Appendix E: Answers to the Exercises

Chapter 4: Case Detection

Exercise 4.1: Finding Unreported TB Cases

4.1	State A documented an unexpected and substantial decline in reported TB cases. The declines in reported TB case counts (-10.6%) and incidence rates (-11.4%) were the greatest single-year declines since reporting began in 1953. What are 4 possible reasons for the decline in the TB cases? What are 2 specific things you would do to investigate each of the four possible reasons?

	Answer: The TB program should conduct an investigation around 4 possible reasons for determining the decline in TB cases.
	
	Reason 1. Surveillance artifact
	
	    Specific things to investigate
	      A. Changes in surveillance and reporting practices through interviews with staff
	      B. Identification and comparison of non-countable cases in the "year of question" and prior year through the information management system and staff

	Answer:
	Reason 2. Underreporting of TB
	
	Specific things to investigate
	    A. Data already within the public health system for delays or disruption in the flow of TB surveillance information from the local level to the state, and from the state to CDC
	    B. Data coming into the public health system for absent reports from hospitals, other providers, and laboratories
	
	(For more information see Chapter 10: Toolkit for Quality Assurance, Case Detection Tool-6, Investigation Process for Underreporting of TB for QA for TB Surveillance Data.)

	Answer:
	Reason 3. Failure to diagnose TB by laboratory or medical criteria (i.e., clinical or provider diagnosis)
	
	Specific things to investigate
	    A. Laboratory-based (state and private), compare the proportion of patients with a positive MTB culture among those who had a specimen inoculated for TB in the year of question and the prior year. For a state laboratory, the total number and type of specimens inoculated for TB should be examined for potential markers for differences in provider suspicion of and for changes in site of TB disease (i.e., extrapulmonary versus pulmonary).
	    B. Medical diagnosis (clinical/provider),
	        ▪ Compare by age group the number of counted cases verified by clinical and provider diagnosis combined versus laboratory criteria in the prior year and "year in question."
	        ▪ Compare the total number of patients with a TB ICD-9 code in the prior year and "year in question" discharge database.

	Answer:
	Reason 4. True decrease in TB
	
	Specific things to investigate
	    A. Epidemiologic trends: Conduct analyses of counted TB cases in the local data management system to describe changes in case characteristics, trends in site of disease, and trends by nativity.
	    B. TB transmission trends:
	        ▪ Compare TB incidence in children by nativity in the "year of question" and prior year.
	        ▪ Assess changes in genotyping clustering of culture-positive cases using the National Tuberculosis Genotyping Service.

Chapter 5: Data Accuracy

Exercises 5.1–5.5: Data Accuracy Examples

5.1	Charles died during therapy. His death date is recorded as 11/25/2012. What should you put in RVCT item 15, Status at TB diagnosis?
	Answer: If Charles died during therapy, he should be alive at diagnosis so there should not be a death date.

5.2	Can a patient have a "Date sputum smear was collected" without a "Date sputum smear result was reported"?
	Answer: Yes. For the sputum smear question, there is NOT a date result reported field.

5.3	Kirk's sputum culture result report date was 06/11/2012 and his sputum culture collection date was 06/27/2012. How long did it take for Kirk's sputum culture result to be reported?
	Answer: Kirk's sputum culture collection date should precede his sputum culture results report date. This situation is not possible.

5.4	Maya's chest x-ray was Abnormal. Should there be a response to Evidence of a cavity or Evidence of miliary TB?
	Answer: When a chest x-ray is Abnormal, there should be responses to both questions. If there is no evidence of cavitary or miliary disease, the responses should be "N" to each question.

5.5	Dwayne's record shows that he was not under the custody of Immigration and Customs Enforcement (ICE). What RVCT item is needed to be responded to first in order to provide this information?
	Answer: Dwayne's record should show that he was a Resident of a Correctional Facility at diagnosis.

Exercise 5.6: Detect Probable Data Errors in the RVCT Items 11 and 12

The following four cases include data from RVCT **Race** (item 11) and **Country of Birth** (item 12). Detect probable data errors for each case.

