

# **2016 Annual Tuberculosis Surveillance Report**

**Virginia Department of Health**

**Office of Epidemiology**

**Division of Tuberculosis and Newcomer  
Health**



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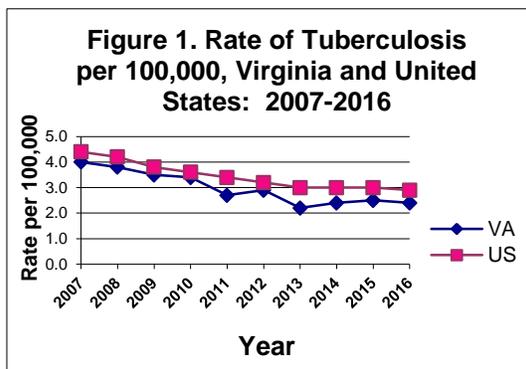
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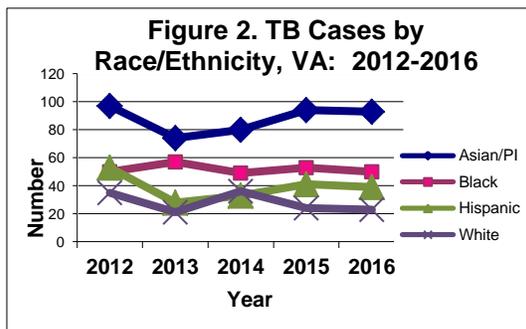
**Introduction**

In 2016, Virginia reported 205 tuberculosis (TB) cases, a 3% decrease from the 212 cases reported in 2015. Nationally the CDC reported 9,287 TB cases for 2016. This represents the lowest number of cases ever reported for a case rate of 2.9 per hundred thousand persons. Virginia ranked 10<sup>th</sup> in the nation for the number of reported TB cases with a case rate of 2.4 per 100,000 persons. In this report, data on demographics and selected risk factors for TB are provided at the state level for 2012-2016.



**Sex and Race**

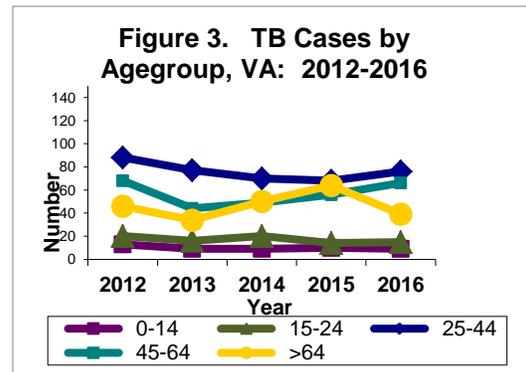
In 2016, 49.8% of TB cases were female and 50.2% were male. Among racial and ethnic groups, when compared to 2015, all racial and ethnic groups had slight decreases in 2016 (Figure 2).



**Age**

Nine pediatric cases, aged 0 to 14 were reported in 2016. Among the 15-24 year old age group, 15 cases were reported. For the

first time in several years, those aged 25 to 44 had an increase compared to the previous year, from 68 cases in 2015 to 76 cases in 2016. Among those aged 45-64, 66 cases were reported in 2016 compared to 56 in 2015. Those aged 65 and older decreased from 64 in 2015 to 39 in 2016 (Figure 3).



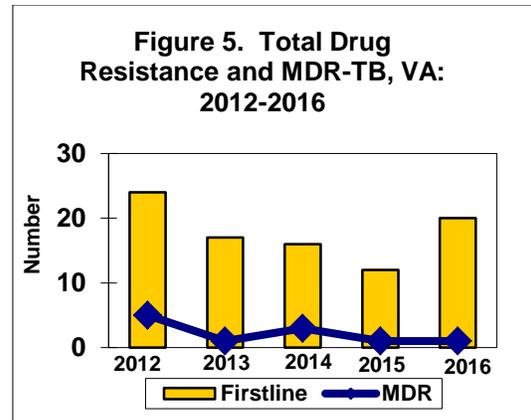
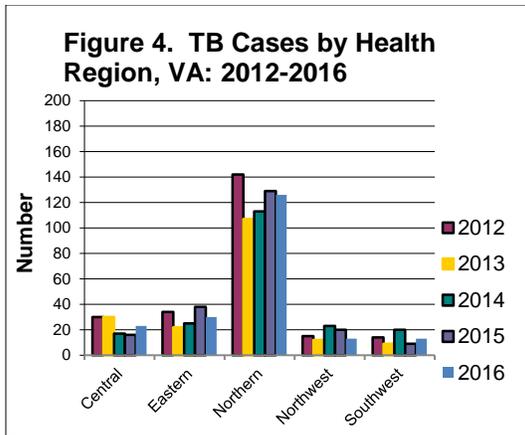
**Place of Origin**

In 2016, 166 or 81% of Virginia's TB cases were reported among foreign-born persons.

