TB Manual
Chapter Six:
Contact Investigation

Revised April 2020

Version 1.1

Contact Investigation

Contact investigations (CI) have been a key component of tuberculosis (TB) control programs in the United States (U.S.) for over 30 years and are considered an essential prevention activity. After the early diagnosis and treatment of active TB cases, prompt detection and effective treatment of contacts to infectious cases is the second basic principle of TB Control in the U.S.[i] On average, as of 2011, 18 contacts are identified for each person with infectious TB in the U.S. In addition, on average, 20%–30% of all contacts have latent TB infection (LTBI) and 1% of contacts have TB disease. Of the contacts that ultimately develop TB disease, approximately one-half develop disease in the first year after exposure[ii]. When contacts with active TB are diagnosed early and are promptly started on effective treatment, TB transmission can be prevented. Since 2017, the Centers for Disease Control and Prevention (CDC) publishes estimates of cases by reporting jurisdiction in the U.S. that are attributable to recent transmission from a plausible source case as well as estimates of extensive recent transmission, defined as the percentage of cases in the jurisdiction that are linked to a plausible transmission chain of six cases as determined by genotype[iii]. In Los Angeles County (LAC), estimates of recent transmission and extensive recent transmission were higher than both California and the U.S. These findings indicate that LAC Department of Public Health (DPH) must remain vigilant and redouble efforts to complete TB CIs. The ideal goal would be to distinguish all recently infected contacts from those who are not infected and prevent progression to TB disease by treating those with infection. In practice, existing technology and methods present challenges to achieve this goal. For this reason, limited public health resources must be focused on contacts most likely to have been infected to stop the chain of transmission of TB in LAC that currently exists.

The Los Angeles County TB Control Program (LAC TBCP) is responsible for the oversight of contact investigation within LAC. As part of this responsibility, the Program has provided guidelines for conducting contact investigations in the LAC TBCP Manual. This version supercedes the last major revision of the LAC TBCP Manual done in 2013. In developing the Los Angeles County Contact Investigation guidelines, the LAC TBCP referenced the State and Federal guidelines to develop a CI framework by compiling tools for the various steps of the CI process. (LAC Nucleic Acid Amplification Test (ATD) guidelines are also referenced in this document.)

The objectives of this chapter are to:

1) provide a detailed and updated framework for performing contact investigations in LAC
2) emphasize the importance of a multi-disciplinary team effort
3) ensure effective communication between public health center staff and the LAC TBCP
4) focus attention on recent changes in guidance in LAC DPH TBCP CI Guidelines

What's New in 2020?

Non-Residential Health Care Facilities

- **Contact investigations at Non-Residential Health Care Facilities (NRHCF) may be more focused and the workflow for CIs are based upon site characteristics that determine the site to be high or low-risk. An algorithm outlining the prioritization of NRHCF sites is provided** (see page P-59).
    - **The roles and responsibilities (Community Field Services (CFS) vs TBCP) for NRHCF have been updated** see Section 10 (pages P54 - P56).
- **The Public Health Department's interaction with a NRHCF after a TB exposure depends on the type of facility where the exposure took place.**
    - **Prioritization of NRHCF is based on site characteristics that determine the site to be a high-risk or low-risk site.**
    - **CIs at high-risk sites will be conducted as per Chapter 6 guidelines including following guidance in Tables 2a and 2b for contact prioritization.**
    - **Low-risk sites will be notified of a TB exposure by a letter in order to comly with the ATD standard** (see attached letter template titled "Tuberculosis (TB) Exposure Notification" on page 6-56).

Title and internal structural revisions

- **CFS-CI core team, led by the Chief I, plans and implements CI activities.**
- **TBCP APS is removed from the District Core CI team.**
- **Area Health Officer (AHO) replaced by Regional Health Officer (RHO).**
- **Area Medical Director changed to Chief Physician I.**
- **District PHI has been added as "Other partner."**

Contact elicitation and CI expansion

- **All contacts identified during index or proxy interviews should be entered in CMaP or IRIS regardless of whether they are tested.**
- **The results of a contact investigation should be analyzed by stratifying results in US-born vs. non-US-born contacts.**
- **The decision to expand CI should be considered if the results of the CI suggest demonstrated transmission evidenced by: 1) secondary case, 2) TB test conversion, or 3)**

higher than expected LTBI rate in contacts as compared with the general population. For household contacts, or contacts with comparable duration of exposure as household contacts, the LTBI prevalence rates are determined by TB Epidemiological Studies Consortium (TBESC) rates. For other contacts, e.g. worksite or school investigation, the LTBI prevalence rates are determined by the prevalence rates as determined by US-born and non-US-born populations in the National Health and Nutrition Examination Survey (NHANES) study.

Contact Diagnosis, Evaluation and Treatment

- **A ≥5 mm TST induration is considered positive in all contacts (high, medium and low priority).**
- **Initial testing of low priority contacts, if undergoing testing, should be performed 8–10 weeks after last known exposure.**
- **Contacts that have a documented previous positive TST and are HIV positive with CD4 < 400 should complete a full course of LTBI treatment regardless of previous LTBI treatment.**
- **However, individuals with CD4 counts > 400 and on ART and who remain IGRA or TST negative may discontinue LTBI treatment at the end of the window period.**

Contents

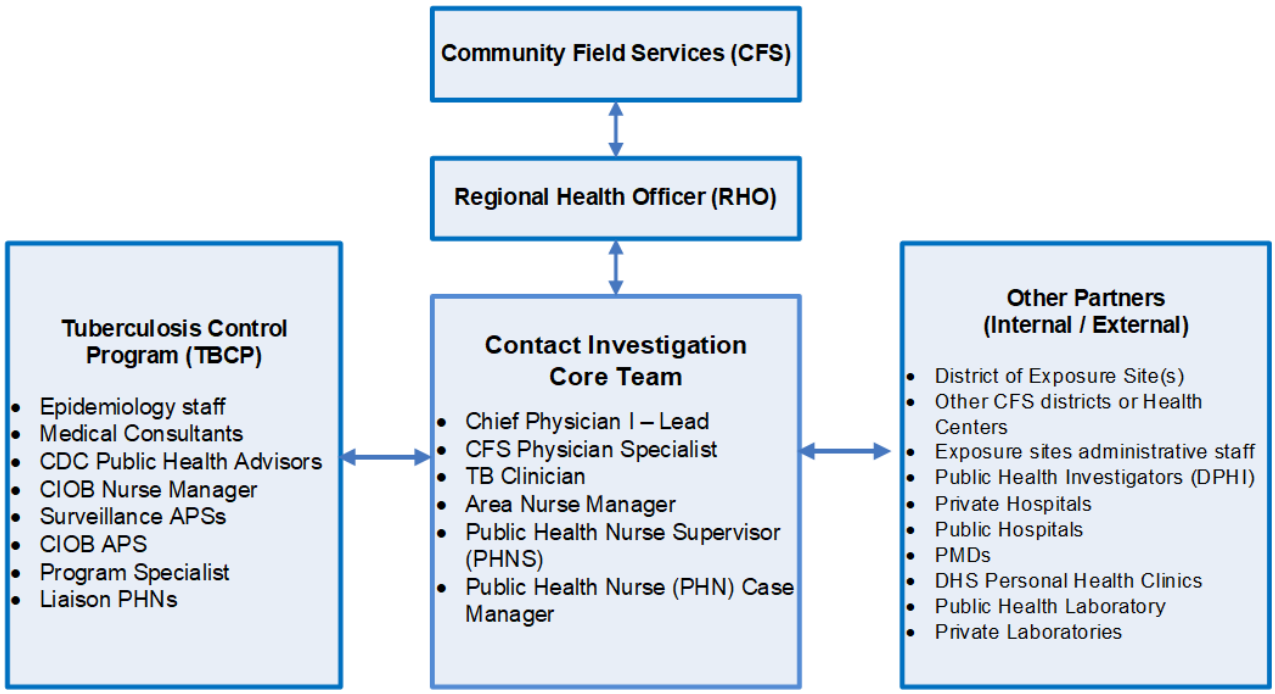
I. Contact Investigation: A Multi-Disciplinary Team Effort

In Los Angeles County, a district public health nurse (DPHN) is assigned as a case manager to each reported patient with suspected or confirmed TB disease. Part of the PHN's overall case management activities should include the assessment of the need for a CI. Since "CIs are complicated undertakings that typically require hundreds of interdependent decisions, the majority of which are made on the basis of incomplete data and dozens of time consuming interventions"[iv], *TBCP and Community Field Services (CFS) recommend that a collaborative TBCP/CFS CI Core Team be established to assist the PHN in completing the various activities of a CI.*

As the PHN collects information about the index patient and his/her contacts, the CI Core Team's objectives should include: determining the scope of the investigation, identification of special circumstances, assisting with the prioritization of exposure sites and contacts, identifying strategies to focus resources on contacts at highest risk of exposure, determining the need to expand an investigation, assuring that contacts with TB infection are evaluated, initiate, and complete treatment, and evaluating the outcomes of the CI. Information should be organized and presented by the PHN in a consistent format to facilitate review.

The suggested CI Core Team structure is illustrated below:

Figure 1: CI Core Team Structure



The CI Core Team, under the leadership of the Chief I, will need to work with TBCP and various internal and external partners in order to conduct a contact investigation. The CIOB team will work closely with all members of TBCP, especially with its medical consultants, to communicate recommendations and guidance. In order to meet the CI Core Team's objectives (listed above), it is critical that the Team shares and discusses CI information and planning **and ensures timely documentation in CMAP** on a regular basis throughout the investigation.

II. Framework for Contact Investigations

This chapter is designed to aid CFS staff who conduct CI activities and CS staff who support the evaluation and provision of treatment to contacts who are not seeking care from community providers. The CI steps described within this section correlate with the LAC DPH TBCP CI Guidelines in TB Control Manual. Each section within this chapter includes a short summary of the major CI concept or activity and tools to assist the CI team to make necessary decisions. Use of these tools by CFS in collecting the necessary information to be reviewed by the CI Core Team is strongly encouraged. Although the CI steps are listed in numerical order, the steps do not necessarily need to be carried out in the exact order presented, and may be conducted in parallel. Included within each section is a reference to the specific section in the LAC DPH TBCP CI Guidelines.

Structure of this section

1) **Decision to initiate a contact investigation**
2) **Investigating the index patient**
3) **Site evaluation**
4) **Assigning priorities to contacts**
5) **Diagnosis and evaluation of contacts**
6) **Treatment of contacts**
7) **When to expand a contact investigation**
8) **Communicating through the media**
9) **Data management and evaluation of contact investigation**
10) **Congregate settings (e.g., schools, health care facilities)**
11) **Source case finding**

Used together, the tools included in this section and the LAC DPH TBCP Guidelines will help focus CI activities on those contacts at greatest risk of being infected and on those at greatest risk of progression to TB disease.

Although these recommendations have attempted to cover most major scenarios, they do not address every circumstance that may arise. It is recommended that TBCP be promptly consulted when situations not addressed in these recommendations arise.

1) Decision to Initiate a Contact Investigation

CIs should be considered for all pulmonary, laryngeal, and pleuro-pulmonary TB suspects and cases. The possibility of pulmonary TB should always be considered in cases with an extra-pulmonary site of TB disease and pulmonary TB disease should be excluded by symptom screening, chest X-ray (CXR) and sputum for acid fast bacilli (AFB) smear and culture if indicated. For a pleural TB suspect or case, pulmonary involvement should always be excluded with CXR and sputum for AFB smear and culture.

Occasionally, in exclusively extra-pulmonary TB disease, aerosolization of infected droplets may occur, such as during an autopsy, electrical cauterization of infected tissue or water-jet irrigation of a TB abscess or wound. In these situations, a CI should be initiated.

The decision to initiate a CI should be based on the estimated degree of contagiousness of the patient (based upon the site of disease, clinical and/or radiographic findings, sputum AFB smear and molecular diagnostic results). Relative infectiousness has been associated with positive sputum culture results and is highest when the sputum AFB smear results are also positive[v,vi,vii,viii]. The significance of results from respiratory specimens, other than sputum, (e.g., bronchial washing or broncho-alveolar lavage fluid) is undetermined. Experts recommend that these specimens be regarded as equivalent to sputum[ix].

Once a decision has been made to initiate a CI, investigation activities are separated into three phases: assessment, continuation, and completion. Activities associated with each phase are outlined in Table 1.

TABLE 1: Contact investigation phases and related activities

CI Phases	CI Activities
Assessment	• DPHN completes PHN TB assessment, interviews index patient or proxy to elicit contact names and locating information, identifies exposure sites and creates a preliminary CI plan (prioritizing sites, setting and contacts). • DPHN has the flexibility to begin testing of household contacts (unless the index patient resides in a congregate residential facility). • DPHN presents all initial information gathered on the index and preliminary CI plan to CI Core Team for review.
Continuation	• Chief I or designee contacts administration of exposure site(s). • DPHN, in consultation with the CI Core Team, conducts site visit(s), identifies contacts, prioritizes contacts (high, medium, low), begins initial testing (TST/IGRA) of high and medium priority contacts, schedules CXR, refers for window period prophylaxis/LTBI treatment as necessary.

	• If the DPHN identifies contacts outside of the district of residence (DOR) of the index patient, the DPHN refers them to the appropriate public health center or public health jurisdiction. • Interpretation of data should be carried out at a minimum by the CI Core Team after initial testing, after second round testing and at final review to determine if any evidence of transmission and need for expansion. High profile CIs, e.g. those assigned to the Health Officer Log, should be reviewed weekly by members of the CI Core Team. Best practice for the CI Core Team is to have a review of individual CIs on a monthly basis to assure timely completion, e.g. 6-9 months, depending on complexity. • CI Core Team determines the need for expansion on an on-going basis. • DPHN monitors initiation of treatment for those contacts diagnosed with LTBI.
Completion	• DPHN completes testing of contacts (as needed). • DPHN monitors completion of treatment for those contacts diagnosed with LTBI. • CI Core Team conducts a comprehensive analysis of the CI (see section 9) at the completion of the investigation.

NOTE: Prioritization of multiple contact investigations is a decision that should be made by the CI team based on factors such as the likelihood of transmission and on the contacts risk for progression to disease.

Tool –Sputum smear positive, Sputum smear negative
Reference - pages 10–16 of the LAC DPH TBCP CI Guidelines, Los Angeles County Nucleic Acid Amplification Test (NAAT) Guideline

2) Investigating the Index Patient

Gathering information about the index patient is the foundation of a contact investigation. Multiple interviews with the index patient and/or proxy are usually required to understand a patient's complex social network. The initial interview should be done in person, not by phone. Over the course of any one CI, a large amount of information will be collected about the patient through interview(s) and from patient medical records. Information required for medical review of the index case includes the following: site of disease, date of onset and type of symptoms, chest radiograph result, chest CT result if available, TB medicines and start date, sputum AFB smear, culture and susceptibility results, name of lab where specimen was sent, other medical conditions, previous TB and TB treatment history, employment history / work site information and living situation / social factors.

An infectious period should be calculated to identify the period during which exposure is most likely to have occurred, in order to focus the CI on individuals at highest risk for infection. The calculation of the infectious period depends upon the patient's clinical characteristics.

For MDR cases, regardless of sputum AFB smear status, cavitation on chest x-ray or TB symptoms, the determination of the end of the infectious period will differ. MDR cases will require additional criteria of at least 3 consecutive negative sputum cultures without a subsequent positive culture and 14 days of TB treatment on DOT.

For patients with a very lengthy estimated infectious period (e.g. >1 year) it may not be feasible to evaluate all high priority contacts. In this situation, an investigation may be initiated using an abbreviated infectious period (e.g., 3 or 6 months). If there is not strong evidence of TB transmission in this abbreviated infectious period, it may not be necessary to expand the timeframe. If however, there is evidence of transmission during the abbreviated infectious period, the investigation timeframe should be expanded.

Information regarding transmission settings that the patient frequented during the infectious period is needed for identifying contacts and assigning priorities. Topics to discuss include where the patient spent nights, met with friends, worked, ate, visited, and sought health care. The interviewer should specifically ask about congregate settings (e.g., high school, university, correctional facility, homeless shelter, or nursing home). The interviewer also should inquire regarding routine and non-routine travel. Contacts not previously identified might have been exposed during the patient's infectious period while the patient was traveling. Routine travel modes (e.g., carpool) could also be settings in which contacts were exposed. This information is collected in a systematic fashion while still stressing patient confidentiality.

For all potentially infectious TB cases, a contact investigation plan should be created in order to document all sites of exposure during the patient's infectious period. *The plan should include the name and location of each site where the index patient spent time during his/her infectious period, the last day the patient was at each site, as well as documenting an estimated exposure period for each location.*

Maintain confidentiality at all times unless doing so endangers the public's health. The PHN should discuss with the patient how best to disclose the potential exposure to family/friends, worksite, social and other settings. Unless permission is given, the index patient should be informed that contacts will not be given information on the identity of the index patient. In certain situations where work, school, or other large groups are involved, it may be necessary for a few persons (e.g., employee health or work supervisor) to know the name of the index patient to ensure that all contacts are identified and to determine their level of risk. Confidentiality may be breached to protect the health of contacts and to protect the public.

Screening low priority contacts or persons not exposed, simply to protect the identity of the index case is not recommended. This practice is contrary to the cardinal principle of prioritizing the evaluation of TB contacts (i.e., testing high and medium priority contacts first, and then proceeding to low priority contacts if indications exist), and may result in harm to individuals tested unnecessarily.

When the CI Core Team encounters sensitive situations regarding protecting the identity of the index patient, they should consult with TBCP.

