

# **NEVADA TUBERCULOSIS REPORT (1999 – 2005)**



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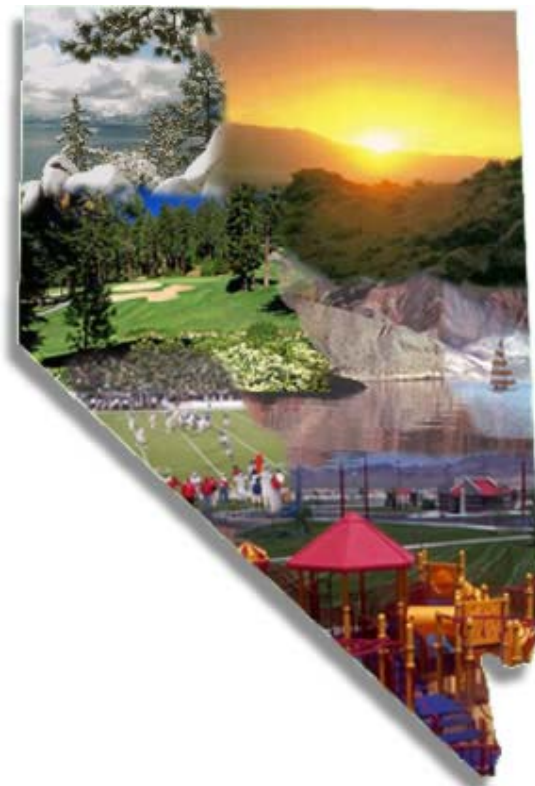
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# Introduction

The purpose of this report is to provide a profile of information and data regarding the current status of Tuberculosis (TB) in Nevada. This profile will describe the scope and characteristics of TB, the general demographic characteristics of the state, the people who live with TB in Nevada, and those persons who are at most risk for contracting TB in the future. The last comprehensive report of Tuberculosis in Nevada was published in 1999.

This profile can serve as a current resource for TB prevention and care efforts at the provider, local, and state levels. Epidemiological information is critical to assist in prioritizing populations and to the entire planning process. Identifying TB issues can better equip local health districts and the State Health Division in addressing TB in the state.

This profile will address the following questions:

- ❖ *What is TB and how is it diagnosed and treated?*
- ❖ *What is the scope of TB in Nevada and how does it compare to the nation?*
- ❖ *What are the primary indicators of risk for TB in Nevada?*

The main data sources used for this report are:

1. *Nevada State Health Division, Bureau of Community Health, Tuberculosis Information Management System (TIMS) database.*
2. *Nevada State Demographer's Office*
3. *The Centers for Disease Control and Prevention*
4. *American Public Health Association, Control of Communicable Disease Manual, 18<sup>th</sup> edition*

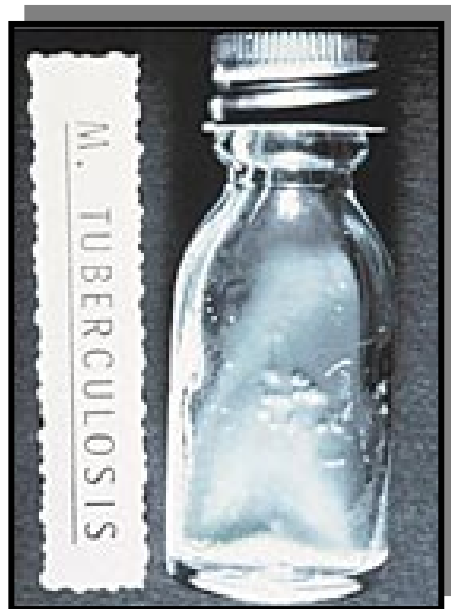
*References are contained in footnotes.*

# Background

*Mycobacterium tuberculosis* complex (MTB) is the group of bacterial organisms that cause the infectious disease Tuberculosis. *Mycobacterium tuberculosis* complex is made up of the following species: *Mycobacterium tuberculosis*, *Mycobacterium africanum* and *Mycobacterium bovis*. Transmission of the bacteria occurs through airborne nuclei droplets that are generated when an infectious person sneezes, coughs, or talks. If a non-infected person is exposed to these droplets, he or she could become infected with the bacteria<sup>1</sup>.

It is important to know that not all people exposed to TB will become infected. Of those who are infected with TB, only 10 percent will develop active disease during their lifetime. The remaining 90 percent, who have a TB infection, will never develop TB disease because the TB bacteria may remain inactive, or latent, throughout their lifetime<sup>1</sup>. Individuals that have been infected, but do not have active disease are referred to as having a latent TB infection (LTBI). Individuals with LTBI cannot spread the disease, and they may be treated with antibiotics to prevent the infection from developing into active TB disease<sup>2</sup>.

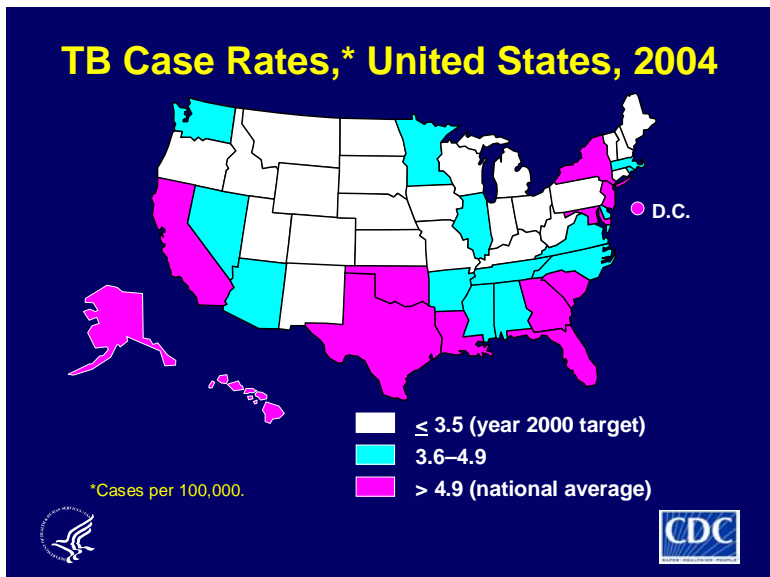
In some individuals, the TB organisms may become active, leading to overt TB disease. This development of active TB disease can be further complicated in individuals who are immune compromised, such as individuals with Human Immunodeficiency Virus (HIV). People with active TB disease may spread the disease to other individuals. People with active TB disease can be cured if they obtain a medical evaluation and appropriate medication<sup>1</sup>.



<sup>1</sup> American Public Health Association, Control of Communicable Disease Manual, 18<sup>th</sup> edition.

<sup>2</sup> Centers for Disease Control and Prevention. (2007). Division of Tuberculosis Elimination. *Fact Sheets*.  
Website: <http://www.cdc.gov/nchstp/tb/pubs/tbfactsheets/250010.htm>

# Tuberculosis in the United States

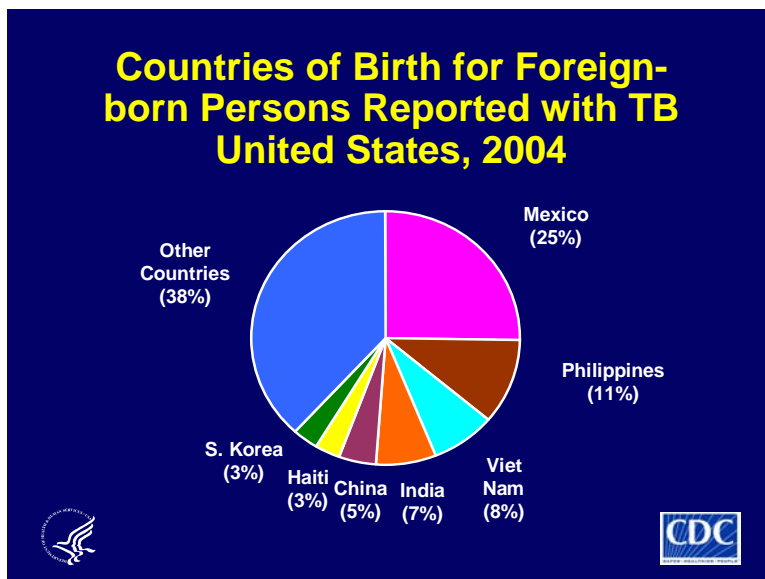


Reported cases of TB declined for several decades in the United States until mid-1980, at which point annual incidence rates began to increase. Reported TB incidence peaked in 1992 at 10.5 cases per 100,000 population<sup>3</sup>. The CDC attributed this increase to a number of factors: immigration from countries with high rates of TB, the emergence of HIV-TB co-infection, and the spread of TB in high-risk settings (e.g., homeless shelters, correctional facilities, and long-term care facilities)<sup>3</sup>.