The diversity of cultures and countries of origin among Virginia's TB cases is remarkable. These cases represent 34 countries of origin other than the United States. The top five countries of origin in 2016 included India, the Philippines, Viet Nam, Ethiopia, and El Salvador.

**Geographic Distribution**

In 2016 Eastern, Northern, Northwest, and Southwest health regions reported fewer cases than the previous year. The Central region reported an increase. The Northern region, with a caseload that is overwhelmingly comprised of foreign-born people, reported 61.5% (126) of the total. Central region reported 23 cases for 11.2% and Eastern region reported 30 cases for 14.6%. Northwest region reported 13 cases for 6.3% and Southwest region reported 13 cases for 6.3% of the total (Figure 4).



**HIV Co-Infection and Selected Risk Factors**

Several risk factors are associated with TB, including occupational risk, congregate living, co-infection with HIV, homelessness, substance use and diabetes. Diabetes is consistently the most frequently observed risk factor among TB cases in Virginia. In 2016, 29 cases (14.1%) with diabetes were reported. In 2016, 7 health care workers were reported with TB and TB was reported among 1 resident of long-term care. Overall, 7 (3.4%) of Virginia’s cases were reported with HIV infection. In 2016, 13 cases reported excessive alcohol use, 4 reported injection drug use and 8 reported non-injection drug use.

**Drug Resistance**

Drug susceptibility tests were performed for 167 culture positive cases. Drug resistance was found in 21 cases to one or more first-line drugs, most frequently isoniazid. One case of multidrug-resistant TB (MDR-TB) was reported in 2016. (By definition MDR-TB is resistant to both isoniazid and rifampin). No cases meeting the definition of extensively drug-resistant (XDR) TB were reported in 2016 (Figure 5).

**Mortality**

In 2015, the most recent year with complete data, 13 (6.1%) TB cases died during treatment and 4 (1.9%) cases were diagnosed at the time of death or post-mortem.

**Treatment Outcomes**

For 2015, the year with the most complete data, 92.2% of the drug-susceptible cases completed therapy within 12 months.

**Contact Investigations**

In 2015, 1,857 contacts to acid-fast bacilli (AFB) sputum smear positive or sputum culture positive cases were identified. Of those, 87% were evaluated for infection and disease. Among the 250 people identified with latent TB infection (LTBI), 163 (65%) were started on treatment and 139 (85%) completed treatment for latent TB infection.

**Summary**

In 2016, morbidity decreased among the elderly substantially more than the decrease experienced overall. Diabetes continues to be the most frequent risk reported among Virginia’s TB cases.

**Table 1. Number and Rate of Tuberculosis Cases: Virginia and United States, 2007-2016**

Year	Virginia		United States	
	No.	Rate	No.	Rate
2007	309	4.0	13,288	4.4
2008	292	3.8	12,904	4.2
2009	273	3.5	11,540	3.8
2010	268	3.4	11,181	3.6
2011	221	2.7	10,521	3.4
2012	235	2.9	9,951	3.2
2013	180	2.2	9,588	3.0
2014	198	2.4	9,412	3.0
2015	212	2.5	9,563	3.0
2016	205	2.4	9,287	2.9

Historical US data from : CDC. Reported Tuberculosis in the United States, 2015. Atlanta, GA: US DHHS, CDC, October 2015.

2016 data from Centers for Disease Control and Prevention. Tuberculosis—United States, 2016, MMWR/66(11);289-294.

**Table 2. Tuberculosis Cases and Rate per 100,000 by Health Region: Virginia, 2012-2016**

Region	2012			2013			2014			2015			2016		
	No.	%	Rate												
<b>Total</b>	<b>235</b>	<b>100</b>	<b>2.9</b>	<b>180</b>	<b>100</b>	<b>2.2</b>	<b>198</b>	<b>100</b>	<b>2.4</b>	<b>212</b>	<b>100</b>	<b>2.5</b>	<b>205</b>	<b>100</b>	<b>2.4</b>
Central	30	12.8	2.0	29	16.1	2.1	17	8.6	1.2	16	7.5	1.1	23	11.2	1.6
Eastern	34	14.5	1.8	22	12.2	1.2	25	12.6	1.3	38	17.9	2.0	30	14.6	1.6
Northern	142	60.4	6.1	107	59.4	4.5	113	57.1	4.7	129	60.8	5.3	126	61.5	5.1
Northwest	15	6.4	1.2	12	6.7	0.9	23	11.6	1.8	20	9.4	1.5	13	6.3	1.0
Southwest	14	6.0	1.0	9	5.0	0.7	20	10.1	1.5	9	4.2	0.7	13	6.3	1.0