Yellow highlight indicates where the error occurred.

| Case # | RVCT Race (item 11) | | | | | RVCT Country of Birth (item 12) | | |
| | | | | | | U.S.-born | | Country of Birth |
	American Indian or Alaska Native	Asian	Black or African American	Native Hawaiian or other Pacific Islander	White	Yes	No	
1.			X				X	United States
2.					X	X		
3.	X					X		India
4.				X			X	Philippines

What are the probable data errors for each case? Write your answers in the space provided.

Case #	Correct Answer
1.	**U.S.-born should be selected as "Yes" if Country of birth is the "United States."**
2.	**Country of birth has been left blank.**
3.	**Race should probably be "Asian" if the country of birth is India and US-born should probably be "No."**
4.	**Race should probably be "Asian" if born in the Philippines.**

Appendix E: Answers to the Exercises
E-5

Exercise 5.7: Detect Possible Data Errors in the RVCT Items 18, 20, 39, and 40

The following three cases include data from RVCT **Sputum Culture** (item 18), **Culture of Tissue and Other Body Fluids** (item 20), **Initial Drug Susceptibility Testing** (item 39), and **Initial Drug Susceptibility Results** (item 40). Detect the possible data errors for each case.

Yellow highlight indicates where the error occurred.

Key for Possible Responses

Key for RVCT Items 18 and 20	Key for RVCT Item 39	Key for RVCT Item 40
P=Positive N=Negative ND=Not Done UK=Unknown	No=Not Performed Yes=Performed UK=Unknown	R=Resistant S=Susceptible ND=Not Done UK=Unknown

Case #	Item 18 Sputum Culture				Item 20 Culture of Tissue and Other Body Fluids				Item 39 Initial Drug Susceptibility Testing			Item 40 Initial Drug Susceptibility Results																
												Isoniazid				Rifampin				Pyrazinamide				Ethambutol			
	P	N	ND	UK	P	N	ND	UK	No	Yes	UK	R	S	ND	UK	R	S	ND	UK	R	S	ND	UK	R	S	ND	UK
1.	X							X	X				X				X				X				X		
2.		X				X				X		X					X				X				X		
3.			X		X					X		X					X								X		

What are the possible data errors? Write your answers in the space provided.

Case #	Your Answer
1.	**Item 39 Initial Drug Susceptibility should be Yes in order to be consistent with Item 40. The responses to Item 40 imply that initial drug susceptibility testing was done.**
2.	**Item 18 Sputum Culture or Item 20 Culture of Tissue and Other Body Fluids needs to be positive. A positive culture result is required in order to perform drug susceptibility testing. The responses to Item 39 and 40 indicate that initial drug susceptibility testing was done.**
3.	**Item 40 Initial Drug Susceptibility Results for Pyrazinamide needs a response. A blank response is incomplete. It does not imply that testing was not done or unknown.**

Exercise 5.8: Reconciling Case Count

The fictitious state of San Price needs to reconcile the annual count for 2011 that is shown in the NTSS TB Case List Report below.

- The state says they have 10 verified counted cases in 2011.
- CDC only shows that there are 4 verified counted cases.

Use the TB Case List Report below for 2011 to identify case(s) that CDC is **not** counting and describe why.

TB Case List Report, 2011

Case #	County	Report Date	Count Date	Count Status Description	CDC Vercrit Code	CDC Vercrit Description
1.	A	20110107	20110107		4	Verified by Provider Diagnosis
2.	A	20110218	20110218	Count as a TB Case	1A	Positive NAA
3.	D	20110320		Verified Case- Counted by another US area	1	Positive Culture
4.	B	20110323	20110323	Count as a TB Case	5	Suspect
5.	E	20110326	20110326	Count as a TB Case	1A	Positive NAA
6.	C	20110710	20110710		0	Not a verified Case
7.	B	20110106	20110106		1A	Positive NAA
8.	G	20110410	20110410	Count as a TB Case	1A	Positive NAA
9.	C	20110114	20110114		3	Clinical Case Definition
10.	D	20110416	20110416	Count as a TB Case	3	Clinical Case Definition

Identify the following:
- Cases CDC has counted.
- Cases CDC has Not Counted.
- Describe why CDC has Not Counted the Cases.

