



Data Management for TB GIMS Super Users

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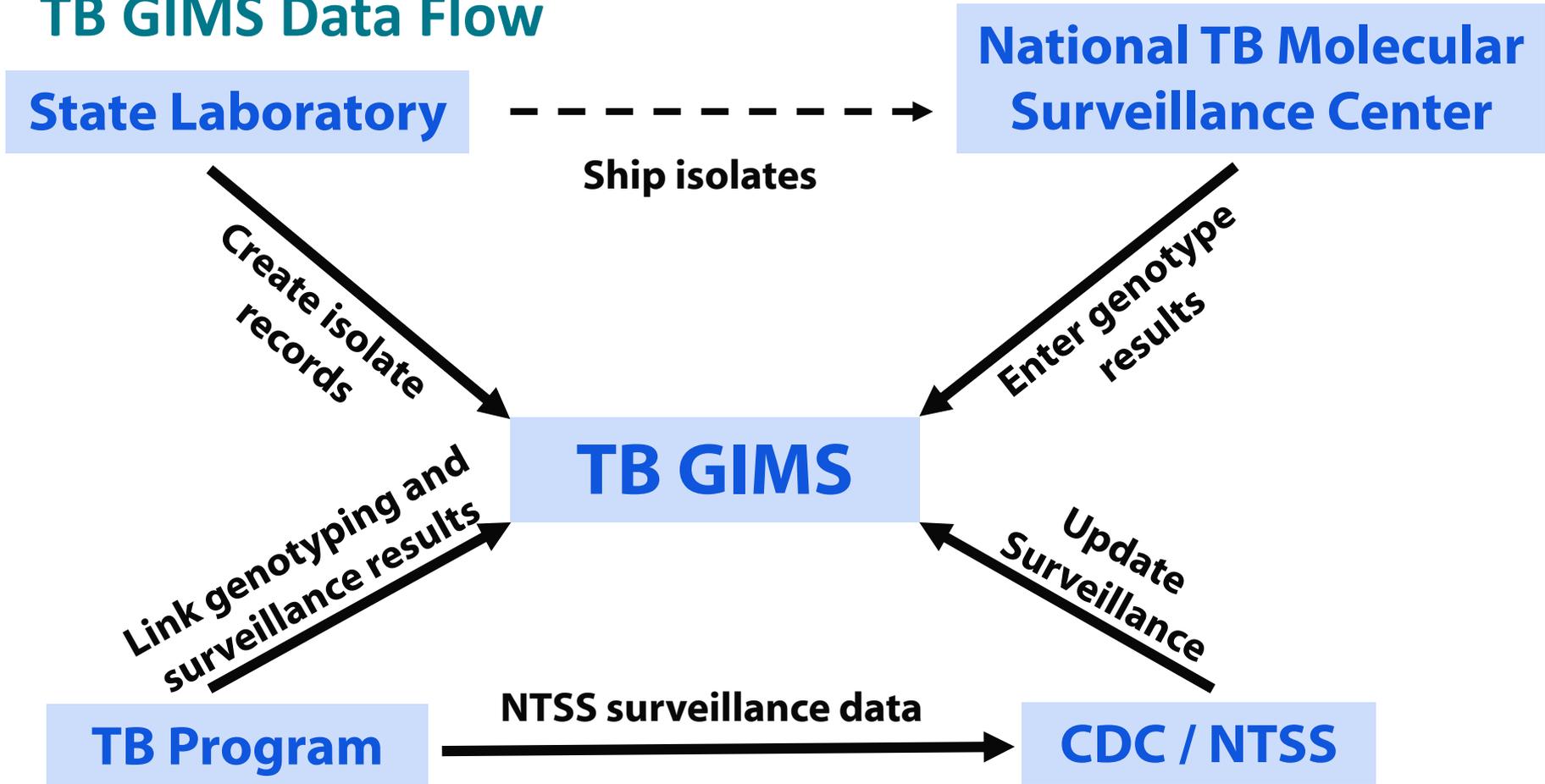
February 2019

Training objectives

At the end of this training, participants should be able to:

- **Describe data flow in TB GIMS**
- **Check linking status of isolates**
- **Perform linking responsibilities**
- **Identify and resolve common problems with linking**
- **Identify and manage isolates that cannot be linked**

TB GIMS Data Flow

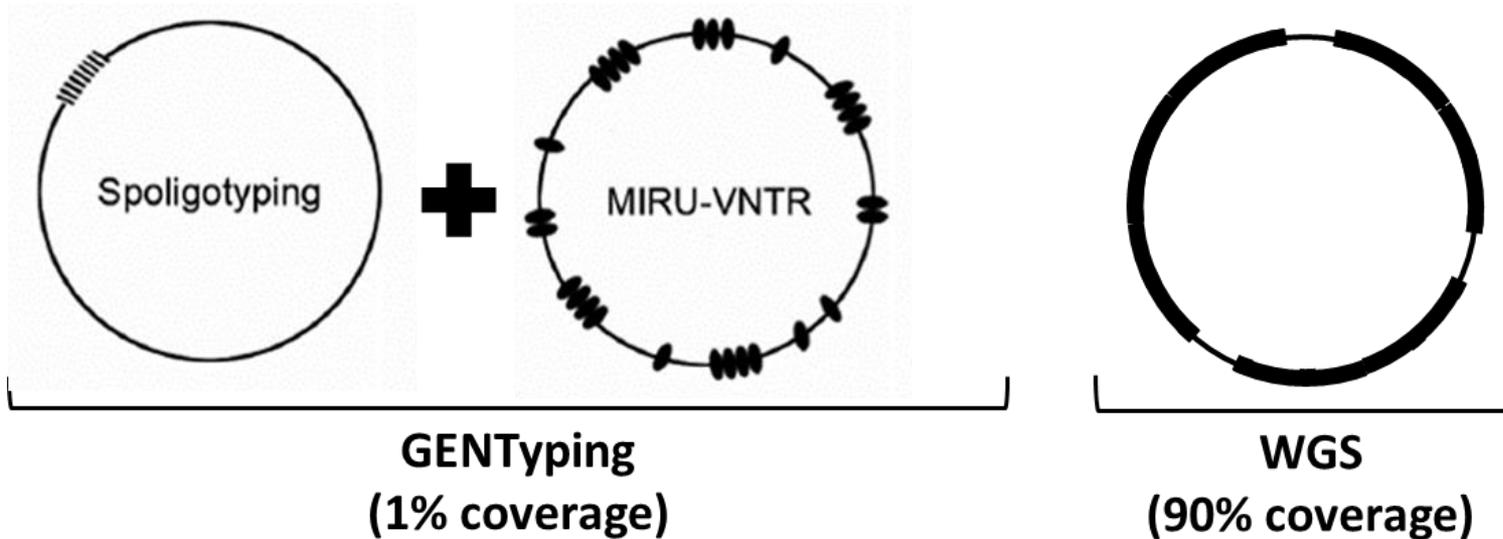


Data management

- Linking isolate records to surveillance records
- Typically handled at state level
- Functions available to “program super users” and “lab-program super users”

WGS can provide added resolution for examining genetic relatedness of isolates

- Captures much more of the genetic changes that occur



WGS training

<https://www.cdc.gov/tb/programs/genotyping/default.htm>

TB Genotyping

TB genotyping is a laboratory-based approach used to analyze the genetic material (e.g., DNA) of *Mycobacterium tuberculosis*, the bacterium that cause TB disease. The total genetic content is referred to as the genome. Specific sections of the *M. tuberculosis* genome form distinct genetic patterns that help distinguish different strains of *M. tuberculosis*.

Why use TB genotyping?

TB genotyping results, when combined with epidemiologic data, help identify persons with TB disease involved in the same chain of recent transmission. In the same way, TB genotyping helps distinguish between persons whose TB disease is the result of TB infection that was acquired in the past, as compared to recently or newly acquired infection with development of TB disease. TB genotyping is a tool that can add value to conventional contact investigation.