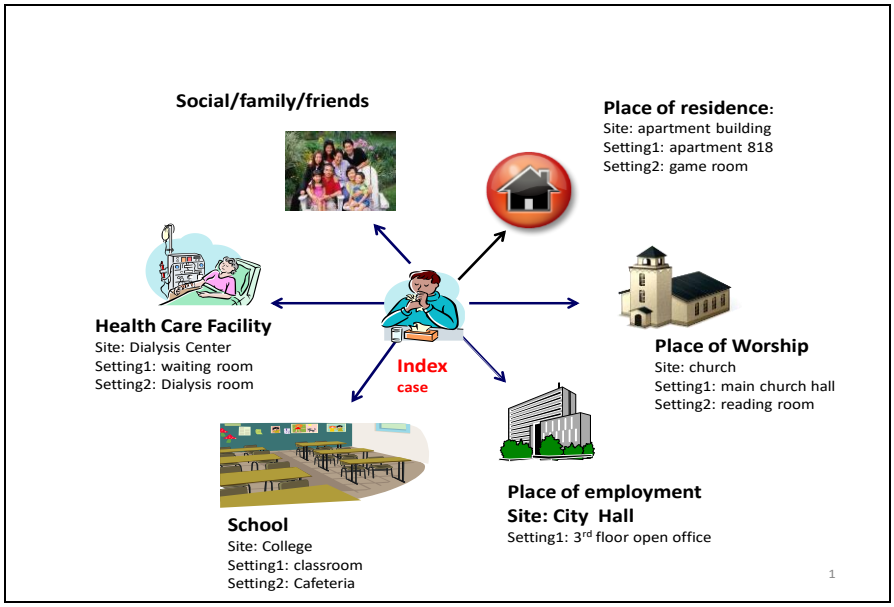
Tools–Interview checklist, Preliminary list of open-ended questions, Estimating infectious period table, List of possible exposure site(s)
Reference - pages 17-21 of the LAC DPH TBCP CI Guidelines

3) Site Evaluation

Factors to consider for assessing the risk of transmission at a site include: infectiousness of the index case, cumulative time of exposure, proximity of contact(s) to index, and environment (area and ventilation). [For specific guidance regarding NRHCF, see Section 10]. The risk of transmission will often vary at each site/setting. A tool (see Exposure site assessment tool) has been provided to help assess the area and ventilation at a site or setting. To supplement this information, pictures, floor plans, video clips, diagrams or other graphical representations of the area can help the CI Core Team understand the space where exposure took place.

Reviewing the entire social network of the index patient (e.g., friends, family, work, school) will inform decision making for prioritization of sites, settings and contacts. For each site (e.g., school), the investigating team should further subdivide the site into settings (e.g., classroom, lunch area, gym, etc.). This process of more strictly dividing sites into settings is essential when performing a contact investigation in any large site, and will help prioritize contacts by duration and intensity of exposure. An example of a contact investigation with multiple sites and settings is illustrated in Figure 2.

Figure 2: Social Network: Potential exposure sites and associated settings



A home visit should be done for all pulmonary (including pleuro-pulmonary) and laryngeal TB suspects/cases to verify the information that is gathered through the index/proxy interview and from medical record review(s). While the home is an important site to investigate, all sites where the case spent time while contagious should be carefully considered for estimating the risk of transmission.

Prioritization of site visits should be done by the CI Core Team for all sites of exposure based on the estimated risk of transmission at each site and the contacts' risk for progression to disease if infected. During the CI Core Team review of the social network of a potentially highly infectious index case (e.g. multiple smear AFB positive), certain sites/settings should take precedence for investigation (e.g. congregate settings, sites where the index patient spent significant time, sites where vulnerable or susceptible contacts are identified, sites with intense exposure (e.g., close proximity within a poorly ventilated space) over a short duration). Conversely, the CI Core Team can delay an investigation at, or decide to not investigate, sites/settings where it can be verified that the index case spent an insignificant amount time during the infectious period.

The reason(s) to delay, not investigate or not visit an exposure site(s) should be discussed by the CI Core Team and clearly documented in CMaP or IRIS event notes.

Contacts should be prioritized as high, medium or low priority at each site/setting. High and medium priority contacts must be screened at each site/setting regardless of TB screening results at other sites/settings. Lack of evidence of transmission at one site/setting (including the home) does not preclude the possibility of transmission at another site/setting.

Tool –Exposure site assessment
Reference - pages 22-25 of the LAC DPH TBCP CI Guidelines

4) Assigning Priorities to Contacts

Although a relatively brief exposure can lead to *M. tuberculosis* infection and disease[x], certain contacts are not infected even after long periods of intensive exposure. However, increasing the intensity and duration of exposure usually increases the likelihood of recent *M. tuberculosis* infection in contacts, and these are the most important factors that determines the initial decision of who is identified as a contact meeting criteria for evaluation. In practice, public health officials must focus their resources on finding exposed persons who are more likely to be infected or to become ill with TB disease. LAC TBCP has defined a period of shared air space for 8 hours during one week of the infectious period with the index case to identify contacts for evaluation, without considering factors that may affect susceptibility to infection or transmission to disease.

All contacts are not at equal risk to become infected, or of developing TB disease once infected. They are assigned a priority on a case-by-case basis depending upon the index patient's ability to transmit TB, the duration of exposure, the environment where possible transmission took place, and the susceptibility and vulnerability of the contact. *LAC DPH TBCP uses a three-tiered prioritization of contacts (high, medium and low*). CFS must be ready to identify additional contacts for evaluation who are immunocompromised and may not have shared air space for 8 hours during a week of

infectious period with the index case, but meet criteria for intensity of exposure. Although additional time may be needed to prioritize contacts into these three categories, this will help to maximize limited resources on the highest-priority contacts. To aid in determining exposure duration and environmental exposure, refer to the Exposure Site Assessment tool.

Contacts of a more infectious index patient (e.g., one with sputum AFB smear positive TB) should be assigned a higher priority than those of a less infectious one because contacts of the more infectious patient are more likely to have recent infection or TB disease[xi,xii,xiii,xiv,xv,xvi].

HIV-infected persons, immunosuppressed patients (see tables 2a and 2b, #2), or children under five years old should be identified as high priority. If infected, they are more likely to progress to TB disease and are also more likely to develop severe or disseminated forms of TB disease.

A contact's risk for progression to TB disease should be determined through a medical assessment or by self report. For high and medium priority contacts, a medical assessment should determine risk factors for progression. For contacts initially categorized as low priority, self-reporting can be utilized, to identify immunosuppressed contacts or contacts at increased risk of progression once infected in order to elevate these individuals to high priority. In large scale investigations, except for special situations such as investigations involving low-risk NRHCF, TBCP recommends that an on-site educational session, along with a TB exposure letter, be provided to all potentially exposed persons, highlighting the need for medical evaluation for any person with TB signs and symptoms and the greater risk of the TB exposure for persons that have medical conditions that increase the risk for progression to active TB disease.

It is critical that after index and contact characteristics have been taken into account, that prioritization of contacts for a particular site should be based on site/setting data that is as accurate as possible (intensity of exposure, duration of exposure, ventilation characteristics, and area of exposure) because it informs decisions on who to test, when to test and the extent of follow-up of contacts. In certain situations changing a contact(s) priority may be necessary as the CI Core Team receives new data while progressing through the investigation.

Regardless of a contact's priority, if a contact has signs or symptoms of TB disease they should be referred immediately for further medical evaluation to rule out TB disease.

The index patient's characteristics that inform contact prioritization can be divided into two general categories:

1) **Exposure to a TB 3 or TB 5 case of pulmonary, laryngeal, and/or pleuro-pulmonary TB with: *Positive sputum AFB smear <u>or</u> Cavitary lesion on chest radiograph***
2) **Exposure to a TB 3 or TB 5 case of pulmonary, laryngeal and/or pleuro-pulmonary TB with: *Negative sputum AFB smear, <u>and</u> Abnormal, non-cavitary chest radiography consistent with TB disease*, *Started on TB treatment***

(see Table 2a and 2b below):

Table 2a: Exposure to a TB 3 or TB 5 case of pulmonary, laryngeal, and/or pleuro-pulmonary TB with:

- ***Positive sputum AFB smear <u>or</u>***
- ***Cavitary lesion on chest radiograph***

High Priority Contacts	Medium Priority Contacts	Low Priority Contacts
1. Children under 5 years of age **2. Immunosuppressed contacts:** a. Infected with HIV b. Immunosuppressive medical treatment, for example: - ≥ 15mg/ day of prednisone or its equivalent for one month or more - Cancer chemotherapy agents - Antirejection drugs for organ transplantation - Biologic agents such as tumor necrosis factor alpha (TNF-α) antagonists (e.g. for autoimmune diseases like rheumatoid arthritis, Crohn's disease) **3. Other conditions that increase risk of progression from latent TB infection to active disease once infected:** a. Chronic kidney disease / end-stage renal failure b. Diabetes mellitus c. Silicosis d. Head or neck cancer e. Hematological and reticuloendothelial disease (e.g. leukemias and lymphomas) f. Intestinal bypass or gastrectomy g. Chronic malabsorption syndrome h. Low body weight (>10% below ideal body weight) i. Chronic alcoholism j. Increased risk for HIV infection (including intravenous drug-use) **4. Exposure during an aerosol-inducing medical procedure** (e.g. autopsy, bronchoscopy or sputum induction) **5. Significant exposure based on intensity <u>AND</u> ≥8 hours of exposure during any one week of the infectious period***	**1**. Persons five years and older, not already classified as high priority with **significant exposure based on intensity <u>OR</u> ≥8 hours of exposure during any one week of the infectious period*.** **2. Any contact who does not meet the above criteria but deemed to be medium priority by the CI Core Team.**	Any contacts, who are not already classified as high or medium priority, and who have limited exposure to the index case.

* <u>Examples of intense exposure include</u>: Carpooling with the index case, sharing the same house or living space as the index case, and sharing air with the index case in small, enclosed spaces with little natural ventilation or mechanical ventilation with re-circulated air.

Table 2b. Exposure to a TB 3 or TB 5 case of pulmonary, laryngeal and/or pleuro-pulmonary TB with:

- ***Negative sputum AFB smear, and***
- ***Abnormal, non-cavitary chest radiography consistent with TB disease***
- ***Started on TB treatment***

High Priority Contacts	Medium Priority Contacts	Low Priority Contacts
1. Children under 5 years of age **2. Immunosuppressed contacts:** a. Infected with HIV b. Immunosuppressive medical treatment, for example: - ≥ l5mg/ day of prednisone or its equivalent for one month or more - Cancer chemotherapy agents - Antirejection drugs for organ transplantation - Biologic agents such as tumor necrosis factor alpha (TNF-α) antagonists (e.g. for autoimmune diseases like rheumatoid arthritis, Crohn's disease) **3. Other conditions that increase risk of progression from latent TB infection to active disease once infected:** a. Chronic kidney disease / end-stage renal failure b. Diabetes mellitus c. Silicosis d. Head or neck cancer e. Hematological and reticuloendothelial disease (e.g. leukemias and lymphomas) f. Intestinal bypass or gastrectomy g. Chronic malabsorption syndrome h. Low body weight (>10% below ideal body weight) i. Chronic alcoholism j. Increased risk for HIV infection (including intravenous drug-use) **4. Exposure during an aerosol-inducing medical procedure** (e.g., autopsy, bronchoscopy or sputum induction)	**1**. Persons five years and older, not already classified as high priority with **significant exposure based on intensity AND ≥8 hours of exposure during at least one week of the infectious period*.** **2. Any contact who does not meet the above criteria but deemed to be medium priority by the CI Core Team.**	Any contacts, who are not already classified as high or medium priority, and who have limited exposure to the index case.

* Examples of intense exposure include: Carpooling with the index case, sharing the same house or living space as the index case and sharing air with the index case in small, enclosed spaces with little natural ventilation or mechanical ventilation with re-circulated air.

Tools – Prioritization of contacts, Contact TB exposure notification template letter, TB exposure notification Site template letter

Reference - pages 25-30 of the 2013 LAC DPH TBCP CI Guidelines

5) Diagnosis and Evaluation of Contacts

Once contacts have been prioritized, resources should initially be allocated to complete all investigative steps for high and medium priority contacts. Exposure sites may not have all three levels of priority contacts (smaller settings or investigations may only have one or two priority levels). In practice, screening and testing of high and medium priority contacts often happens simultaneously. TBCP recommends that the CI Core Team consider on-site screening and testing of contacts whenever possible. On-site testing is strongly recommended in order to expeditiously and comprehensively screen and test (TST/IGRA) high and medium priority contacts. After screening and initial testing, contacts that are converters, TST/IGRA positive and those contacts needing window period prophylaxis should be promptly referred to their district of residence public health center for follow up evaluation and treatment.

When on-site testing can be done by the facility where the exposure occurred (e.g., facilities covered by ATD Standard or facilities that contract out their employee screening), CFS can assist in prioritizing contacts and document that evaluation is completed.

A medical history should include an assessment of TB risk factors, (see tables 2a and 2b), and whether the patient is US-born or non-US-born. *High and medium priority contacts who have not had an HIV test in the past year should be offered HIV testing as a routine part of their evaluation*.

IGRAs are preferred for evaluation of TB infection among persons who have received BCG (either as a vaccine or for cancer therapy); and persons from groups that have historically poor rates of return for TST reading.

When using a TST to test for infection, a TST result of ≥5 mm induration is considered positive in ***all contacts*** *(high, medium and low priority).*

If the initial TST is five (5) millimeters or greater, the contact is asymptomatic and has a normal chest x-ray, then the contact is diagnosed with LTBI. If after medical evaluation there is no contraindication to LTBI medications, the contact should be strongly encouraged to complete LTBI treatment.

If the initial TST is less than five (5) millimeters, a repeat TST is indicated 8-10 weeks after the last exposure to the infectious index case or after smear conversion if exposure is continued. *Window period prophylaxis should only be offered for those contacts who are immunosuppressed or less than 5 years old.*

If the repeat TST is still less than five (5) millimeters, consider the possibility of anergy in immunosuppressed contacts (see tables 2a and 2b, #2). If it is unlikely that a negative TST is the result of anergy, window period prophylaxis should be discontinued. Contacts who are HIV-infected and were started on window period prophylaxis should complete a full course of LTBI treatment. **Exception: individuals with CD4 counts > 400 and on ART and who remain IGRA or TST negative may discontinue LTBI treatment at the end of the window period[xvii].**

For contacts, a skin test conversion is defined as an increase of at least 5mm, from less than 5mm on the initial skin test to a reaction of greater than or equal to 5mm on the second test, 8 to 10 weeks after last exposure.

LAC TBCP has provided table 3 below to aid in the definition of TST conversion in a contact investigation. Any prior documented TST >10mm should be considered a prior positive and evaluated (as outlined on page 6-43). Expert consultation should be obtained in interpreting TST results in a contact investigation if there continues to be uncertainty about whether individuals have had clinically significant TST changes.

Table 3. Guidance for Defining a Tuberculin Skin Test Converter in a CI[+]

Scenario	Previous TST status	Initial post-exposure TST result	Repeat post-exposure TST result	TST converter?
1	No previous documented TST	< 5 mm	Increase of at least 5 mm	Yes
		≥ 5 mm	Do not place TST	No (Reactor)
2	Documented previous TST within last 2 years was < 5 mm	< 5 mm	Increase of at least 5 mm	Yes
		≥ 5 mm	Do not place TST	Yes
3	Documented previous TST within last 2 years was qualitatively "negative" but no quantitative measurement was noted	< 5 mm	Increase of at least 5 mm	Yes
		≥ 5 mm	Do not place	Yes

[+]Any person with a documented TST negative greater than 2 years prior to exposure who tests positive on the first post-exposure TST (≥ 5mm) is considered a reactor and not a converter.

In the context of a CI, it is difficult to interpret the results of a two-step TST done to detect boosting of sensitivity. (Note: Two-step testing is distinct from the practice of repeat testing 8–10 weeks after last exposure.) For this reason, CDC does not recommend the use of two-step testing in CI. *A contact whose second test result is positive (increase of at least 5mm) after an initial negative result (<5mm) should be classified as a converter*.

Low priority contacts should be tested at least 8–10 weeks from the time of last exposure. The CI team decision of whether to test low priority contacts will depend on the results of the testing of high and medium priority contacts (see Section 7: When to expand a CI).

At a site where only low priority contacts have been identified, testing outcomes from other sites (that have high and/or medium priority contacts) within the social network of the index patient can be used to decide whether to proceed with testing.

A CXR is indicated at the initial screening of a contact, regardless of TST/IGRA results, for children less than 5 years old, and immunosuppressed contacts* (i.e. contacts infected with HIV, contacts on immunosuppressive medical treatment, such as: ≥ 15mg /day of prednisone or its equivalent for one month or more, cancer chemotherapy agents, antirejection drugs for organ transplantation, tumor necrosis factor alpha (TNF-α) antagonists). *Note: Children < 5 years old should have a two view CXR.

Any contact (high, medium or low priority) with signs and/or symptoms of active TB (e.g. chronic cough, unexplained weight loss, night sweats, fever) should be fully evaluated for TB disease.

Management of broken appointments differs between high, medium and low priority contacts. Key factors in increasing the adherence of individuals include engagement of their existing medical providers in evaluation and treatment and provision of certain enablers in selected situations, and coordination with exposure sites that have clearance requirements for continued participation and attendance, amongst other strategies. Contacts who fail to comply with an initial appointment for examination should be managed in the following manner:

- For high priority contacts, the DPHN should contact the patient immediately, provide education and address barriers for adherence, and reschedule an appointment within one week. With the second broken appointment, the high priority contact is referred to the PHNS and then to the SPHI. With the third broken appointment, the CI Core Team should assess the need for a Legal Order of Examination within 72 hours.