Answers are provided below.

| Case #	CDC Counted Case (check)	CDC Has Not Counted Case (check	Describe Why it is Not Counted by CDC
1.		X	Provide "**Count Status**" to be able to count as a TB Case
2.	X		
3.		X	"**Noncountable**" because the case is verified and counted by another US jurisdiction
4.		X	"**Suspect**" needs more verification information to determine if this is a verified TB case
5.	X		
6.		X	Not counted because it is "**Not a TB case**"
7.		X	Provide "**Count Status**" to be able to count as a TB Case
8.	X		
9.		X	Provide "**Count Status**" to be able to count as a TB Case
10.	X		

Exercises 7.1-7.3: Case Count

Use the calendar below to determine the answers for exercises 7.1-7.3.

7.1	State A: Case Count
	Today is Thursday, December 13, 2012. State A received a letter indicating that Friday, February 8, 2013, is the case count deadline. State A transfers data every Tuesday. What is the last possible date for State A to enter data so that it will be transferred to CDC and meet the February 8 Final TB Case Count deadline? Write your answer in the space below.
	Answer: Monday, February 4th

7.2	State B: Case Count
	State B transfers data every 2 weeks on Tuesday. **What is the last possible date for State B to enter data so that it will be transferred to CDC, and meet the Friday, February 8 Final TB Case Count deadline?** **Write your answer in the space below.**
	Answer: **Monday, February 4th**
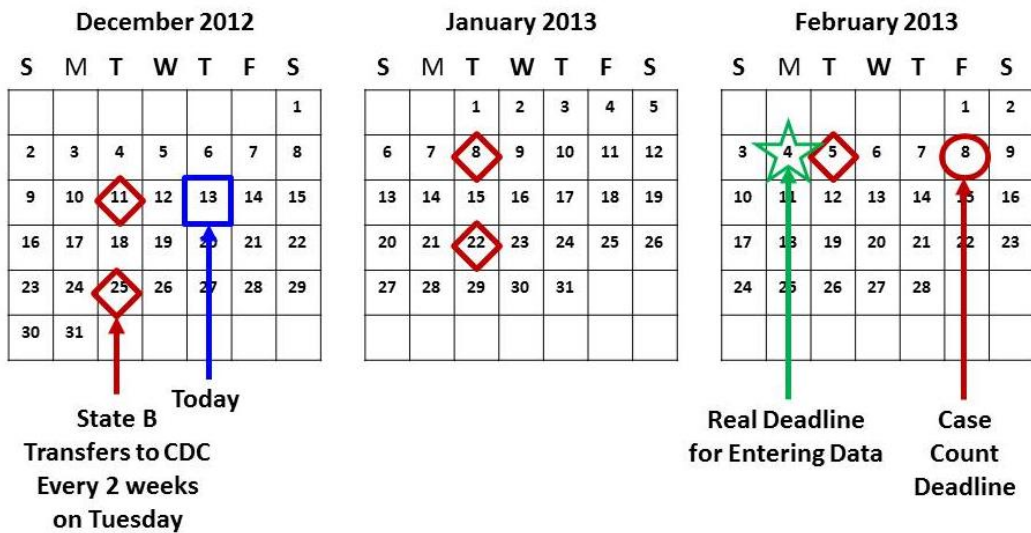
7.3	State C: Case Count
	State C transfers data monthly on the 2nd Tuesday of each month. What is the last possible date for State C to enter data so that it will be transferred to CDC, and meet the Friday, February 8 Final TB Case Count deadline? Write your answer in the space below.
	Answer: **Monday, January 7th**
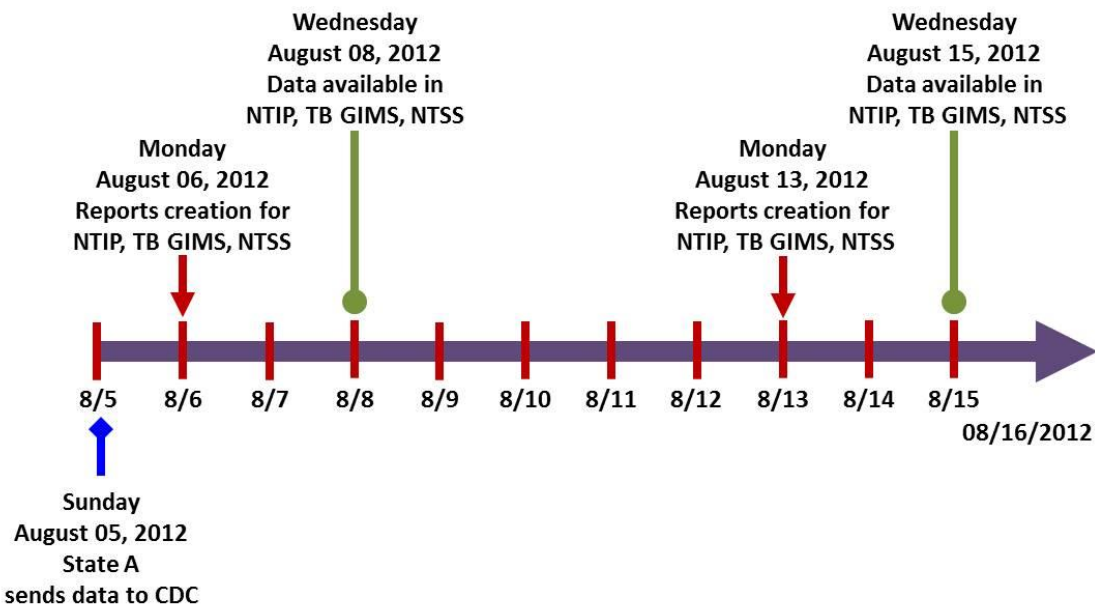
Exercises 7.4-7.5: CDC TB Data Report Availability

