

Tuberculosis Surveillance Report

Arizona, 2013

Arizona Department of Health Services

Bureau of Epidemiology and Disease Control Services

Office of Disease and Integration Services

April 2014

Executive Summary

The Arizona Department of Health Services (ADHS) TB Control Program (the Department) conducts surveillance, data analysis, program evaluation, and consultation for Arizona's local health departments, which provide direct patient care for TB patients. This 2013 Tuberculosis (TB) Annual Surveillance Report provides descriptive data for TB in Arizona.

- In 2013, there were 184 cases of active TB disease reported in Arizona. The 2013 TB case rate in Arizona was 2.8 per 100,000 population compared to 3.0 per 100,000 nationally. Four of Arizona's fifteen counties Maricopa, Pinal, Pima and Yuma comprised 89.1% (164/184) of active TB cases reported. Maricopa County, the most highly populated county in Arizona, reported 48.4% (89/184) of the state's cases.
- Risk factors identified for all Arizona TB cases included:
 - 73.8% (136/184) of the TB cases reported a country of birth other than the U.S.
 - 23.9% (44/184) of the TB cases were diagnosed while a resident in a correctional facility.
 - 19.6% (36/184) of the TB cases had diabetes mellitus.
 - 5.4% (10/184) of the TB cases were reported with HIV co-infection.
- Drug susceptibility testing was reported for 99.3% (153/154) of the culture positive TB cases.
 - 11.1% (17/153) reported isoniazid (INH) resistance.
 - 1 case of multi-drug resistance was reported.
- Completion of treatment has been a major concern of the Department. The latest year for which completion of treatment data is available is 2011. The Department saw improvement for completion of treatment of both correctional and non-correctional TB cases.
 - Completion of treatment within twelve months for non-correctional TB cases was 90.9% (140/154) in 2011. Overall completion of treatment for non-correctional facility cases was 97.4% (150/154) compared to 96.0% (193/201) in 2010.
 - Completion of treatment within twelve months for correctional TB cases was 72.3% (16/22) compared to 59.1% (13/22) in 2010. In 2011, there were a total of 64 correctional facility TB cases of which 45.3% (29/64) were lost to follow-up due to repatriation, transferring to a facility out of Arizona, or community release.
- Continuity of care for active TB cases who return to their home country is achieved with international referrals via CureTB and TBNet. These agencies provide assistance to TB cases for medical case management and treatment continuation. The Department coordinates Meet and Greets through the Ports of Entry of Nogales and San Luis for cases returning to Mexico. These Meet and Greets are coordinated with the Office of Border Health, ADHS TB Control and the health department in Mexico. In 2013, five meet and greets were arranged.

The Arizona Department of Health Services Tuberculosis Control Program

The Department has overall responsibility for surveillance, analysis, and evaluation of TB activities in Arizona. The Department provides epidemiological, technical, medical, nursing, and programmatic consultative services regarding TB prevention and control to health care providers, local health departments (LHDs), tribal health departments, and health care facilities. Close collaboration with the Arizona State Public Health Laboratory (ASPHL), ensures appropriate laboratory testing for specimens and monitors drug-resistance patterns in the state.

Arizona is comprised of fifteen counties and twenty-one federally recognized tribes. The LHDs provide direct patient care for TB control activities. The LHDs coordinate with various medical providers and correctional health staff members within their jurisdiction to provide TB control and prevention services.

The Arizona State Public Health Laboratory provides comprehensive testing services including acid-fast bacillus (AFB) smear, culture, nucleic acid amplification, identification, and drug susceptibility testing for clinical mycobacterial samples statewide. The laboratory serves as a reference laboratory for all isolates suspected to be positive for TB and performs drug susceptibility testing for all first-time positive isolates. The laboratory also sends isolates to the CDC contract lab in Michigan for genotyping of all positive culture isolates.

This report provides information about Arizona's reported TB cases in 2013 and completion of treatment data for 2011. The latest year for completion of treatment information available is 2011 due to length of time needed to successfully complete TB treatment.

Figure 1. TB Cases and Case Rates in Arizona and Nationally, 2004-2013

In 2013, Arizona's LHDs reported 184 cases of active TB with a case rate of 2.8 per 100,000. This represents an 8.7% decrease in number of cases and 12.5% decrease in case rate compared to 2012. In the United States, a total of 9,588 TB cases were reported in 2013 with a case rate of 3.0 per 100,000. This was the lowest rate recorded in the U.S. since 1953.

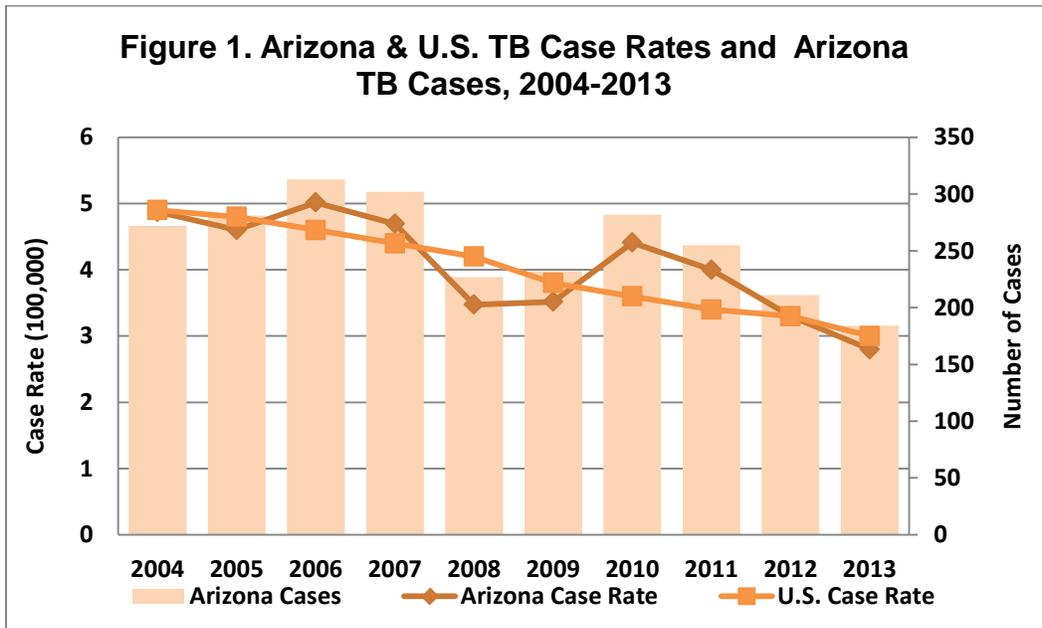


Figure 2. TB Cases Rates by Selected Population Groups, Arizona, 2013.

In 2013, the TB case rate among foreign-born individuals was 15.3 per 100,000. The case rate among U.S.-born persons was 0.9 per 100,000. Among U.S.-born Non-Hispanic blacks, the rate was 0.8 per 100,000. TB case rates among children less than five years of age was 0.7 per 100,000.