**Table 3. Tuberculosis Cases by Demographics and Location:  
Virginia, 2012-2016**

	2012		2013		2014		2015		2016	
	<b>235</b>		<b>180</b>		<b>198</b>		<b>212</b>		<b>205</b>	
<b>Total Cases</b>	No	%								
<b>Sex</b>										
Female	106	45.1	72	40.0	94	47.5	104	49.1	102	49.8
Male	129	54.9	108	60.0	104	52.5	108	50.9	103	50.2
<b>Race/Ethnicity</b>										
Asian/Pacific Islander	97	41.3	74	41.1	80	40.4	94	44.3	93	45.4
Black, Not Hispanic	50	21.3	57	31.7	49	24.7	53	25.0	50	24.4
Hispanic	53	22.6	28	15.6	33	16.7	41	19.3	39	19.0
White, Not Hispanic	35	14.9	21	11.7	36	18.2	24	11.3	23	11.2
<b>Age</b>										
0-14	13	5.5	9	5.0	9	4.5	10	4.7	9	4.4
15-24	20	8.5	16	8.9	20	10.1	14	6.6	15	7.3
25-44	88	37.4	77	42.8	70	35.4	68	32.1	76	37.1
45-64	68	28.9	44	24.4	49	24.7	56	26.4	66	32.2
>64	46	19.6	34	18.9	50	25.3	64	30.2	39	19.0
<b>Place of Birth</b>										
Foreign-born	183	77.9	149	82.8	147	74.2	167	78.8	166	81.0
US-born	52	22.1	31	17.2	51	25.8	45	21.2	39	19.0
<b>Health Region</b>										
Central	30	12.8	30	16.7	17	8.6	16	7.5	23	11.2
Eastern	34	14.5	22	12.2	25	12.6	38	17.9	30	14.6
Northern	142	60.4	107	59.4	113	57.1	129	60.8	126	61.5
Northwest	15	6.4	12	6.7	23	11.6	20	9.4	13	6.3
Southwest	14	6.0	9	5.0	20	10.1	9	4.2	13	6.3

**Table 4. Tuberculosis Cases by Race/Ethnicity and Place of Birth: Virginia, 2012-2016**

Race/Ethnicity	2012		2013		2014		2015		2016	
	US-born	Foreign-born								
<b>Total</b>	<b>52</b>	<b>183</b>	<b>31</b>	<b>149</b>	<b>51</b>	<b>147</b>	<b>45</b>	<b>167</b>	<b>39</b>	<b>166</b>
Asian/Pacific Islander	3	94	0	74	4	76	3	91	5	88
Black, Not Hispanic	22	28	16	41	21	28	23	30	18	32
Hispanic	4	49	0	28	3	30	2	39	0	39
White, Not Hispanic	23	12	15	6	23	13	17	7	16	7

**Table 5. Tuberculosis Cases by Selected Risk Factors: Virginia, 2012-2016**

Total Cases	2012		2013		2014		2015		2016	
	<b>235</b>		<b>180</b>		<b>198</b>		<b>212</b>		<b>205</b>	
	No.	%								
<b>Occupation</b>										
Health Care	8	3.4	5	2.8	5	2.5	7	3.3	7	3.4
Migrant	1	0.4	0	0.0	1	0.5	0	0.0	0	0.0
Corrections	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
<b>Type of Residence</b>										
Long Term Care	2	0.9	4	2.2	5	2.5	2	0.9	1	0.5
Prison/Jail	6	2.6	0	0.0	0	0.0	1	0.5	2	1.0
Homeless	10	4.3	8	4.4	1	0.5	2	0.9	6	2.9
<b>Co-Morbidity</b>										
Diabetes	27	11.5	26	14.4	33	16.7	45	21.2	29	14.1
HIV	12	5.1	10	5.6	10	5.1	7	3.3	7	3.4
<b>Substance Use</b>										
Alcohol	21	8.9	13	7.2	7	3.5	17	8.0	13	6.3
IDU	2	0.9	2	1.1	0	0.0	2	0.9	4	2.0
Non-IDU	15	6.4	7	3.9	1	0.5	4	1.9	8	3.9

**Table 6. Culture Positive Tuberculosis Cases with Drug Resistance: Virginia, 2012-2016**

Initial Susceptibilities	2012		2013		2014		2015		2016	
	<b>172</b>		<b>135</b>		<b>151</b>		<b>171</b>		<b>167</b>	
	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Total Drug Resistance</b>	<b>24</b>	<b>14.0</b>	<b>17</b>	<b>12.6</b>	<b>19</b>	<b>12.6</b>	<b>13</b>	<b>7.6</b>	<b>21</b>	<b>12.6</b>
Any firstline drug	19	11.0	16	11.9	16	10.6	12	7.0	20	12.0
Multidrug**	5	2.9	1	0.7	3	2.0	1	0.6	1	0.6

\*\*Multidrug resistance or MDR is by definition resistance to isoniazid and rifampin.

