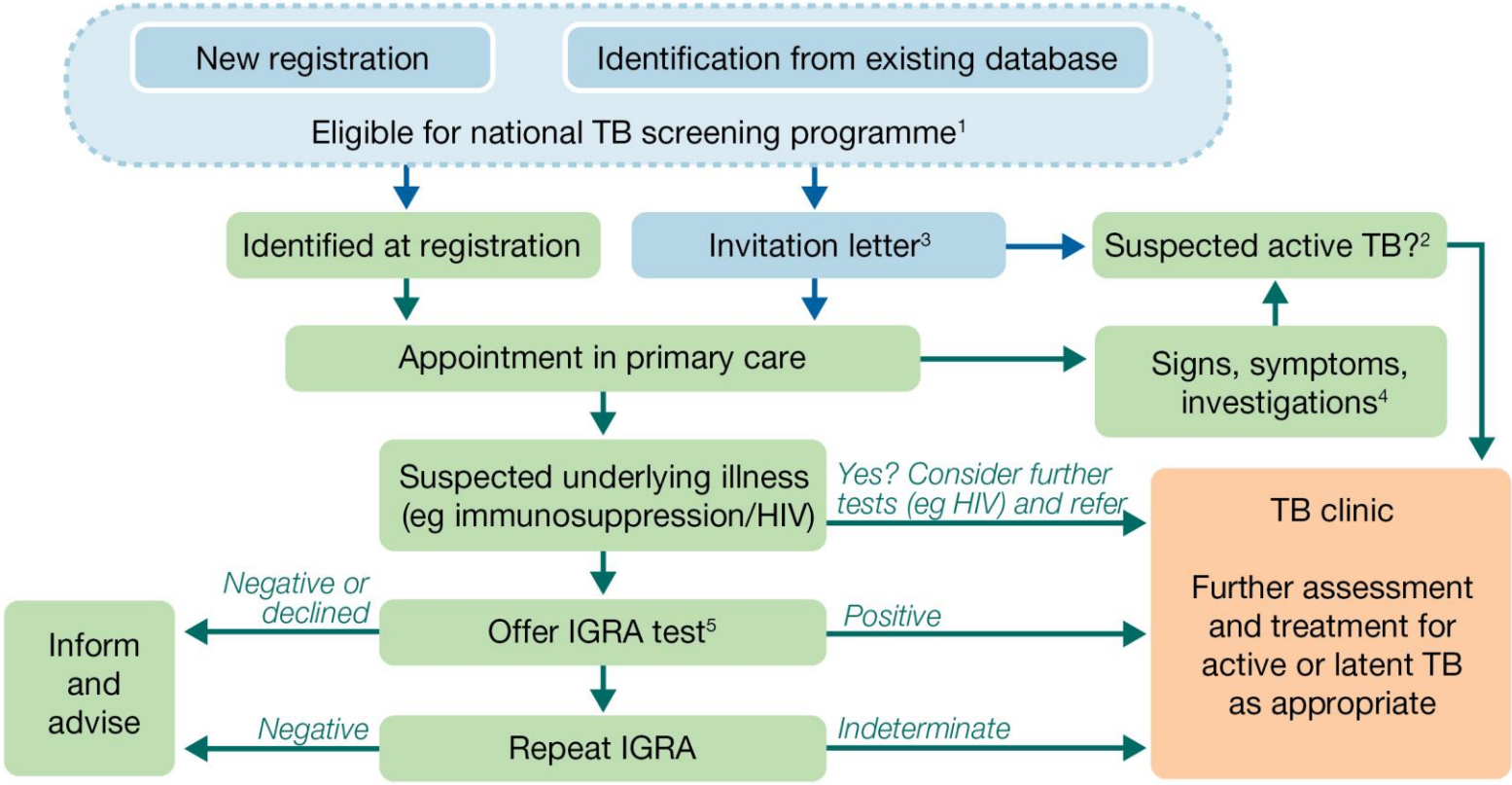
Country	Incident	Country	Incident
Afghanistan	189	Liberia	308
Angola	320	Madagascar	233
Bangladesh	224	Malawi	156
Benin	70	Mali	60
Bhutan	169	Marshall	354
Botswana	414	Mauritania	115
Burkina Faso	54	Mauritius	21
Burundi	128	Micronesia	188
Cote d'Ivoire	170	Mongolia	181
Cabo Verde	143	Mozambique	552
Cambodia	400	Myanmar	373
Cameroon	235	Namibia	651
Central African	359	Nepal	156
Chad	151	Niger	102
Comoros	34	Nigeria	338
Congo	382	Pakistan	275
DRP Korea	429	Papua New	347
DR Congo	326	Philippines	292
Djibouti	619	Republic of	159
Equatorial Guinea	144	Rwanda	69
Eritrea	92	Sao Tome &	91
Ethiopia	224	Senegal	136
Gabon	423	Seychelles	30
Gambia	173	Sierra Leone	313
Ghana	66	Somalia	285
Greenland	194	South Africa	860
Guinea	177	South	146
Guinea-Bissau	387	Swaziland	138
Haiti	206	Timor-Leste	498
India	171	Togo	73
Indonesia	183	Tuvalu	228
Kenya	268	Uganda	166
Kiribati	497	UR	164
Laos PDR	197	Zambia	410
Lesotho	916	Zimbabwe	552