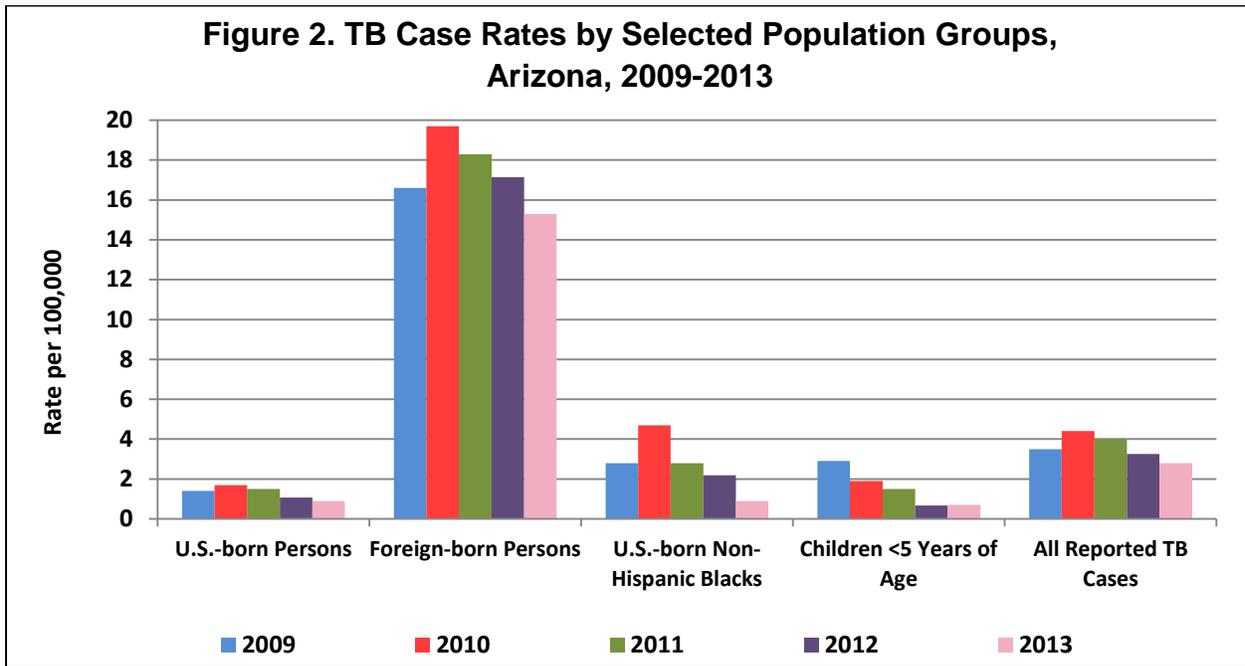


Figure 3. TB Cases by County of Residence, Arizona 2013.

Four of Arizona’s fifteen counties, Maricopa, Pima, Pinal and Yuma accounted for 89.1% (164/184) of all cases reported. Maricopa County, the most populous county in Arizona, reported 48.4% (89/184) of the state’s cases.

The TB cases reported from Pinal County accounted for 17.4% (32/184) of cases statewide with 93.8% (30/32) diagnosed in a correctional facility. There are twenty-one correctional facilities located within Pinal County, including U.S. Immigrations and Customs Enforcement Service Processing Centers (ICE-SPC), federal, state, local and privately managed facilities. Yuma County reported 11.9% (22/184) of total cases and Pima County reported 13.0% (24/184). In 2013, there were no cases reported in Santa Cruz, Gila, Graham, Greenlee, La Paz, or Yavapai counties.

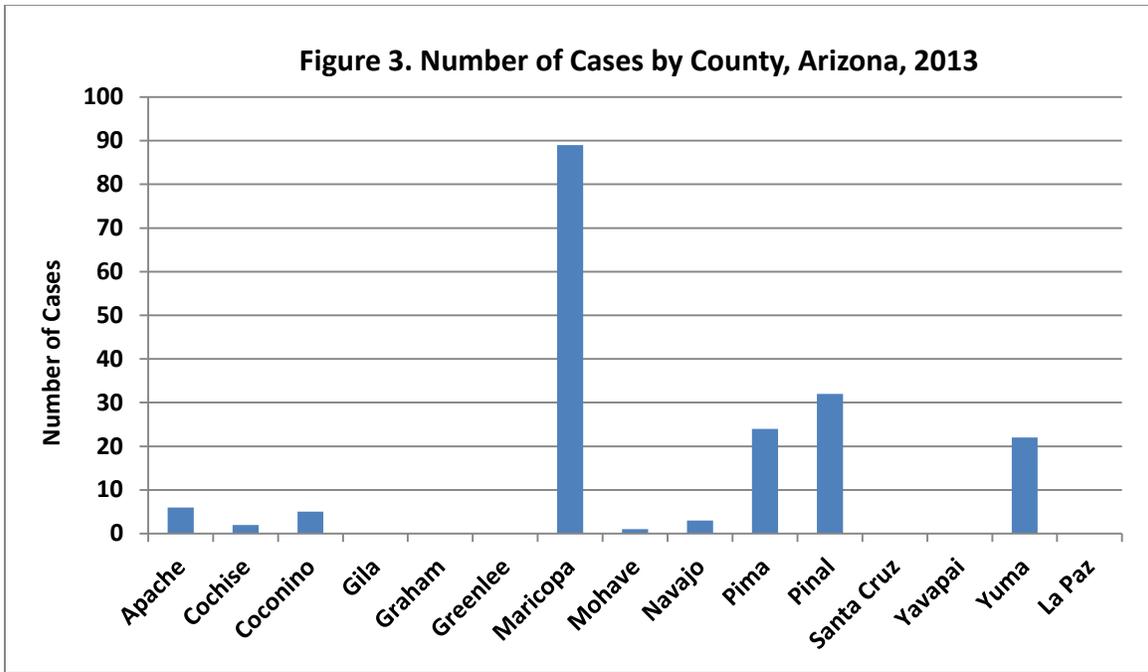


Figure 4. TB Case Rates by County, Arizona 2013.

The statewide TB case rate was exceeded in Apache, Coconino, Pinal, and Yuma counties. Maricopa County, which reports around 50% of the states TB cases annually decreased from 2.8 per 100,000 in 2012 to 2.3 per 100,000 in 2013. This is lower than the state and national rate.

Pinal County decreased from 11.0 to 8.1 per 100,000. Yuma County decreased from 12.9 per 100,000 in 2012 to 10.5 per 100,000 in 2013. Apache and Coconino have elevated case rates due to low population numbers.

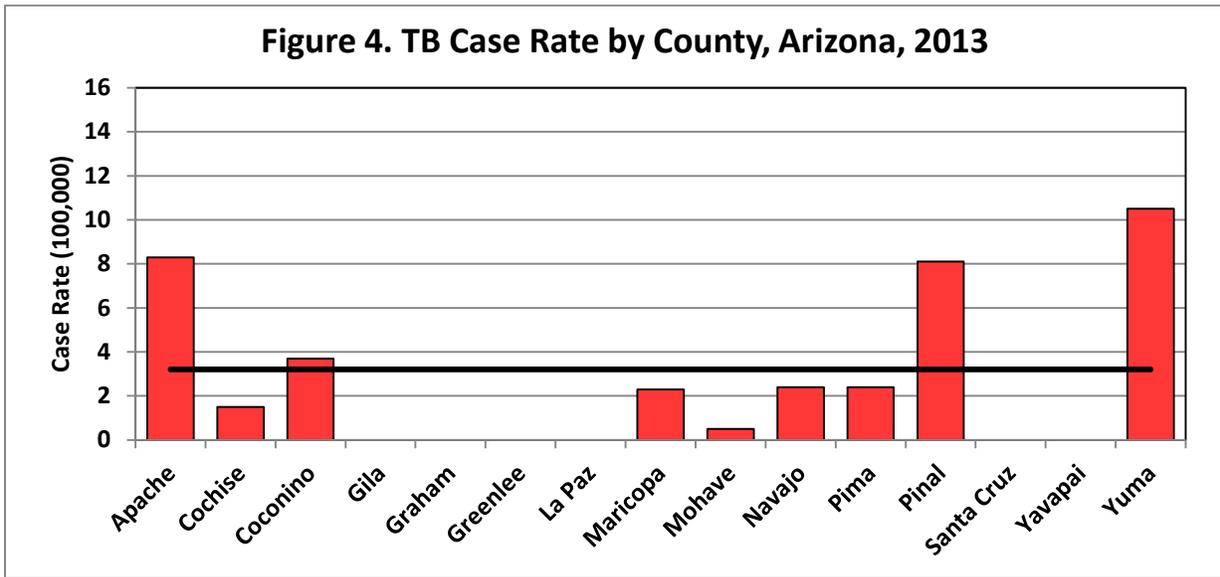


Figure 5. Number of TB cases by Race and Ethnicity.