The public health response to this growth in TB sparked an increase in funding to improve TB control measures at the federal, state and local levels. These efforts resulted in the decline of TB rates nationwide<sup>4</sup>. In 2005, the U.S. TB case rate reached was 4.8 cases per 100,000 population<sup>3</sup>.

The CDC reports foreign-born persons from countries endemic for TB as the leading high-risk population for TB in the United States. Other high-risk factors for TB reported by the CDC include<sup>3</sup>:

- contact to someone with infectious TB,
- residents of long-term care or residential settings,
- persons in homeless shelters,
- inmates in correctional/detention facilities,
- those who inject drugs,
- HIV positive persons.



<sup>3</sup> Centers for Disease Control and Prevention. (2007). Division of Tuberculosis Elimination. Website: <http://www.cdc.gov/nchstp/tb/pubs/slidesets/surv/surv2005/default.htm> and [http://www.cdc.gov/nchstp/tb/pubs/mmwrhtml/Maj\\_guide/high\\_risk.htm](http://www.cdc.gov/nchstp/tb/pubs/mmwrhtml/Maj_guide/high_risk.htm) and <http://www.cdc.gov/mmwr/preview/mmwrhtml/00038823.htm>

<sup>4</sup> American Lung Association. (2007). *TB Funding*. Website: [http://lungaction.org/alasc/notice-description.tcl?newsletter\\_id=4926418](http://lungaction.org/alasc/notice-description.tcl?newsletter_id=4926418)

# Tuberculosis Diagnosis and Treatment

The diagnosis of tuberculosis involves a multi-step process. This process involves obtaining a medical history, physical examination, and checking for symptoms. Several tests are used to check for TB as well. These tests include: Mantoux Tuberculin Skin Test and/or QuantiFERON-TB Gold Test, chest radiograph, diagnostic microbiology and drug susceptibility<sup>3</sup>.

The medical history includes facts about the social, family, medical, and occupational aspects of the patient's life. The clinician should ask about<sup>5</sup>:

- Exposure to a person who has infectious TB
- Any symptoms of TB (productive cough lasting longer than 3 weeks, fever, unexplained weight loss, night sweats)
- The patient's history of TB infection or TB disease
- Risk factors for developing the disease (intravenous drug use, immune system condition, diabetes)
- Country of birth
- Length of time in the United States if the patient is an immigrant

The Mantoux Tuberculin Skin Test is used as a screening tool to determine if an individual has been infected with TB. A substance, called tuberculin, is injected with a needle into the upper skin layer of the patient's arm. The immune system of most people who have TB infection recognizes tuberculin and this will cause a reaction in the skin. The arm is examined 48 to 72 hours after the tuberculin injection in order to evaluate the reaction on the patient's skin. The diagnosis of TB infection depends on the size of the measured induration, localized hardening of soft tissue, and the patient's individual risk factors<sup>5</sup>.

In December 2004, the FDA approved a new diagnostic test for *M. tuberculosis*-complex infection known as the QuantiFERON®-TB Gold. This diagnostic test measures the amount of interferon-gamma produced by cells in whole blood that have been stimulated by mycobacterium peptides. The peptides used in the test mimic proteins known as ESAT-6 and CFP-10, which are present in *M. tuberculosis* but absent from all BCG strains and from most non-tuberculosis mycobacterium. It is intended for use as a diagnostic aide for *M. tuberculosis* infection, including both tuberculosis disease and latent tuberculosis infection (LTBI). It cannot distinguish between LTBI and tuberculosis disease, and should be used in conjunction with risk assessment, radiography, and other diagnostic evaluations. The advantages of QuantiFERON®-TB Gold and the prior generation test, compared with the tuberculin skin test, are that results can be obtained after a single patient visit, and that the subjectivity associated with skin test readings can be eliminated<sup>6</sup>.

If TB infection or active TB disease is suspected, a posterior-anterior chest x-ray is normally taken. The chest x-ray helps the clinician determine the presence of any damage to the lungs due to the presence of TB organisms or an old disease that has healed<sup>5</sup>.

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<sup>5</sup> Centers for Disease Control and Prevention. Division of Tuberculosis Elimination. *Diagnosis of TB*. Website: [http://www.cdc.gov/nchstp/tb/pubs/slidesets/core/html/trans5\\_slides.htm](http://www.cdc.gov/nchstp/tb/pubs/slidesets/core/html/trans5_slides.htm) and <http://www.cdc.gov/nchstp/tb/pubs/tbfactsheets/250102.htm>

<sup>6</sup> Centers for Disease Control and Prevention. Division of Tuberculosis Elimination. *Quantiferon®-TB Gold Test*. Website: <http://www.cdc.gov/nchstp/tb/pubs/tbfactsheets/250103.htm>

The presence of acid-fast bacilli (AFB) on a secretion from the lung (sputum) specimen often indicates active TB disease. A sputum sample smeared on a slide and stained using an acid fast stain is a quick and easy test. However, this test does not confirm a diagnosis of TB since there are other acid-fast bacilli than TB. In addition to staining the sputum specimen, a bacterial culture is done to grow the organism for definitive identification and susceptibility testing<sup>5</sup>.

The treatment for active TB disease usually lasts six months and involves at least four medications. The most common antibiotic regimen consists of Isoniazid (INH), Rifampin (RIF), Pyrazinamide (PZA), Ethambutol (EMB) or streptomycin (SM). Treatment of TB should be completed through directly observed therapy (DOT), in which the patient is directly observed by the health care provided to ensure medication was ingested. If the antibiotics are not taken for the full duration of indicated therapy some bacilli may survive. The survival of these organisms can lead to reactivation of active TB disease at a later time or lead to the development of a drug-resistant TB strain. Therefore, it is imperative to ensure that complete treatment is given to a TB patient to eradicate all bacilli<sup>7</sup>.

If TB infection is detected while the patient has LTBI, treatment with antibiotics may prevent future development of active TB disease. The treatment requires six to nine months of a single medication (isoniazid) or two months of a combination of two medications (rifampin and pyrazinamide)<sup>8</sup>. However, the CDC has discouraged the use of the two-month combination of rifampin and pyrazinamide due to severe liver injury in patients treated with this regimen.

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<sup>7</sup> Centers for Disease Control and Prevention. (2003). MMWR: *Treatment of Tuberculosis*. Website: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5211a1.htm>

<sup>8</sup> Francis J. Curry National Tuberculosis Center. *Diagnosis and Treatment*. Website: [http://www.nationaltbcenter.edu/abouttb/diagnosis\\_and\\_treatment.cfm](http://www.nationaltbcenter.edu/abouttb/diagnosis_and_treatment.cfm)

# Overview of Nevada

## Population Characteristics

- ✚ By geographical size, Nevada is the 7<sup>th</sup> largest state in the nation.
- ✚ Nevada is comprised of 17 counties that cover 110,540 total square miles.
- ✚ Approximately 67% of the state public lands are administered by the Bureau of Land Management, and 84.5% of the land in Nevada is owned by the federal government.
- ✚ Nevada was the 35<sup>th</sup> largest state in the nation in 2005, with a total estimated population of 2,509,637.
- ✚ By 2025, Nevada is projected to rank 15<sup>th</sup> largest among all the states through net internal migration.
- ✚ Nevada has been the fastest growing state in the nation for 19 consecutive years.
- ✚ Nevada consists of vast, sparsely populated areas in rural and frontier Nevada, combined with larger population centers in Clark and Washoe Counties, which together accounted for 87.4% of the total state population in 2005.