Appendix B: Map of WHO countries by estimated incidence rates, 2013



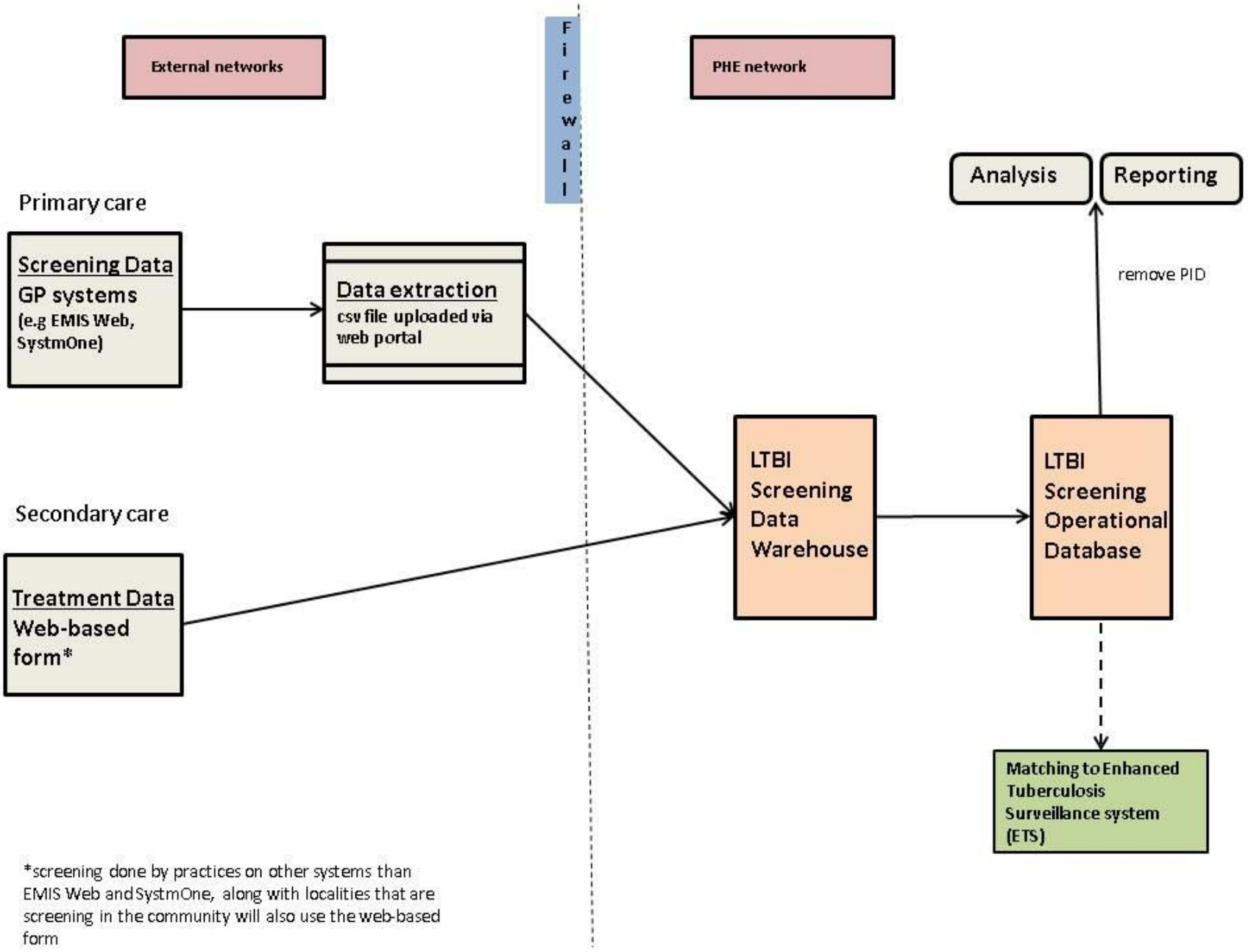
The Legend indicates estimates of TB incidence per 100,000 population.