Hispanic ethnicity of any race accounts for 56.5% (104/184) of all reported TB cases annually. TB cases of Asian descent accounted for 14.1% (26/184) followed by Native American at 10.3% (19/184), Non-Hispanic Whites accounted for 13.6% (25/184) and Black/African-American accounted for 4.9% (9/184) of reported TB cases.

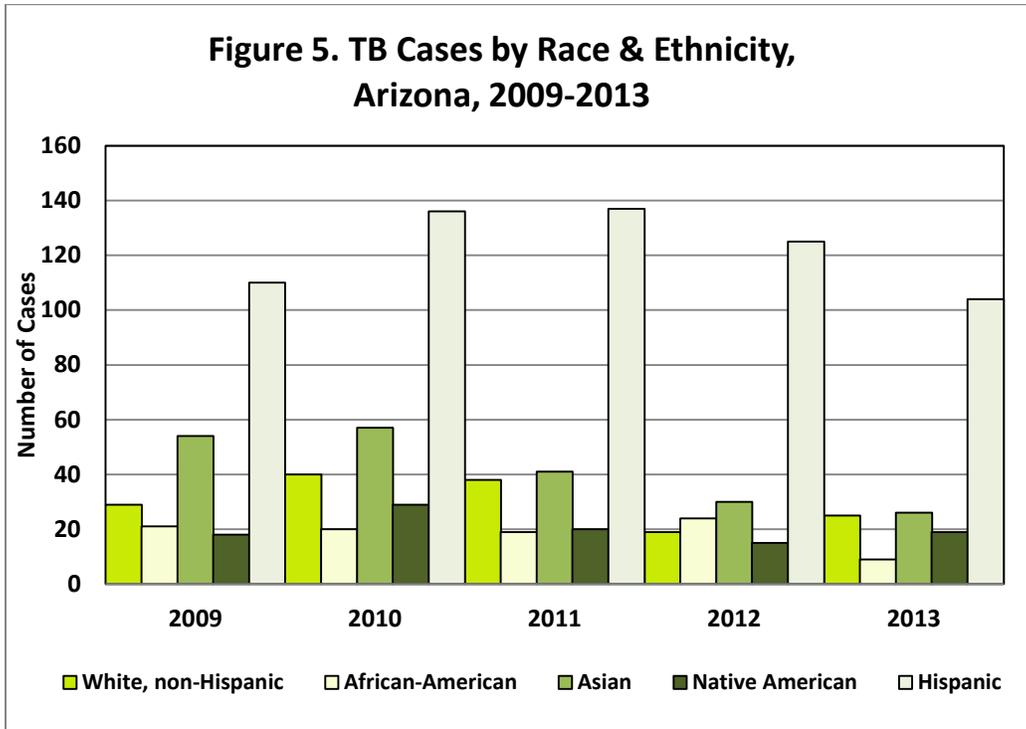


Figure 6. Case Rates by Race and Ethnicity.

The highest TB case rate among racial/ethnic groups was reported for TB cases of Asian descent with 13.0 per 100,000. The rate decreased 13.3% from 15 per 100,000 in 2012. The rates among Native Americans increased 31.0% from 4.3 per 100,000 in 2012 to 6.2 per 100,000 in 2013. TB case rates among Hispanics decreased 21.0% from 6.7 per 100,000 in 2012 to 5.3 per 100,000 in 2013. The TB case rate among African-Americans decreased 63.0% from 8.9 per 100,000 in 2012 to 3.3 per 100,000 in 2013.

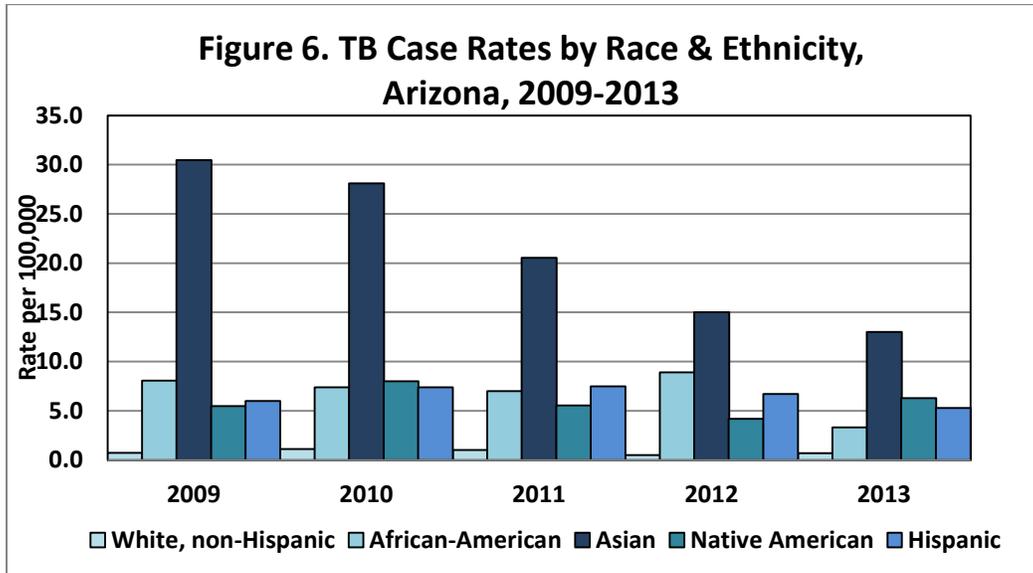


Figure 7. and 8. TB Cases by Gender, Arizona, 2013.

In 2013, males accounted for 66.8% (123/184) of active TB cases. Females accounted for 33.2% (61/184) of cases. This is consistent with previous year's data.

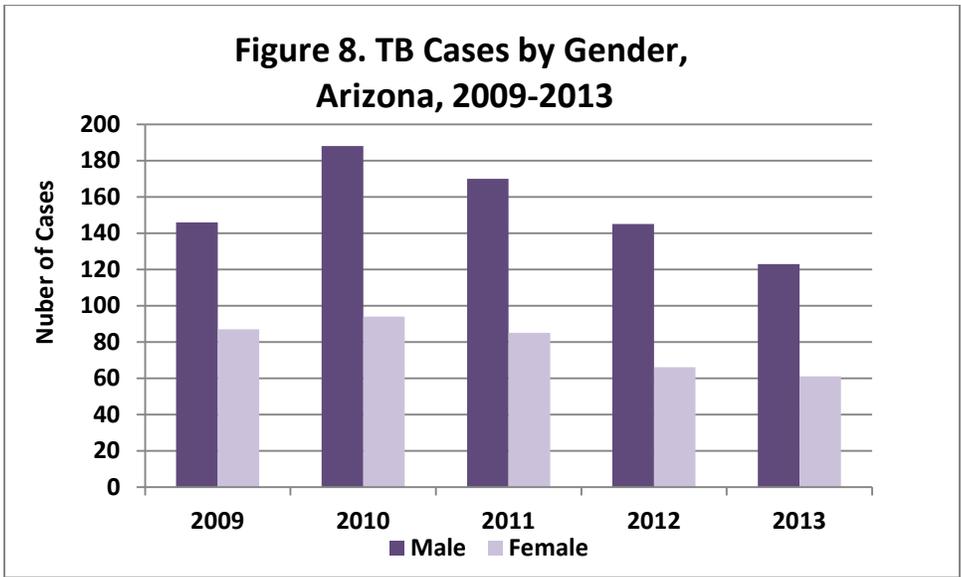
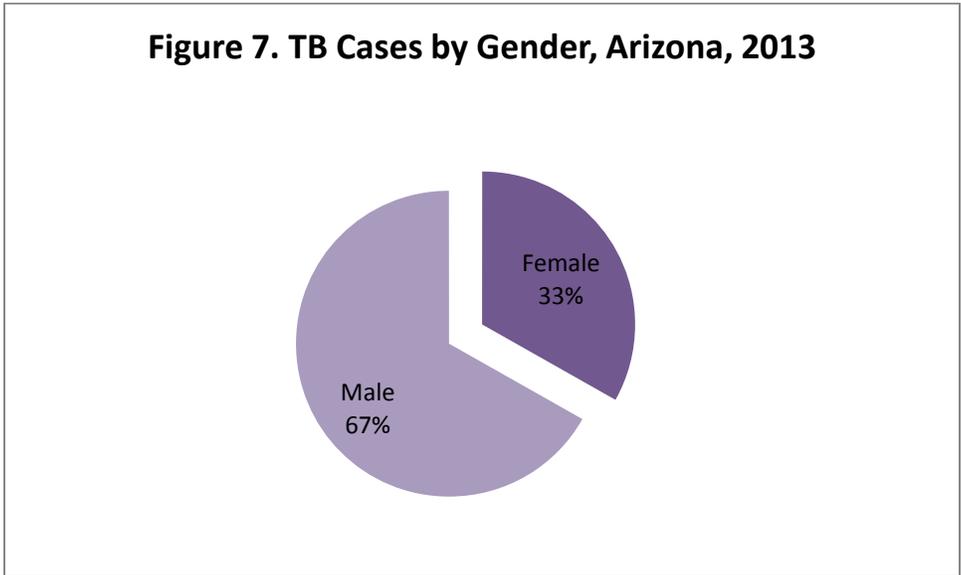