- For medium priority contacts, the DPHN should contact the patient immediately, provide education and address barriers for adherence, and reschedule an appointment within two weeks. With the second broken appointment, it is not necessary to make further attempts to reschedule the contact. The TB Clinician should determine the disposition for the contact.

- If a low priority contact breaks the initial appointment, the investigation of that contact may be closed at the discretion of the DPHN. It is not necessary to reschedule the contact for an appointment.

If transmission is identified within a CI, high priority and medium priority contacts who have been closed may need to be re-addressed and revisited. Medium and low priority contacts should be reviewed for reassignment as high or medium priority contacts, depending on the extent of the exposure and transmission.

Principles of contact investigation for multidrug-resistant TB (MDR-TB) index cases are the same as those used for index cases who have drug-susceptible TB. While MDR-TB organisms are not considered more virulent than drug-susceptible organisms, a heightened effort should be made to identify and evaluate all contacts because of the increased complexities regarding LTBI treatment or treatment of TB disease that may arise. Consultation with TBCP for expert advice about MDR-LTBI treatment is required.

Tool – Timeframe for contact follow-up, Diagnosis and evaluation of contacts; TBCP BA /Unable To Locate follow-up
Reference - pages 31-44 of the LAC DPH TBCP CI Guidelines

6) Treatment of Contacts

Once contacts have been identified and screened, appropriate treatment of contacts is essential.

In the absence of treatment for LTBI, 5% to 10% of immunologically competent adults develop TB disease during their lifetimes, and half of the risk occurs in the first 2 to 3 years after infection[xviii]. Infected children have a comparatively higher risk of progression to active disease: 43% of infants less than 1 year of age, 24% of children 1 to 5 years old, and 15% of those 11 to 15 years old develop TB disease if not treated for LTBI[xix]. Factors that increase the risk of progression to disease usually affect the immune system — HIV-infection is the most important risk factor that promotes progression to active TB in people with LTBI. Compared to a 5% to 10% lifetime risk for an immunologically competent adult, persons infected with HIV have a 5% to 15% annual risk of developing active TB disease[xx].

All contacts that are examined and diagnosed with LTBI but refuse therapy should be counseled regarding their specific risk for developing TB disease. This includes contacts with a history of a previously positive TST/IGRA. The PHN and the Clinic Services (CS) chest clinician should discuss with patients and their families the reasons for refusing treatment and attempt to address concerns or misconceptions about TB infection and TB disease. Initiation and completion of treatment for LTBI is an essential component of CIs and every effort should be made to ensure high rates of initiation and completion. For certain high priority contacts who refuse treatment, such as persons living with HIV, other immunosuppressed individuals or children < 5 years of age, the CS chest clinician may require that the contact return for periodic examinations to evaluate for active TB disease.

Contacts may choose to be followed by their own health care provider. In such cases, the PHN should contact the primary care physician and stress the need for TB testing and initiation and completion of LTBI treatment as indicated. Private providers should follow the guidelines for medical management of contacts as described in this chapter. The PHN case manager must obtain final TB evaluation results for those contacts that are evaluated by their primary care provider and document whether LTBI treatment was initiated, and if not, the reason for not initiating treatment. If LTBI treatment was initiated, treatment start date and final treatment outcome should be obtained in a timely manner by the PHN case manager.

For contacts who initiate LTBI therapy, every effort must be made to help support completion of therapy. This is an opportunity to address barriers to LTBI treatment adherence. Completion of LTBI treatment is essential to interrupting the chain of transmission of TB and is one of the most important goals of all contact investigations.

Tools –Primary Care Provider follow-up letter, Primary Care Provider evaluation summary roster (Reference - pages 44-45 of the LAC DPH TBCP CI Guidelines, TB Control Manual Chapter 2

7) When to Expand a Contact Investigation

The decision to expand a CI should be based on the outcome of screening of high and medium priority contacts. Generally, the screening outcome for at least 70% of high and medium priority contacts within a large investigation should be completed prior to assessing the need for expansion. In addition, the identification of other TB cases or any TST/IGRA conversions among the contacts should trigger discussion of expanding the CI. Whenever possible, the nativity status, (e.g. US-born vs. non-US-born) of a contact should be taken into consideration when calculating LTBI prevalence for a CI, as the ability to discern possible or evidence of transmission is enhanced.

The CI Core Team should **consider** expanding the scope (i.e., number of contacts) of an investigation if any one or more of the following criteria are met:

- Unexpectedly high prevalence of LTBI in high or medium priority contacts. Two sources that can be used to estimate prevalence are:
    - The 2011-2012 NHANES) which indicates that the estimated prevalence of LTBI in US born individuals (based on TST screening) is 1.5% and in non-US born individuals living in the US is 21%[xxi], The estimated LTBI prevalence based on IGRA is 3% for US-born individuals and 16% for non-US-born individuals living in the US[xxii].
    - The TB Epidemiology Consortium Studies (TBESC) latent class analysis of TST, QFT and T spot in high prevalence populations in a multicenter trial showed an average of 34% LTBI prevalence in individuals > 5 years old and 4% in children < 5 years[xxiii].
- TB disease in any contact, **OR**
- TB infection in any contact aged < 5 years, **OR**
- Contact with change in TST/IGRA status from negative to positive (see table 3).

The TBCP recommends that the NHANES estimates for LTBI prevalence are most comparable to non household contact exposures, while the TBESC estimates for LTBI prevalence are comparable for non-US born household. It should be noted that because households often have small numbers of individuals living together and it is difficult to assess the infectiousness of an index case when only a small number (e.g. < 10 contacts) are identified for an index. Therefore, in the case of smear positive index cases in particular, it is recommended that additional medium or high priority contacts are elicited (e.g. social network, other family members outside the household, frequent visitors, recently departed family members) to have an adequate number of contacts to evaluate.

LTBI prevalence amongst US-born contacts offer an opportunity to identify possible transmission more easily than that in non-US-born contacts. Any US-born contacts that do not have previous TB test results should be interviewed to identify TB risk exposures unrelated to the current CI (refer to TB

II Risk Assessment Checklist). These include: known contact to other TB index, travel overseas to TB endemic country > 3 weeks, history of homelessness or incarceration. If there are other possible TB exposures, then the likelihood that the positive TB test is related to the exposure is less. If no other exposures are identified, this LTBI diagonsis may be an indication of possible transmission.

At times, preliminary data may provide sufficient evidence to support recent transmission in the setting. Thus, a decision to expand the investigation may be made even if less than 70% of contacts have been evaluated. In these situations, derive the strategy for expanding an investigation from the data obtained to that point in time. Without data from the initial contact investigation to support evidence of transmission, there is no indication to expand a CI. Ensure that you have data from all of the identified contacts, including those who reside in other public health centers.

Tools– TB II Risk Assessment Checklist , framework-when to expand a contact investigation, calculation of infection prevalence
Reference - pages 47-48 of the LAC DPH TBCP CI Guidelines

8) Communicating through the Media

As per Los Angeles County guidelines, all media inquiries should be routed through the DPH Office of Communications and Public Affairs. It is often helpful to anticipate media inquiries for high profile settings, such as school or large workplace. In these instances, consider contacting the Office of Communications and Public Affairs prior to actually receiving a media inquiry. The TBCP CIOB team can provide support with communication upon request.

Phone: (213) 240-8144 E-mail: media@ph.lacounty.gov

Tool – N/A
Reference - pages 48-50 of the LAC DPH TBCP CI Guidelines, LAC DPH Policy No. 400 Contact with News Media

9) Data Management and Evaluation of Contact Investigation

Data management related to contact investigations has three broad components: data collection, data summary, and data analysis.

Data collection should be done using standardized (paper or electronic) forms to allow for the systematic collection of data in an organized fashion. The information regarding contacts and their screening results must be entered into CMaP or IRIS. The collection and management of contact

information in large and/or more complicated investigations may be enhanced by using an electronic contact list. Summarizing contact evaluations in an electronic format will make sorting, calculating and analyzing the results of the investigation easier for the CI Core Team. In these situations, it would be appropriate to notify TBCP that an electronic contact roster would be submitted.

Data collected should be summarized and presented in an easy to understand electronic format to enable the CI Core Team to routinely access standardized summary reports. CI Core Team decisions regarding which contacts to assign as high, medium and low priority must be documented so as to aid in assessing and evaluating outcomes.

Data analysis should be carried out by the CI Core Team periodically throughout the investigation, especially after initial testing results and post 8-10 week window testing results/evaluations in order to determine if any evidence that transmission has occured.

A comprehensive analysis should be done at the completion of the investigation. Ideally, as a result of this comprehensive analysis, a CI summary should be generated to identify lessons learned and best practices. Large complex investigations involving TBCP and CFS should be documented in a ‘Post Event Evaluation’. TBCP and CFS should work together after such investigations to document a summary of the investigation, including: decisions made throughout the investigation (prioritization of sites, contacts included in testing and those not included), epidemiologic links identified between cases, probable/possible sites of exposure, resources allocated, assessment of the response, lessons learned, TBCP specific recommendations, CFS specific recommendations and, if necessary, any corrective action measures. When possible, Post-Event Evaluations should take place no later than three months after the screening and testing of contacts.

The purpose of the Contact Investigation Data Management Tool is to provide an overall assessment of the investigation and should be used by CFS to communicate information to TBCP. Additional information may be requested by TBCP during the investigation to aid in oversight and consultation. Data elements to be reported to TBCP are outlined in table 4 below:

Table 4 Minimum Data Elements Reported to TBCP

Outcomes (separate US-born & non-US-born)	Definition (contacts at each site/setting)	Suggested indicators for CI completeness
A. # of contacts identified	Includes all potentially exposed contacts (stratified by priority)	
B. # with initial evaluation	Includes all contacts for whom medical history and TB exposure history have been obtained	B/A (Goal=100%)
C. # fully evaluated	Includes all contacts for whom necessary testing to provide final diagnosis of LTBI, including TST/IGRA (if indicated) and CXR (if indicated) was obtained	C/B (Goal=100%)
D. # diagnosed with LTBI	Includes all reactors, documented prior positives, and documented converters	
i. # reactors	Includes all reactors (either on 1st or 2nd test), excluding converters	
ii. # prior positive TST/IGRA	Includes all documented prior TST/IGRA positives	
iii. # documented converters	Includes all converters (either on 1st or 2nd test)	
iv. # unexpected reactors	US born without other risk factor for TB infection	
E. Infection rate (%)	(Di+Dii+Diii) / (C)*	
F. # started on LTBI treatment		F/D (Goal=100%)
G. # completed LTBI treatment		G/F (Goal=100%)
H. # children (< 5 years old) diagnosed with LTBI		
I. # suspects or additional confirmed cases	Excluding the index case	

*Whenever possible, this should be calculated for US-born contacts and non-US-born contacts separately to improve the detection of possible transmission.

Tool – Contact Investigation Data Management Tool
Reference - pages 50-55 of the LAC DPH TBCP CI Guidelines, LAC DPH Policy No. 400 Contact with News Media

10) Special Circumstances

In addition to the general challenges that a large scale TB contact investigation may present, a CI in a health care setting, school, homeless shelter or correctional facility poses several specific challenges that are important to consider in planning and carrying out activities. This section is based on lessons learned from CIs conducted in these particular settings.

The early identification of a TB exposure, within a health care setting, school, homeless shelter, or correctional facility, is critical and is usually determined during the initial patient interview. The CI Core Team should review all available information regarding the exposure and determine if a CI should be initiated. Once a decision to initiate a CI has been made, the CI Core Team should determine how and when to notify the facility. The public health department and facility administration should be in close communication and coordinate CI activities to ensure that the investigation proceeds as quickly and efficiently as possible. A written action plan outlining roles/responsibilities and agreed upon timelines may help to reduce duplicative tasks and focus limited resources.

Contact investigation within a homeless shelter or school will require management of a large number of contacts. For this reason, TBCP recommends that, when possible, the initial contact roster be obtained in electronic format from the facility administration. In addition to name, date of birth, country of birth, and contact information, administration should also be asked to include information on prior TB screening and known medical conditions.

The TBCP can be an important resource and partner for approaching contact investigations in special situations, including (but not limited to):

- People experiencing homelessness
- Prolonged infectious periods (e.g., > 1 year)
- Congregate settings
- Drug resistance
- Any evidence of transmission (i.e., another case with the same genotype or likely connection)
- Sites involving immunosuppressed individuals
- Other situations that require a more complex approach

One should have a low threshold to inform TBCP of CIs meeting the above criteria, as unorthodox approaches or advanced epidemiologic methods may be necessary.

Contact investigations within health care settings:
Post exposure follow up of health care personnel after exposure to an aerosol transmissible disease is an employer responsibility as outlined in Title 8 of the California Code of Regulations (CCR) General Industry Safety Orders § 5199, also known as the Aerosol Transmissible Diseases (ATD) Standard[xxiv]. Covered workplaces include health care settings such as hospitals, skilled nursing facilities, clinics, doctor's offices, other outpatient medical facilities, home health care operations, long-term health care facilities, hospices, medical transport, homeless shelters, correctional facilities, drug treatment programs, emergency response operations, and coroner facilities and laboratories. The Division of Occupational Safety and Health (DOSH) has drafted summary sheets to assist in

understanding how proposed Section 5199 would apply in certain facilities (see California State Department of Industrial Relations).

Certain health care facilities are not covered by the standard if they meet specific conditions outlined in the standard. For example, outpatient dental clinics are not required to comply with the standard if they do not perform dental procedures on patients identified as having or suspected of having an ATD. They must have written procedures for screening patients for ATDs, they must implement these procedures before performing any dental procedure to determine if there is an exposure risk and staff must be trained on the screening procedures.

Likewise, certain specialty clinics are not required to comply with the standard if they do not perform aerosol generating procedures on cases or suspected cases of ATDs, have a screening process in place to identify patients with potential exposure risk and implement the screening procedure prior to treating the patients. Staff must also be trained on the established procedures.

The below summary of public health responsibilities are not intended to modify or replace the actual language of the ATD standard, rather are listed to clarify responsibilities.

Public Health Responsibility

The Public Health Department's interaction with a health care facility after a TB exposure depends on the type of facility where the exposure took place. The TBCP has identified six types of high-risk medical facilities that should be prioritized for follow-up. These sites include HIV/AIDS clinics, chemotherapy infusion centers, dialysis centers, oncology clinics, organ transplant clinics and rheumatology clinics. Any site, after assessment by the Chief Physician or CI Core Team, deemed to primarily serve high-risk clients and/or with significant durations of exposure can also be considered as high-risk. Table 10 identifies the lead department/program responsible for notifying and working with the major types of health care facilities. See Appendix XI for algorithm to determine high-risk vs. low-risk NRHCF.

Community Field Services (CFS) staff responsibilities within **high-risk** NRHCF

- Notify the facility/agency of the potential exposure.
- Assist with determining the infectious period of the index.
- Assist with determining the exposure period for the identified exposure setting(s).
- Complete a site visit and site evaluation.
- Assist with setting limits of the contact investigation (post exposure follow up).
- Recommend that the facility perform testing or notify the primary care provider of any patients who may need TB screening.
- Facilities should notify and offer evaluation of employee contacts who are no longer employed or employee contacts on long term leave.
- CFS may offer the facility assistance in evaluating patient contacts who do not have a primary provider or health insurance.
- Request a summary of the post exposure follow up (# of contacts identified, number screened and outcome of the screening).

Non-Residential Health Care Facilities (NRHCF) Contact Investigations:
Local experience has shown that significant resources were being spent on low-risk NRHCF sites where exposure periods are generally short and intermittent and contact investigation (CI) results generally show no evidence of transmission of TB.

As a result, DPH will initiate and track the outcomes of high-risk NRHCF where the expertise and oversight of DPH personnel will be more impactful, while low-risk NRHCF will be notified of the exposure in order to comply with the ATD Standard. Low-risk NRHCF may be reassigned a high-risk NRHCF if transmission is detected amongst the HCP tested OR transmission is detected in another exposure site associated with the index case.

A NRHCF is defined as a facility that provides medical care which is not located on a hospital campus and does not house patients.

Tuberculosis Control Program (TBCP) responsibilities: **Hospital based investigations**
Upon reporting an infectious TB suspect/case from a public/private hospital, TBCP will determine from the Infection Control Practitioner (ICP) if the patient was appropriately isolated upon entry to the hospital. If the patient was appropriately isolated, no CI will be needed at the facility. If the patient was not appropriately isolated, a CI is indicated at the facility. TBCP surveillance unit clerk will send out a notification letter regarding the exposure to the hospital facility.

CFS staff may contact surveillance nursing staff if they become aware of a potential health care facility exposure not previously identified using the email address: TBCPSurvNur@ph.lacounty.gov. Surveillance nursing will then notify the appropriate facility ICP and request information regarding isolation and need for post exposure follow up of exposed contacts

TBCP surveillance nursing will offer health department assistance in locating and evaluating exposed contacts unable to be evaluated by the facility (i.e., patient contacts without a primary care provider, visitors, former employees, employees on long-term leave). The TBCP recognizes the employer responsibility to evaluate employee contacts under Title 8 CCR, however, assistance will be offered to locate and evaluate employee contacts when all employer attempts have failed at TBCP discretion. If transmission is suspected to have occurred, patient contacts or employees unable to be located or screened may be referred by TBCP to the district of residence public health center or other provider.

