



ESP CASE DETECTION ALGORITHM

TUBERCULOSIS

Active TB Disease, Latent TB Infection

Documentation version 1.0

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Modification History

Version	Date	Modification	By
1.0	6/19/2019	<ul style="list-style-type: none">Original circulated version.	MDPH/DPM



Section 1. Overview

The purpose of this document is to describe the criteria used to identify and report tuberculosis (TB) cases and their continuum of care from electronic medical records (EMR) using ESP. ESP will identify all patients with TB, report them to the Massachusetts Department of Public Health (MDPH), and provide follow-up reports for subsequent events relevant to the continuum of care (e.g. treatment information). In addition, ESP will make a presumptive classification of whether a case is active TB disease or latent TB infection (LTBI). This indicator will be added to case reports for MDPH review but final classification is at MDPH's discretion.

Section 2. Criteria used to identify cases using ESP data

I. CASE TYPES

This document includes an algorithm to identify TB cases and to make a presumptive classification of active TB disease or latent TB infection at the time of case detection using each patient's clinical data.

II. TIME WINDOW

A. ACTIVE TB DISEASE

The recurrence window for active TB cases is one year. After one year they will be flagged as latent TB infection and will remain a case for lifetime unless they later meet the case criteria for active TB disease again.

B. LATENT TB INFECTION

There is no recurrence window for latent TB infection. A case will remain a latent TB case for lifetime unless it later meets case criteria for active TB disease.

III. CASE CRITERIA

A. ACTIVE TB CASES

Any patient who has at least one of the following:

1. Prescription for Pyrazinamide
2. Order for an AFB test and a diagnosis code for TB* coded in the 14 days prior to the lab order or in the 60 days following the test order
3. Diagnosis code for TB* with a prescription for two or more anti-TB medications** within 60 days either before or after. One prescription can be ordered within 60 days prior and another or more within 60 days after diagnosis code. They do not need to occur both before or both after diagnosis code. Prescription for two or more anti-TB medications excludes the combination of Isoniazid (INH) and Rifapentine (RPT) only (i.e. only these two medications identified) as these are used for latent TB infection. If a third prescription is ordered in addition to this combination, this exclusion does not hold.

B. LATENT TB INFECTION CASES

Any patient who does not meet criteria for Active TB and has one of the following:



1. Diagnosis code for LTBI*
2. Positive IGRA (Quantiferon or T-Spot)
3. Prescription for Isoniazid (INH)
4. Prescription for Rifapentine (RPT)

*See Section 4, Table 1 for diagnosis codes used to identify TB cases.

**See Section 4, Table 5 for anti-TB medications used to identify TB cases.

Section 3. Specifications for reporting diseases/conditions to the Massachusetts Department of Public Health (MDPH)

I. INITIAL CASE REPORTING CRITERIA

All cases should be immediately reported to MDPH upon initial detection. Each patient is only reported the first time they meet the case definition.

II. CASE REPORT UPDATE CRITERIA

An updated report should be sent to MDPH for a period of one year after initial case report is sent whenever any of the following occur:

1. Prescription for anti-TB medication* (new and refills)
2. New IGRA test result
3. Order for an AFB test

*See Section 4, Table 5 for anti-TB medications used to identify TB cases.

III. DATA TO INCLUDE IN INITIAL REPORTS TO MDPH

A. Demographic

Name	Last, first, middle
Date of birth	yyyy/mm/dd
Gender	Male / Female
Race	American Indian / Asian / Black / White / Other / Unknown
Ethnicity	Hispanic / Non-Hispanic / Unknown
Address	Line 1, line 2, city, state, zip, country
Phone	xxx-xxx-xxxx
Language spoken	
Medical record number	

B. Lab Ordering Facility Information

Facility name	
Facility address	Line 1, line 2, city, state, zip
Facility contact person	
Contact person email	



Contact person phone	xxx-xxx-xxxx
Facility phone	xxx-xxx-xxxx
Facility NPI	

C. Encounter Data

See Section 4, Table 7 below for the NA codes to send provider fields in HL7 messages

Lab test ordering provider	Name and NPI
Prescribing provider	Name and NPI
Primary care provider	Name and NPI
Managing treatment provider	Name and NPI
Treatment encounter facility name	
Treatment encounter facility address	Line 1, line 2, city, state, zip
Treatment encounter facility NPI	

D. Laboratory Results

All results 6 months before and 30 days after the day on which case established. **Include test dates.**

IGRA (Quantiferon/T-spot)	
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E. TST/PPD

If any of the diagnosis codes listed in Section 4, Table 2 are present (ever) then report TST/PPD flag. See Section 4, Table 7 for the NA code to send this field in HL7 messages.

Reactive tuberculin skin test (TST)/purified protein derivative (PPD)	Yes
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F. Pregnancy

See Section 4, Table 7 for the NA code to send this field in HL7 messages.