## Demographic Characteristics

### *Race/Ethnicity*

- ✚ In 2005, the racial/ethnic composition of Nevada was 62.1% White, 23.3% Hispanic, 6.9% Black, 6.4% Asian/Pacific Islander, and the remaining 1.3% Native American or Alaskan Native.
- ✚ Nevada is one of nine states to potentially become a minority-majority state in the coming decades. Currently, Nevada has a composition of 37.9% minority.

### *Age*

- ✚ In 2005, slightly over one-half of the population in Nevada was between the ages of 25 and 64 (53.5%), another one-third was between the ages of 0 and 24 (35.4%), and 11.2% of the population was aged 65 and older.
- ✚ In 2005, an estimated 50.7% of the population was male.

### *Socioeconomic Status*

- ✚ In 2004, the average annual pay in Nevada was \$37,106, ranking 20<sup>th</sup> in the nation.
- ✚ The median household income in 2003 (most recent data), was \$45,396, ranking 18<sup>th</sup> in the nation.
- ✚ In 2004, Nevada ranked 17<sup>th</sup> in the nation for personal per capita income at \$30,981.
- ✚ In 2003, Nevada ranked 24<sup>th</sup> among states for persons living below the poverty level at 11.5% of the total population. The poverty rates per county ranged from 5.2 in Storey County to 14.6 in Mineral County.
- ✚ In regards to education, Nevada ranked 34<sup>th</sup> in the nation for persons 25 years and older with a Bachelor's degree or more in 2004, with almost one-quarter of the population having at least a Bachelor's degree.
- ✚ Over 80% of Nevada's population is a high school graduate or higher.
- ✚ According to the Bureau of Labor Statistics, 96.0% of the workforce in Nevada falls under permanent worker status.
- ✚ An estimated 76% of households in the state have at least one full-time worker.
- ✚ Nevada has a greater percentage of the population in the following industries than the United States: Mining; Utilities; Construction; Finance and Insurance; Real Estate, Rental, and Leasing;

Administrative and Waste Services; Arts, Entertainment, and Recreation; and Accommodation and Food Services.

### ***Health Status***

- ✚ In 2005, the United Health Foundation ranked Nevada 37<sup>th</sup> in the nation based on 19 health indicators. These indicators determined the healthiest (1<sup>st</sup>) to least healthy (50<sup>th</sup>) states in the nation.
- ✚ Nevada's strengths (ranking higher than 20<sup>th</sup> in the nation) included its low prevalence of obesity at 21.0% of the population, a low infant mortality rate at 6.2 deaths per 1,000 live births, and a low percentage of children in poverty at 13.8% of persons under age 18.
- ✚ Some of the challenges facing Nevada were the low immunization coverage with only 68.4% of children ages 19 to 35 months receiving complete immunizations (ranking Nevada 50<sup>th</sup> in the nation), a high violent crime rate of 616 offenses per 100,000 population, and a high rate of uninsured population at 18.5%.
- ✚ The per capita public health spending (\$ per person per year) in Nevada was \$155, ranking the state 23<sup>rd</sup> in the nation.
- ✚ Nevada ranked 38<sup>th</sup> among states for premature death (years lost per 100,000 population).

### ***Health Insurance***

- ✚ In 2004, Nevada had a higher rate of uninsured residents than the national average, at 19% compared to 16%. However, Nevada had a higher percentage of individuals who are insured through their employer. The percentage of government funded insurance is lower in Nevada than the national average.
- ✚ By race/ethnicity, Hispanics are almost twice as likely to be uninsured as Whites.

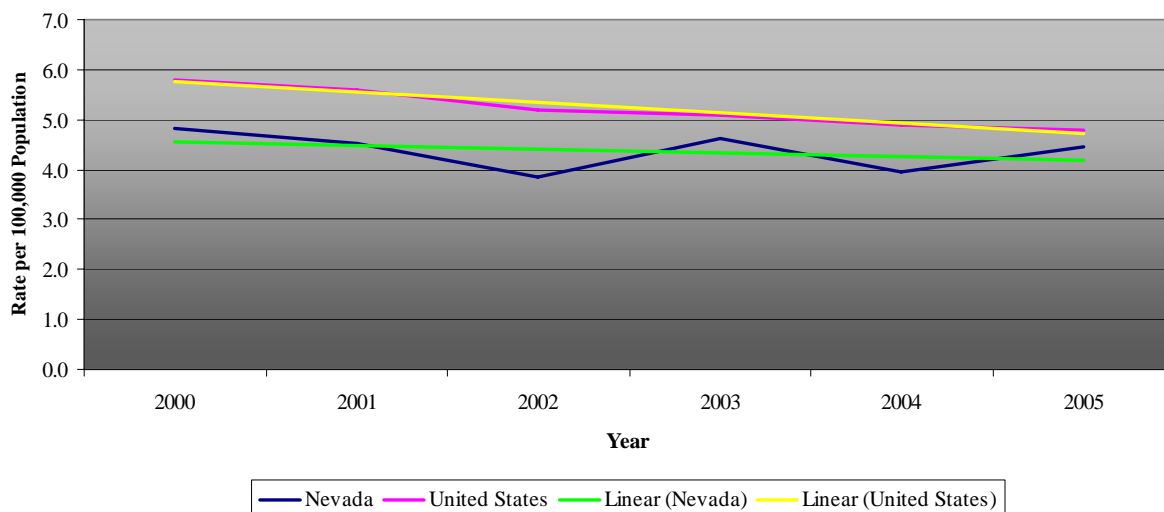
# Tuberculosis in Nevada

The mission of the Nevada State Health Division, Tuberculosis Prevention and Control Program is to prevent, control, track, and ultimately eliminate tuberculosis in the citizens of Nevada. Nevada's population is concentrated in three urban areas: Clark County in the south, and both Washoe County and Carson City in the north. These three areas account for 88 percent of the state's population, with the remainder of the population being divided among Nevada's rural counties<sup>9</sup>. Nevada's 14 rural counties cover 96,000 square miles, making access to these communities challenging and time-consuming.

The state of Nevada is facing significant challenges addressing its mission with regard to tuberculosis. Most notably, extreme and persistent population growth has made Nevada the fastest growing state in the country. Although Nevada is ranked 35<sup>th</sup> in the nation in terms of total population size, it has experienced a 66.3 percent increase in population in the ten-year period between 1990 and 2000<sup>10</sup>. Compounding the issue further, during this same time period, Nevada experienced a 202 percent increase in the foreign-born population. Based on the 2000 census number, 15.8 percent of Nevada's population is foreign-born, compared to 11.1 percent for the entire United States. The foreign-born population is a high-risk population for development of active tuberculosis, adding an additional burden to Nevada's public health system.

Nationally, tuberculosis rates have consistently declined from a rate of 5.8 per 100,000 population in 2000 to a rate of 4.8 per 100,000 population in 2005. Nevada's rate increased from 4.0 in 2004 to 4.5 in 2005. In 2004, Nevada ranked 23<sup>rd</sup> according to national TB rates, and in 2005, Nevada's rank increased to 17<sup>th</sup>. Nevada's TB case rate (displayed in the graph in blue and pink) has fluctuated over the past five years due to small case numbers and increasing state population growth; however, the overall trend (linear trend lines displayed in the following graph in yellow and green) during the past five years has shown a decline.

**Tuberculosis Case Rates per 100,000 Population, 2000 - 2005**



<sup>9</sup> Hardcastle, J. (2003). Population projections for Nevada and Nevada's counties from 2002 to 2022. State of Nevada Demographer. Retrieved June 21, 2004 from <http://www.nsbdc.org/demographer/pubs>.