TBCP will assist with obtaining summary CI reports from public/private hospitals if transmission is suspected in other sites and settings of the index CI. These requests should be submitted to the TBCP Surveillance APS or LPHN. Due to the nature of post exposure follow up testing and the potential for second round testing, results may take up to 3 months for completion.

The California Codes and Regulations Title 22, indicates that there are additional requirements of health care facilities to provide information to the local health officer in the event of an unusual occurrence (e.g. TB exposure). The relevant Title 22 chapters and articles are as follows:

Skilled Nursing Facilities – chapter 3, article 5, §72541

Acute Psych Hospital – chapter 2, article 6, §71535
Intermediate Care Facilities – chapter 4, article 4, §73539
Primary Care Clinic – chapter 7, article 6, §75053

Tool - California State Department of Industrial Relations - ATD fact sheets
Reference - ATD standards

Contact investigations surrounding patients who are experiencing homelessness

Contact investigations involving homeless patients are challenging for many reasons, including:

- Difficulty locating the patient and contacts if they are mobile
- Episodic incarceration
- Migration from one jurisdiction to another
- Psychiatric illnesses (including chemical dependency disorders) that hinder communication or participation

Due to a high prevalence of TB risk factors (e.g., substance abuse, HIV infection, incarceration) and transmission in congregate settings, TB among people experiencing homelessness is a priority for TB control and prevention. A contact investigation among homeless persons, when conducted in a targeted and well-planned manner, has the potential to be a very high impact public health intervention.

Interview:
A TB CI interview with a person experiencing homelessness (PEH) may be affected by his/her lifestyle, life circumstance, or the client's prior (positive or negative) encounters with other county agencies/departments. For this reason, greater time should be allocated for conducting an interview in order to first develop rapport and trust between the homeless patient and the interviewer. Careful consideration should be placed on where the interview should take place and who should be present.

A TB CI interview with a PEH should take place as soon as possible. If the patient is hospitalized at time of initial report, the interview should take place before discharge. The basic interview conducted for most patients with TB is often not sufficient for patients who are experiencing homelessness. Interviews with PEH should include detailed information on shelters, social hangouts, location of meals, prior hospitalization(s), location and dates of incarceration, employment, and frequent use of public transportation.

It is not uncommon for PEH to express during an interview that they have few or no close contacts. When names or locations of specific contacts are unknown, interviews with the patient and potential contacts should focus on social networks and settings, including correctional facilities. Often it is possible that a PEH will spend a substantial amount of time with other people without realizing it. After carefully questioning and listening, it might become apparent that a PEH has established a regular daily routine, visiting the same locations or meeting with friends (social hangouts). If the client indicates that he/she stays at a particular shelter, it is critical to conduct a site visit and speak with shelter staff (day time and night time staff) to identify close friends and contacts.

Establishing infectious periods:
As with non-homeless patients, establishing the patient's infectious period is an essential first step to conducting a contact investigation. However, this can be challenging if the patient cannot recall precise dates of (cough, hoarseness) onset. Therefore, additional techniques should be used to verify symptom onset. Specifically, asking the patient about previous visits to medical care for TB related symptoms can help refine dates. Efforts should be made to contact medical providers or hospitals to determine the likelihood that the patient was contagious at that time. In addition, records of symptom screens performed at shelter entry can also be used to refine potential start dates for the infectious period.

Visiting sites of exposure:
Site visits and interviews are crucial because the social communities of PEH are likely to vary by situation. A contact investigation presents an opportunity to review the screening and testing procedures established within a shelter and to offer assistance with these and other means of decreasing transmission of *M. tuberculosis* (e.g., administrative and environmental controls). However, transmission also could occur at sites besides shelters (e.g., jails, bars, abandoned buildings, and cars).

Settings providing services to PEH are affected by policies, laws, and regulations according to their service population, location, and funding sources, some of which are relevant for the contact investigation. Access to visitation and occupancy rosters (or logs) and to other information regarding persons vital for listing contacts and determining priorities, should be discussed with homeless service providers in advance, so that requests for information become a routine collaboration with public health authorities.

Once sites of exposure have been identified, approaching the investigation will differ depending if the site is a congregate site or a non-congregate site. When conducting an investigation of exposures at a congregate site, such as a homeless shelter, one should:

- Contact shelter administration and shelter TB Liaison
- Contact TBCP early in the process to provide epidemiologic support and technical assistance
- Conduct a site visit and complete site environmental assessment worksheet
- Determine if index patient was part of any programs or obtained any services
- Obtain electronic rosters of clients, including room or bed location
- Review cough log
- Review employee TB screening results
- Review genotype data to identify other cases that may be related
- Set up educational sessions for staff and clients

Identifying exposed contacts:
One surrogate for degree of exposure at an overnight shelter is the bed/cot assignment. The proximity and duration of overlap should be estimated as closely as possible for selecting high and medium priority contacts. However, it is essential to not limit the investigation to individuals with bed assignments near the index case at the time of diagnosis; historical records should be examined for

the duration of the infectious period to identify exposed persons who may no longer be at the facility at the time of investigation.

PEH often seek health care from multiple volunteer providers, halfway houses, chemical dependency treatment programs, community clinics, urgent care centers, and hospital emergency departments. Consultation and assistance from health-care providers in these systems can be helpful. This also creates an opportunity for collaboration, contact ascertainment, and mutual education.

Identifying possible sites of exposure at a non-congregate site, such as social hangouts or gathering places, are just as important in identifying potential contacts. When investigating exposures at non-congregate sites, one should:

- Talk with the owner or manager about the investigation and need for an investigation.
- Research the site and review the location using internet maps to get familiar with the area before a site visit.
- Conduct multiple visits to the site (during similar times that the patient visited the site) to identify regular customers or clients.
- Ask about regular customers and clients.
- Encourage compliance for screening and testing in the field through the use of incentives and enablers.

Contact investigations with schools

This category includes child care centers, preschools, primary through secondary schools, vocational schools that replace or immediately follow secondary school, and colleges or universities.

Early collaboration with school officials and community members is recommended when considering an investigation related to a school, even if preliminary information suggests that an investigation is unnecessary. TBCP recommends that when the CI Core Team decides that a CI is necessary in a school setting, the District Public Health Center work closely with the school administration. Determining whether the student attended classes, identifies with a particular social network, or participated in extracurricular activities at school during his/her infectious period, should be validated with school district officials. The typical features of contact investigations in schools are the potentially substantial numbers of contacts and difficulties in assigning priorities to contacts who have undetermined durations and proximities of exposure. The potential is great for controversies among public health officials, school officials, and the guardians of the children.

The presence of TB in schools often generates publicity. Ideally, the health department should communicate with the school and parents (and guardians) before any media report a story. Public health officials should anticipate media coverage and plan a collaborative strategy.

Consent, agreement, and disclosure of information are more complex for non-emancipated minors than for adults. Each interaction with a minor is also a potential interaction with the family. The health department typically has limited alternatives for evaluating a minor if permission is not granted.

Minors that are 12 years or older that have been exposed to an infectious index can consent to TB evaluation. The TBCP recommends obtaining written or at least verbal consent from a parent or guardian prior to testing minors in a school investigation.

Public health officials should visit the school to check indoor spaces, observe general conditions, and interview maintenance personnel regarding ventilation as well as request a copy of the ventilation report/records of maintenance. Class assignment records help in listing contacts, estimating durations of exposure, and setting priorities. CFS may request TB epidemiology support to analyze class lists to account for cumulative duration of exposure of individuals. However, certain schools purge these files at the end of each school year, in which case interviews with students and personnel are necessary to list contacts.

Extracurricular activities add other exposure sites and contacts. Clubs, sports, and certain classes require additional information gained from interviewing the patient, the patient's guardians, and school personnel. For patients who ride school buses, a bus company might keep a roster of riders with addresses.

The strategy for contact investigations in child care centers, preschools, and primary schools depends on whether the index patient is a child (i.e., preadolescent) or an adult (e.g., a teacher or caregiver). The potential infectiousness of an adult in the school should be determined (see Decisions to Initiate a Contact Investigation and Investigating the Index Patient and Site Evaluation). “There are a number of reasons why children with TB disease may be less contagious than adults. First, children often have paucibacillary disease, leading to low rates of AFB-positive specimens. Second, young children are less likely to have cavitary lesions, in part due to less mature immune responses. Third, pre-pubertal children have a less forceful cough than adults and the cough is less likely to be productive, leading to decreased aerosolization. Fourth, childhood TB is more likely to be extra-pulmonary in nature than TB in immunocompetent adults. Finally, children may be less contagious, on a public health level, simply because they have more circumscribed social networks than adults.”[xxv]

In a source-case investigation of a child aged <5 years who has TB and who attends preschool or child care, all adults in these settings should be included if the source case has not been located in the family or household (see Source-Case Finding). Certain home-based child care centers include adults who do not provide child care but who still share airspace with the children. Source-case investigations should not be pursued in primary and higher-level schools unless other evidence points to the school as the focus.

In secondary and higher levels of education, students usually have adult-form TB and infectiousness can be estimated by the standard criteria (see Decisions to Initiate a Contact Investigation and Investigating the Index Patient and Sites Evaluation). With advancing education, academic schedules and extracurricular social schedules become more complex, and the information reported by the index patient is more important for a thorough investigation than it is for younger children.
Though LA County no longer requires TB testing of students as a school entry requirement, a risk assessment and testing only if risk facors are identified is done upon entry to first grade and high school along with a complete physical exam.

Most school districts have pre-employment requirements for TB clearance screening (e.g., a test for *M. tuberculosis* infection) and some school districts still require TB clearance for entering students. Certain colleges and universities also have these requirements. These baseline data are helpful for interpreting results from the investigation. Currently, children in daycare centers and pre-schools are required by CA State law to be assessed for risk factors of TB and then tested only if found to have a risk factor for TB.

School breaks, vacations, graduations, and transfers disrupt the contact investigation. In collaboration with school officials, the health department can notify, by mail, students and other contacts who will be unavailable at the school. These contacts should be referred for evaluation at the health department. Contacts choosing to be evaluated by their own providers, should receive written instructions identifying the patient as a contact and instructions on whom to provide final TB evaluation results.

Tool – N/A
Reference - pages 61-82 of the LAC DPH TBCP CI Guidelines, California TB Control Branch Contact Investigation in Schools Toolkit, California Tuberculosis Screening Guidelines for Child Care Centers and Schools

11) Source Case Finding

Source Case Finding (SCF) attempts to determine the source of TB disease in a child. Initiating a SCF may yield new cases and a high yield of infected individuals that stem from a common source of infection. Examination of the closest associates is usually all that is necessary, but the investigation may become larger if more infected persons are found and the source case is not immediately apparent. Source case findings can be considered for children under the age of five years old.

SCF includes interviewing and re-interviewing a proxy adult (usually parents or guardian) and similar interviewing and investigation principles described in earlier chapters apply. Additionally, inquiries such as child care, family visitors, travel, known family/friends with TB symptoms, and child's daily routine should be discussed.

Source case finding should not be done for a child of any age diagnosed with LTBI.

Reference - pages 82-83 of the LAC DPH TBCP CI Guidelines

III. Toolkit

This section includes all the tools mentioned in Section II: Framework for Contact Investigations along with editable versions of the different documents to assist staff assigned to conducting contact investigations.

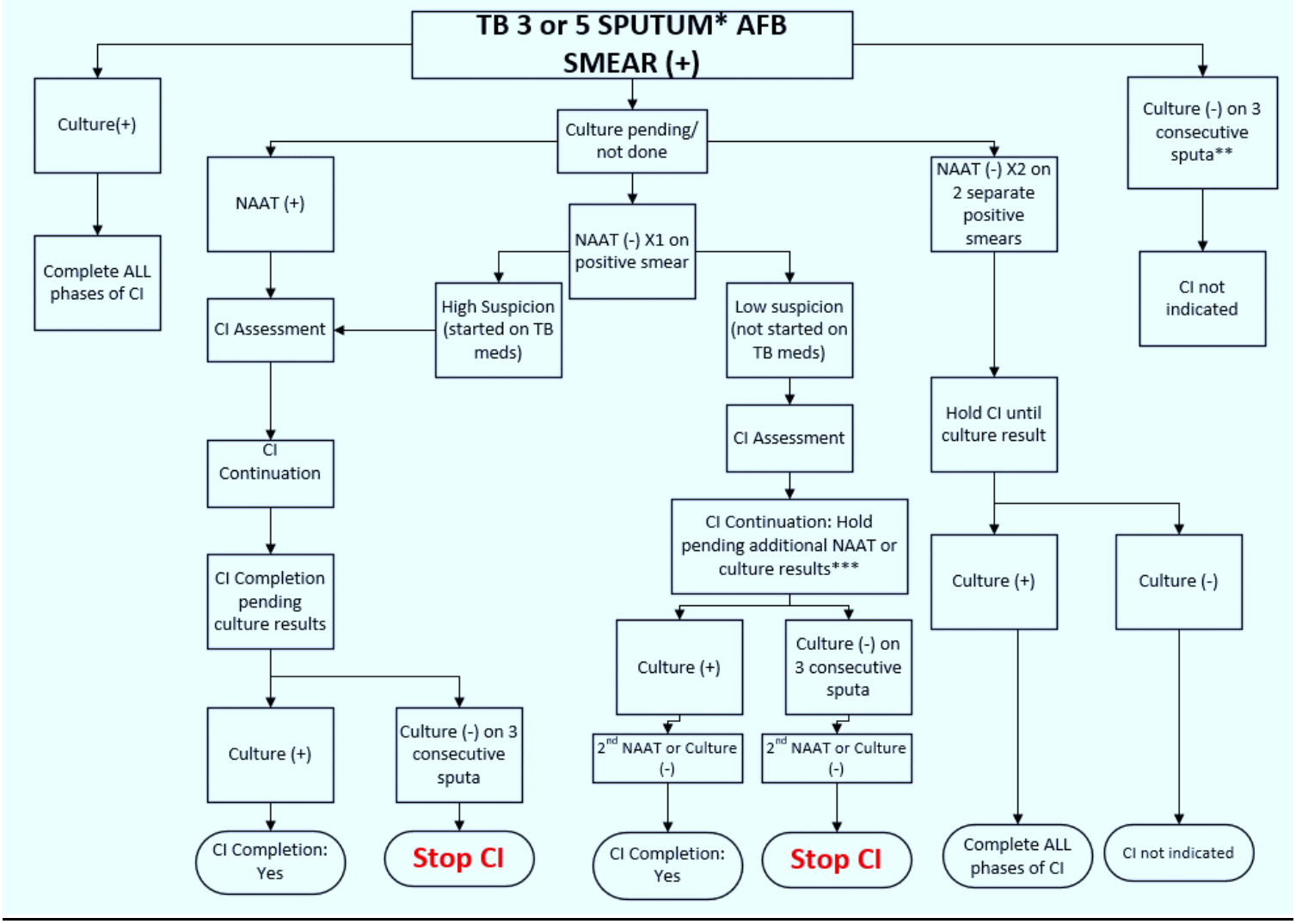
Toolkit Contents

CI CORE TEAM GRID: QUICK REFERENCE GUIDE

OBJECTIVE	COMPONENTS	FACTORS/MEASURES	NOTES
1) Determining scope of the investigation	Estimate degree of contagiousness of the index case	• Anatomic site • Sputum AFB smear status (+/-) • Radiological findings (CT/CXR) • NAAT/PCR results	
	Determine infectious period (IP)		
	Review social network of index	• Number of exposure sites and settings, • Types of sites/setting (e.g. congregate, high profile)	
2) Assisting with prioritization of exposure sites and contacts	Review types of sites/settings: estimate risk of transmission at each site/setting	• Type of space/area • Ventilation: (natural, A/C) • Duration of exposure • Site history: other recent cases at site	
	Establish plan to interact with site administration	• Determine which HC staff will establish primary communication with site administration	
	Determine exposure periods for each site/setting		
	Assess and prioritize contacts within each site/setting	• Infectiousness of index • Contacts' risk of progression to disease • Degree of exposure (intensity and duration)	
3) Identifying strategies to focus resources on contacts at highest risk	Abbreviate infectious period	• If IP > 1 yr, you can start by testing contacts exposed 3-6 months prior to diagnosis	
	Determine if certain sites can do their own testing	• e.g., SNF, other healthcare facilities	
	Delay testing of low priority wherever possible	• $\geq$ 8 weeks post exposure	
	Assess need to test low priority based on result of high and medium priority testing data	• Review data from testing of high/medium priority contacts	
	Assess resource availability and prioritize work	• CFS Administrative staff at HC takes into account current demands, other CI activities, etc.	
4) Determining need to expand	Determine if exposure occurred at site	• Identification of any new cases or conversions among groups initially tested • Determine whether to expand to low priority contacts	
5) Evaluating outcomes	Documentation of key decisions Collection of data and data analysis	• e.g. event notes in CMAP/progress notes • Data forms	

Criteria for Initiating a Contact Investigation

(Sputum Smear Positive)



*'Sputum' refers to sputum, bronchial washing or bronchoalveolar lavage fluid.