Pregnancy flag active	Yes or No
Expected Date of Delivery (EDD)	

G. Symptoms

If any of the diagnosis codes or vital sign findings listed in Section 4, Table 3 are present 30 days before date case established then report symptoms as noted below. See Section 4, Table 7 for the NA code to send this field in HL7 messages.

Symptoms	Text string including ICD-9 or ICD-10 code and description or vital sign finding as described in Section 4, Table 3.
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H. Underlying Illness:

If any of the diagnosis codes listed in Section 4, Table 4 are present 30 days before the date on which case is established then report underlying illnesses as below. See Section 4, Table 7 for the NA code to send this field in HL7 messages.

Underlying illness	Text string including ICD-9 or ICD-10 code and description.
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I. Medications

See Section 4, Table 7 for the NA code to send this field in HL7 messages.

Prescription for TB medication	Text string including medication name, dose, frequency, and duration
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	(calculated using start and end date). See Section 4, Table 5 for specific medications.
Treatment date	Date on which each prescription was ordered.

J. Classification:

See Section 4, Table 7 for the NA code to send this field in HL7 messages.

ESP classification flag	Active TB or TB Infection
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K. Variables requiring further exploration

Explore availability of the following variables of interest at ESP sites:

Chest x-ray	We will evaluate how this information is captured in ESP data. Prioritize identifying whether x-ray was done and the date.
Country of Birth	We will explore feasibility of receiving this information with providers.
Substance use in the past year. Ideally, we'd be able to specify injection drug use vs. non-injection drug use.	We will explore feasibility of receiving this information with providers, but will not be prioritized for initial implementation.
Smoking status	We will explore feasibility of receiving this information with providers that populate the social history tab, but will not be prioritized for initial implementation.
Excessive alcohol use	We will explore feasibility of receiving this information with providers that populate the social history tab, but will not be prioritized for initial implementation.
Malignancy as underlying illness	Diagnosis codes are too extensive and all would need to be listed individually. We will explore feasibility of receiving this information in another manner in the future.

Section 4. Codes, laboratory tests, and medications used to identify criteria listed in Section 2 and supplementary reporting information in Section 3.

I. DIAGNOSES CODES

Table 1. Diagnosis Codes Used to Identify Case Components

Component Name	Code Type	Code	Description
TB	ICD-9-CM	010.00-018.99	Tuberculosis
	ICD-10-CM	A15-A19	Tuberculosis
LTBI	ICD-9-CM	795.5	Nonspecific reaction to test for tuberculosis
		795.51	Nonspecific reaction to tuberculin skin test without active tuberculosis
		795.52	Nonspecific reaction to cell mediated immunity measurement of gamma interferon antigen response without active tuberculosis
	ICD-10-CM	R76.1	Nonspecific reaction to test for tuberculosis
		R76.11	Nonspecific reaction to tuberculin skin test without active tuberculosis
		R76.12	Nonspecific reaction to cell mediated immunity measurement of gamma interferon antigen response without active tuberculosis



Table 2. Diagnosis Codes Used to define TB Skin Test

Component	Code Type	Code	Description
TST/PPD	ICD-9-CM	795.51	Nonspecific reaction to tuberculin skin test without active tuberculosis
	ICD-10-CM	R76.11	Nonspecific reaction to tuberculin skin test without active tuberculosis

Table 3. Diagnosis Codes Used to Identify Symptoms

Symptom	Code Type	Code	Description
Fever	N/A	Temperature >100.4	Measured temperature if available, ELSE "fever".
	ICD-9-CM	780.60	Fever, unspecified
	ICD-10-CM	R50.9	Fever, unspecified
Cough	ICD-9-CM	786.2	Cough
	ICD-10-CM	R05	Cough
Hemoptysis	ICD-9-CM	786.30	Hemoptysis, unspecified
	ICD-10-CM	R04.2	Hemoptysis
Night sweats	ICD-9-CM	780.8	Generalized hyperhidrosis
	ICD-10-CM	R61	Generalized hyperhidrosis
Malaise	ICD-9-CM	780.79	Other malaise and fatigue
	ICD-10-CM	R53.81	Other malaise
		R53.83	Other fatigue
Chest pains	ICD-9-CM	786.50	Chest pain, unspecified
		786.51	Precordial pain
		786.52	Painful respiration
		786.59	Other chest pain
	ICD-10-CM	R07.1	Chest pain on breathing
		R07.2	Precordial pain
		R07.8	Other chest pain
R07.9		Chest pain, unspecified	
Weight loss	ICD-9-CM	783.2	Abnormal loss of weight and underweight
		783.21	Loss of weight
	ICD-10-CM	R63.4	Abnormal weight loss