<sup>10</sup> U.S. Census Bureau. (2003). United States: Population, percent change, 1990 to 2000. Retrieved July 5, 2006 from <http://quickfacts.census.gov/qfd/rankings/PL01200004.html>

## Tuberculosis Cases and Case Rates per 100,000 Population

Year	Nevada Tuberculosis Cases			US Tuberculosis Cases**	
	Number	Population	Rate*	Number	Rate
1993	101	1,398,760	7.2	25,108	9.7
1994	126	1,494,230	8.4	24,205	9.2
1995	113	1,582,390	7.1	22,727	8.5
1996	137	1,688,140	8.1	21,211	7.9
1997	112	1,799,850	6.2	19,751	7.2
1998	128	1,852,650	6.9	18,287	6.6
1999	93	1,961,600	4.7	17,501	6.3
2000	97	2,017,665	4.8	16,309	5.8
2001	96	2,126,792	4.5	15,945	5.6
2002	85	2,200,294	3.9	15,057	5.2
2003	106	2,290,855	4.6	14,852	5.1
2004	95	2,404,191	4.0	14,517	4.9
2005	112	2,509,637	4.5	14,093	4.8

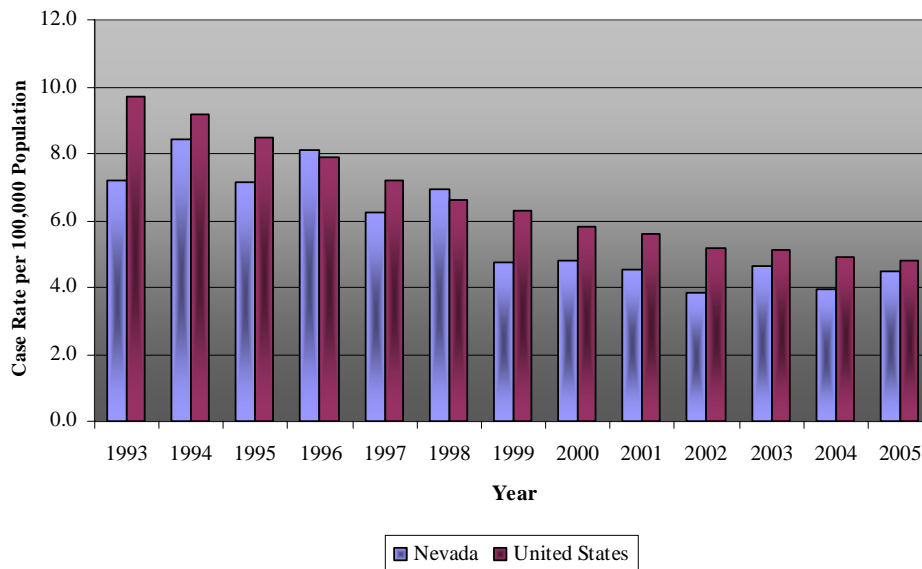
\* Per 100,000 Population. Population estimates from the Nevada State Demographer's Office

\*\* Numbers from the CDC Reported Tuberculosis in the United States, 2004

Source: Nevada State Health Division, Bureau of Community Health, TIMS

Since 1993, Nevada has had a lower tuberculosis case rate than the United States in all years except 1996 and 1998. Nevada had an average of 108 cases of TB per year between 1993 and 2005, with the lowest number of cases being 85 in 2002 and the highest being 137 in 1996.

**Tuberculosis Case Rates per 100,000 Population, 1993-2005**



Source: Nevada State Health Division, Bureau of Community Health, TIMS

## Tuberculosis Cases by County

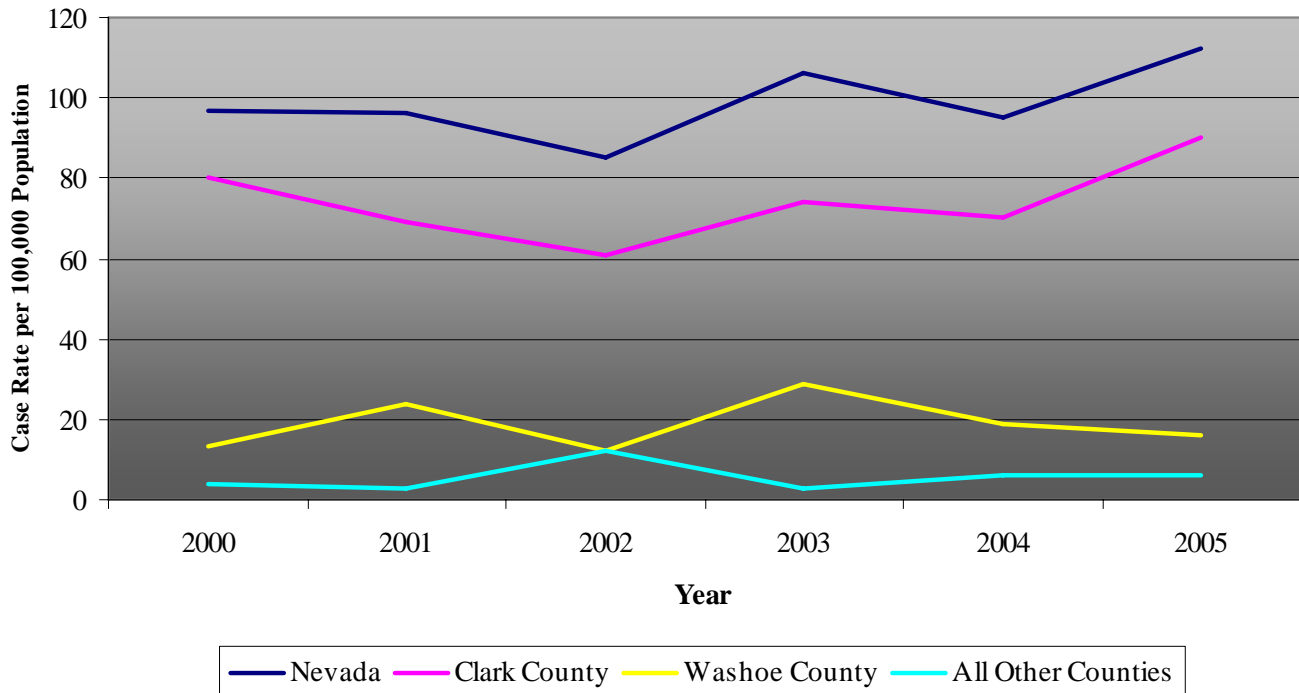
Year	Total Case	Clark			Washoe			All Other Counties**		
		N	%	Rate	N	%	Rate	N	%	Rate
2000	97	80	82.5	5.7	13	13.4	3.8	4	4.1	1.4
2001	96	69	71.9	4.6	24	25	6.8	3	3.1	1.0
2002	85	61	71.8	3.9	12	14.1	3.3	12	14.1	4.1
2003	106	74	69.8	4.6	29	27.4	7.8	3	2.8	1.0
2004	95	70	73.7	4.1	19	20	5.0	6	6.3	2.0
2005	112	90	80.4	5.0	16	14.3	4.0	6	5.4	1.9

\*\*The "All Other Counties" category includes the counties of Carson City, Churchill, Douglas, Elko, Esmeralda, Eureka, Humboldt, Lander, Lincoln, Lyon, Mineral, Nye, Pershing, Storey, and White Pine.

Source: Nevada State Health Division, Bureau of Community Health, TIMS

The distribution of TB cases in Nevada disproportionately affects Clark County. Though Clark County accounts for roughly 71 percent of the state's total population, it accounted for 81 percent of the TB disease burden in 2005. Clark County had an average of 74 cases per year between 2000 and 2005. Washoe County accounted for 14 percent of the TB disease burden; Carson City accounted for 1 percent; and the rural and frontier counties accounted for the remaining 4 percent.