Figure 9. Number of TB Cases by Age Groups and Figure 10. TB Case Rates by Age Groups.

In 2013, 35.9% (66/184) of TB cases were reported in the 25 – 44 year age group. Those in the 45 – 64 year age group accounted for 23.9% (44/184) of TB cases followed by the 65+ age group with 22.8% (42/184) and the 15 – 24 age group with 14.7% (27/184). Pediatric cases aged 5 – 14 years contributed 2.2% (4/184) and those 4 and under accounted for 1.6% (3/184) of all cases.

In Arizona, the highest case rates occurred in the 65 years or older age group (4.3 per 100,000). The second highest occurred in those 25 to 44 years of age (3.9 per 100,000). The TB case rate for all age groups except 65 years or over declined or stayed the same.

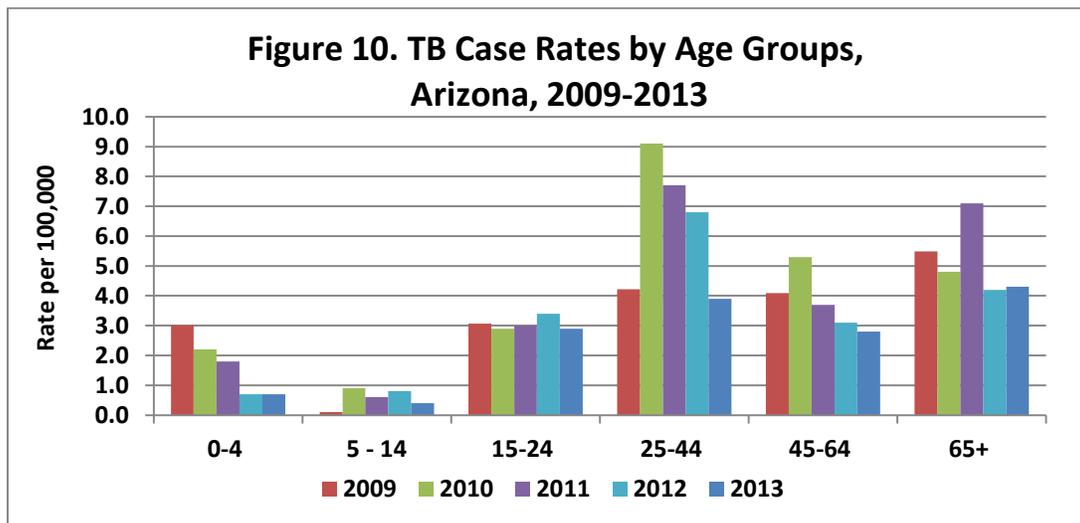
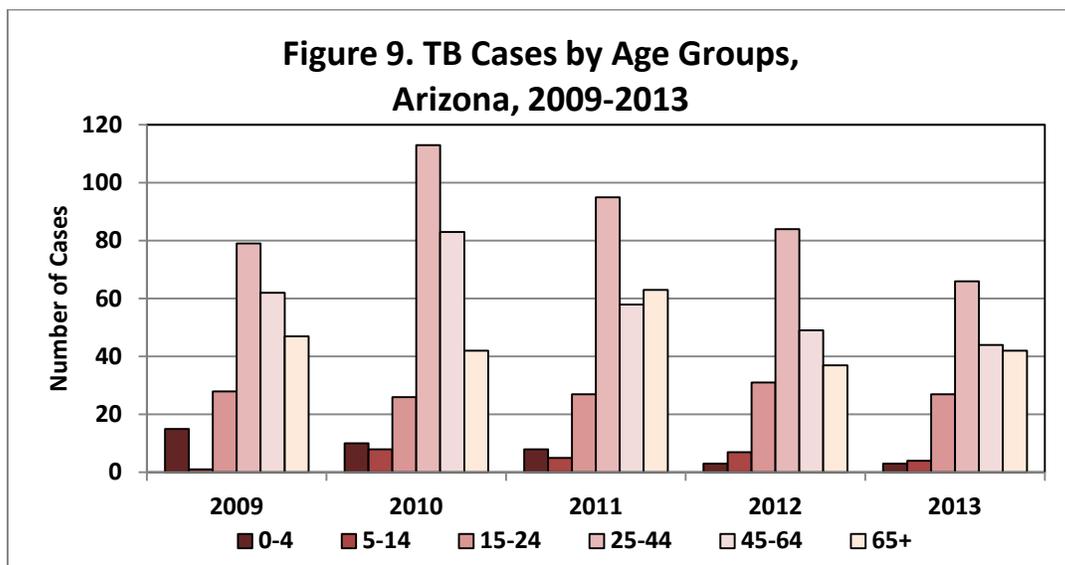


Figure 11. TB Cases by Nativity.

Over half of all reported TB cases reported in the United States occur among foreign-born persons. The risk of disease among the foreign-born also appears related to chronological age and age at immigration; younger people and those who immigrated at younger ages are at lower risk for subsequent infection with TB. In 2013, 73.9% (136/184) of the TB cases were identified as foreign-born cases. U.S.-born TB cases accounted for 26.1% (48/184) of total reported cases. For TB surveillance purposes, a U.S.-born person is defined as someone born in the United States or its associated jurisdictions or someone born in a foreign county but with at least one U.S.-citizen parent.

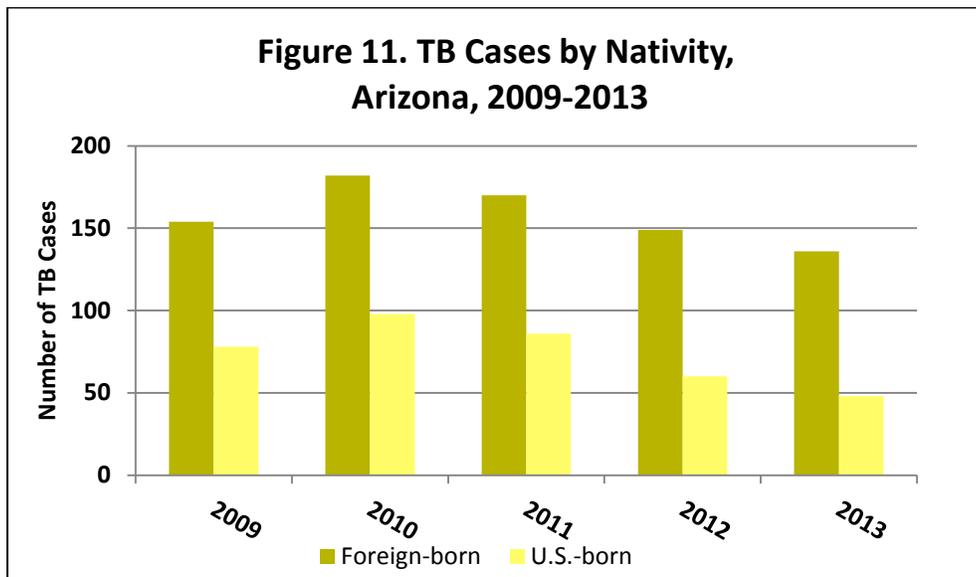


Figure 12. TB Cases by Country of Birth.