Appendix C: LTBI testing and treatment algorithm



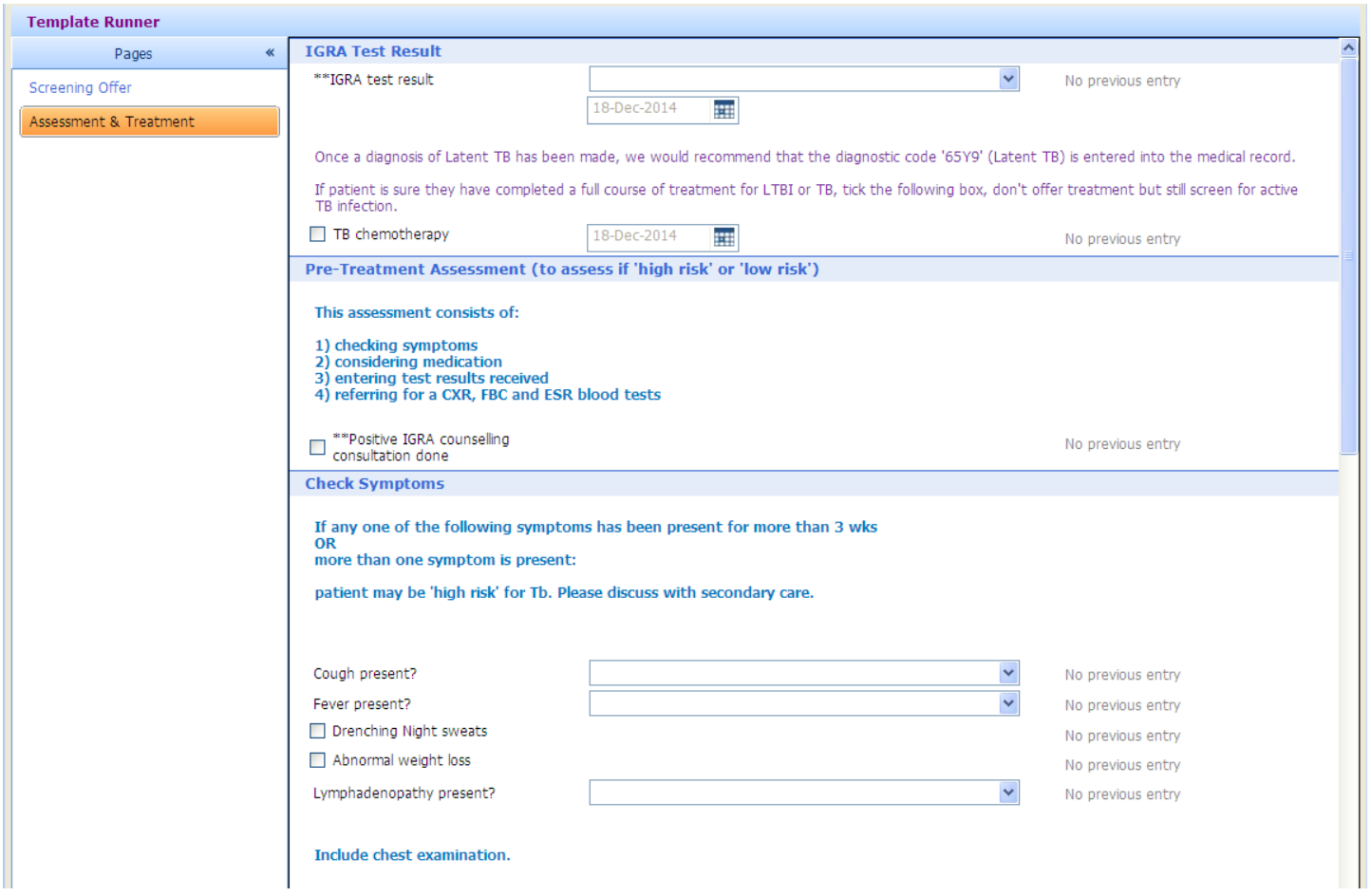
1 Full eligibility criteria a) Born or spent >6 months in high TB incidence country (150 cases per 100,000 or more/Sub-Saharan Africa); b) Entered the UK within the last 5 years (including where entry was via other countries (eg within EU/EEA); c) Aged 16-35 years; d) No history of TB either treated or untreated; e) Never screened for TB in UK. Also review indication for LTBI screening using NICE guidance (eg if outside age group)
2 TB contacts should be referred to the local TB service. TB suggestive symptoms include a) Cough> 3 weeks; b) Haemoptysis (cough with blood); c) Night sweats; d) Unexplained weight loss; e) Unexplained fever; f) Lymph node swelling (especially cervical).
3 The invitation letter advises patients to seek clinical care if they have symptoms of TB
4 The recommended investigations prior to referral will depend on local arrangements, but might include CXR and sputum collection as appropriate NB- colours of the boxes denote location and responsibilities: blue- systematic identification mechanism; Green- Primary Care; Orange- Secondary Care
5 Also offer HIV test according to BHIVA/HPA recommendations and consider hepatitis B/C testing where appropriate