### Tuberculosis Case Rates by 100,000 Population, 2000 - 2005



Source: Nevada State Health Division, Bureau of Community Health, TIMS

## Tuberculosis Cases by Age

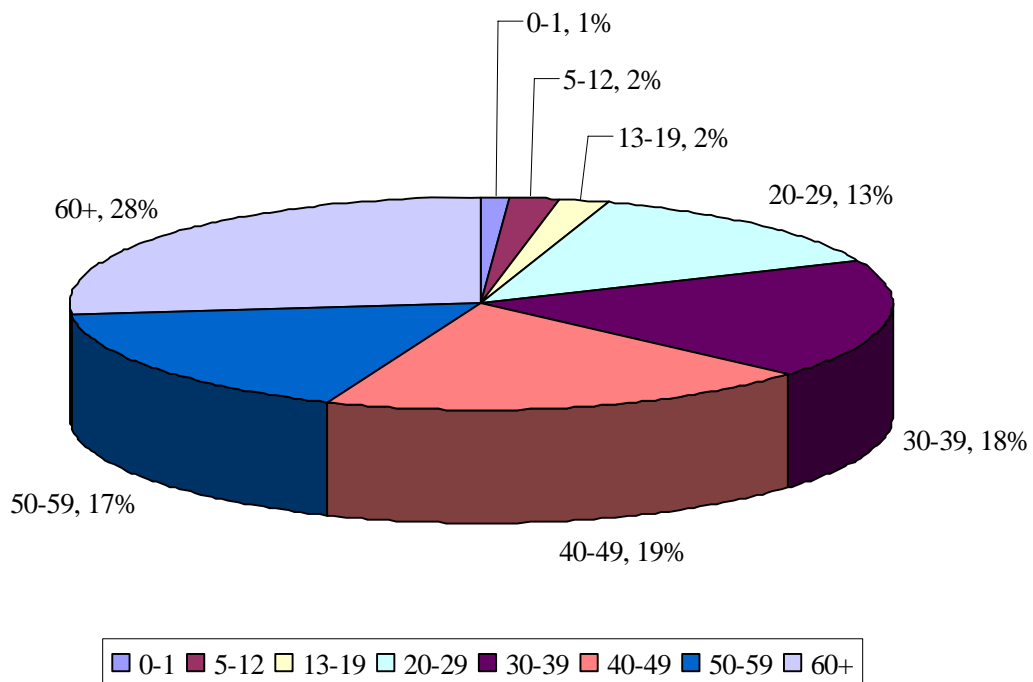
Year	Total Cases	0-1		5-12		13-19		20-29		30-39		40-49		50-59		60+	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
2000	97	1	1.0	5	5.2	3	3.1	11	11.3	22	22.7	15	15.5	18	18.6	22	22.7
2001	96	1	1.0	3	3.1	2	2.1	10	10.4	19	19.8	20	20.8	18	18.8	23	24.0
2002	85	1	1.2	0	0.0	1	1.2	8	9.4	15	17.6	19	22.4	18	21.2	23	27.1
2003	106	4	3.8	0	0.0	0	0.0	17	16.0	19	17.9	24	22.6	18	17.0	24	22.6
2004	95	0	0.0	1	1.1	3	3.2	20	21.1	13	13.7	13	13.7	13	13.7	32	33.7
2005	112	0	0.9	3	2.7	5	4.5	14	12.5	17	15.2	24	21.4	16	14.3	32	28.6

Source: Nevada State Health Division, Bureau of Community Health, TIMS

In Nevada, TB affects those aged 40 and older most profoundly, with those over 40 making up over 64 percent of the total cases in the state. Within that age group, those aged over 60 years account for 28 percent of the cases. Similar trends in TB cases by age group are also seen nationally. The average number of cases per year (2000 to 2005) of TB by age group is as follows:

- ❖ Ages 0 to 1: 1 case
- ❖ Ages 5 to 12: 2 cases
- ❖ Ages 13 to 19: 2 cases
- ❖ Ages 20 to 29: 13 cases
- ❖ Ages 30 to 39: 18 cases
- ❖ Ages 40 to 49: 19 cases
- ❖ Ages 50 to 59: 17 cases
- ❖ Ages 60+: 26 cases

**Nevada Tuberculosis Cases by Age, 2000-2005 (Average)**



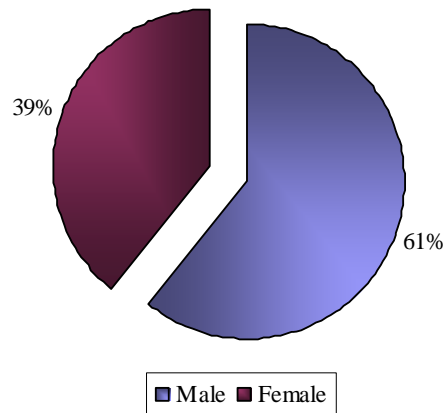
## Tuberculosis Cases by Gender

Gender	2000		2001		2002		2003		2004		2005	
	N	%	N	%	N	%	N	%	N	%	N	%
Male	66	68.0%	62	64.6%	42	49.4%	61	57.5%	61	64.2%	68	60.7%
Female	31	32.0%	34	35.4%	43	50.6%	45	42.5%	34	35.8%	44	39.3%

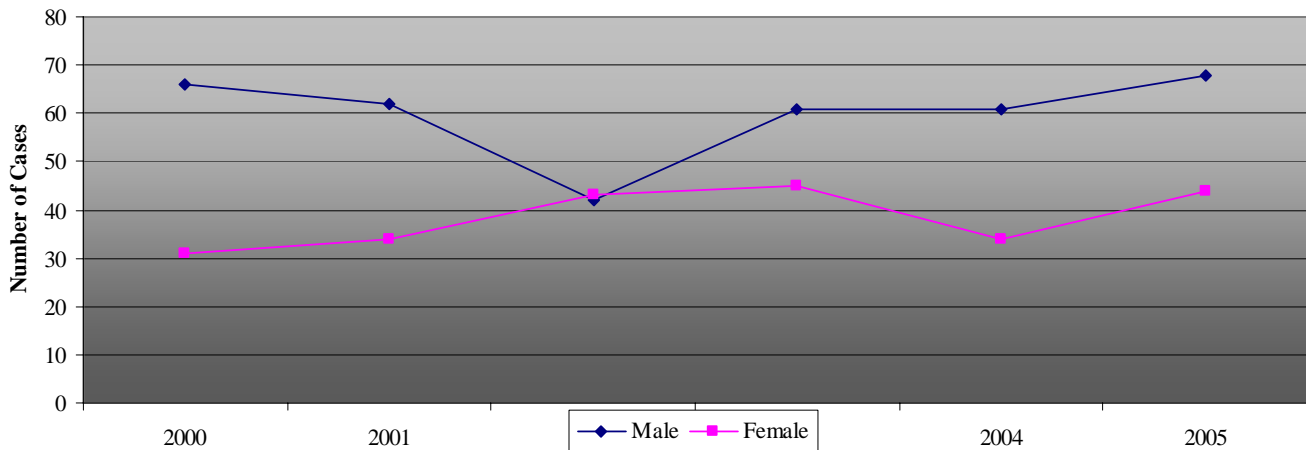
Source: Nevada State Health Division, Bureau of Community Health, TIMS

According to the World Health Organization, in most of the world, TB disproportionately affects men<sup>11</sup>. This trend is also seen in Nevada, where between 50 percent and 70 percent of the total annual TB cases are among men. Worldwide, more men die from TB than women, though TB is also a major infectious disease that causes death among women<sup>3</sup>.

**Nevada Tuberculosis Cases by Gender, 2000-2005**



**Nevada Tuberculosis Cases by Gender, 2000-2005**



<sup>11</sup> World Health Organization. *Tuberculosis and gender*. Website: (<http://www.who.int/tb/dots/gender/en/>).