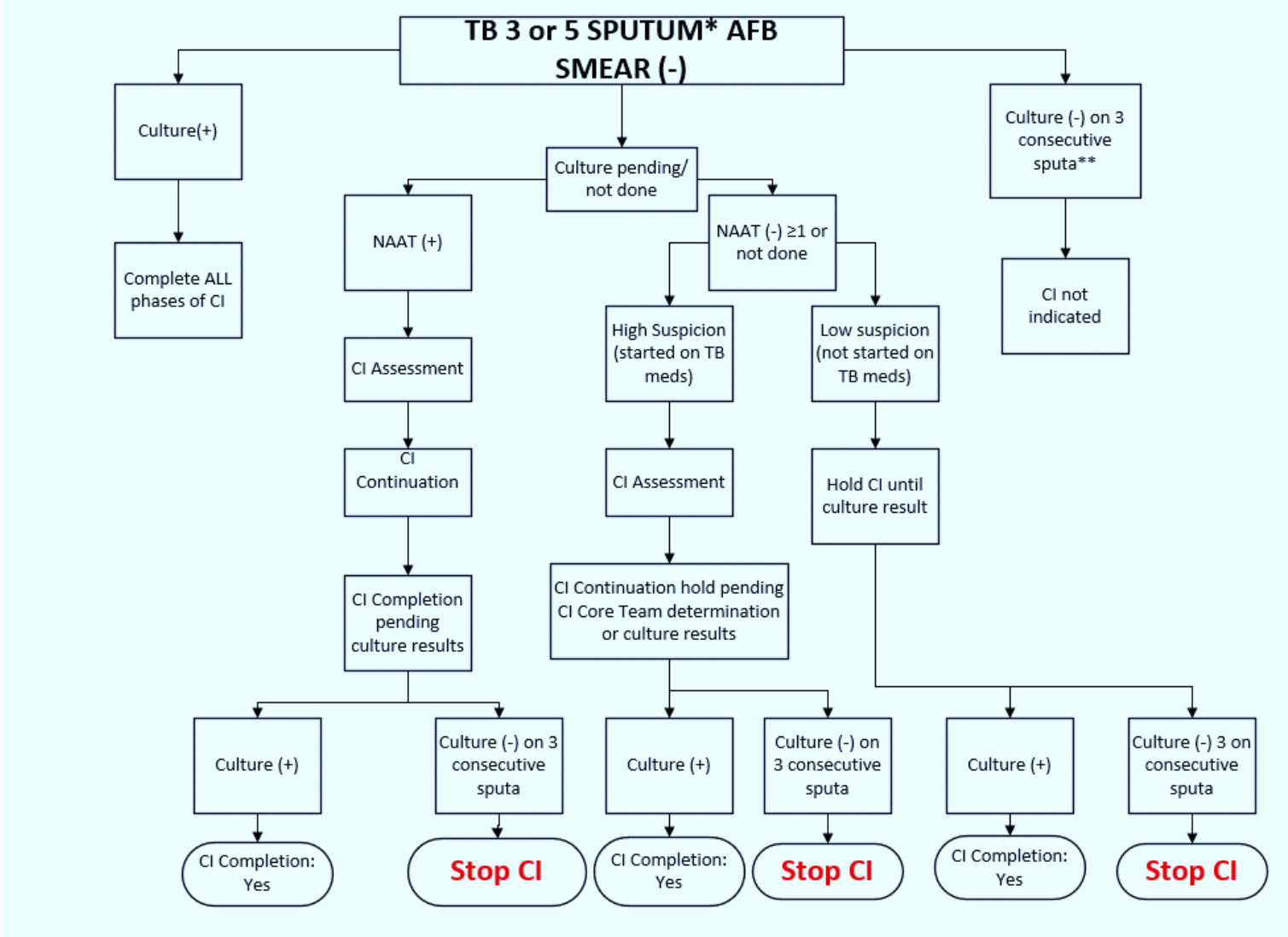
**If patient is unable to produce 3 sputum specimens, then all sputum specimens assessed should be culture negative for Mtb (document in chart, 'all cultures performed are negative for Mtb').

***Refer to 2015 LAC TBCP NAAT Guidelines.

^If meds are stopped (based on a change in diagnosis) then reassess need for CI.

Criteria for Initiating a Contact Investigation

(Smear Negative)



*'Sputum' refers to sputum, bronchial washing or bronchoalveolar lavage fluid.

**If patient is unable to produce 3 sputum specimens, then all sputum specimens assessed should be culture negative for Mtb (document in chart, 'all cultures performed are negative for Mtb').

***Refer to 2015 LAC TBCP NAAT Guidelines.

^If meds are stopped (based on a change in diagnosis) then reassess need for CI.

Investigating Index Patient

Click here to download a copy of:

TB Interviewing for Contact Investigation: A Practical Resource for the Healthcare Worker

TB Interview Checklist

Open-ended Questions (page 44-45)

TB Interview Guide

CDC Contact Investigation Patient Brochure

Establishing an Infectious Period (IP)

Patients with sputum smear positive for AFB OR cavitary chest x-ray OR with cough/ hoarseness	**Patients with sputum smear negative for AFB, AND non-cavitary chest x-ray AND NO cough/ hoarseness**
IP Beginning: 3 months prior to symptoms of **cough/ hoarseness** onset Date of **cough/hoarseness** onset:_____ _____or Date of first positive finding: _____	**IP Beginning: 4 weeks** prior to date of suspected diagnosis (date treatment started) Date treatment started:_____
IP Ending: All three of the following criteria need to be met: completion and tolerance of 14 days of appropriate TB treatment (preferably via DOT), 3 consecutive negative sputum AFB smears, and clinical improvement. The IP ending date is the latest date out of the 3 criteria. 1) 14 days of TB treatment:_____ 2) Date of 3rd consecutive AFB-negative smear: _____ 3) Date of clinical improvement: _____	**IP Ending:** After at least 5 days of appropriate TB treatment is taken and tolerated. Completion of 5 days of TB treatment: _____

NOTE: For MDR cases, regardless of sputum AFB smear status, cavitation on chest x-ray or TB symptoms, the closure of the infectious period will differ. MDR cases will require additional criteria of at least 3 consecutive negative sputum cultures without a subsequent positive culture and 14 days of TB treatment.

IP worksheet

Months |—|—|—|—|—|—|—|—|

Estimated IP: _____ to _____
Start End

List of Possible Exposure Site(s)

Purpose: This form can be used to document all sites identified where exposure occurred during the infectious period (IP)of a suspect/confirmed TB case.

Index Case:_____ **PF #:** _____-_____ -_____
NAME

IP: ____/____/____ - ____/____/____

Site Summary

Name of Site: _____ Last Day at Site: __/__/__

Address: _____ Exposure Period: __/__/__ - __/__/__

SPA: _____ District: _____ Chief I: _____ PHNS: _____
NAME NAME

When was the District of Exposure notified? __/__/__ Facility Type:_____

Name of Site: _____ Last Day at Site: __/__/__

Address: _____ Exposure Period: __/__/__ - __/__/__

SPA: _____ District: _____ Chief I: _____ PHNS: _____
NAME NAME

When was the District of Exposure notified? __/__/__ Facility Type:_____

Name of Site: _____ Last Day at Site: __/__/__

Address: _____Exposure Period: __/__/__ - __/__/__

SPA: _____ District: _____ Chief I: _____ PHNS: _____
NAME NAME

When was the District of Exposure notified? __/__/__ Facility Type:_____

Name of Site: _____ Last Day at Site: __/__/__

Address: _____ Exposure Period: __/__/__ - __/__/__

SPA: _____ District: _____ Chief I: _____ PHNS: _____
NAME NAME

When was the District of Exposure notified? __/__/__ Facility Type:_____

Name of Site: _____ Last Day at Site: __/__/__

Address: _____ Exposure Period: __/__/__ - __/__/__

SPA: _____ District: _____ Chief I: _____ PHNS: _____
NAME NAME

When was the District of Exposure notified? __/__/__ Facility Type:_____

Exposure Site Assessment

Suspect/Case:_____ **Date of Assessment:** _____

Site #:_____ **Infectious period:** _____ **to** _____

Type of exposure site (e.g, other residence, workplace, school, shelter, jail, assisted living, SRO etc.):

_____

Name of Exposure Site: _____ **Contact Person:**_____

Phone Number: _____

Last Date of Exposure:_____

Exposure Period: _____/_____/_____ to _____/_____/_____

List exposure settings at site:	Size of exposure area: (car / bedroom / house / house)	sq. ft (if available)	Cumulative hours of exposure during IP: (duration x frequency x timeframe of exposure)*
a._____	_____	_____	_____ X _____ X _____ = _____
b._____	_____	_____	_____ X _____ X _____ = _____
c. _____	_____	_____	_____ X _____ X _____ = _____
d. _____	_____	_____	_____ X _____ X _____ = _____

Use separate sheet to record information on additional sites

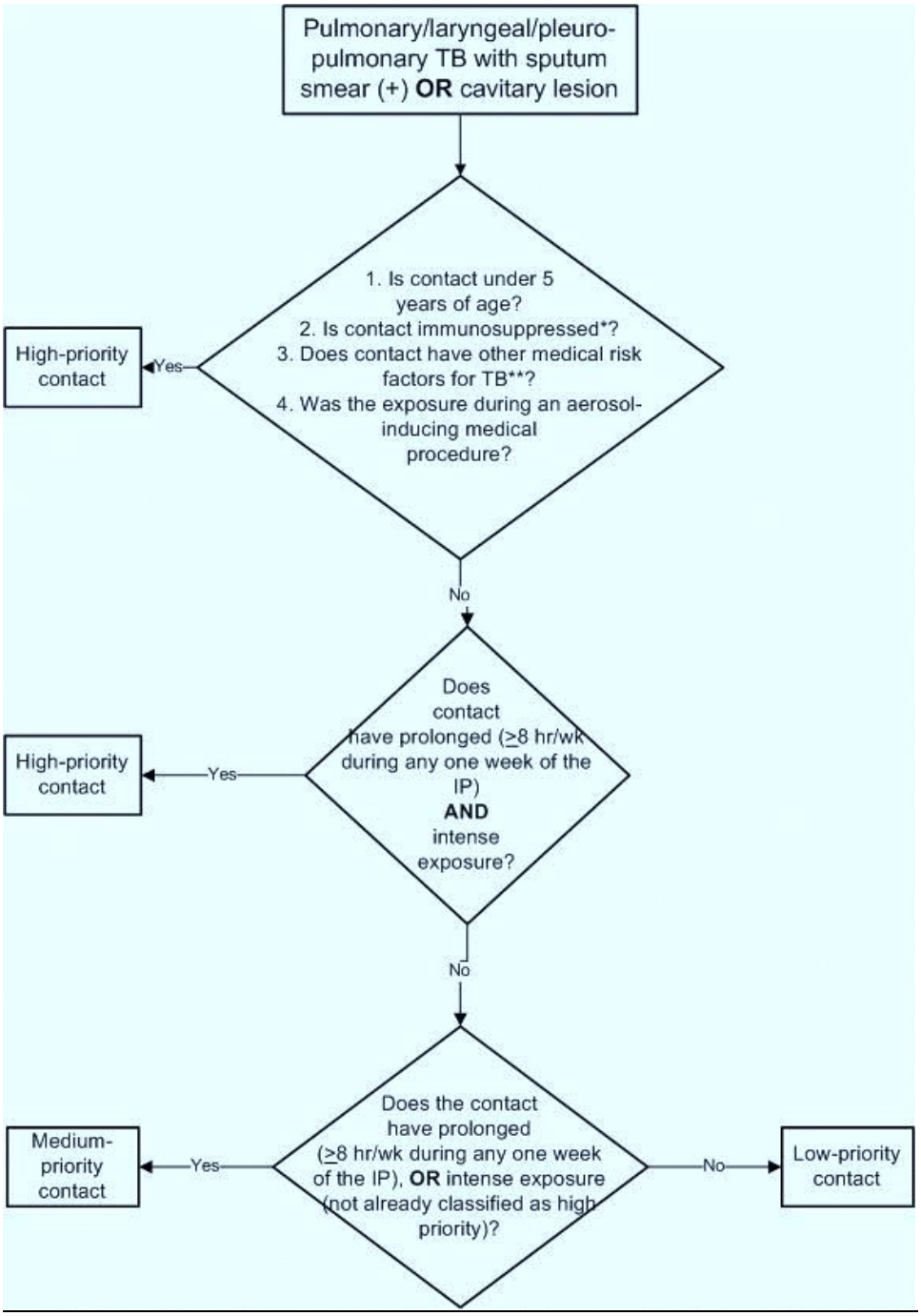
Type of natural ventilation: (record all that apply) Windows / doors / completely outside Routinely open / closed all the time	**Type of mechanical ventilation:** (record all that apply) wall AC/ central AC / fan / none / other Date of last maintenance (if available):		**Comments: How does it feel when you walk into area:** hot and stuffy / warm / cool
a._____	_____	_____	_____
b._____	_____	_____	_____
c. _____	_____	_____	_____
d. _____	_____	_____	_____

*Duration - minutes or hours of exposure during each occurrence
Frequency - number of exposures per week
Timeframe of exposure - total weeks of exposure period

To supplement this information, pictures, floor plans, video clips, diagrams, HVAC maintenance records, facility HVAC specifications for room exchange rates, or other graphical representations of the area can help the CI Core Team understand the space were exposure took place.

Prioritization of Contacts

Index: TB 3 or 5 smear (+) OR cavitary chest x-ray



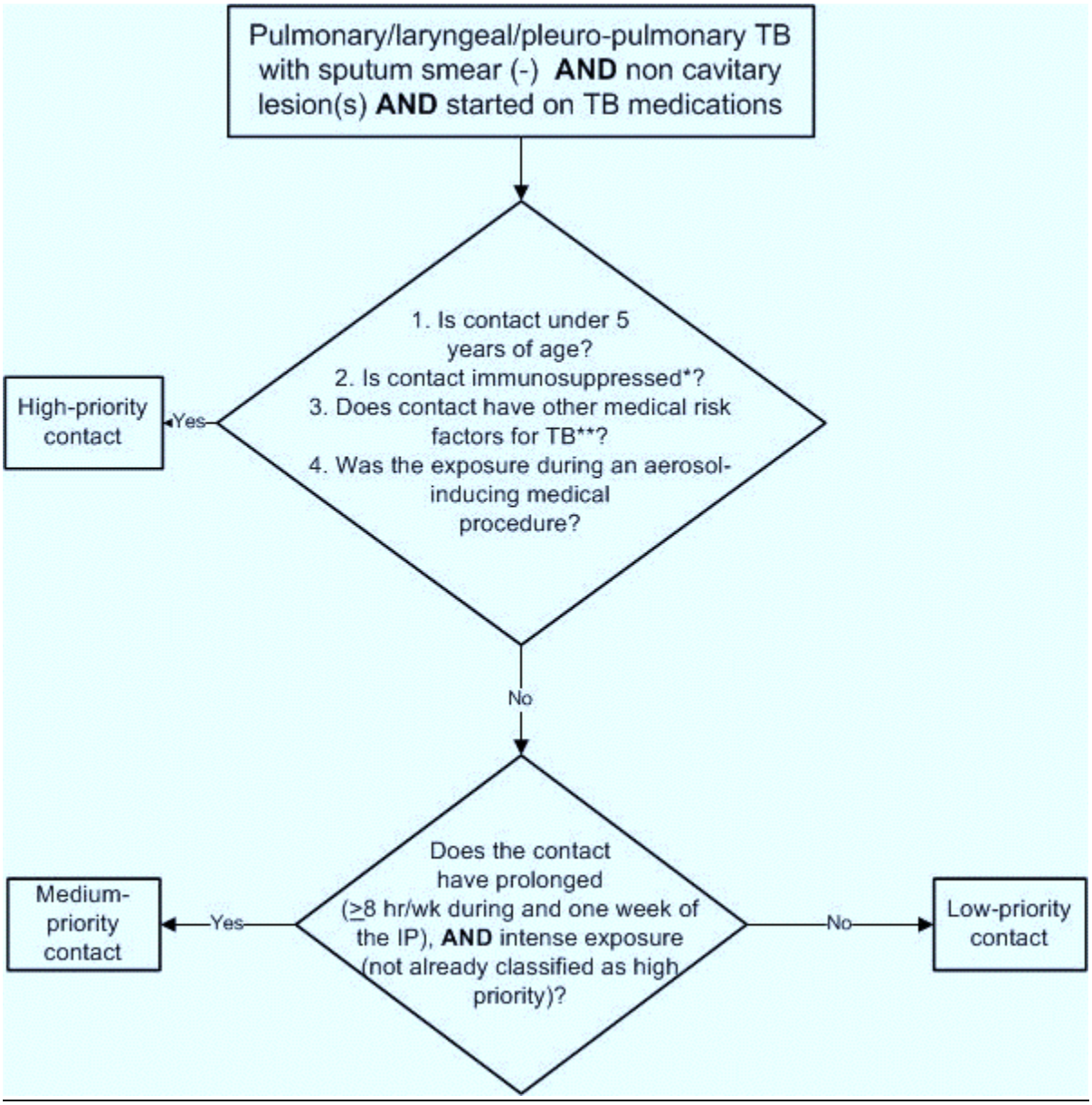
*Immunosuppressed contact: see tables 2a and 2b

**Other medical risk factors for TB: see tables 2a and 2b

Prioritization of Contacts

Index TB 3 or 5:

Smear (-) AND non-cavitary AND started on TB treatment



*Immunosuppressed contact: see tables 2a and 2b

**Other medical risk factors for TB: see tables 2a and 2b

Timeframe for evaluation of contacts of persons exposed to tuberculosis*

Characteristics of index patient	Contact priority	Timeframe for follow-up	
TB 3 OR 5		From elicitation of contact to initial screening and testing** (calendar days)	From initial screening and testing to completion of medical evaluation (calendar days)
SPUTUM AFB SMEAR (+) **OR** CAVITARY CXR **OR** TB SYMPTOMS	high	5-7	7
	medium	14	10
	low	8-10 **weeks** after last known exposure	14 days from date of screening
SPUTUM AFB SMEAR (-) **AND** NON-CAVITARY CXR **AND** NO TB SYMPTOMS	high	7	10
	medium	14	10
	low	8-10 **weeks** after last known exposure	14 days from date of screening