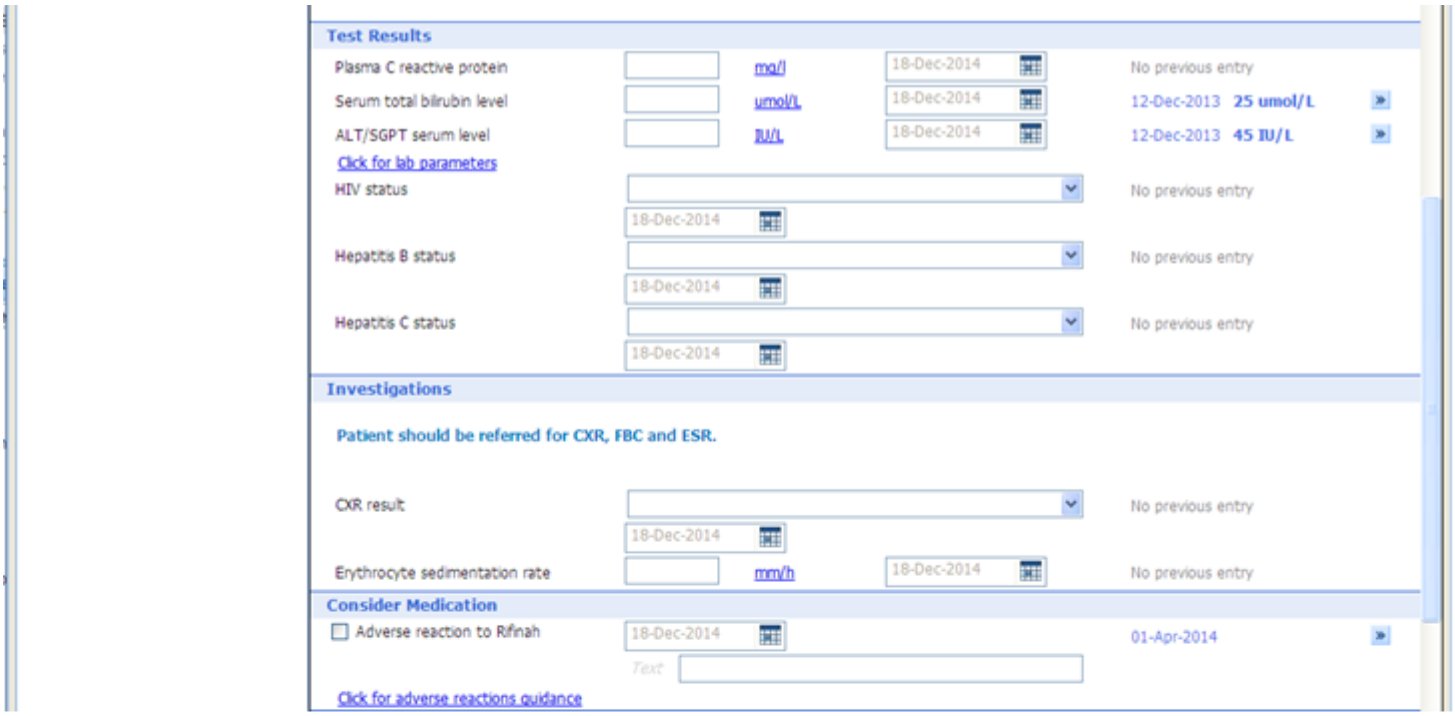
Appendix D: Data flow schematic for LTBI testing and treatment monitoring