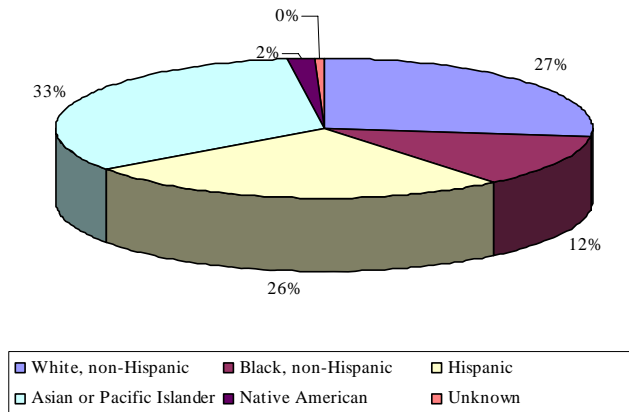
## Tuberculosis Cases by Race/Ethnicity

Year	Total Case	White, non Hispanic	Black, non Hispanic	Hispanic	Asian or Pacific Islander	Native American	Unknown
1999	93	25	11	20	33	2	2
2000	97	29	14	26	25	3	0
2001	96	29	14	17	34	1	1
2002	85	24	9	21	28	3	0
2003	106	20	13	23	49	1	0
2004	95	29	12	34	17	3	0
2005	112	28	11	36	37	0	0

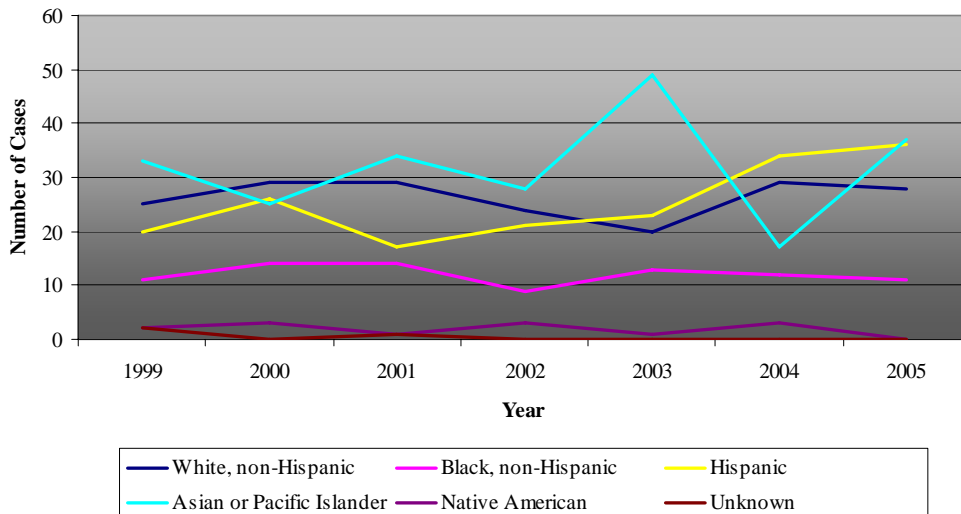
Source: Nevada State Health Division, Bureau of Community Health, TIMS

From 1999 to 2005, Asian/Pacific Islanders accounted for the greatest number of cases of TB in Nevada with 33 percent of the total cases during that period. White, non-Hispanic persons accounted for an average of 27 percent of the total TB cases from 1999 to 2005. Hispanics represented the third highest race/ethnicity in TB statistics, accounting for 26 percent of the cases during that period. Black, non-Hispanics represented 12 percent of the cases and Native Americans accounted for 2 percent of the cases. The cases per year are increasing, most notably among Hispanics and Asian/Pacific Islanders.

Nevada Tuberculosis Cases by Race/Ethnicity, 1999-2005 (Average)



Nevada Tuberculosis by Race/Ethnicity, 1999-2005



## Tuberculosis and Human Immunodeficiency Virus (HIV)

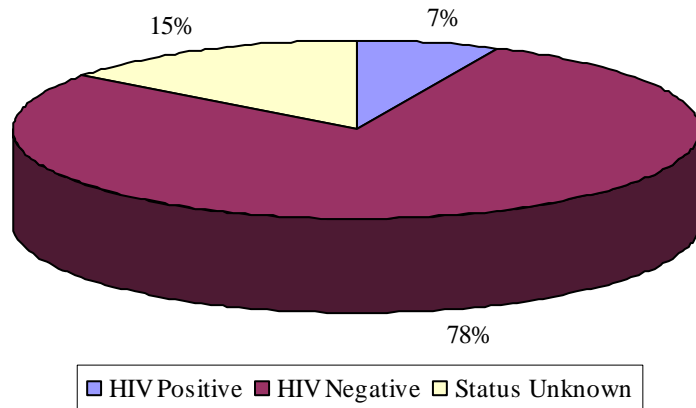
Worldwide, tuberculosis is the leading cause of death among persons infected with HIV. Persons with weakened immune systems are more susceptible to TB, and in the case of HIV, the risk of contracting TB can increase as much as 100 times<sup>12</sup>. The CDC recommends that, “All people infected with HIV should be tested for TB, and if infected, complete preventive therapy as soon as possible to prevent TB disease.” Alarmingly, persons with HIV and TB are at a greater risk of developing multi-drug-resistant TB<sup>13</sup>. In Nevada, the number of persons who have both HIV and TB is increasing. In 2000, 6 percent of the state’s TB cases were co-infected with HIV, but by 2005, this number had increased to 10 percent. The CDC estimates that in the United States, approximately 10 to 15 percent of all HIV cases are co-infected with TB<sup>5</sup>.

**Nevada TB Cases by HIV Status**

Year	# of Cases	HIV Positive	HIV Negative	Status Unknown
2000	97	6	69	22
2001	96	7	69	20
2002	85	4	63	18
2003	106	9	85	12
2004	95	3	87	5
2005	112	11	91	10

Source: Nevada State Health Division, Bureau of Community Health, TIMS

**Nevada TB Cases by HIV Status, 2000-2005 (Average)**



Source: Nevada State Health Division, Bureau of Community Health, TIMS

<sup>12</sup> Cichocki, M. *The Deadly Intersection Between TB and HIV*. Website: <http://aids.about.com/od/opportunisticinfections/a/tbhiv.htm>

<sup>13</sup> Centers for Disease Control and Prevention (November 1999). *The Deadly Intersection Between TB and HIV*. Website: <http://www.cdc.gov/hiv/resources/factsheets/hivtb.htm>

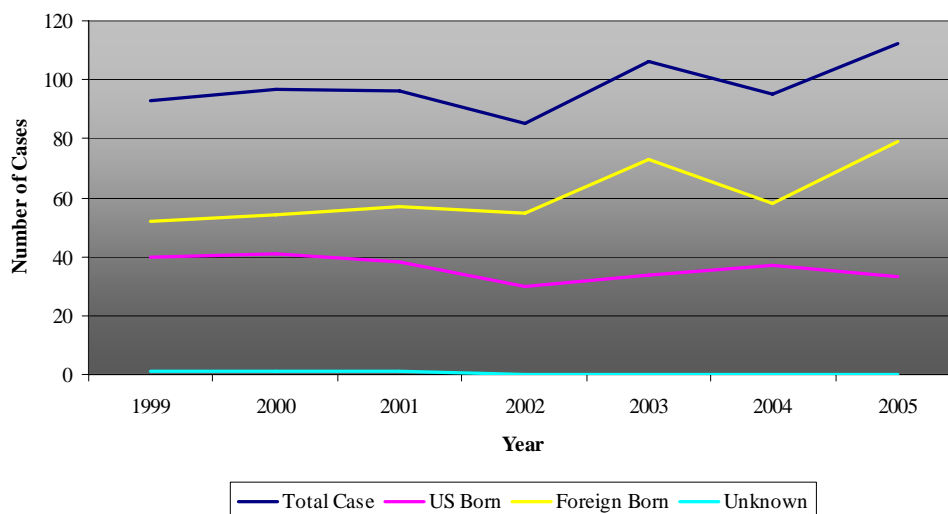
## Tuberculosis Cases by Place of Birth

Year	Total Case	US Born	Foreign Born	Unknown
1999	93	40	52	1
2000	97	41	54	1
2001	96	38	57	1
2002	85	30	55	0
2003	106	34	73	0
2004	95	37	58	0
2005	112	33	79	0

Source: Nevada State Health Division, Bureau of Community Health, TIMS

One of the greatest risk factors associated with tuberculosis in Nevada is being foreign-born. Nevada has a greater percentage of the population that was foreign-born than the national average at 15.8 percent compared to 11.1 percent<sup>14</sup>. Of the total TB cases from 1999 to 2005, 63 percent were born outside of the United States'. In 2005, 71 percent of the state's TB cases were among persons born outside of the United States. The number of foreign-born TB cases in Nevada has been showing an upward trend, while the TB cases among United States born persons has been declining. Of the foreign-born cases of TB in 2005 in Nevada, 39 percent were born in Mexico and 33 percent were born in the Philippines. Between 1999 and 2005, Nevada TB cases from the Philippines accounted for 38.3 percent of the total cases and Mexico accounted for 30.1 percent of the total cases. Unlike Nevada, in the United States, more foreign born persons with TB were born in Mexico at 25.6 percent of the total cases, than the Philippines at 11.6 percent<sup>15</sup>.

