Using Page Builder for Latent Tuberculosis Infection Surveillance in Tennessee

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BACKGROUND

Latent Tuberculosis Infection (LTBI) affects nearly one-third of the global population. If left untreated, persons with LTBI have a 5-10% chance of developing active tuberculosis (TB) disease during their lifetime. Approximately half of those who develop active TB disease will do so within the first two years of infection. LTBI is a non-reportable condition in Tennessee and thus, morbidity and treatment outcomes are not known.

The NEDSS (National Electronic Disease Surveillance System) Base System (NBS) was created for state agencies to integrate public health surveillance systems data and process in a secure environment. The NBS is the CDC supplied solution for NEDSS and is the integrated disease surveillance system at the Tennessee Department of Health. The NBS is used for the reporting and tracking of cases of many different illnesses in Tennessee. In 2009, TB was integrated within the NBS with the dissolution of the Tuberculosis Information Management System (TIMS).

Within the state of Tennessee, there are 13 public health regions (6 metro and 7 rural) each with their own TB program. All regions use the NBS TB Program Area Module (TB PAM) for surveillance and reporting of active TB disease (cases and suspects). However, each of the 13 public health regions tracked LTBI differently—ranging from notecards to elaborate databases.

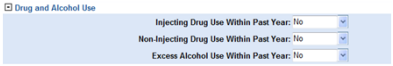
Recent versions of the NBS offer a new functionality, PageBuilder, which allows for the creation of new disease modules using standardized questions and vocabulary through a user interface. Using PageBuilder, each state can develop and build disease modules, or pages, specific to their needs. These pages are built using Public Health Information Network (PHIN) questions as well as Standard terminology including Systematized Nomenclature of Medicine – Clinical Terms (SNOMED CT).

METHODS

To prepare for implementing standardized LTBI surveillance in Tennessee, the Tennessee TB Elimination Program (TTBEP) researched how other states, particularly those that also use the NBS for TB surveillance and reporting, perform LTBI surveillance. In addition, the Report of a Verified Case of Tuberculosis (RVCT) was reviewed, and questions that were common for both TB and LTBI were noted. Additional LTBI questions were developed. All questions were added to an LTBI surveillance form to be used by regional TB staff throughout the state.

Questions from RVCT:

Questions in NBS:



The Centers for Disease Control and Prevention (CDC) facilitated several conference calls with various NBS states that were interested in LTBI surveillance, including Tennessee. CDC developed a comprehensive list of relevant questions and variables. The questions captured information regarding previous TB or LTBI diagnosis, laboratory testing, reason for testing, risk factors such as HIV status, residence, occupation, and drug and alcohol use, and drug treatment details. CDC built a template page with assistance from the Tennessee NBS staff, and the template page was piloted in Tennessee.

Figure 1. Tennessee LTBI Cases Reported by Month, 2013

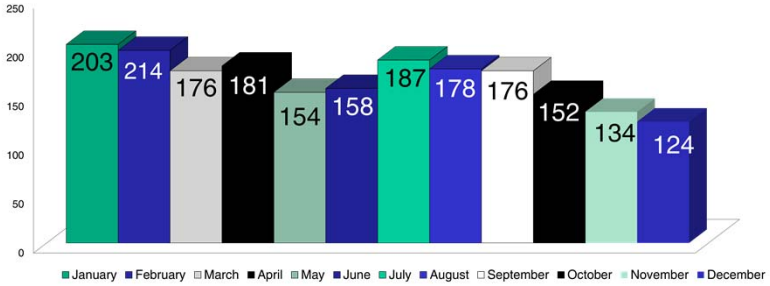


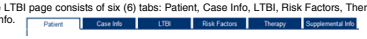
Figure 2. Tennessee LTBIs by Region, 2013

Region	# LTBI Reported
Chattanooga/Hamilton County (metro)	158
East Tennessee Region (rural—15 counties)	68
Jackson/Madison County (metro)	43
Knoxville/Knox County (metro)	80
Mid-Cumberland Region (rural—12 counties)	225
Memphis/Shelby County (metro)	535
Nashville/Davidson County (metro)	519
Northeast Tennessee Region (rural—7 counties)	95
South Central Tennessee Region (rural—12 counties)	38
Southeast Tennessee Region (rural—10 counties)	106
Sullivan County (metro)	11
Upper Cumberland Tennessee Region (rural—14 counties)	67
West Tennessee Region (rural—19 counties)	75
TOTAL	**2,020**

RESULTS

Staff from the TTBEP and the Tennessee Surveillance Systems and Informatics Program (SSIP) tailored the template developed by CDC to meet the needs of the TTBEP. The page was harmonized with the NBS TB PAM page to allow an LTBI case to become a TB case and inversely a TB suspect to become an LTBI without duplicate data entry (utilizing case reporting functionality available in NBS).

The Tennessee LTBI page consists of six (6) tabs: Patient, Case Info, LTBI, Risk Factors, Therapy, and Supplemental Info.



Because LTBI patients may change drug regimens, it was important to add the functionality to have multiple drug regimens with corresponding therapy start and stop dates. This allowed for the state TB program to monitor the differing drug regimens that were being used at any given time.

The LTBI page went into production in August 2012. Regional TB staff were asked to enter all LTBI cases reported from July 1, 2012 forward. Some regions with low LTBI morbidity entered LTBI cases from January 1, 2012 forward. From January 1, 2013 to December 31, 2103, there were 2,020 cases of LTBI reported in the 13 public health regions. Figure 1 shows the breakdown of cases reported by month. Figure 2 shows the number of LTBI cases reported by each region during this time period. During this time period there was one patient who was initially diagnosed with LTBI but became an active TB case. Also, there were 21 patients who had an initial investigation as TB suspects but were later deemed to be LTBIs.

CONCLUSIONS

Lack of treatment or incomplete treatment for LTBI is a risk factor for progression to active disease and drug-resistant TB. With implementation of the LTBI page, standardized surveillance and treatment outcomes are documented statewide. During the recent nationwide Isoniazid (INH) shortage, surveillance data were important in verifying how many LTBI patients were on INH, were switched to Rifampin (RIF), or were deferred for LTBI treatment until INH became readily available. The addition of a locally defined field (LDF) that allowed for a "Reason Therapy Stopped or Never Started = Medication Shortage" allowed for surveillance on those patients who 1) completed a shorter course INH regimen (according to guidance) or 2) were deferred for treatment. In addition, the documentation of LTBI patients in a central repository provides an overall look at contact investigations when LTBI patients are linked to active cases of TB and aids in determining if contact investigations should be expanded.

The LTBI page in NBS marked the first use of the PageBuilder functionality for surveillance of a non-reportable condition in Tennessee. Through this process, SSIP staff gained experience with PageBuilder, enhancing the ability to respond to evolving surveillance needs. Since the LTBI page went into production, the SSIP staff have built template pages for Novel Influenza A (H3N2v) and Carbon Monoxide (CO) Poisoning. The Novel Influenza A (H3N2v) page remains in NBS as a template. Although that page was never moved into production, the SSIP staff were able to quickly build the template in preparation for its use. The CO page went into production in 2013. CO was a new reportable condition in Tennessee in 2013, and having the PageBuilder functionality available made it possible to develop and implement the CO page for use by the Environmental Epidemiology program.

The most challenging process was identifying and standardizing data elements to be collected when compared with the actual building of the page in NBS. Though collaboration with various stakeholders both within the state and nationwide was time-intensive, this worthwhile effort showcases the collaborative process between the CDC and NBS jurisdictions around surveillance for a condition of public health interest.

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