For country of birth besides the United States, Mexico accounted for the highest percentage with 39.7% (73/184). Guatemala had the second highest with 5.4% (10/184) of all cases. The third highest is the Philippines which accounted for 4.9% (9/184) of cases. The other category contains all other countries with 2 or fewer cases reported in 2013.

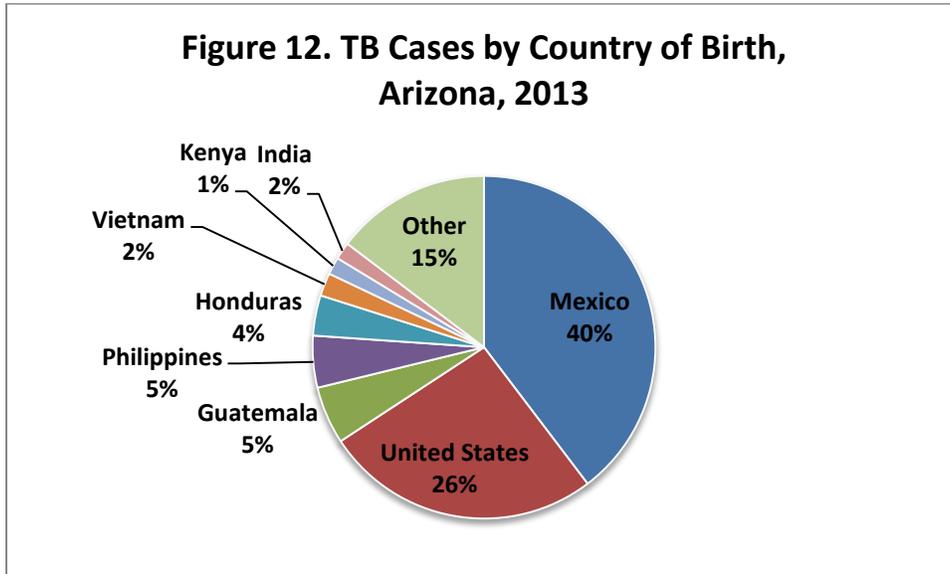


Figure 13. Percentage of TB cases with HIV Co-infection and % HIV Results Known, Arizona 2008 -2012.

HIV is the strongest known risk factor for TB disease. The Department recommends all medical providers to provide HIV counseling and testing for all TB patients. Co-infection with HIV and TB in individuals is a major concern. Immunosuppression by HIV can negatively impact the body’s ability to fight infection. Individuals with co-infection have high mortality rates and are more susceptible to increased drug resistance. This leads to longer and more complex treatment regimens.

In 2013, 95.5% (171/179) of all reported cases had HIV screening results reported and with positive results reported for 5.4% (10/184) of the cases.

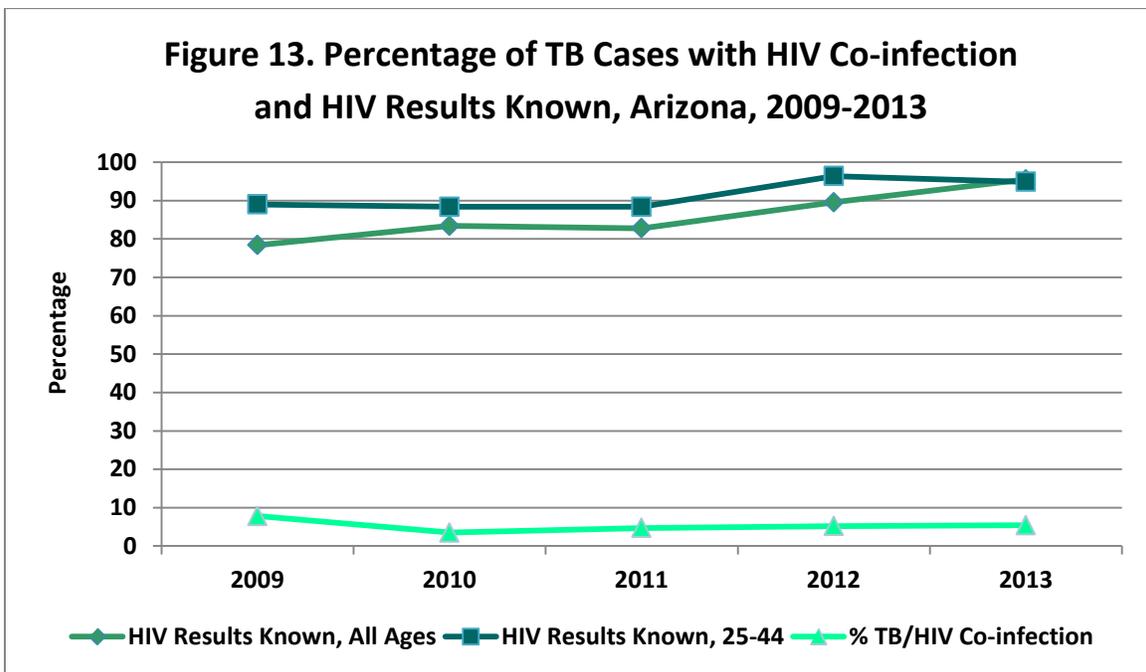


Figure 14. TB Cases diagnosed in a Correctional Facility.

Arizona has consistently ranked as one of the highest states in the nation for percentage of TB cases diagnosed while incarcerated. In 2013, among reported cases over the age of fourteen, residence in a correctional facility at time of diagnosis represented 25.0% (44/176) of cases. Routine evaluation of all inmates for TB during the intake process allows for diagnosis of both latent and active TB in this population. The Department works closely with all correctional facilities in the state and provides correctional health staff with TB training and education to ensure facilities abide by inmate screening requirements.

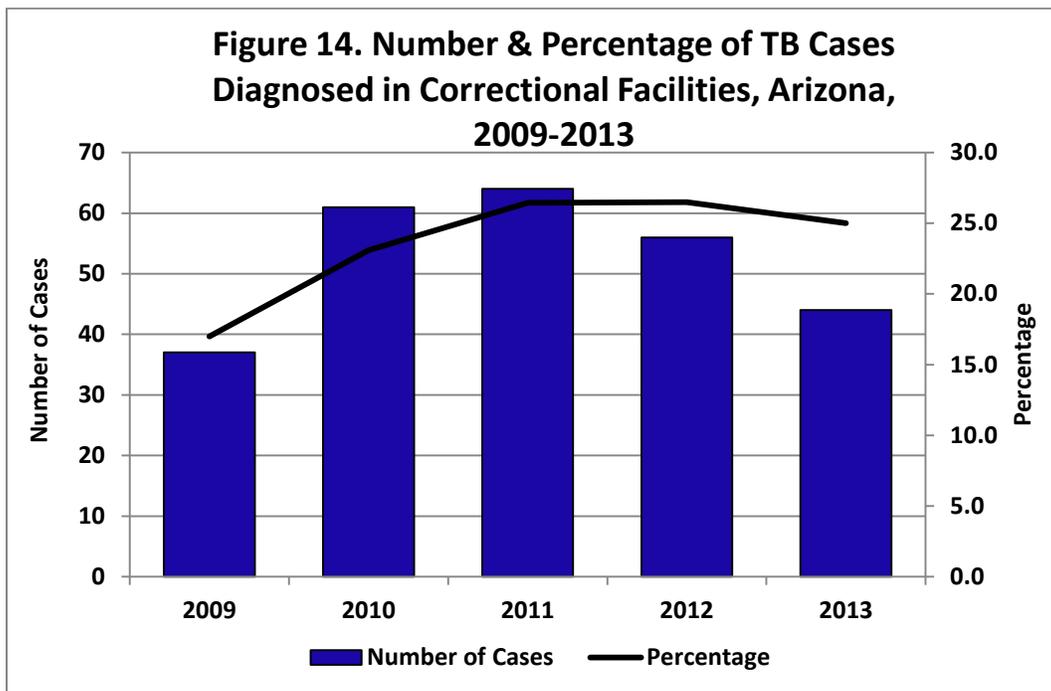


Table 1. TB Cases by Selected Risk Factors.