7.4	State A: Data Availability
	State A sends data to CDC on Sunday, August 5, 2012. Based on the timeline below, when are the TB data reports available for review by State A? Write your answer in the space below.
	Answer: Wednesday, August 8, 2012

7.5	**State B: Data Availability**
	State B sends data to CDC on Tuesday, August 7, 2012. Based on the timeline below, when are the TB data reports available for review by State B? Write your answer in the space below.
	Answer: **Wednesday, August 15, 2012**
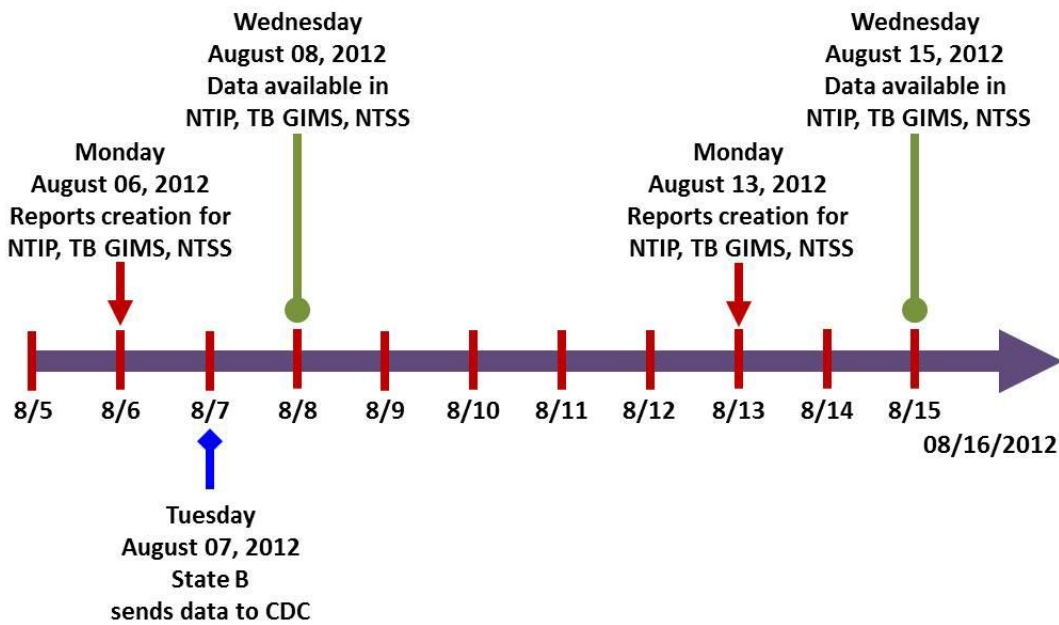
Chapter 8: Data Security and Confidentiality