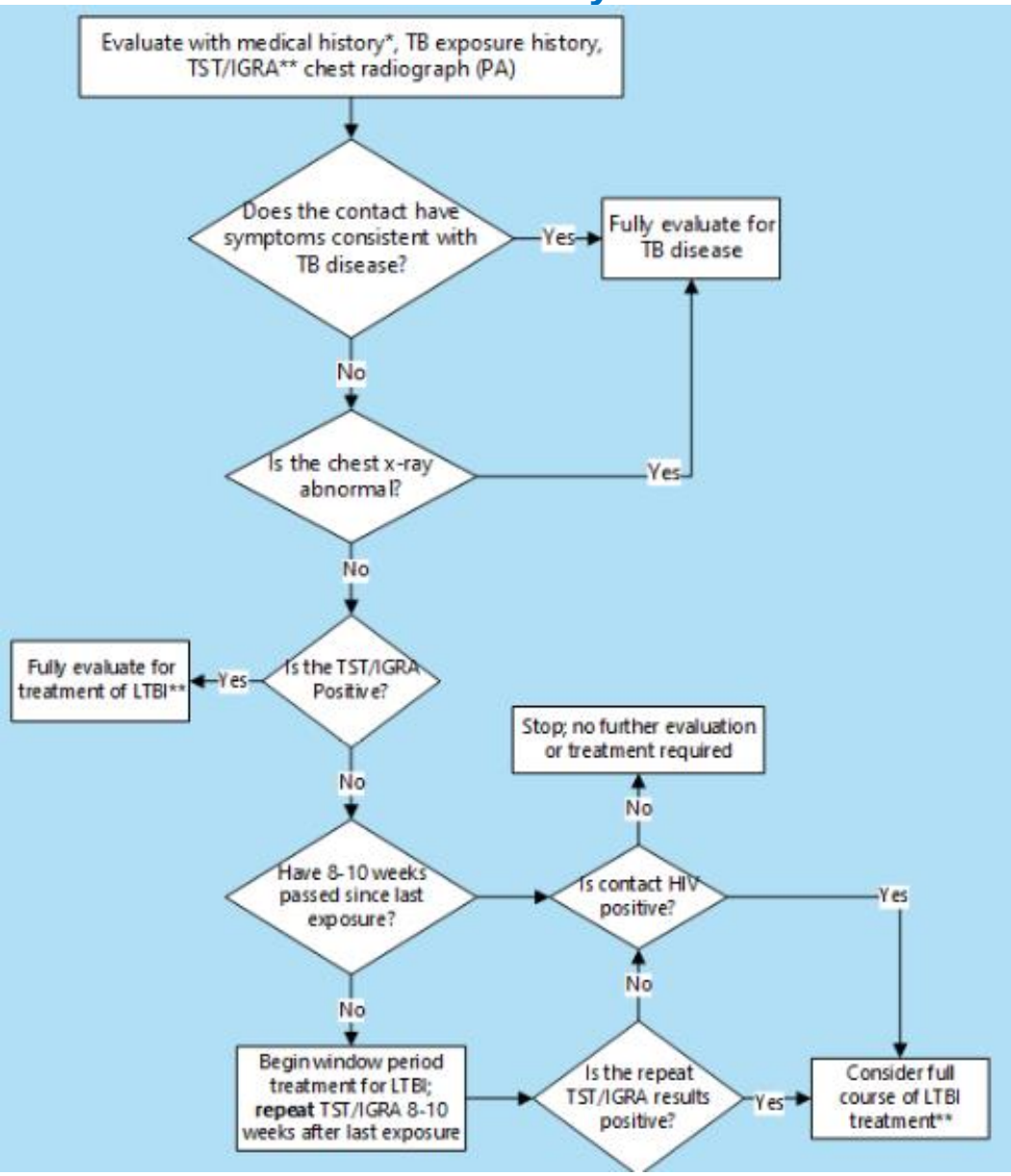
*Not including repeat testing 8-10 weeks after last exposure.

**The time frame for follow-up are for those contacts at sites/settings where the CI Core Team has determined a true exposure has taken place.

Diagnosis and Evaluation of Contacts

Evaluation, treatment, and follow-up of

Contacts under 5 years old



*A medical history should include an assessment of TB risk factors, **including nativity status** (US-born or non-US-born) and comorbid conditions that predispose the contact to an increased risk of progression to TB disease if infected. High and medium priority contacts who have not had an HIV test in the past year should be offered HIV testing as a routine part of their evaluation.

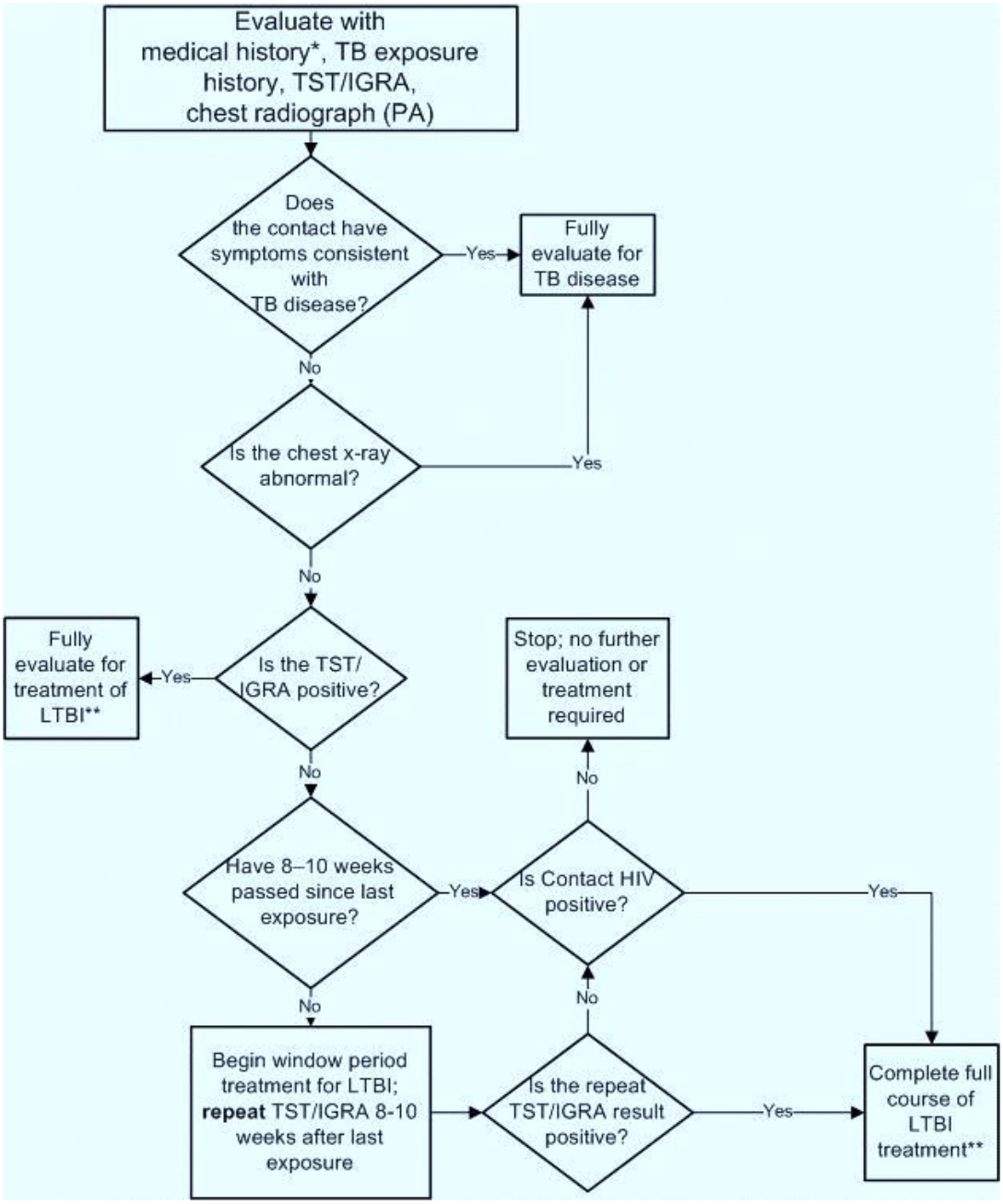
**IGRA may be used in children > 2 y/o or may be used in consultation with TBCP if < 2 y/o.

***Special attention should be paid to immunosuppressed contacts to ensure that they do not have TB disease when starting therapy for LTBI. Careful physician evaluation should precede any decision to initiate LTBI treatment in an immunosuppressed contact.

Diagnosis and Evaluation of Contacts

Evaluation, treatment, and follow-up of

Immunosuppressed^ contacts ≥ 5 years old



^See tables 2a and 2b, #2 for description of immunosuppressed contacts.

*A medical history should include an assessment of TB risk factors, **including nativity status (US-born or non-US-born)** and comorbid conditions that predispose the contact to an increased risk of progression to TB disease if infected. High and medium priority contacts who have not had an HIV test in the past year should be offered HIV testing as a routine part of their evaluation.

**If HIV positive, on antiretroviral therapy, CD4 > 400 and and viral load undetectable then acceptable to d/c window prophylaxis.

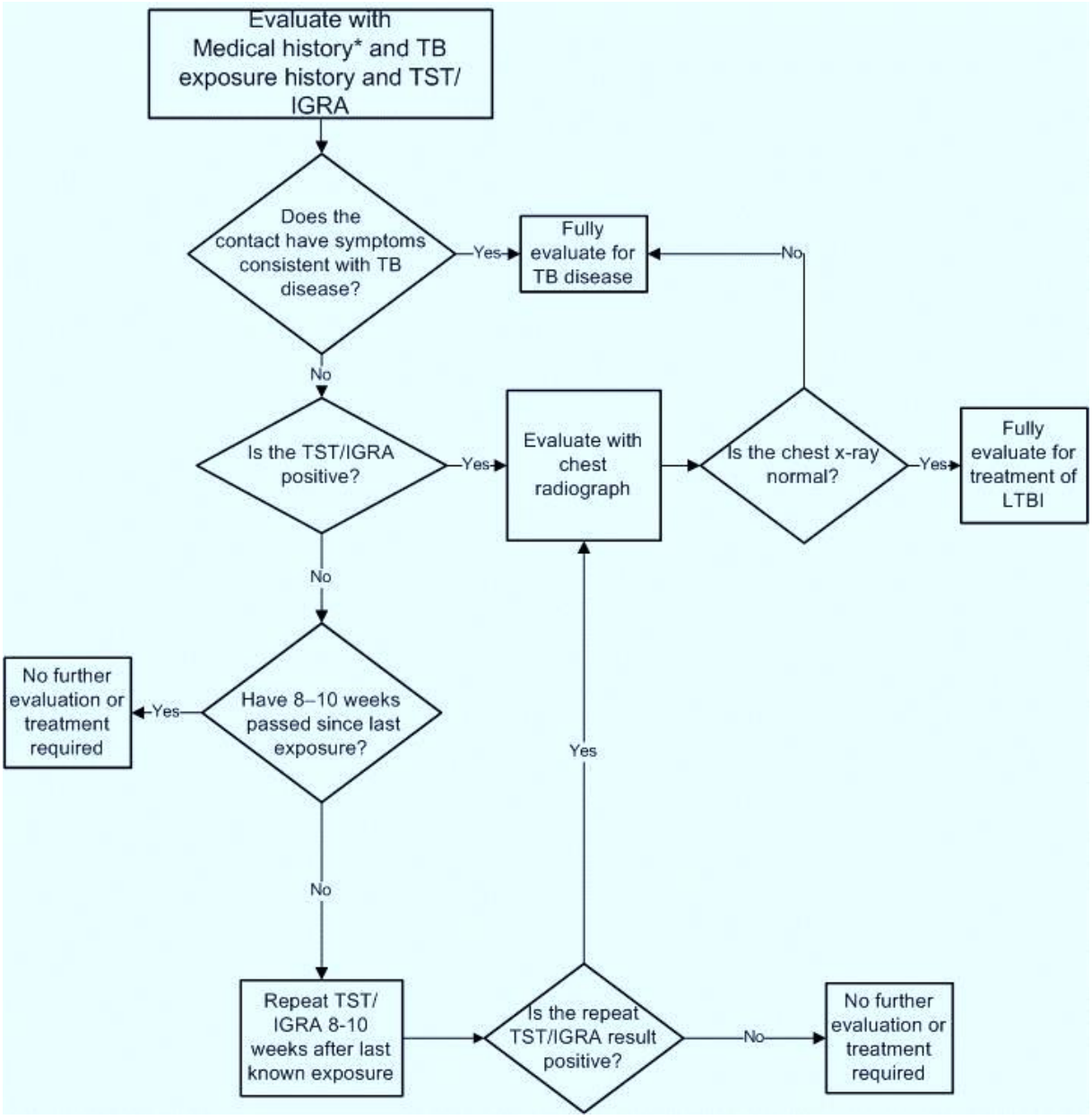
**Special attention should be paid to immunosuppressed contacts to ensure that they do not have TB disease when starting therapy for LTBI. Careful physician evaluation should precede any decision to initiate LTBI treatment in an immunosuppressed contact.

Diagnosis and Evaluation of Contacts

Evaluation, treatment, and follow-up of

High and medium priority contacts,

that are not immunosuppressed and children aged ≥5 years

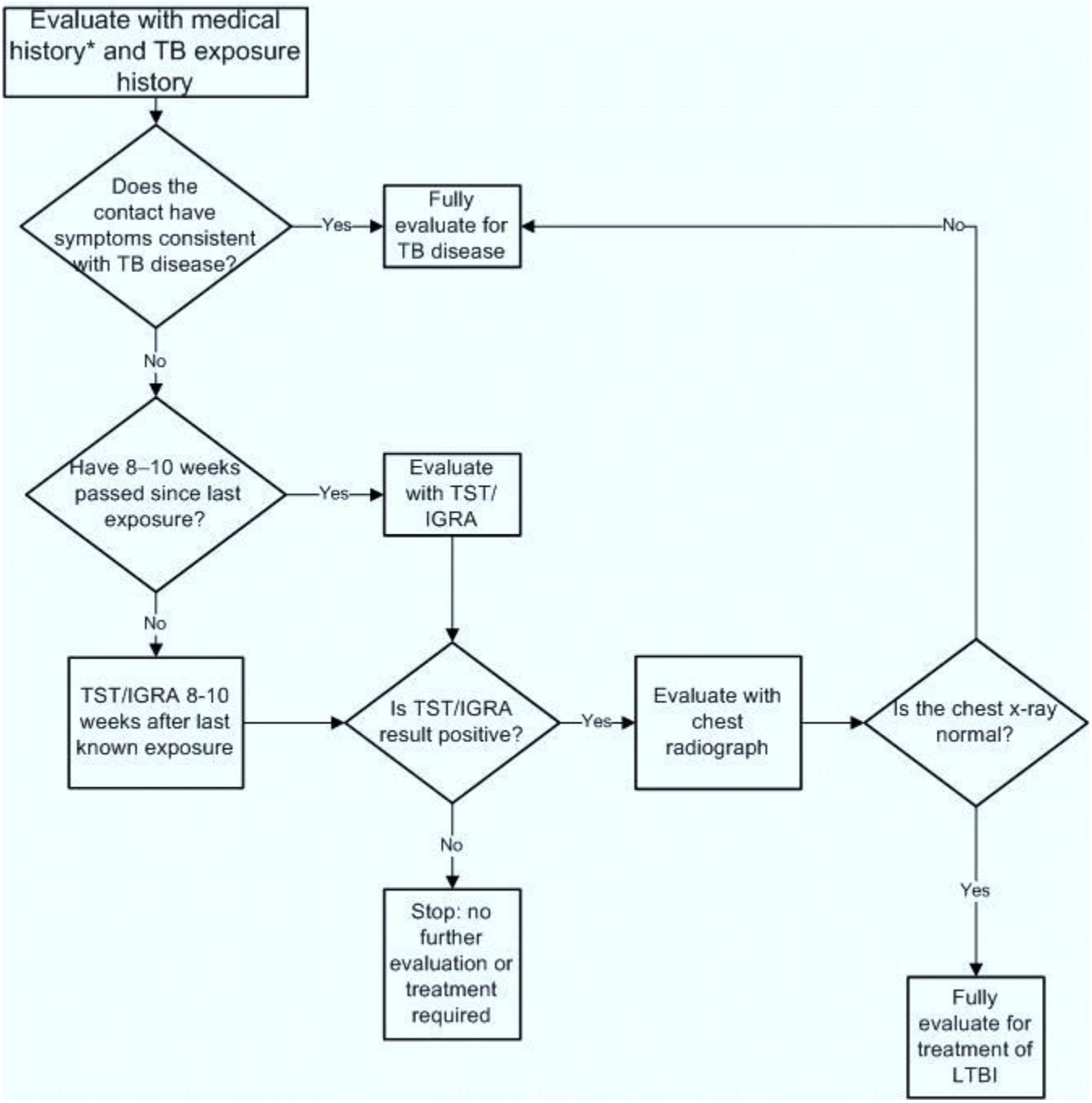


*A medical history should include an assessment of TB risk factors, including nativity status, (e.g. US-born vs. non-US-born) and comorbid conditions that predispose the contact to an increased risk of progression to TB disease if infected. High and medium priority contacts who have not had an HIV test in the past year should be offered HIV testing as a routine part of their evaluation.