**Nevada Tuberculosis Cases by Place of Birth, 1999-2005**



Source: Nevada State Health Division, Bureau of Community Health, TIMS

<sup>14</sup> United States Census Bureau (2000). *Nevada Quick Facts*. Website: <http://quickfacts.census.gov/qfd/states/32000.html>

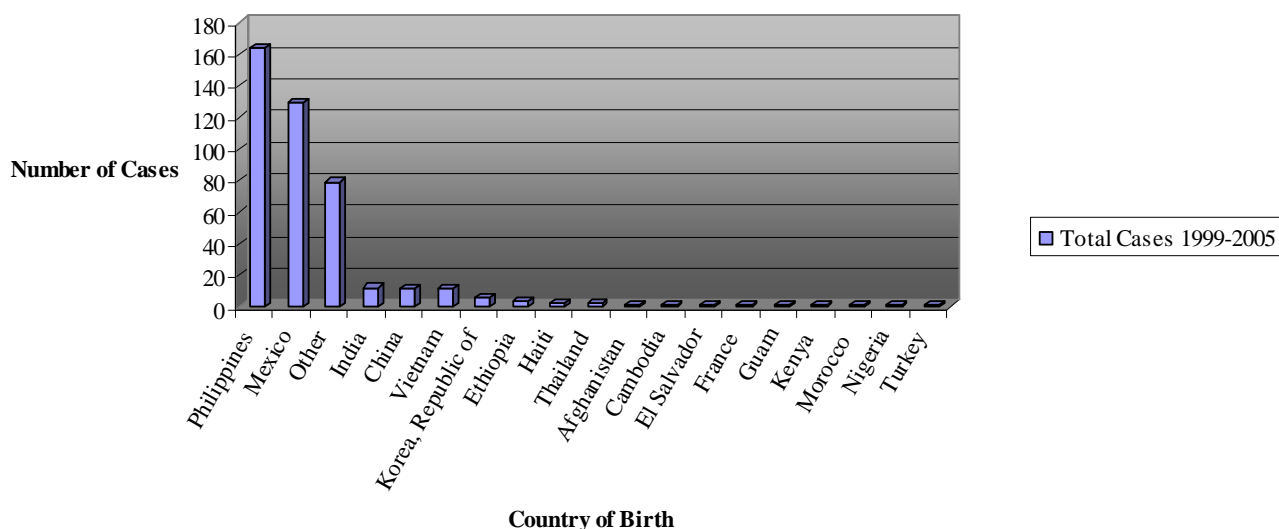
<sup>15</sup> Centers for Disease Control and Prevention. *Trends in tuberculosis, United States, 1998-2003*. MMWR 2004; 53:209-14. Website: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5310a2.htm>

## Tuberculosis by Country of Birth

US and Foreign Born	1999		2000		2001		2002		2003		2004		2005	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Afghanistan	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%
Cambodia	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%
China	0	0%	3	4%	2	3%	1	1%	2	3%	2	3%	1	1%
El Salvador	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%
Ethiopia	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	3	4%
France	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%
Guam	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%
Haiti	0	0%	0	0%	0	0%	0	0%	1	1%	0	0%	1	1%
India	1	2%	1	1%	2	3%	1	1%	2	3%	3	4%	2	3%
Kenya	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%
Korea, Republic of	0	0%	2	3%	0	0%	1	1%	0	0%	1	1%	2	3%
Mexico	14	27%	19	24%	14	18%	15	19%	15	19%	21	27%	31	39%
Morocco	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%
Nigeria	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%
Philippines	28	54%	17	22%	27	34%	17	22%	36	46%	13	16%	26	33%
Thailand	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	2	3%
Turkey	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%
Vietnam	2	4%	2	3%	0	0%	2	3%	2	3%	1	1%	2	3%
Other	7	13%	10	13%	12	15%	18	23%	15	19%	17	22%	0	0%

Source: Nevada State Health Division, Bureau of Community Health, TIMS

**Nevada Total Foreign Born TB Cases by Country, 1999-2005**

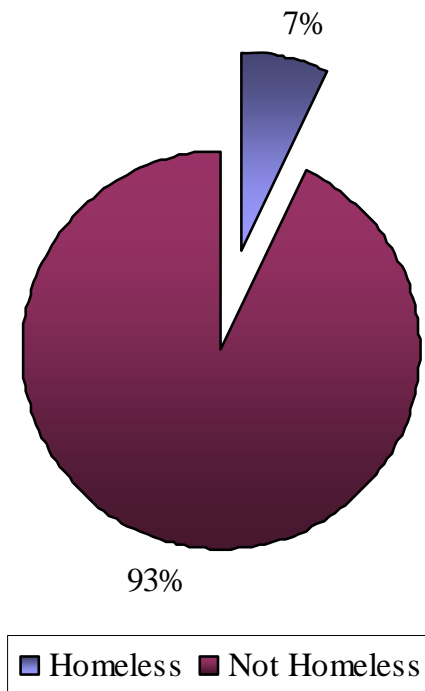


Source: Nevada State Health Division, Bureau of Community Health, TIMS

## Tuberculosis Cases in the Homeless

Homelessness is another risk factor associated with tuberculosis. It is extremely difficult to gain an accurate count on the number of persons who are homeless in Nevada and the rest of the nation. The most recent national count to try and determine the scope of homelessness was conducted in 1996. At that time, it was estimated that 2.3 to 3.5 million people experienced homelessness over the course of that year. Rural areas tend to have a lower percentage of persons who are homeless than urban and suburban areas<sup>16</sup>. In 2005, approximately 7 percent of the total TB cases were among persons who were homeless. In 2003, the United States had 6.3 percent of the total TB cases in the nation that were homeless. Persons who are homeless tend to have a greater risk of contracting latent TB infection and having a progression to active disease<sup>17</sup>.

### Nevada Tuberculosis Cases by Housing Status, 2005



<sup>16</sup> National Alliance to End Homelessness. *FAQs*. Website: <http://www.endhomelessness.org/section/aboutus/faq>

<sup>17</sup> Centers for Disease Control and Prevention (18 Feb. 2006). *MMWR Weekly. Tuberculosis Transmission in a Homeless Shelter Population* – New York, 2000-2003. Website: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5406a4.htm>

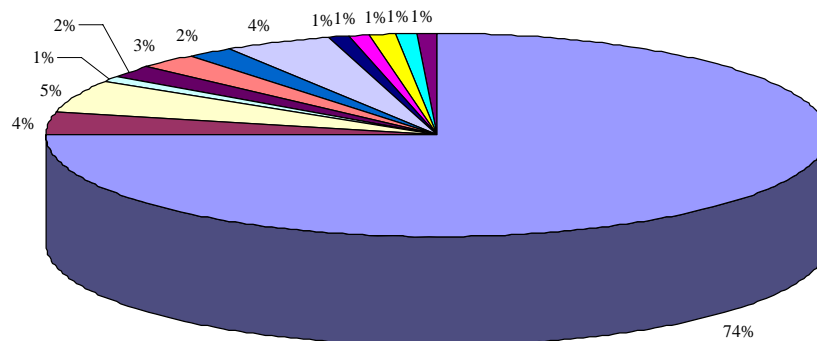
## Tuberculosis by Site of Disease

TB Site	N	%
<b>Pulmonary</b>	84	75
<b>Pleural</b>	4	3.6
<b>Lymphatic: Cervical</b>	6	5.4
<b>Lymphatic: Intrathoracic</b>	1	0.9
<b>Lymphatic: Other</b>	2	1.8
<b>Bone and/or Joint</b>	3	2.7
<b>Genitourinary</b>	2	1.8
<b>Peritoneal</b>	5	4.5
<b>Other: Skin and skin appendages</b>	1	0.9
<b>Other: Breast</b>	1	0.9
<b>Other: Subcutaneous Tissue</b>	1	0.9
<b>Other: Brain</b>	1	0.9
<b>Other: Spinal Cord</b>	1	0.9

Source: Nevada State Health Division, Bureau of Community Health, TIMS

Tuberculosis most often attacks the lungs, but may affect any part of the body, such as the kidney, spine, and brain<sup>18</sup>. In 2005 in Nevada, 75 percent of the TB cases had a disease site located in the pulmonary system. The second most common site of the disease was cervical, with 5.4 percent, followed by peritoneal at 4.5 percent.