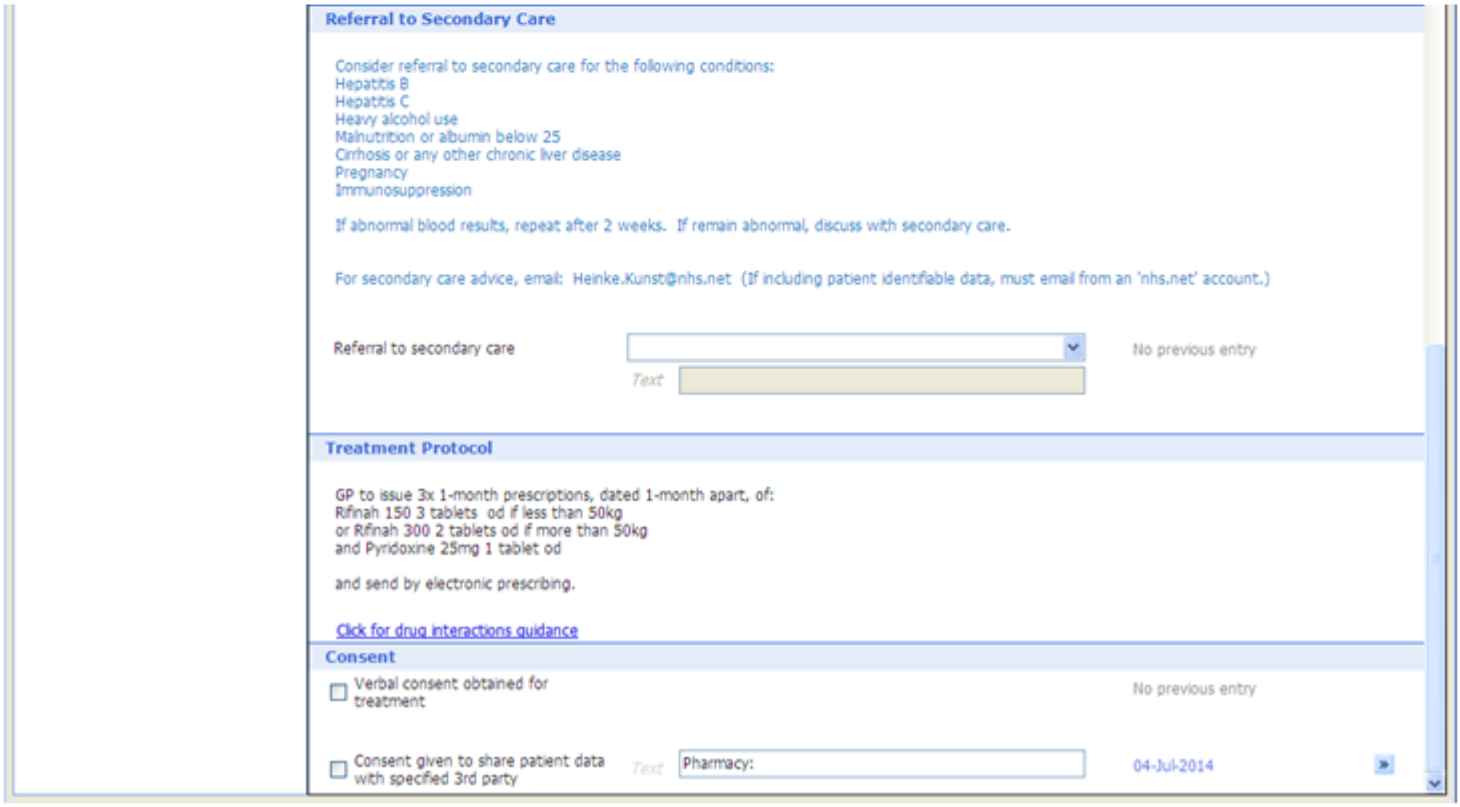


Appendix E: EMIS Web screenshots for data entry

Please note that this is for illustration purposes only and some details (eg treatment in primary care) are specific to the situation in East London.



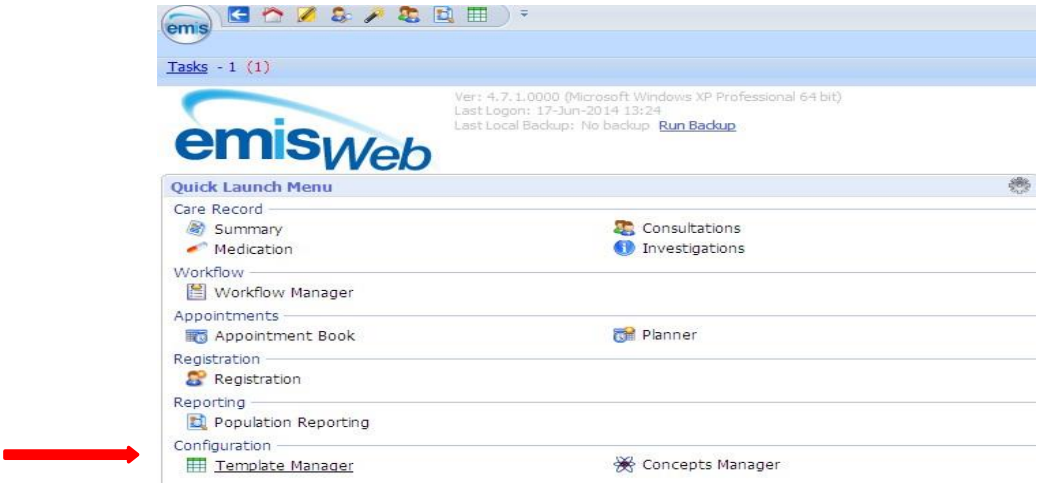

Test Results
Plasma C reactive protein
mg/l
18-Dec-2014
No previous entry
Serum total bilirubin level
umol/L
18-Dec-2014
12-Dec-2013 25 umol/L
ALT/SGPT serum level
IU/L
18-Dec-2014
12-Dec-2013 45 IU/L
Click for lab parameters
HIV status
No previous entry
18-Dec-2014
Hepatitis B status
No previous entry
18-Dec-2014
Hepatitis C status
No previous entry
18-Dec-2014
Investigations
Patient should be referred for CXR, FBC and ESR.
CXR result
No previous entry
18-Dec-2014
Erythrocyte sedimentation rate
mm/h
18-Dec-2014
No previous entry
Consider Medication
Adverse reaction to Rifinah
18-Dec-2014
01-Apr-2014
Text
Click for adverse reactions guidance