**National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
Division of Tuberculosis Elimination**

Whole-genome sequencing for investigation of recent TB transmission in the United States: Current uses and future plans

Sarah Talarico, PhD and Benjamin Silk, PhD
Surveillance, Epidemiology, and Outbreak Investigations Branch

**Tammi Show, MPH and Martin Clinis, MPH, MS
TB Control Branch, California Department of Public Health**

Part 1: Using WGS for detection and investigation of recent TB transmission

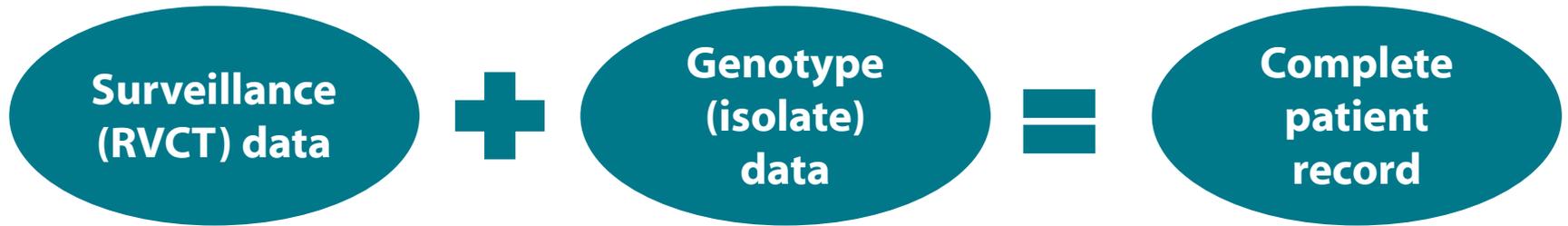
Part 2: Case Studies: Using WGS to investigate TB cluster alerts in California

Part 3: Plans for transition to a fully responsive web

<https://www.cdc.gov/tb/programs/genotyping/default.htm>

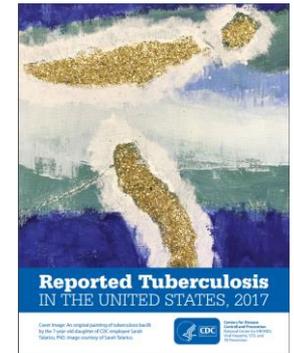
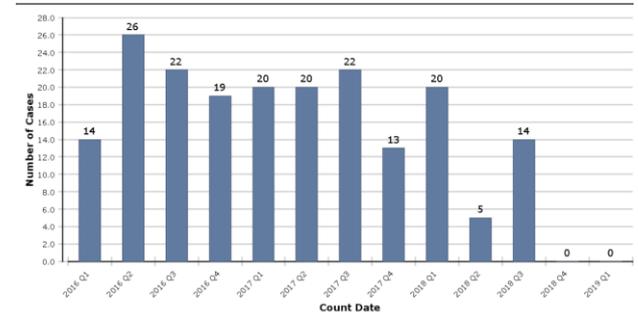
Why is linking important?

Linking creates a complete record



Linked records are used to

- View complete patient results data
- Generate TB GIMS reports/maps
- View Cluster Snapshots
- Generate cluster alerts for outbreak detection
- Monitor previously known clusters of concern
- Analyze genotyping data for TB Annual Report
- Calculate genotype surveillance coverage



Genotyping surveillance coverage

- Proportion of culture-positive TB cases linked with a genotype result in the jurisdiction of interest
- Current national target: 94%
- 2020 national target: 100%

TB GIMS Home Tuberculosis Genotyping Information Management System

Search

Genotype Results
Patient Results
Blank State Case Numbers
Blank Surveillance

Records

Submitted Isolates
New Isolates
Edit Isolates
Submit Isolates
Find Duplicates
Import Data
Reports and Tools

The last TB GIMS Surveillance Upload includes data transmitted to CDC through: 01/15/2019
Searches and reports will only include data reported to CDC by the state and included in the latest TB GIMS surveillance upload.

Announcements:
No New Announcements.