Risk factors associated with cases reported to the Department in 2013 include diabetes mellitus in 19.6% (36/184) of cases, homelessness in 9.2% (17/184), incomplete LTBI therapy in 2.2% (4/184) and contact of an infectious TB case within the previous two years in 3.8% (7/184) of cases.

Among reported cases over the age of fourteen, risk factors included non-injecting drug use in 16.5% (29/176) of cases, injecting drug use in 8.0% (14/176), and excess alcohol use in 11.9% (21/176) of cases. High-risk occupations for TB transmission include health care workers and migrant farm workers. Migrant farm workers comprised 3.8% (7/184) and health care workers represented 2.7% (5/184) of 2013 cases. The other significant risk factors include TB/HIV co-infection, residence in a correctional facility and country of birth. These risk factors were discussed in more detail individually.

Table 1. Tuberculosis Cases by Selected Risk Factors, Arizona, 2011-2013

	2011		2012		2013	
	Cases	%	Cases	%	Cases	%
Total Cases	255		211		184	
Occupation						
Health Care Worker ≥ 15 years	10	4.1	8	4.0	5	2.8
Migrant Farm Worker ≥ 15 years	19	17.9	17	8.4	7	4.0
Reported Behaviors						
Injecting Drug Use ^a ≥ 15 years	8	3.3	8	4.0	14	7.8
Non-injecting Drug Use ^a ≥ 15 years	25	10.3	26	12.9	29	15.8
Excess Alcohol Use ^a ≥ 15 years	34	14.1	24	11.9	21	11.9
Type of Residence						
Long Term Care Facility ^b	6	1.8	2	1.0	4	2.2
Homeless ^a	24	8.5	12	5.7	17	9.2
Comorbidity						
Diabetes Mellitus ^c	31	12.2	36	17.1	36	19.6
Immunosuppression (Not HIV/AIDS) ^c	6	2.3	4	1.9	9	4.9
Incomplete LTBI Therapy ^c	6	2.4	5	2.4	4	2.2
Contact of infectious TB case (2 years or less) ^c	15	5.9	8	3.8	7	3.8
^a Within one year prior to diagnosis of tuberculosis.						
^b Residence at time of diagnosis.						

Table 2. TB Cases Reported with Drug Sensitivity and Drug Resistance.

In 2013, 83.7% (154/184) of the TB cases reported had positive culture results. Of these cases, 99.3% (153/154) reported drug sensitivity results. Isoniazid (INH) resistance increased from 2012 from 7.9% to 11.1% of culture-positive cases. In 2013, one case of multi-drug resistance was reported.

Tuberculosis Cases Resistant to INH and Other Anti-TB Drugs, Arizona, 2007- 2013												
Year	Cases	Culture Confirmed	Drug Sensitivity Testing		INH Resistant ^a		MDR ^b		Other Resistance ^c		Total Resistance ^d	
			No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
2007	302	222	218	(98.2)	18	(8.3)	3	(1.4)	14	(6.4)	35	(16.1)
2008	227	152	146	(96.1)	6	(4.1)	0	(0.0)	6	(4.1)	12	(8.2)
2009	232	181	178	(98.3)	13	(7.3)	0	(0.0)	23	(12.9)	36	(20.2)
2010	282	202	196	(97.0)	15	(7.7)	0	(0.0)	14	(7.1)	29	(14.8)
2011	256	192	189	(98.4)	15	(7.9)	1	(0.5)	13	(6.9)	29	(15.3)
2012	211	168	165	(98.2)	13	(7.9)	0	(0.0)	8	(4.8)	21	(12.7)
2013	184	154	153	(99.3)	17	(11.1)	1	(0.7)	8	(5.3)	25	(16.3)

^aIsolates may also be resistant to other drugs, including rifampin, includes initial and final susceptibility results

^bResistant to at least isoniazid and rifampin, includes initial and final susceptibility results.

^cOther patterns of drug resistance excluding INH resistance

^dIsolates with resistance to any first or second line TB drug

Figure 15. Directly Observed Therapy, Arizona, 2002-2011.

Directly observed therapy (DOT) is the standard of care for administering TB medications to active cases. In DOT, health care workers observe the individual take his/her medications to ensure compliance with the treatment regimen. All LHDs are encouraged to provide DOT for community cases. DOT can be difficult for some of Arizona’s LHDs as most of the rural counties are large and require traveling long distances to provide this service. Several LHDs also provide DOT for correctional facilities within their jurisdictions. Other facilities have their own nursing staff provide DOT to inmates.

In 2011, 92.3% (227/246) of the TB cases who started treatment received directly observed therapy or a combination of directly observed therapy and self-administered therapy. Self-administered therapy only was reported for 4.5% (11/246) of cases.

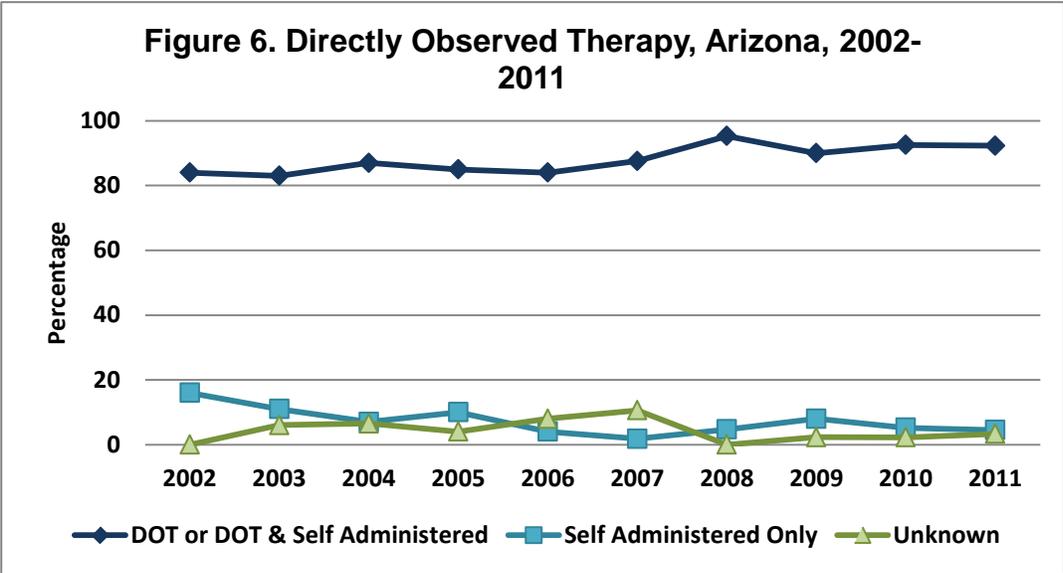


Figure 16. Completion of Treatment, Arizona, 2007-2011.

Completion of treatment for TB cases is a continuing focus for the Department. The overall goals for treatment of TB are to cure the individual patient and limit the transmission of TB to other people. Thus, successful treatment of each individual TB patient benefits the individual and the community. The Department conducted cohort reviews and collaborated with LHDs which improved completion of treatment in Arizona. Also, the Department utilizes international referrals to provide completion of treatment information for TB cases that have left the U.S. and returned to their country of origin. In 2011, 89.5% (145/162) of the eligible cases completed treatment within twelve months. Overall, 96.3% (156/162) of the cases completed therapy regardless of the time frame.