Referral to Secondary Care
Consider referral to secondary care for the following conditions:
Hepatitis B
Hepatitis C
Heavy alcohol use
Malnutrition or albumin below 25
Cirrhosis or any other chronic liver disease
Pregnancy
Immunosuppression
If abnormal blood results, repeat after 2 weeks. If remain abnormal, discuss with secondary care.
For secondary care advice, email: Heinke.Kunst@nhs.net (If including patient identifiable data, must email from an 'nhs.net' account.)
Referral to secondary care
No previous entry
Text
Treatment Protocol
GP to issue 3x 1-month prescriptions, dated 1-month apart, of:
Rifinah 150 3 tablets od if less than 50kg
or Rifinah 300 2 tablets od if more than 50kg
and Pyridoxine 25mg 1 tablet od
and send by electronic prescribing.
Click for drug interactions guidance
Consent
Verbal consent obtained for treatment
No previous entry
Consent given to share patient data with specified 3rd party
Text
Pharmacy:
04-Jul-2014

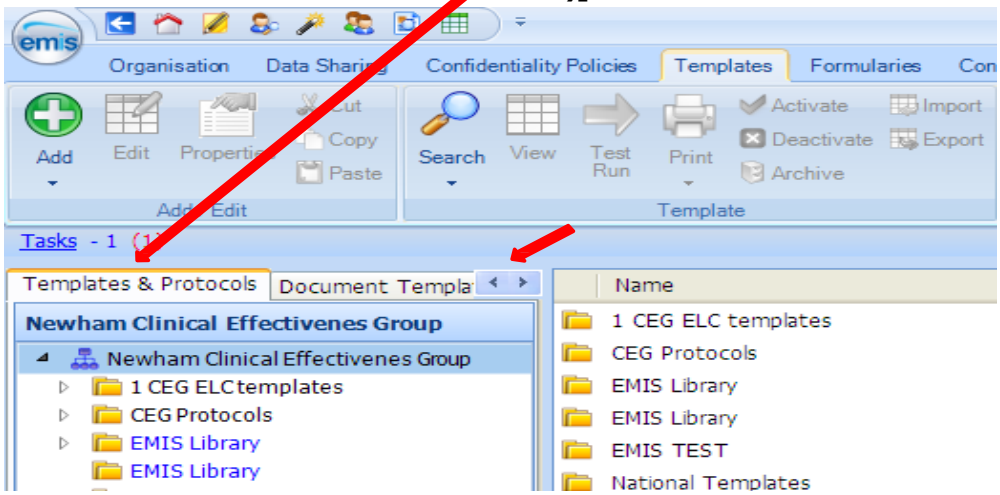
Appendix F: Screenshots of how to activate the EMIS Web template locally

Instructions for Activating CEG templates from the EMIS library folder

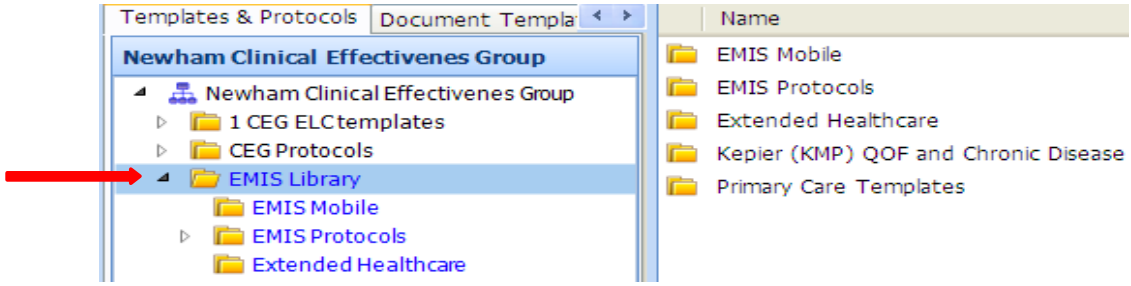
1. From EMIS home page, select '**Template Manager'.**



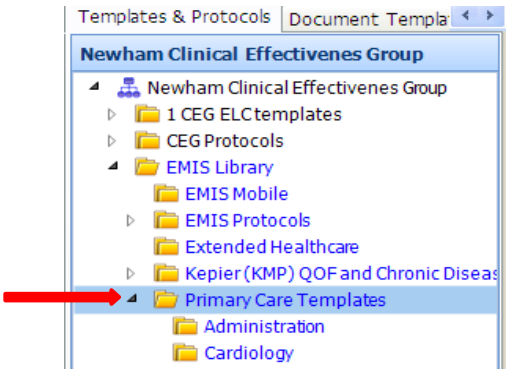
2. This should display the '**Templates & Protocols**' tab. **[Please ensure you are on this tab before proceeding. (If you are not, click on the arrows beside the tabs to scroll to it.)]**