Table 4. Diagnosis Codes Used to Identify Underlying Illness

Symptom	Code Type	Code	Description
Chronic/Renal Disease/Hemodialysis	ICD-9-CM	585.1 - 585.9	Chronic kidney disease (CKD)
	ICD-10-CM	Z99.2	Dependence on renal dialysis
		N18.1 – N18.9	Chronic kidney disease (CKD)
Diabetes (Type II)	ICD-9-CM	250*	Diabetes mellitus without mention of complication, type II or unspecified type, not stated as uncontrolled <i>Includes all sub-codes with "250" prefix</i>
	ICD-10-CM	E11*	Type 2 diabetes mellitus <i>Includes all sub-codes with "E11" prefix</i>
Gastrectomy/Jejunioileal Bypass	ICD-9-CM	V45.75	Acquired absence of organ, stomach
	ICD-10-CM	Z90.3	Acquired absence of stomach [part of]
Immunosuppression (not HIV/AIDS)	ICD-9-CM	279.0-279.9	Disorders involving the immune mechanism
	ICD-10-CM	D80-D89	Certain disorders involving the immune mechanism
Long-term use of insulin	ICD-9-CM	V58.67	Long-term (current) use of insulin
	ICD-10-CM	Z79.4	Long term (current) use of insulin
Organ Transplant	ICD-9-CM	V42.0-V42.9	Organ or tissue replaced by transplant



	ICD-10-CM	Z94.0-Z94.9	Transplanted organ and tissue status
Silicosis	ICD-9-CM	502	Pneumoconiosis due to other silica or silicates
	ICD-10-CM	J62.8	Pneumoconiosis due to other dust containing silica
Steroid Therapy	ICD-9-CM	V87.44	Personal history of inhaled steroid therapy
		V87.45	Personal history of systemic steroid therapy
		V58.65	Long-term (current) use of steroids
	ICD-10-CM	Z92.24	Personal history of steroid therapy
		Z92.240	Personal history of inhaled steroid therapy
		Z92.241	Personal history of systemic steroid therapy
		Z79.5	Long term (current) use of steroids
		Z79.51	Long term (current) use of inhaled steroids
Z79.52	Long term (current) use of systemic steroids		
Weight Loss (Greater than 10% of ideal body weight)	ICD-9-CM	783.2	Abnormal loss of weight and underweight
		783.21	Loss of weight
	ICD-10-CM	R63.4	Abnormal weight loss

II. MEDICATIONS

Table 5. Medications

Brand Name	Generic Name
Nydrazid, Laniazid	Isoniazid or INH (exclude INHAL, INHL, INHIB, rifampin)
Rifamata, isonaRif	Isoniazid + rifampin
Myambutol	Ethambutol
Rifadin, Rimactane	Rifampin
Mycobutin	Rifabutin
Priftin	Rifapentine
Tebrazid	Pyrazinamide or PZA (exclude CAPZA and XTAMPZA)
Rifater	Rifampin, isoniazid, and pyrazinamide
	Streptomycin
Paser	Para-aminosalicylic acid
	Kanamycin
	Capreomycin
Seromycin	Cycloserine
Trecator	Ethionamide
Avelox, Vigamox, Moxeza	Moxifloxacin (exclude EYE, OPHT, OPTH, OP SOLN)

III. LABORATORY TESTS LOINCS

Table 6. Laboratory Test LOINC Mapping

Laboratory Test	Component Name	LOINC	LOINC Name
IGRA	IGRA (Quantiferon/T-spot)	45323-3	M. tuberculosis tuberculin stimulated gamma interferon: ACnc: Pt: Bld: Ord: Micro
AFB	AFB Culture	11475-1	Microorganism identified : PrId : Pt : xxx : Nom : Culture
	AFB Stain	11545-1	Microscopic observation : PrId : Pt : xxx : Nom : Acid fast stain
	RNA probe for specific Mycobacterium species	17296-5	Mycobacterium tuberculosis complex DNA : ACnc : Pt : xxx : Ord : Probe
	Genexpert	MDPH-196	MTB: PrId: Pt: xxx: Ord: Nucleic Acid Amplification



IV. NA CODES

Table 7. NA codes

NA code	Description
NA-1562	Medications
NA-1731	ESP classification flag
NA-1737	Reactive TST/PPD flag
NA-1738	Diagnosis codes
NA-1746	Prescribing provider name
NA-1747	Prescribing provider NPI
NA-1748	Treatment encounter facility name
NA-1749	Treatment encounter facility address
NA-1750	Treatment encounter facility city
NA-1751	Treatment encounter facility state
NA-1752	Treatment encounter facility NPI
NA-1753	Primary care provider name
NA-1754	Primary care provider NPI
NA-1755	Ordering provider name
NA-1756	Ordering provider NPI
NA-1757	Lab ordering facility name
NA-1758	Lab ordering facility address
NA-1759	Lab ordering facility city
NA-1760	Lab ordering facility state
NA-1761	Lab ordering facility NPI
NA-1762	Managing treatment provider name
NA-1763	Managing treatment provider NPI
NA-1767	Pregnancy status

V. CODE MAINTENANCE STRATEGY

TBD