State:

Genotyping Surveillance Coverage

Year	2016	2017	2018	2019*
National (%)	97.3	97.3	82.2	0.0

*Year to date. NA-Not Available. Source: NTIP

● **Report:**

● **State:**

County:
APPLING
ATKINSON
BACON
BAKER (max. 25)

● **Report Type:**

How can I link isolates?

Two methods to link surveillance and isolate records

State case number

Surveillance (RVCT) record
Patient results
15 character unique string
2018GA000000001

Accession number

Isolate record
Genotype results
8 character unique string
18RF0001

Enter Accession number on
RVCT (Item 38)

Enter state case number in TB
GIMS isolate record (Edit Isolates)

38. Genotyping Accession Number

Isolate submitted for genotyping (select one): No Yes

If YES, genotyping accession number for episode:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Basic Options

State Case #	Submitter #	GIMS ID
<input type="text"/>	<input type="text"/>	<input type="text"/>
Linked ⓘ	Linkable ⓘ	WGS ⓘ
Select	Select	Select
Yes	Yes	Yes
No	No	No
	Unknown	Pending

Search only for:

- Blank State Case Number
- Blank Surveillance

How should I know when and which isolates need to be linked?

Isolate linking summary on TB GIMS home page

TB GIMS Home

Search

Genotype Results

Patient Results

Blank State Case Numbers

Blank Surveillance

Records

Submitted Isolates

New Isolates

Edit Isolates

Submit Isolates

Find Duplicates

Import Data

Reports and Tools

Watch List

Cluster Snapshot

Generate Reports

Templates

Export Data

Cluster Tracking List

Recent Transmission

Additional Testing

WGS Request

Directory

View Users

Contact Us

Tuberculosis Genotyping Information Management System

The last TB GIMS Surveillance Upload includes data transmitted to CDC through: 01/15/2019
 Searches and reports will only include data reported to CDC by the state and included in the latest TB GIMS surveillance upload.

Announcements: No New Announcements.

State: ALL Submit

Genotyping Surveillance Coverage [?](#)

Year	2016	2017	2018	2019*
National (%)	97.3	97.3	82.2	0.0

*Year to date. NA-Not Available. Source: NTIP

Timeliness of Genotyping - by Isolate

Time From → To	Median number of days		Goal (days)
	National		
	2018	2019*	
Specimen collection → Isolate shipped to genotyping lab ?	51	57	NA
Receipt at genotyping lab → Genotype create date ?	14	18	14
Genotype create date → State Case No. entered ?	1	52	56
Genotype create date → Isolate Linked ?	6	52	90
Specimen collection → Isolate Linked ?	89	117	NA

*Year to date. NA-Not Available.

Isolate Linking [?](#)

Number of Isolates	2018	2019*
Not linked isolates	1,313	340
Due to blank State Case No. ²	1,165	320
Due to blank surveillance ³	148	20
Not linkable isolates	234	0
Total isolates	8,814	526
Linkable isolates ³	8,580	526
Linked isolates	7,267	186

³Linkable Isolates: Isolates able to be linked to a surveillance

Pending Isolates

Number of Isolates	2018	2019*
Pending genotype results	156	438
Pending additional results (MIRU2 or RFLP)	1	0

*Year to date.

Isolate linking summary on TB GIMS home page

Isolate Linking 		
Number of Isolates	2018	2019*
Total isolates	30	4
Linkable isolates ¹	30	4
Linked isolates	26	3
Not linked isolates	4	1
Due to blank State Case No. ²	3	0
Due to blank surveillance ³	1	1
Not linkable isolates	0	0

¹Linkable Isolates: Isolates able to be linked to a surveillance record.

²Blank State Case Number: State Case Number not entered for the isolate record.

³Blank Surveillance: State Case Number is entered but not linked to a surveillance record.

*Year to date.

Isolate linking summary on TB GIMS home page

Isolate Linking 		
Number of Isolates	2018	2019*
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Due to blank State Case No. ²	3	0
Due to blank surveillance ³	1	1
Not linkable isolates	0	0

¹Linkable Isolates: Isolates able to be linked to a surveillance record.
²Blank State Case Number: State Case Number not entered for the isolate record.
³Blank Surveillance: State Case Number is entered but not linked to a surveillance record.
*Year to date.