Diagnosis and Evaluation of Contacts

Evaluation, treatment, and follow-up of

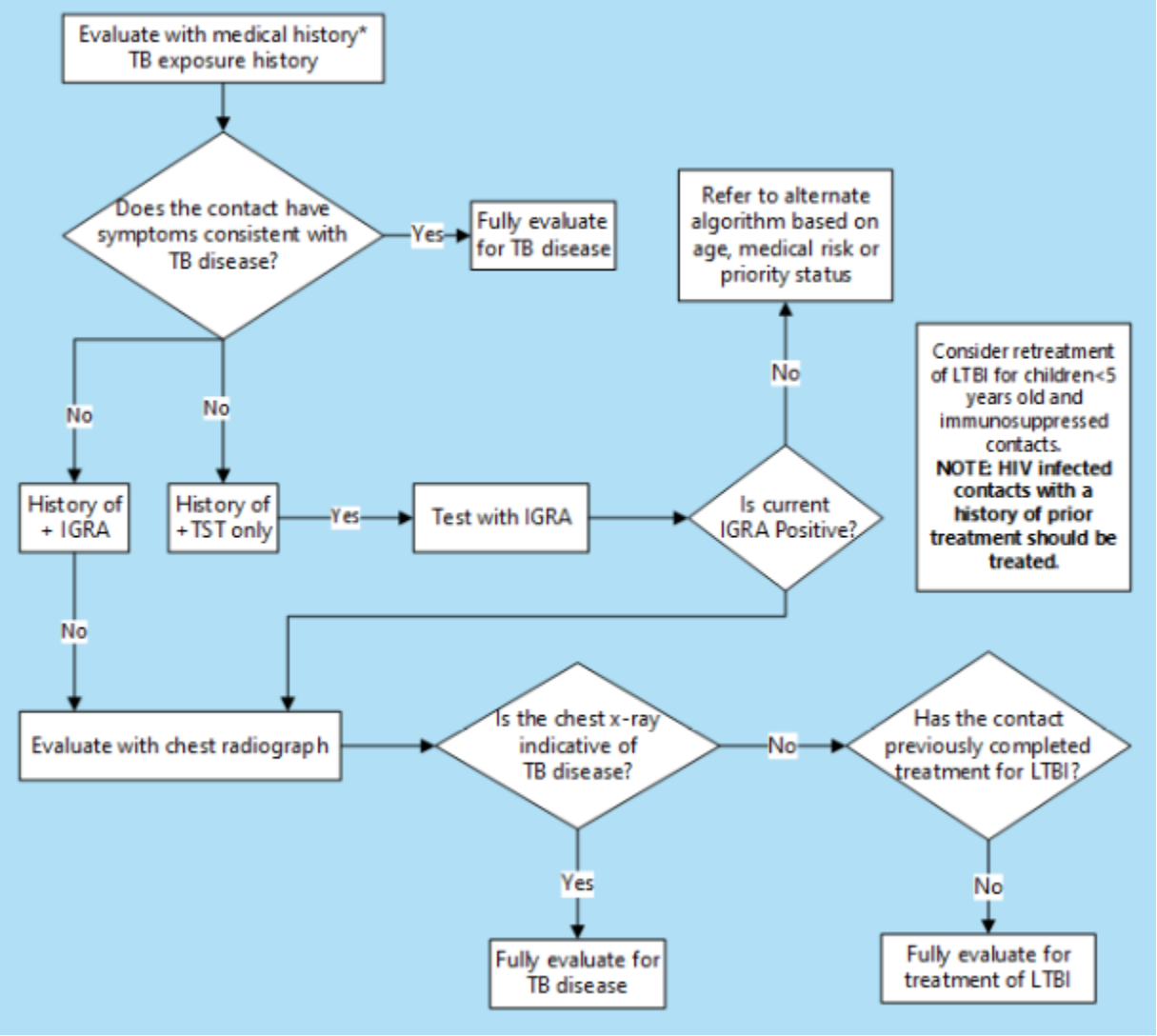
Low priority contacts



*A medical history should include an assessment of TB risk factors, including nativity status, (e.g. US-born vs. non-US-born) and comorbid conditions that predispose the contact to an increased risk of progression to TB disease if infected. High and medium priority contacts who have not had an HIV test in the past year should be offered HIV testing as a routine part of their evaluation.

Diagnosis and Evaluation of Contacts

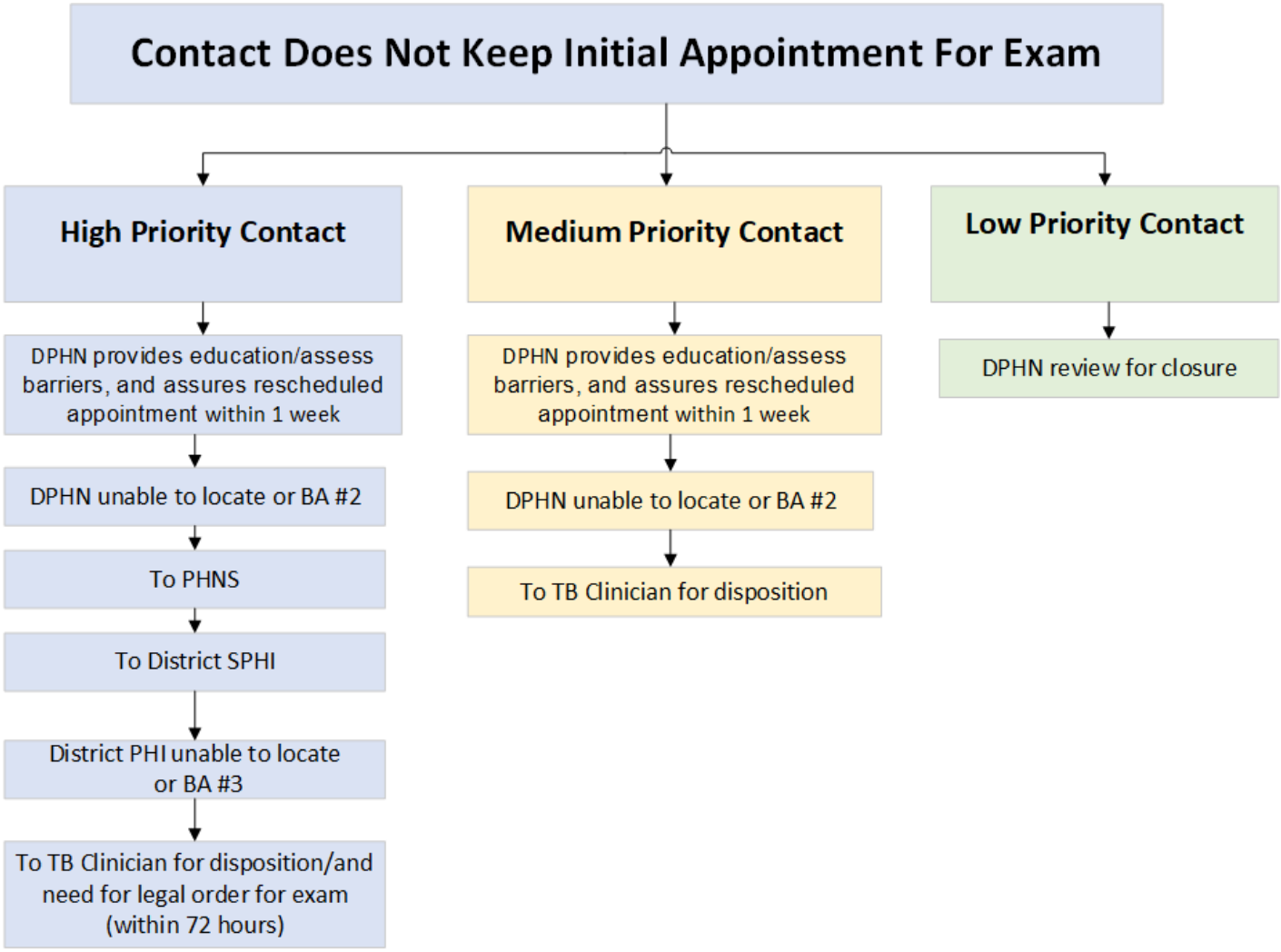
Evaluation, treatment, and follow-up of contacts with a documented Previously positive tuberculin skin test or IGRA**



*A medical history should include an assessment of TB risk factors, including comorbid conditions that predispose the contact to an increased risk of progression to TB disease if infected. High and medium priority contacts who have no had an HIV test in the past year should be offered HIV testing as a routine part of their evaluation.
**Positive test not associated with current contact investigation, e.g. > 3 months prior to exposure.

TB Contact Investigation

Broken Appointment (BA) and Unable to locate follow-up



TB II Risk Assessment Checklist

Review the following questions with any contact with a ***positive PPD/IGRA*** to determine other possible sources of exposure. Note: If a patient was evaluated at any County hospital or PH center, this information may be available in ORCHID.

1) Country of Birth

2) Previous TB screening type (TST or IGRA), result, and date of screening (if available).

3) Did you travel outside the United states? If so, where, when and length of stay?

4) Do you have any known immunosuppression? If yes, please indicate.

5) Did you have any visitors from another country who stayed with you? If yes, please indicate length of stay.

6) Do you have any known previous TB Exposure aside from this current CI exposure (i.e., contact to a relative with TB)?

If Yes, Name of Person: _____

Locating address: _____

Additional Information: _____

_____

_____

7) Indicate any other TB risk factors that you may have identified for this contact.

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Los Angeles, California 90012
TEL (213) 240-8117 • FAX (213) 975-1273

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Date:

PRIMARY CARE PROVIDER FOLLOW-UP

(under development)

Patient Name:
Patient D.O.B.:

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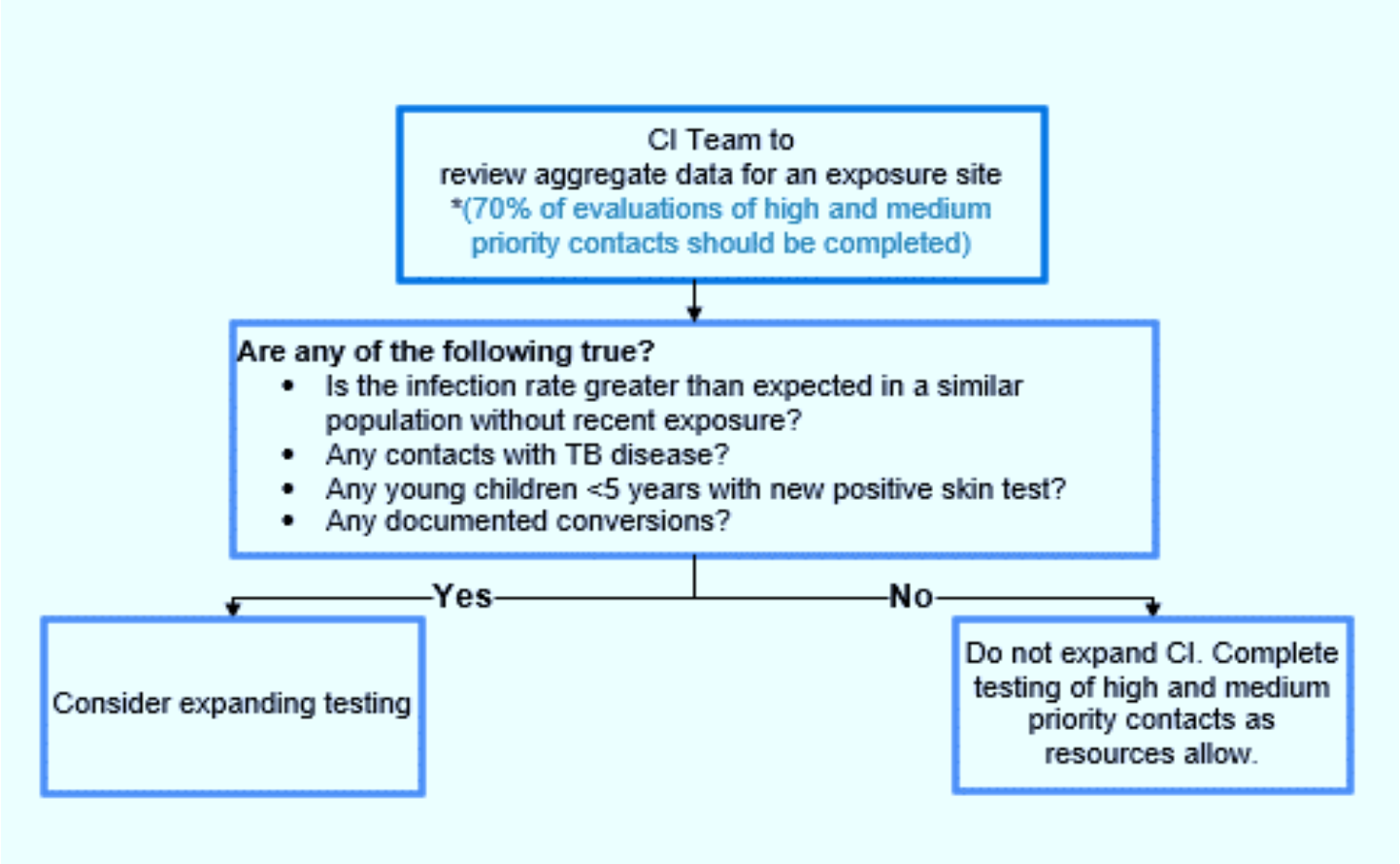
Primary Care Provider evaluation summary roster

Date:

(under development)

When to Expand a CI



*At times, preliminary data may be used to provide sufficient evidence to support transmission in any setting. Thus, a decision to expand the investigation may be made even if less than 70% of contacts have been evaluated. In these situations, formulate a strategy for expanding an investigation from the data obtained to that point in time.

Calculation of Infection Prevalence

The percentage of contacts with a similar amount of exposure who have an identified positive skin test reaction (5 or more millimeters of induration) or positive IGRA is called the **LTBI prevalence** for that group of contacts.

To calculate the LTBI prevalence among a given group of contacts, the health care worker should follow these steps:

Separate identified contacts into US-born and non-US-born cohorts.

1. Determine the number of contacts with positive skin tests/IGRA in each cohort.

2. Finally, determine the LTBI prevalence:
   - Divide the number of US-born contacts with a positive skin test/IGRA by the total number of US-born contacts for the US-born cohort. Divide the number of non-US-born contacts by the total number of non-US-born contacts for the non-US-born cohort.
   - Multiply by 100; the resulting percentage is the LTBI prevalence for both the US-born and non-US-born cohorts in the CI.

Example: Total of 14 contacts identified in a household

11 Non-US-born contacts were identified:
1 contact had a documented previous positive skin test/IGRA
10 contacts had no documented previous skin test/IGRA
7 of the 10 contacts had a newly identified positive skin test/IGRA
3 of the 10 contacts had a newly identified negative skin test/IGRA
3 US-born contacts were identified:
2 contacts have documented previous negative skin test/IGRA
1 contact has newly identified positive skin test/ IGRA

Step 1: 11 Non-US-born contacts identified and 3 US-born contacts identified.

Step 2:
11 total number of non-US-born contacts identified
1 contact with documented previous positive skin test/IGRA and normal CXR
7 contacts with newly identified positive skin test/IGRA and normal CXRs
8 total non-US-born contacts with LTBI

3 total number of US-born contacts identified
0 contacts with documented previous positive skin test/IGRA and normal CXR
1 US-born contact with newly identified positive skin test/IGRA and normal CXR
1 total US-born contact with LTBI

Step 3:

8 non-US-Born contacts with a new positive skin test/IGRA 11 contacts without a documented previous positive skin test/IGRA	X100 = 73 %
1 US-born contact with positive skin test IGRA 3 total US-born contacts	X100= 33 %

Interpretation:

Non-US-born prevalence rate = 73%, compared with expected LTBI prevalence of 34% (TBESC ref), is high. Possible transmission.

US-born prevalence = 33% and a new diagnosis, assume that this is possible transmission.

Expansion indicated for this CI.

Contact Investigation Data Management Tool

Last Name:	First Name:	DOB:	Sex: ☐ M ☐ F	DP#:	PF#:
Symptoms: **Estimated Infectious Period:** Start Date: _____ to End Date: _____			**CXR:** ☐ Cavitary ☐ Abnl /Non-Cavitary ☐ Other: _____ **Sputum AFB smear:** ☐ POS ☐ NEG ☐ ND ☐ UNK	**Culture:** ☐ POS ☐ NEG ☐ ND ☐ UNK	**NAAT\PCR:** ☐ POS ☐ NEG ☐ ND ☐ UNK

CI Start Date: _____

Report Date: _____ ☐ **Check if Final Report**

Household (non-congregate):

Date of 1st Testing (TST/IGRA): _____

Date of 2nd Testing (TST/IGRA): _____

Outcomes	High Priority		Medium Priority	
	Non-US-Born	US-Born	Non-US-Born	US-Born
A. # of contacts identified at site				
B. # with initial evaluation				
C. # fully evaluated				
D. # diagnosed with LTBI*				
i. # reactors				
ii. # prior positive TST/IGRA				
iii. # documented converters**				
iv. # unexpected reactors (US-born without other risk factors for exposure)				
E. Infection rate (%) (Di+Dii+Diii) / (C)				
F. # started on LTBI treatment				
G. # completed LTBI treatment				
H. # children (< 5 years old) diagnosed with LTBI				
I. # Suspects or additional confirmed cases				

***Diagnosed with LTBI**: includes all reactors, prior positive and documented converters

****TST conversion**: For contacts, a skin test conversion is defined as an increase of at least 5mm, from less than 5mm on the initial skin test to a reaction of greater than or equal to 5mm on the second test, 8 to 10 weeks after last exposure.