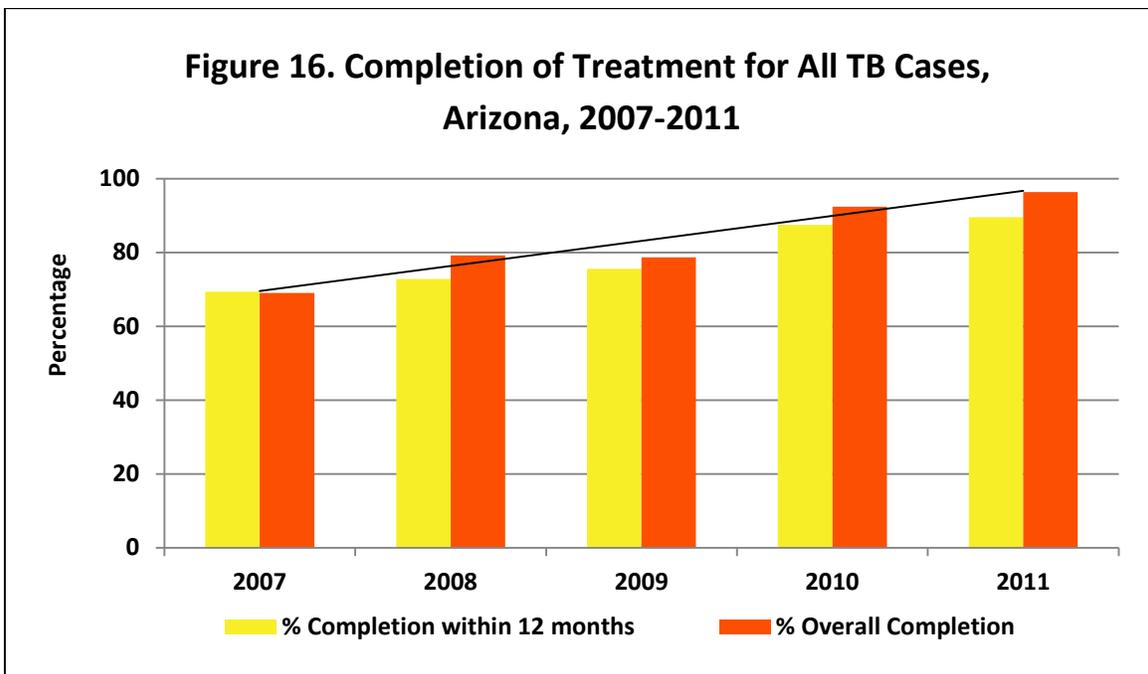


Figure 17. Completion of Treatment for Non-Correctional Facility TB Cases.

Residence in a correctional facility impacts completion of treatment rates negatively. For cases of TB not diagnosed in a correctional facility, 90.9% (140/154) of cases completed treatment within one year. 97.4% (150/154) of non-correctional facility cases completed therapy regardless of the time frame.

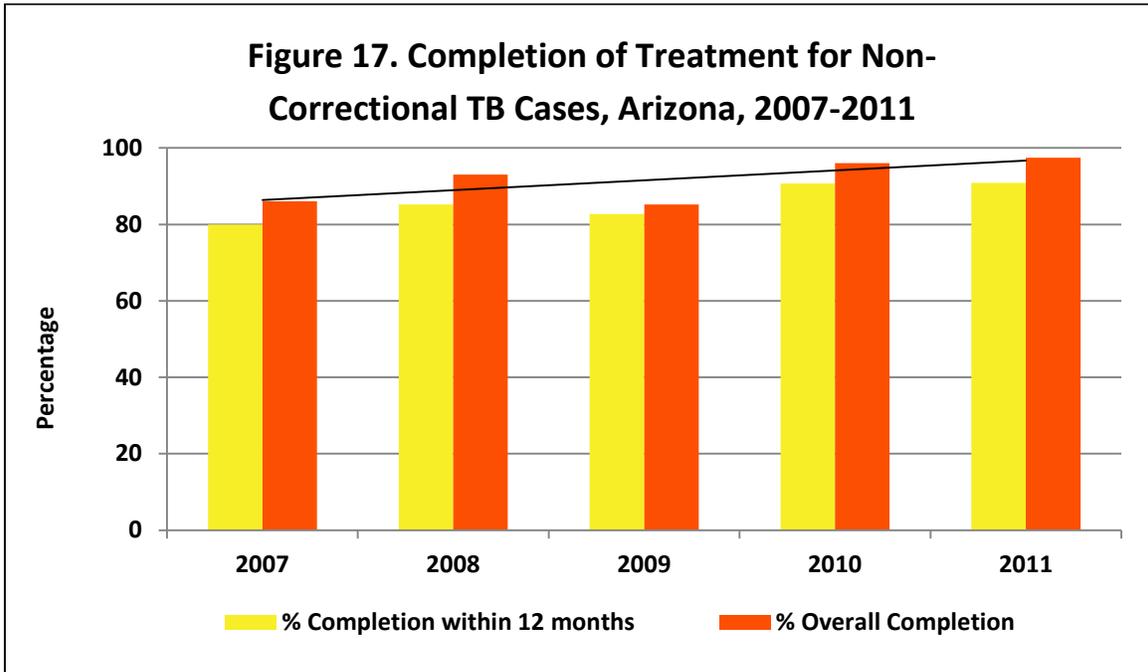


Figure 18. Completion of Treatment for Homeless Non-Correctional TB Cases.

In 2011, 100.0% (8/8) of homeless non-correctional TB cases for whom therapy was indicated for a year or less completed treatment.