Find corresponding state case number and enter it

Troubleshoot to identify why the isolate hasn't linked

Resolving blank state case numbers

Find isolates with blank state case number

TB GIMS Home	
Search	
	Genotype Results
	Patient Results
	Blank State Case Numbers
	Blank Surveillance
Records	
	Submitted Isolates
	New Isolates
	Edit Isolates
	Submit Isolates
	Find Duplicates
	Import Data

Blank State Case Numbers search

Basic Options

• State:

County:
County A
County B
County C
County D
County E
County F

Region:

Date Type:

Start Date:

End Date:

GENType:

PCRType:

ClusterName:

ClusterName2:

Search Results (2 Total Records) Page 1 of 1

	GIMS ID	State ID	County	Submitter#	Accession#	State Case#	Originating Lab	Date Ship
	143201	AA		AA180001	18RF4641		Lab 1	07/11/20
	141656	AA		AA180002	18RF3179		Lab 2	05/16/20

Edit isolates – blank state case number

<u>TB GIMS Home</u>
Search
Genotype Results
Patient Results
Blank State Case Numbers
Blank Surveillance
Records
Submitted Isolates
New Isolates
 Edit Isolates
Submit Isolates
Find Duplicates
Import Data

Edit isolates – blank state case number

▼ Basic Options

State Case # <input type="text"/>	Submitter # <input type="text"/>	GIMS ID <input type="text"/>	Search only for: <input checked="" type="checkbox"/> Blank State Case Number <input type="checkbox"/> Blank Surveillance
Linked ⓘ Select Yes No	Linkable ⓘ Select Yes No Unknown	WGS ⓘ Select Yes No Pending	
GENType <input type="text"/>	PCRTYPE <input type="text"/>	Accession # <input type="text"/>	
Date Type Date Isolate Created ▼	Start Date 01/01/2018	End Date 01/18/2019	
State Your state ▼	County Select a County County A County B County C County D County E	Region Select a Region	



Edit isolates – blank state case number

Basic Options

State Case #

Submitter #

GIMS ID

Linked **i** **Select**
Yes
No

Linkable **i** **Select**
Yes
No
Unknown

WGS **i** **Select**
Yes
No
Pending

Search only for:
 Blank State Case Number
 Blank Surveillance

GENType

PCRTType

Accession #

Date Type
Date Isolate Created **v**

Start Date
01/01/2018 **📅**

End Date
01/18/2019 **📅**

State
Your state **v**

County
Select a County
County A
County B
County C
County D
County E

Region
Select a Region

Double click isolate
to edit

Search Results (2 Total Records) Page 1 of 1 Go

	GIMS ID	Submitting Lab	State Case#	County	Submitter#	Linked	Linkable	Reason Not Linkable	Linkable Comment	WG
i	143201	Lab 1			123456	N	Y			
i	141656	Lab 2			234567	N	Y			

Export list to edit in Excel

Export Type: **Update State Case Number** **v** **Export** **Edit** **Copy**

Import data to Update State Case Number

TB GIMS Home
Search
Genotype Results
Patient Results
Blank State Case Numbers
Blank Surveillance
Records
Submitted Isolates
New Isolates
Edit Isolates
Submit Isolates
Find Duplicates
 Import Data

Import Data



To import data, select an import type, click **Browse** to locate the file then click **Upload**.
Reminder: Patient Identifiers (e.g., names, dates of birth, initials, etc.) are not permitted in the Options 1, 2 or 3 fields or in any other variables in TB GIMS.
For more information, refer to **Import Data** in the online help.

• Required

• **Import:** Update State Case Number

• **Import File:**

Isolate linking summary does not update immediately

Isolate Linking 		
Number of Isolates	2018	2019*
Total isolates	30	4
Linkable isolates ¹	30	4
Linked isolates	29	3
Not linked isolates	1	1
Due to blank State Case No. ²	0	0
Due to blank surveillance ³	1	1
Not linkable isolates	0	0

¹Linkable Isolates: Isolates able to be linked to a surveillance record.
²Blank State Case Number: State Case Number not entered for the isolate record.
³Blank Surveillance: State Case Number is entered but not linked to a surveillance record.
*Year to date.