Exercise 8.1-8.2: Maintaining Data Security and Confidentiality When Coordinating Patient Care and Collecting Surveillance Data

Mario is referred to a small TB clinic at the Laredo County Health Department by Dr. Garcia, his primary care provider. The referral letter requests that he be evaluated to rule out TB disease. Dr. Garcia's referral records indicated that Mario is positive for HIV, hepatitis C, and gonorrhea. From the diagnostic work-up, Dr. Llamas, the physician at the TB clinic, determines that Mario has TB disease.

Helen, the TB clinic nurse, is also the TB surveillance coordinator at the health department. She is entering the TB surveillance data from Mario's medical records into the clinic computer when Dr. Llamas calls her for an emergency. She jumps up to help him in the exam room. She and Dr. Llamas return to the computer and find Mario's neighbor Hector reading Mario's personally identifiable information (PII) on the computer screen.

8.1	**What should Dr. Llamas and Helen do?** **Answer:** Dr. Llamas and Helen should follow the policy and procedure of the health department on security and confidentiality of personally identifiable information. Refer to Standard 1.5 of the Data Security and Confidentiality Guidelines for HIV, Viral Hepatitis, Sexually Transmitted Disease, and Tuberculosis Programs. **"Ensure that any breach of data security protocol, regardless of whether personal information was released, is reported to the Overall Responsible Party (ORP) and investigated immediately. Any breach that results in the release of PII to unauthorized persons should be reported to the ORP, to CDC, and, if warranted, to law enforcement agencies."** Guidelines for a risk-based approach for protecting confidentiality of PII including responding to breaches (incident response) are described in National Institute of Standards and Technology Special Publication 800-122 (Draft) Spec. Publ. 800-122, 58 pages (Jan. 2009) Guide to Protecting the Confidentiality of Personally Identifiable Information available at http://csrc.nist.gov/publications/. The data security policy should include procedures for reporting suspected breaches, including who to notify about a suspected breach. Staff members should be familiar with the program's definition of a security breach. Staff members should review procedures during annual security training. A log of security breaches and lessons learned during investigations of breaches might be useful in revising security policies.

	Breaches that do not result in the release of PII can be handled within programs. Breaches that result in unauthorized disclosure of PII require immediate consultation with legal counsel and notification of high-level authorities in the agency to ensure appropriate action. There are federal requirements for reporting breaches of PII involving federal data, or federal supported systems. For instance, based on OMB Memorandum 06-19 (http://www.whitehouse.gov/sites/default/files/omb/memoranda/fy2006/m06-19.pdf), if PII from a federally supported system were to be released to, or stolen by, unauthorized persons, that breach must be reported to federal security officials within one hour of its discovery. For NCHHSTP, the designated person is the Information System Security Officer (ISSO) for the Center. Both the ISSO and the CDC program contact need to be notified immediately.	
8.2	**How can they prevent this from happening in the future?** **Answer:** The TB Control Program should control access to all medical records relating to TB and limit access to only TB Control Program staff. The confidentiality of medical records should be maintained at all times according to the policy and procedures of the health department. Refer to Standard 1.6 of the Data Security and Confidentiality Guidelines for HIV, Viral Hepatitis, Sexually Transmitted Disease, and Tuberculosis Programs. "**Ensure that staff members with access to identifiable public health data attend data security and confidentiality training annually.**" All staff members (including IT personnel, contractors, and mail room and custodial staff) require generic security awareness training to ensure and support a culture of confidentiality, but staff who have access to PII require additional training specific to their responsibilities and level of authorized access to PII. Training should cover: • Personal responsibilities • Procedures for ensuring physical security of PII • Procedures for electronically storing and transferring data • Policies and procedures for data sharing • Procedures for reporting and responding to security breaches • Review of relevant laws and regulations All staff should have documentation of completion of their training. Programs are responsible for maintaining this documentation in the personnel files.	