Last Name:	First Name:	DOB:	Sex: ☐ M ☐ F	PF#:	DP#:

CI Start Date: _____ **Report Date:** _____ ☐ **Check if Final Report**	Site Name: _____ Setting: _____ Exposure Period: _____ - _____ District: _____	Site Name: _____ Setting: _____ Exposure Period: _____ - _____ District: _____	Site Name: _____ Setting: _____ Exposure Period: _____ - _____ District: _____	Site Name: _____ Setting: _____ Exposure Period: _____ - _____ District: _____

Outcomes

	High Priority		Medium Priority		High Priority		Medium Priority		High Priority		Medium Priority		High Priority		Medium Priority	
	Non-US-Born	US-Born	Non-US-Born	US-Born	Non-US-Born	US-Born	Non-US-Born	US-Born	Non-US-Born	US-Born	Non-US-Born	US-Born	Non-US-Born	US-Born	Non-US-Born	US-Born
A. # of contacts identified at site																
B. # with initial evaluation																
C. # fully evaluated																
D. # diagnosed with LTBI*																
i. # reactors																
ii. # prior positive TST/IGRA																
iii. # documented converters**																
iv # unexpected reactors (US-born without other risk factors for TB exposure)																
E. LTBI prevalence (%) (Di+Dii+Diii) / (C)																
F. # started on LTBI treatment																
G. # completed LTBI treatment																
H. # children (< 5 years old) diagnosed with LTBI																
I. # Suspects or additional confirmed cases																

***Diagnosed with LTBI**: includes all reactors, prior positive and documented converters.

****TST conversion**: For contacts, a skin test conversion is defined as an increase of at least 5mm, from less than 5mm on the initial skin test to a reaction of greater than or equal to 5mm on the second test, 8 to 10 weeks after last exposure.

Special Circumstances

CFS/TBCP post exposure TB follow-up for health care facilities

The interaction within a health care facility after a TB exposure depends on the type of facility where the exposure took place. The table below identifies the lead department/program responsible for notifying, working with and documenting the results of a CI within the major types of health care facilities

Interaction with health facility	County or private hospitals, hospital based clinic or urgent care	SNF, board and care, and hospice	High-risk NRHCF HIV/AIDS clinics, chemo, infusion centers, dialysis centers, oncology clinics and rheumatology clinic	Low-risk NRHCF PMD office, community, county and private medical clinics, home health care operations, urgent care (not on hospital campus)	Homeless shelter, SROs, drug treatment programs	Medical transport, paramedic and emergency medical services	Correctional facilities	Coroner facilities and laboratories
Notify facility of exposure in writing	Yes-TBCP	Yes-CFS	Yes-CFS	Yes-CFS	Yes-CFS	Yes-CFS	Yes-TBCP	Yes-TBCP
Offer assistance with determining the infectious period and exposure period for the identified exposure setting	Yes-TBCP	Yes-CFS	Yes-CFS	upon request	Yes-CFS	Yes-CFS	Yes-TBCP	Yes-TBCP
Conduct site visit	No	Yes-CFS	Yes-CFS	No	Yes-CFS	N/A	N/A	TBCP CIOB team decision
Assist with prioritizing contacts (post exposure follow-up)	upon request	upon request	upon request	upon request	Yes-CFS	upon request	upon request	upon request
Assist with testing of employee contacts covered by ATD	No	No	No	No	No	No	No	No

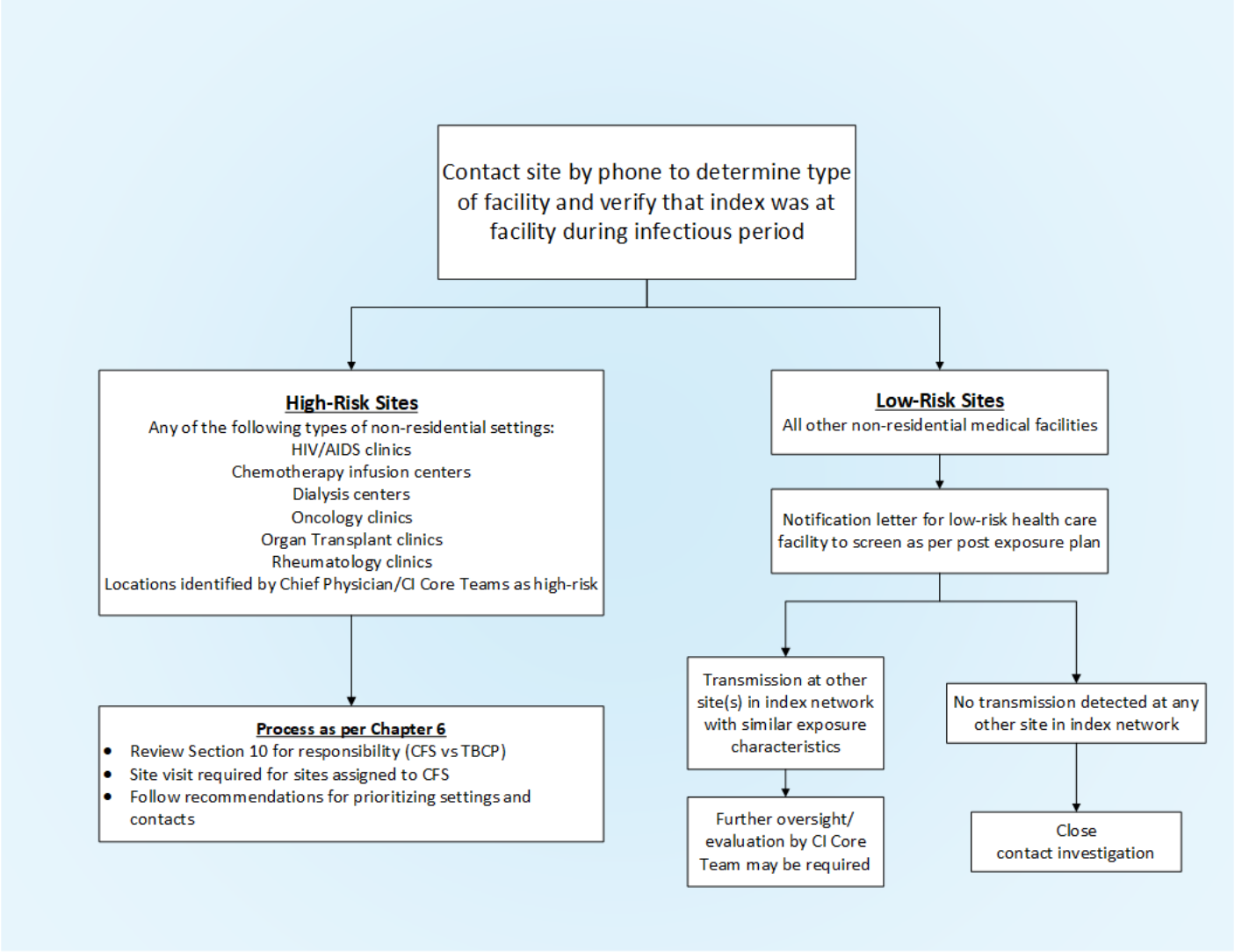
Interaction with health facility	County or private hospitals, hospital based clinic or urgent Care	SNF, board and care, and hospice	High-risk NRHCF HIV/AIDS clinics, chemo, infusion centers, dialysis centers, oncology clinics and rheumatology clinic	Low-risk NRHCF** PMD office, community, county and private medical clinics, home health care operations, urgent care (not on hospital campus)	Homeless shelter, SROs, drug treatment programs	Medical transport, paramedic and emergency medical services	Correctional facilities	Coroner facilities and laboratories
Assist with testing of patient/client contacts with primary provider	No	No	No	No	Yes-CFS	No	No	No
Offer assistance in locating and evaluating any of the following high priority contacts: employee contacts who are no longer employed, contacts on long-term leave, or patient contacts who do not have a primary provider	Yes-TBCP (TBCP will obtain list and provide to CFS)	Yes-CFS	Yes-CFS	No	Yes-CFS	Yes-CFS	Yes-CFS	Yes-CFS
Recommend that the facility do the TB screening or notify the primary provider of any patient contact who may need TB screening	Yes-TBCP	Yes-CFS	Yes-CFS	No	N/A	N/A	N/A	N/A
Request line list of at-risk patients/ employees/ clients/ visitors/etc.	No	No	Yes-CFS	No	Yes-CFS	No	No	No

Request facility complete form *'Summary Report of a TB Contact Investigation in a Health-Care Setting'*	Yes-TBCP	Yes-CFS	Yes-CFS	No*	N/A	Yes-CFS	Yes-TBCP	Yes-TBCP

*May be requested if transmission at any other site index network.

**Low-risk NRHCF may be reprioritized as a high-risk NRHCF if transmission is found in health care personnel OR other exposure sites are found to have transmission.

Prioritization of Non-Residential Health Care Facilities



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Date:

TUBERCULOSIS (TB) EXPOSURE NOTIFICATION for (Name of Site):

Patient/Employee Name:
Patient/Employee D.O.B.:

Facility Name:
Facility Address:

Dear [Facility Administrator]:

This is to notify you that the above patient/employee **who was seen/is employed** in your facility has been diagnosed with active pulmonary tuberculosis (TB). This patient had _____ sample collected _____ that was smear **negative/positive** for acid fast bacilli (AFB); Mycobacterium *tuberculosis(Mtb)* was confirmed by **AFB culture/ *Mtb* PCR.**

His/Her infectious period should be considered to have started on_____and ended on_____.

The exposure period at the site has been determined as started on_____and ended on_____.

As per the Cal OSHA Aerosol Transmissible Diseases standard, Title 8 California Code of Regulations (CCR) §5199, you are required to offer your staff post-exposure TB testing.

Please initiate your post-exposure plan and screen health care personnel that have had significant exposure to the patient, e.g. at least 8 hours of shared airspace in one week during the infectious period.

Please notify the Public Health Nurse assigned to your facility [PHN contact info] if you determine that there are any additional TB cases or TB test conversions, i.e. past negative TB tests that are now positive 8-10 weeks after the end of the exposure period amongst your employees.

You are not required to report the results of the contact investigation at this time. However, the Los Angeles County Department of Public Health (LAC DPH) may at any time request TB screening results for this exposure.

LAC DPH will notify you if there is evidence of transmission at other sites related to the above patient and will advise expansion of testing at your site to include other individuals if indicated.

Please contact your assigned PHN if you have any questions regarding this notification or regarding TB contact investigation.

Sincerely

Choose Physician
Choose Job Title
County of Los Angeles Department of Public Health
Choose Health Center

COUNTY OF LOS ANGELES
Public Health

LOS ANGELES COUNTY
HEALTH AGENCY

BARBARA FERRER, Ph.D., M.P.H., M.Ed.
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CONFIDENTIAL TUBERCULOSIS (TB) EXPOSURE NOTIFICATION

[Date]

Name: **[FREE TEXT]**
D.O.B.: **[FREE TEXT]**

Dear **[PARENT/GUARDIAN/STAFF PERSON]:**

The Los Angeles County Department of Public Health has identified an individual associated with **[NAME OF SITE]**, who has recently been diagnosed with tuberculosis (TB). There is reason to believe that **[PATIENT/EMPLOYEE NAME]** may have been exposed to this individual. We would like to take this opportunity to provide you with information about TB and what steps should be taken next.

TB is a disease usually spread through the air and through close, prolonged contact in enclosed spaces. It may be contagious and is a treatable and curable disease. The first step is to do a TB assessment in order to determine if **[PATIENT/EMPLOYEE NAME]** has been infected with the TB germ. The TB assessment may include a TB skin test, blood test and/or a chest x-ray.

Each case is unique and requires an individualized approach. If you have a medical condition that weakens your immune system, such as HIV/AIDS, cancer, or take medications that suppress your immune system, you are at higher risk for developing TB infection after an exposure to TB. Your assigned Public Health Nurse, **[PHN NAME]**, will be contacting you directly to develop a plan appropriate for your specific situation.

Please note, all correspondence and information shared regarding this investigation is considered confidential in order to protect patient privacy, so we cannot release the name(s) of the ill person(s).

Enclosed with this letter you will find a TB fact sheet. If you have any questions or concerns, please do not hesitate to contact your assigned Public Health Nurse, **[PHN NAME]** at **[PHN PHONE NUMBER]**. Thank you for your understanding and cooperation with the Public Health Department.

Sincerely,

Choose Physician
Choose Job Title
County of Los Angeles Department of Public Health
Choose Health Center

IV. Definitions / Key Abbreviations

- **Clinical high-suspicion -** TB suspect or case that has been started on appropriate TB meds.
- **Clinical low-suspicion -** TB suspect or case that has not been started on TB meds.
- **Contact -** An individual who has been exposed to *M. tuberculosis* infection by sharing air space with a person with infectious TB.
- **Conversion (TST conversion for contacts) -** See Table 3.
- **Exposure -** The condition of being subjected to something (e.g., an infectious agent) that could have an effect. A person exposed to M. tuberculosis does not necessarily become infected. Much of the work in a TB contact investigation is dedicated to learning who was exposed and, of these, who became infected.
- **Exposure period -** The coincident period when a contact shared the same air space as a person with TB during the infectious period.
- **Exposure site -** Locations where the index patient visited or spent time during the infectious period and include (but not limited to): 1) Congregate sites (e.g., jails/prisons, hospitals, shelters, skilled nursing facilities, factories, places of worship, alcohol and drug rehabilitation centers, etc.), 2) Contained environments in which air is shared (e.g., restaurants, universities, colleges, schools, classrooms, airplanes, etc.), and 3) Places where medical services are provided for immunosuppressed populations (e.g., hemodialysis centers, chemotherapy suites, medical clinics, etc.).
- **Exposure setting -** Areas within an exposure site where the index patient shared air with others.
- **Household setting -** The primary residence of a TB suspect or case. The primary residence should not include congregate settings (e.g., shelters, skilled nursing facilities, SROs). Congregate settings should be considered exposure sites.
- **Infection rate -** The proportion of contacts with a similar degree of exposure who have a newly identified positive TST/IGRA test result.
- **Infectious period -** The time during which a person with TB disease might have transmitted *M. tuberculosis* organisms to others. Within Los Angeles County, estimating the infectious period depends upon the characteristics of the index patient.

- **If the index patient is AFB sputum smear positive OR has a cavitary CXR OR is symptomatic -** The infectious period begins 3 months prior to symptoms onset or 1st positive findings consistent with TB disease (whichever is longer) and ends when all three of the following criteria are met: completion and tolerance of 14 days of appropriate TB treatment, 3 consecutive negative AFB sputum smears, and clinical improvement (ending date is the latest date out of the 3 criteria).

- **If the index patient is AFB sputum smear negative AND non-cavitary AND has no TB symptoms -** The infectious period typically is defined as 4 weeks prior to the date of suspected diagnosis (date of treatment started) and ends after at least 5 days of appropriate TB treatment is taken and tolerated. TB diagnosis.

- **Immunosuppressed contacts -** Contacts infected with HIV, contacts on immunosuppressive medical treatment, such as: ≥ l5mg day of prednisone or its equivalent for one month or more, cancer chemotherapy agents, antirejection drugs for organ transplantation, and tumor necrosis factor alpha (TNF-α) antagonists.

- **Non Residential Health Care Facility -** A facility that provides medical care which is not located on a hospital campus and does not house patients.

- **Outbreak -** A situation that is consistent with either of two sets of criteria:
  - during (and because of) a contact investigation, two or more contacts are identified as having active TB, regardless of their assigned priority; or
  - when any two or more cases occurring ≤1 year of each other are discovered to be linked, and the linkage is established outside of a contact investigation (e.g., two patients who received a diagnosis of TB outside of a contact investigation are found to work in the same office, and only one or neither of the persons was listed as a contact to the other).

- **Pleuro-pulmonary TB -** Refers to a patient with concomitant pleural and pulmonary TB. These cases do require a contact investigation. Cases with exclusive pleural disease are handled separately.

- **Secondary case -** A case of TB disease discovered as a result of a contact investigation.

- **Social network -** The description of a set of persons and places, and the connections among them.

- **Window period -** The time period between the date of an initial TST/IGRA test with a negative result and the date of the follow-up TST/IGRA test that should take place 8 to 10 weeks after last exposure; a repeat TST/IGRA test should be administered to each contact who had an initial negative result.

- **Window period prophylaxis -** The practice of providing treatment for LTBI to high priority contacts (including children < 5 years of age, persons living with HIV, and other immunosuppressed persons) with an initial negative TST/IGRA test result less than 8 –10 weeks after their exposure; if the contact has a negative TST/IGRA test reaction after the window period, treatment of LTBI is stopped in children. However, treatment is continued after the window period in persons living with HIV, unless the individual is on antiretroviral therapy, with CD4 count > 400 and HIV viral load undetectable.

Key Abbreviations

AFB = Acid Fast Bacillus

RHO = Regional Health Officer

Chief I= Chief Physician I

ANM = Area Nurse Manager

ATD = Aerosol Transmissible Disease

CFS = Community Field Services

CS = Clinic Services

DPH = Department of Public Health

DPHN = District Public Health Nurse

DPHNS = District Public Health Nurse Supervisor

LAC = Los Angeles County

NRHCF = Non Residential Health Care Facility

PHC = Public Health Center

PHL = Public Health Laboratory

SPHI = Supervising Public Health Investigator

TBCP = Tuberculosis Control Program

V. References

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