* Home page updates every 2 hours

Troubleshoot to identify why the isolate hasn't linked

Resolving blank surveillance

Possible reasons for blank surveillance

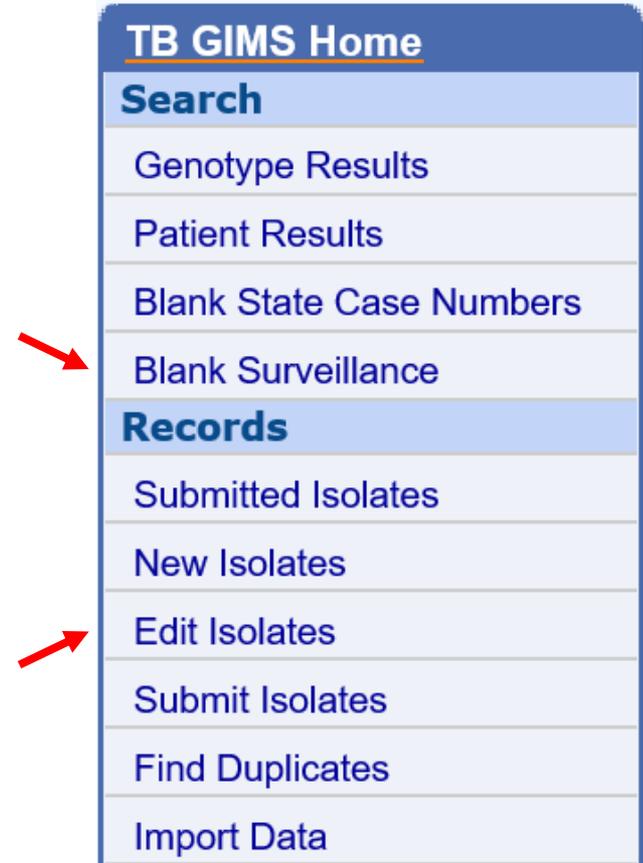
- **State case number is incorrect or invalid**
 - More than or less than 15 characters
 - Invalid year or state code
 - Year is based on count date or isolate date
- **Surveillance (RVCT) record has not been transmitted to NTSS**
- **Surveillance record has not yet been loaded from NTSS to TB GIMS**
 - Data are pulled weekly on Wednesday mornings

Possible reasons for blank surveillance

- **State case number is incorrect or invalid** ← Correct state case number in TB GIMS
 - More than or less than 15 characters
 - Invalid year or state code
 - Year is based on report date or isolate date
- **Surveillance (RVCT) record has not been transmitted to NTSS**
- **Surveillance record has not yet been loaded from NTSS to TB GIMS** ← Follow up with surveillance
 - Data are pulled weekly on Wednesday mornings

Correcting the state case number

- Same process blank state case number
- Use 'Blank Surveillance' search to view and export list of isolates
 - Export list and update in Excel
- Correct in 'Edit Isolates'
 - Click to edit isolates individually
 - Export list and update in Excel
- Import Data from Excel



The image shows a screenshot of the TB GIMS Home interface. The menu is titled 'TB GIMS Home' and is divided into two main sections: 'Search' and 'Records'. The 'Search' section includes 'Genotype Results', 'Patient Results', 'Blank State Case Numbers', and 'Blank Surveillance'. The 'Records' section includes 'Submitted Isolates', 'New Isolates', 'Edit Isolates', 'Submit Isolates', 'Find Duplicates', and 'Import Data'. Two red arrows point to the 'Blank Surveillance' and 'Edit Isolates' options.