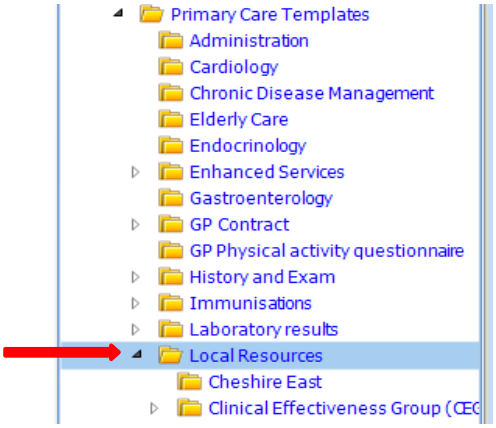
3. Select the **'EMIS Library'** folder (click arrow beside it).



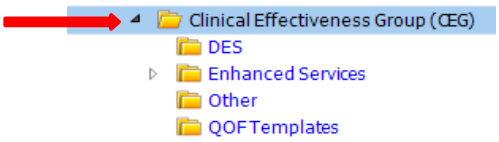
4. There are a number of subfolders. Select the ‘Primary Care Templates’ folder.



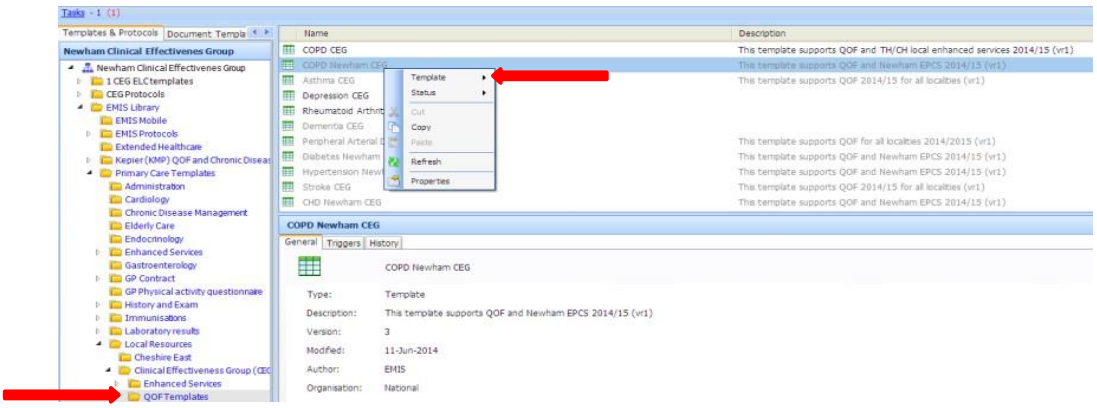
5. Select the ‘Local Resources’ folder.



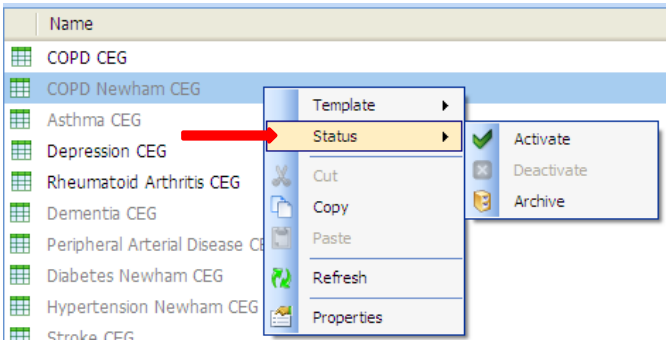
6. Select the ‘Clinical Effectiveness Group (CEG)’ folder (click arrow beside it). CEG templates are located in one of its subfolders:



7. Select the required subfolder by clicking on it and its templates will appear in the top-right pane. Right-click on the required template. A box will appear.



8. Select status



9. Select ‘Activate’ and a box will appear. Select ‘yes’ to activate the item