Chapter 9: QA Cross-cutting Systems and Process

Exercise 9.1: Identifying NTIP and MUNK Missing Data for Country of Origin

This exercise illustrates how to use an NTIP Report to identify invalid, missing or unknown data in the MUNK Report.

You are from the fictitious state of San Price. Your 2012 NTIP Report shows only 40% completion for Country of Origin for 2012 MUNK Report.

NTIP Report, 2012
Country of Origin

Variable	RVCT Fields	San Price 2012			Complete %
		(N)	Unknown Missing (n)	Complete (n)	
Date of Birth	7	20	0	20	100%
Race	10	20	2	18	90%
Country of Origin	11	20	12	8	40%

9.1	Use the 2012 MUNK Report below to help you identify cases with missing data. Note that **Country of Birth**, as well as **U.S.-born** status, is included when calculating **Country of Origin** for TB Case Rates.
	Answer: The rows highlighted in yellow indicate which cases are missing data.
	Note that **Country of Birth**, as well as **U.S.-born** status, is included when calculating **Country of Origin** for TB Case Rates. As a result, 11 rows (2, 5, 8, 10, 12, 17, 19, 20, 22, 34, 36) are highlighted that are missing **Country of Birth.**
	One row (9) is highlighted that is missing **U.S.-born**.