TB GIMS Home	
Search	
Genotype Results	
Patient Results	
Blank State Case Numbers	
Blank Surveillance	
Records	
Submitted Isolates	
New Isolates	
Edit Isolates	
Submit Isolates	
Find Duplicates	
Import Data	

Isolate linking summary

Isolate Linking 		
Number of Isolates	2018	2019*
Total isolates	30	4
Linkable isolates ¹	30	4
Linked isolates	30	3
Not linked isolates	0	1
Due to blank State Case No. ²	0	0
Due to blank surveillance ³	0	1
Not linkable isolates	0	0

¹Linkable Isolates: Isolates able to be linked to a surveillance record.
²Blank State Case Number: State Case Number not entered for the isolate record.
³Blank Surveillance: State Case Number is entered but not linked to a surveillance record.
*Year to date.



* Home page updates every 2 hours

Alternative ways to identify unlinked isolates

Searching for unlinked isolates

- **Genotype Results search or Edit Isolates**
 - Under advanced options, select Linked='No' and Linkable='Yes'
 - Shows all isolates eligible for linking
- **Unlinked isolates report**

Genotype search results

Advanced Options

Linked ⓘ

Select
Yes
No

Linkable ⓘ

Select
Yes
No
Unknown

Reason Not Linkable ⓘ

Select
Out of State
Out of Country
Not a Case
Other

Pending Results ⓘ

Select
Yes
No

WGS ⓘ

Select
Yes
No
Pending

Find

Clear

Create Watch List Item

Unlinked isolates report

Basic Options ● Required

● **Report:** Unlinked Isolates

● **State:** FLORIDA

County: Select a County
ALACHUA
BAKER
BAY
BRADFORD (max. 25) ⓘ

● **Date Type:** Genotype Create Date

● **Date Range:** 01/01/2018 (Begin) 01/24/2019 (End)

The last TB GIMS Surveillance Upload includes data transmitted to CDC through: **01/22/2019**
Reports and maps only include data from this year and the 10 previous calendar years.

● **Report Type:** PDF

Run Clear

Unlinked isolates report

Unlinked Isolates Due to Blank Surveillance

State:

Standard Format: 8



County: ALL

Non Standard Format: 4



Date Type: Genotype Create Date

Total Number of Records: 12

Date Range: 01/01/2018 - 01/24/2019

State Case Number in Standard Format

GIMS ID	State Case Number	Genotype Create Date	County	Submitting Lab	Submitter Number	Accession Number	GenType	Linkable
---------	-------------------	----------------------	--------	----------------	------------------	------------------	---------	----------

State Case Number in Non Standard Format

GIMS ID	State Case Number	Genotype Create Date	County	Submitting Lab	Submitter Number	Accession Number	GenType	Linkable
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What if an isolate should NOT be linked to a surveillance record?

Some isolates cannot be linked

Isolate Linking

Number of Isolates	2018	2019*
Total isolates	30	4
Linkable isolates ¹	30	4
Linked isolates	26	3
Not linked isolates	4	1
Due to blank State Case No. ²	3	0
Due to blank surveillance ³	1	1
Not linkable isolates	0	0



¹Linkable Isolates: Isolates able to be linked to a surveillance record.

²Blank State Case Number: State Case Number not entered for the isolate record.

³Blank Surveillance: State Case Number is entered but not linked to a surveillance record.

*Year to date.

'Linkable' variable allows us to identify isolates that cannot be linked

- Default is 'Yes'
- Reasons not linkable
 - Out of state
 - Out of country
 - Not a case
 - Other

Find the isolates using Edit Isolates

Basic Options

State Case #

Submitter #

GIMS ID

Linked 

Yes
No

Linkable 

Yes
No
Unknown

WGS 

Yes
No
Pending

Search only for:
 Blank State Case Number
 Blank Surveillance

GENType

PCRTYPE

Accession #

Date Type 

Start Date 

End Date 

Search Results (1,287 Total Records)

Page 5 of 86 Go

	GIMS ID	Submitting Lab	State Case#	County	Submitter#	Linked	Linkable	Reason Not Linkable	Linkable Comment	WGS
	147945					N	Y			
	147944					N	Y			
	147943					N	Y			
	147941					N	Y			

Two options to change Linkable to 'No'

- Edit each isolate individually

Edit Isolates

 To edit an isolate, enter the required data then click **Save**.
Reminder: Patient Identifiers (e.g., names, dates of birth, initials, etc.) are not permitted in the Options 1, 2 or 3 fields or in any other variables in TB GIMS.
For more information, refer to [Edit Isolates](#) in the online help.