**Table 7. Tuberculosis Mortality: Virginia, 2010-2015\***

Total Cases	2011		2012		2013		2014		2015	
	<b>221</b>		<b>235</b>		<b>180</b>		<b>198</b>		<b>212</b>	
	No.	%								
<b>Total Deaths</b>	<b>17</b>	<b>7.7</b>	<b>21</b>	<b>8.9</b>	<b>15</b>	<b>8.3</b>	<b>10</b>	<b>5.1</b>	<b>17</b>	<b>8.0</b>
Dead at Time Diagnosis	2	0.9	6	2.6	7	3.9	5	2.5	4	1.9
Died During Treatment	15	6.8	15	6.4	8	4.4	5	2.5	13	6.1

\*If a person is diagnosed with TB post-mortem or diagnosed with TB at the time of death they are coded as dead at the time of diagnosis. If they died during TB treatment, they are coded as died during treatment. There may be people in either of these categories whose underlying cause of death is not TB.

## Technical Notes

TB disease is a reportable condition as defined in the Regulations for Disease Reporting and Control. In addition, TB infection in children under age 4 is also a reportable condition. **The Division of Tuberculosis and Newcomer Health** conducts surveillance for TB disease in the entire population and for TB infection among children. It collects, analyzes, and disseminates data as an integral part of TB control.

### Rates per 100,000

In Tables 1 and 2, rates for 2007-2010 were calculated using 2000 Census data released by the United States Bureau of the Census, Population Estimates Program. Annual Estimates of the Population for Counties of Virginia: April 1, 2000 to July 1, 2010 (CO-EST2006-01-51). For 2011 to 2016 rates were calculated using estimates compiled by the Weldon Cooper Center for Public Service, accessed 3/1/2017 <http://www.coopercenter.org/demographics/virginia-population-estimates#popestimates>

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## Tuberculosis (TB) (*Mycobacterium tuberculosis*)

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### 2009 Case Definition

#### CSTE Position Statement(s)

- 09-ID-65

#### Clinical Description

A chronic bacterial infection caused by *Mycobacterium tuberculosis* usually characterized pathologically by the formation of granulomas. The most common site of infection is the lung, but other organs may be involved.

#### Clinical Criteria

A case that meets all the following criteria:

- A positive tuberculin skin test or positive interferon gamma release assay for *M. tuberculosis*
- Other signs and symptoms compatible with tuberculosis (TB) (e.g., abnormal chest radiograph, abnormal chest computerized tomography scan or other chest imaging study, or clinical evidence of current disease)
- Treatment with two or more anti-TB medications
- A completed diagnostic evaluation

#### Laboratory Criteria for Diagnosis

- Isolation of *M. tuberculosis* from a clinical specimen,\* OR
- Demonstration of *M. tuberculosis* complex from a clinical specimen by nucleic acid amplification test,\*\* OR
- Demonstration of acid-fast bacilli in a clinical specimen when a culture has not been or cannot be obtained or is falsely negative or contaminated.

## Case Classification

### Confirmed

A case that meets the clinical case definition or is laboratory confirmed

### Comment(s)

A case should not be counted twice within any consecutive 12-month period. However, a case occurring in a patient who had previously had verified TB disease should be reported and counted again if more than 12 months have elapsed since the patient completed therapy. A case should also be reported and counted again if the patient was lost to supervision for greater than 12 months and TB disease can be verified again. Mycobacterial diseases other than those caused by *M. tuberculosis* complex should not be counted in tuberculosis morbidity statistics unless there is concurrent tuberculosis.

\*Use of rapid identification techniques for *M. tuberculosis* (e.g., DNA probes and mycolic acid high-pressure liquid chromatography performed on a culture from a clinical specimen) are acceptable under this criterion.

\*\* Nucleic acid amplification (NAA) tests must be accompanied by culture for mycobacteria species for clinical purposes. A culture isolate of *M. tuberculosis* complex is required for complete drug susceptibility testing and also genotyping. However, for surveillance purposes, CDC will accept results obtained from NAA tests approved by the Food and Drug Administration (FDA) and used according to the approved product labeling on the package insert, or a test produced and validated in accordance with applicable FDA and Clinical Laboratory Improvement Amendments (CLIA) regulations.

<http://wwwn.cdc.gov/nndss/script/casedef.aspx?condyrid=876&datepub=1/1/2009%2012:00:00%20am>