2012 MUNK Report

Row #	State_ Alpha_ Cd	Case_ Status	State_Case_ID	County_ Cd_Desc	Report_ Date	Count_ Date	Questions_Desc	Value	Value_ Desc
1	SP	Counted	2012SP201000001	Jackson	20120107	20120107	12-Country of Birth (v2)		
2	SP	Counted	2012SP201000002	Jefferson	20120106	20120106	13-Month-Year Arrived in US (V2)		
3	SP	Counted	2012SP201000002	Jefferson	20120106	20120106	19-Microscopic Exam		
4	SP	Counted	2012SP201000002	Jefferson	20120106	20120106	21-NAA Specimen Type or Anatomic Site		
5	SP	Counted	2012SP201000003	Cobb	20120114	20120114	12-Country of Birth (v2)		
6	SP	Counted	2012SP201000003	Cobb	20120114	20120114	43-Date Therapy Stopped		
7	SP	Counted	2012SP201000003	Cobb	20120114	20120114	44-Reason Therapy Stopped		
8	SP	Counted	2012SP201000007	Jackson	20120218	20120218	12-Country of Birth (v2)		
9	SP	Counted	2012SP201000013	Greene	20120326	20120326	12-U.S. Born		
10	SP	Counted	2012SP201000017	Stoddard	20120410	20120410	12-Country of Birth (v2)		
11	SP	Counted	2012SP201000017	Stoddard	20120410	20120410	44-Reason Therapy Stopped		
12	SP	Counted	2012SP201000019	Taney	20120415	20120415	12-Country of Birth (v2)		
13	SP	Counted	2012SP201000019	Taney	20120415	20120415	15-Status of TB Diagnosis		
14	SP	Counted	2012SP201000032		20120528	20120528	04-City		
15	SP	Counted	2012SP201000032		20120528	20120528	04-County		
16	SP	Counted	2012SP201000032		20120528	20120528	04-Zip Code		Null Zip Code
17	SP	Counted	2012SP201000032		20120528	20120528	12-Country of Birth (v2)		
18	SP	Counted	2012SP201000034	Calhoun	20120416	20120416	11-Race	2131-1	Other Race
19	SP	Counted	2012SP201000034	Calhoun	20120416	20120416	12-Country of Birth (v2)		
20	SP	Counted	2012SP201000040	Greene	20120626	20120626	12-Country of Birth (v2)		
21	SP	Counted	2012SP201000040	Greene	20120626	20120626	43-Date Therapy Stopped		
22	SP	Counted	2012SP201000045	Jackson	20120708	20120708	12-Country of Birth (v2)		
23	SP	Counted	2012SP201000045	Jackson	20120708	20120708	19-Microscopic Exam		
24	SP	Counted	2012SP201000064	Cobb	20120925	20120925	07-Previous TB	UNK	Unknown
25	SP	Counted	2012SP201000064	Cobb	20120925	20120925	11-Race	2131-1	Other Race
26	SP	Counted	2012SP201000064	Cobb	20120925	20120925	13-Month-Year Arrived in US (v2)		
27	SP	Counted	2012SP201000064	Cobb	20120925	20120925	19-Microscopic Exam		
28	SP	Counted	2012SP201000064	Cobb	20120925	20120925	21-NAA Specimen Type or Anatomic Site		
29	SP	Counted	2012SP201000064	Cobb	20120925	20120925	43-Date Therapy Stopped		
30	SP	Counted	2012SP201000064	Cobb	20120925	20120925	44-Reason Therapy Stopped		
31	SP	Counted	2012SP201000073	Calhoun	20121008	20121008	15-Status of TB Diagnosis		
32	SP	Counted	2012SP201000073	Calhoun	20121008	20121008	19-Microscopic Exam		
33	SP	Counted	2012SP201000073	Calhoun	20121008	20121008	21-NAA Specimen Type or Anatomic Site		
34	SP	Counted	2012SP201000078	Stark	20121029	20121029	12-Country of Birth (v2)		
35	SP	Counted	2012SP201000078	Stark	20121029	20121029	43-Date Therapy Stopped		
36	SP	Counted	2012SP201000082	Platte	20120803	20120803	12-Country of Birth (v2)		

Appendix E: Answers to the Exercises
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Exercise 9.2: Checking Data Accuracy

9.2	**Mr. Peanut Smith had TB in 2009 and was diagnosed with TB again in April 2012. If the program is linking records using TB GIMS, the Super User/genotyping coordinator should ensure that the State Case Number corresponds to the correct Genotype Accession Number (i.e., ensure the accession number corresponding to the 2009 case is not from 2012 and vice versa).**
	What should be entered for Genotyping Accession Number (item 38) on Mr. Smith's RVCT?
	Answer (provide an explanation):
	Mr. Smith will have two RVCT records.
	• The RVCT for the 2012 episode should have a **State Case Number** from 2012 (e.g., 2012ST000000007) with a **Genotype Accession Number** from isolate submitted in 2012 (12RF9999).
	• The RVCT for the 2009 episode will have a **State Case Number** from 2009 (e.g., 2009ST123456789).

Exercise 9.3-9.4: What Genotype Information Can and Can Not be Shared

9.3	**Lisa is investigating an outbreak that includes a genotype cluster. The genotype is also found in three other states. Who can she share reports and maps with from TB GIMS?**
	Answer:
	Lisa can share all TB GIMS reports and data with her state and local health department staff as per her state's data security and confidentiality rules and regulations.
	She can also share TB GIMS reports and data with TB control staff in other states if it is for the purpose of investigating the outbreak, such as identifying a case that has moved or finding epidemiologic connections.

9.4	**Can Lisa present her recent updates and findings at an upcoming regional conference?**
	Answer:
	Lisa can only share maps or reports showing data from other states during the regional conference if she has permission from CDC and all states that are displayed on the map.