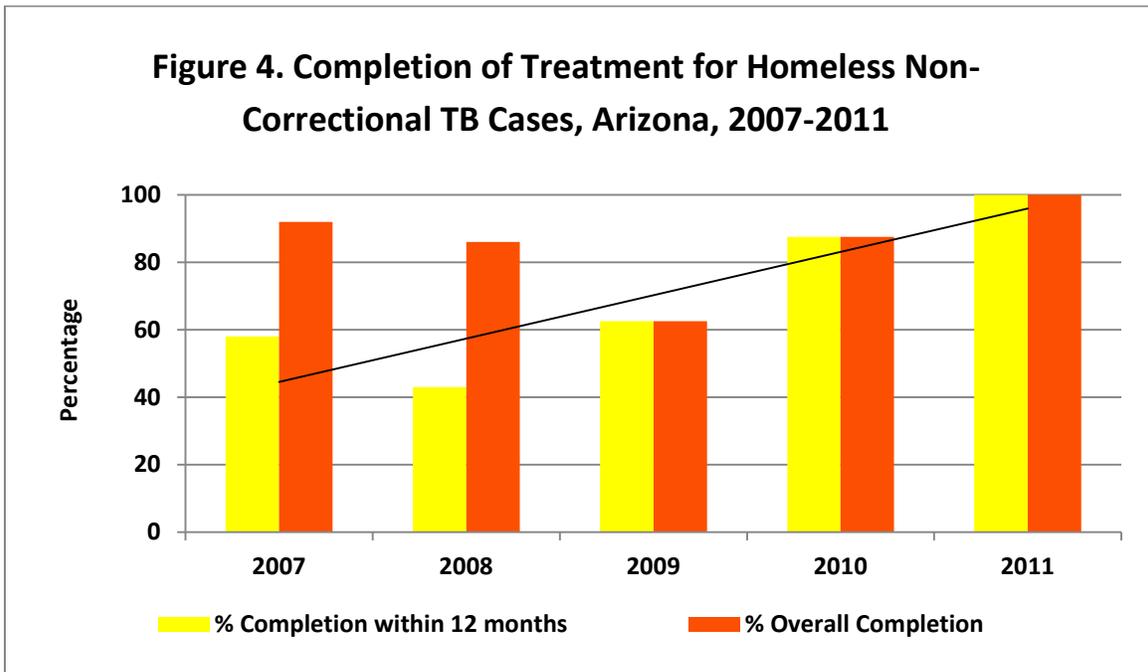
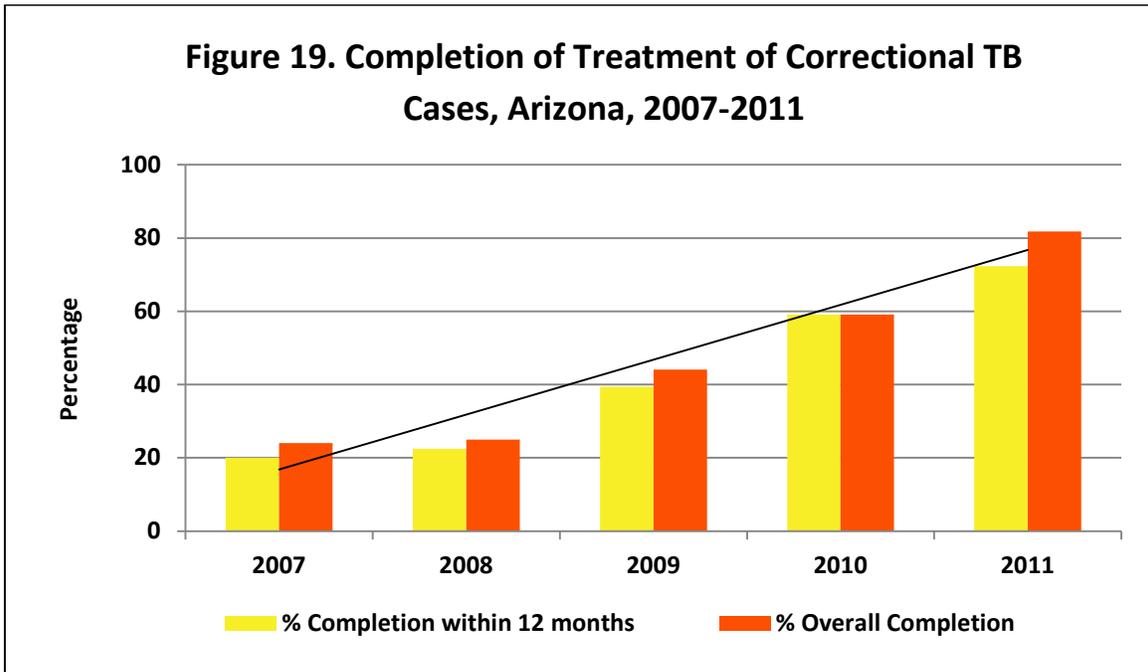


Figure 19. Completion of Treatment for Correctional TB Cases.

In 2011, 72.7% (16/22) of TB cases diagnosed in a correctional facility completed treatment within one year. Overall completion of treatment regardless of time frame was 77.3% (17/22). The low percentages for completion of treatment in correctional facilities are likely due to the transient nature of those incarcerated. Cases transfer facilities multiple times or are repatriated to their home country. Although international referrals are performed, completion of treatment data is not always known. The Department has been focusing on improving numbers and following cases for treatment completion more closely. This has had a positive effect on the numbers.



Contact Investigations

Contact investigations are an essential component of tuberculosis control. Contact investigations identify, examine, and evaluate all persons who are at risk of TB infection due to recent exposure to a diagnosed infectious case. This process facilitates new case finding which in turn allows for early detection and treatment of new infections. In some cases, it may even prevent disease. The LHDs are responsible for conducting contact investigations or coordinating with responsible parties outside local public health to ensure contact investigations are completed. The last year for which contact information data is available is 2011 due to the length of time to complete treatment.

In 2011, contacts were identified for 83.0% (75/91) of sputum-smear positive TB cases. Of contacts to sputum-smear positive TB cases, 79.0% (974/1,236) were evaluated. Of the contacts evaluated 187 contacts were newly diagnosed latent TB infections. 74.0% (138/187) of these cases initiated LTBI treatment and 57.0% (79/138) completed treatment.

Table 3. Contacts to Sputum-Smear Positive TB Cases, Arizona, 2007-2011

	2007		2008		2009		2010		2011	
	No.	%								
Cases with Contacts	64	71	63	82	58	82	63	76	75	83
Cases without Contacts	26		14		13		20		16	
Total Sputum-Smear Positive Cases	90		77		71		83		91	

Table 4. Evaluation of Contacts to Sputum-Smear Positive TB Cases, Arizona, 2007-2011

	2007		2008		2009		2010		2011	
	No.	%	No.	%	No.	%	No.	%	No.	%
Contacts Evaluated	409	88	476	63	594	70	815	68	974	79
Contacts Not Evaluated	54		281		250		388		262	
Total Contacts to Sputum-Smear Positive Cases	463		757		844		1203		1,236	

Table 5. LTBI Therapy for Newly Infected Contacts, Arizona, 2007-2011

	2007		2008		2009		2010		2011	
	No.	%								
Newly Diagnosed Infected Contacts	142		164		213		222		187	
Infected Contacts Started on LTBI Therapy	98	69	91	55	39	18	193	87	138	74
Infected Contacts Completing LTBI Therapy	66	67	65	71	27	69	77	40	79	57

Evaluation of Class B1/B2 Referrals

Immigrants and refugees traveling to the U.S. are evaluated for TB as part of the admission process, and are assigned a classification according to the status of their disease. Class A individuals have TB disease and have been granted a waiver. Class B1 includes individuals with non-infectious pulmonary TB disease with negative acid-fast bacilli sputum smears and cultures. Class B1 also includes extra pulmonary TB cases. Class B2 individuals have positive skin tests but have negative evaluations for active TB disease. Class B3 individuals are recent contacts of a known TB case.

The CDC Division of Global Migration and Quarantine notifies the Department of all Class B individuals entering the state. The Department forwards these referrals to the LHDs where the individual will reside. The LHDs provide medical evaluation and treatment. The transitory nature of the immigrant and refugee population makes it difficult to initiate or complete evaluations and treatment for these individuals. The Department is developing strategies to overcome these barriers.

In 2013, the Department received 302 notifications for immigrants and refugees designated as class B1, of which 40.1% (121/302) initiated medical evaluation within 30 days and 50.1% (153/302) completed medical evaluation overall. The Department received 161 Class B2 notifications. Of these 74.5% (120/161) completed the evaluation and 59.8% (52/87) were started on treatment for latent TB infection.

International Referrals and Case Management

The Department coordinates with international referral agencies to ensure continuity of care for individuals with TB or suspected of having TB who return to their home country. CureTB facilitates the referral process with public health officials in Mexico and is expanding to other countries. Migrant Clinicians Network (TBNNet) facilitates the referral process for all countries including Mexico. In 2013, 124 cases and suspect cases were referred to these international agencies.

Border Health Activities

To ensure continuity of care for individuals being treated for TB who are repatriated to Mexico through Nogales and San Luis, Arizona, the ADHS TB Control Program coordinates "Meet and Greets." The Meet and Greet involves transferring these individuals from Arizona and federal law enforcement authorities to Mexican law enforcement and public health authorities.

The Meet and Greet protocol developed in 2007 has resulted in better coordination of inmates returning to Mexico. The protocol includes working closely with the ADHS Office of Border Health, correctional facilities, LHDs, Sonoran partners, CureTB, and ICE authorities. In 2013, the Department arranged four Meet and Greets through the port of Nogales and one through the port of San Luis.

The Department is collaborating with Sonoran public health officials to improve communication and completion of treatment for binational TB cases. MEDSIS (Medical Electronic Disease Surveillance Intelligence System) the Arizona disease surveillance system for reporting TB cases is now translated into Spanish and will be made available to Sonora Public Health officials to improve communication with the Department in 2014.

Conclusion

The Department continues to partner with local health departments, federal agencies, correctional facilities, and the international community to prevent and control TB in Arizona. These partnerships have improved treatment completion, data quality and communication between different jurisdictions. Continued close collaborations with local health departments and outside partners will prevent further spread and curb the emergence of drug-resistant TB.