GIMS ID: 147945 ● Required

● **Submitting Lab:**

● **State:** (Please enter patient's state of residence)

● **Submitter Number:**

State Case Number:

WGS:

Linkable: (This field is highlighted in red in the original image)

Reason Not Linkable: **Comment:**

Out Of State: **Specific State:**

Out Of Country: **Specific Country:**

Bi National: Yes No

County:

Suspected False Positive: Yes No

Two options to change Linkable to 'No'

- Export / import Excel spreadsheet

Export Type:

	A	B	C	D	E	F	G	H	I	J
	GIMS ID*	State ID*	State Case Number*	Submitter Number*	Accession Number*	Genotype Report Date*	Option1	Linkable*	Reason Not Linkable	Linkable Comment
1	148327	TB		8675309	19RF0527			Y		
3	148326	TB		8675310	19RF0528			Y		
4	148325	TB		8675311	19RF0529			Y		
5	148324	TB		8675312	19RF0530			Y		
6	148323	TB		8675313	19RF0531			Y		
7	148322	TB		8675314	19RF0532			Y		

Reason Not Linkable
If Linkable is 'N', then this variable takes the following values:
Out of State
Out of Country
Not a Case
Other

Records

- Submitted Isolates
- New Isolates
- Edit Isolates
- Submit Isolates
- Find Duplicates
- >> Import Data

● **Import:**

● **Import File:**

Managing 'out of state' isolates

Managing out of state isolates

Definition: isolates that your state sent for genotyping, but the case is counted outside your jurisdiction

- **Confirm with receiving state that they will count the case**
- **Copy/Transfer isolate to the other state using Edit Isolates**
- **Change your isolate to Linkable='No'**

Use Edit Isolates to find the isolate and make a copy

Basic Options

Find

Clear

Search Results (1 Total Records)

Page 1 of 1 Go

	GIMS ID	Submitting Lab	State Case#	County	Submitter#	Linked	Linkable	Reason Not Linkable	Linkable Co
 	147835	My Lab		County A	TB0000672	N	Y		

Export Type: Update Linkable

Export

Edit

Copy

Transfer the isolate to other state

Copy Isolate Details



To copy the isolates, enter the required data then click **Submit**.

State: (Enter state the isolate record should be copied to.) ● Required

State Case Number: (State Case Number for the patient in the receiving state, if available.)

Comments: (Do not enter any patient identifiers in the comments field.)

500 *characters left*

Selected Results

	GIMS ID	State Case#	County	Submitter#	Linked	Linkable	Reason Not Linkable	Linkable Comment	Accession#
	147835		County A	TB0000672	N	Y			19RF0000

Submit

Close

Managing 'Not a case' isolates

Common reasons for 'Not a case'

- Lab contamination
- Bovis BCG strain

Bovis BCG

- All human TB cases with any *M. tuberculosis* complex species are reportable
- One exception is Bovis BCG strain
 - Used in BCG vaccine and as immunotherapy for bladder cancer
 - Considered healthcare-associated, not communicable
 - Not reportable and not counted for surveillance purposes

Bovis BCG

- **Identify isolates in TB GIMS**
 - Lineage: *M. bovis*
 - Spoligotype: 6767737777777777600
 - MIRU: x, y, or z in second position
- **Use Edit Isolates to change the isolate to NOT linkable**
 - Reason not linkable: “Not a case”
 - Comment field: enter “Bovis BCG”

Linkable:

No ▼

Reason Not Linkable:

Not a Case ▼

Comment:

Bovis- BCG

TB Genotyping on the CDC website:
<https://www.cdc.gov/tb/programs/genotyping/default.htm>

TBgenotyping@cdc.gov

DTBESupport@cdc.gov

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