**Nevada Tuberculosis Cases by Site of Disease, 2005**



<span style="color: blue;">■</span> Pulmonary	<span style="color: maroon;">■</span> Pleural	<span style="color: lightblue;">■</span> Lymphatic: Cervical	<span style="color: cyan;">■</span> Lymphatic: Intrathoracic	<span style="color: purple;">■</span> Lymphatic: Other
<span style="color: red;">■</span> Bone and/or Joint	<span style="color: blue;">■</span> Genitourinary	<span style="color: lightblue;">■</span> Peritoneal	<span style="color: darkblue;">■</span> Other: Skin and skin appendages	<span style="color: magenta;">■</span> Other: Breast
<span style="color: yellow;">■</span> Other: Subcutaneous Tissue	<span style="color: cyan;">■</span> Other: Brain	<span style="color: purple;">■</span> Other: Spinal Cord		

<sup>18</sup> Center for Disease Control and Prevention. *Questions and Answers about TB 2005*. Website: [http://www.cdc.gov/nchstp/tb/faqs/qa\\_introduction.htm#Intro1](http://www.cdc.gov/nchstp/tb/faqs/qa_introduction.htm#Intro1)

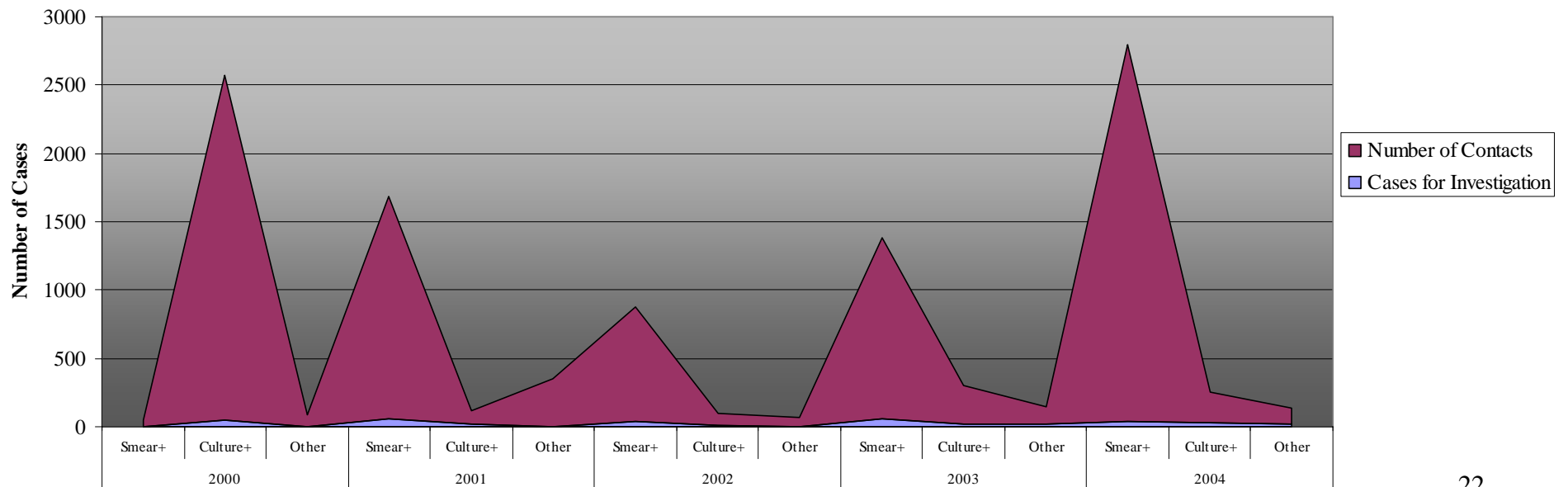
## Contact Investigation Statistics

	2000			2001			2002			2003			2004		
	Smear+	Culture+	Other	Smear+	Culture+	Other	Smear+	Culture+	Other	Smear+	Culture+	Other	Smear+	Culture+	Other
Cases for Investigation	3	53	N/A	55	18	N/A	38	14	N/A	56	20	21	42	25	22
Number of Contacts	49	2522	84	1630	101	346	836	83	72	1328	281	123	2751	231	111
Contacts Per Case	16.3	47.6	N/A	29.6	5.6	N/A	22	5.9	N/A	23.7	14.1	5.6	25.9	9	5
Evaluated	39	2520	84	1432	100	320	835	80	70	1300	277	116	1223	277	71
Evaluation Rate	80%	100%	100%	88%	99%	92%	100%	96%	97%	98%	99%	94%	94%	100%	97%
TB Disease	1	4	0	4	0	0	4	0	0	5	0	1	9	0	0
Disease Rate	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%
LTBI	10	290	23	321	33	160	143	34	18	321	96	49	244	71	19
Latent Infection Rate	26%	12%	27%	22%	33%	50%	17%	43%	26%	25%	35%	42%	20%	26%	27%
Treatment Rate	100%	84%	65%	81%	88%	87%	80%	88%	89%	81%	93%	80%	81%	68%	89%
Completion Rate	90%	85%	100%	66%	93%	71%	53%	73%	94%	92%	97%	97%	76%	67%	41%

Source: Nevada State Health Division, Bureau of Community Health, TIMS

The Nevada State Health Division and local health districts investigate TB cases and their contacts throughout the state. The table above is a listing of the number of cases for investigation, number of contacts, contacts per case, and other important information regarding tracking of the disease.

**Nevada Tuberculosis Contact Investigation Statistics, 2000-2004**



# Risk Factors for Tuberculosis

Certain factors can increase a person's risk of contracting tuberculosis, though it affects every age, race, gender, and nationality. According to the Mayo Clinic<sup>19</sup>, the key risk factors (found below in bold print) associated with TB include:

❖ **Compromised Immune System**

*This risk factor is most noticeable with HIV and TB co-morbidity. As was mentioned earlier, tuberculosis is the leading cause of death among persons infected with HIV. Persons with weakened immune systems are more susceptible to TB, and in the case of HIV, the risk of contracting TB can increase as much as 100 times. In Nevada, the number of persons who have both HIV and TB is increasing. In 2000, 6% of the state's TB cases were co-infected with HIV, but by 2005, this number had increased to 10%.*

❖ **Close contact with a person with infectious TB**

*To become infected with TB, a person typically needs to spend a prolonged amount of time with an infectious person who has been coughing and secretes numerous TB organisms. It is normally transmitted through the air or through unpasteurized milk or milk products from infected cattle<sup>20</sup>.*

❖ **Nationality (Africa, Asia, and Latin America are at a higher risk)**

*Persons of certain nationalities are more at risk due to higher prevalence of TB in other countries. This higher prevalence affects the United States and Nevada, primarily through immigration. Nevada has a greater percentage of the population that was foreign-born than the national average at 15.8% compared to 11.1%<sup>21</sup>. Of the total TB cases from 1999 to 2005, 63% were born outside of the United States. In 2005, 71% of the state's TB cases were among persons born outside of the United States. The number of foreign-born TB cases in Nevada has been showing an upward trend, while the TB cases among United States' born persons has been decreasing. Of the foreign-born cases of TB in 2005 in Nevada, 39% were born in Mexico and 33% were born in the Philippines. Between 1999 and 2005, Nevada TB cases from the Philippines accounted for 38.3% of the total cases, and Mexico accounted for 30.1% of total cases. Unlike Nevada, in the United States, more foreign-born persons with TB were born in Mexico at 25.6% of the total cases, than the Philippines at 11.6%<sup>22</sup>.*

❖ **Race (in America, Hispanics, American Indians, and Blacks are at higher risk)**

*From 1999 to 2005, Asian/Pacific Islanders accounted for the greatest number of cases of TB in Nevada with 33% of the total cases during that period. White, non-Hispanic persons accounted for an average of 27% of the total TB cases from 1999 to 2005, and Hispanics represented the third highest race/ethnicity in TB statistics, accounting for 26% of the cases during that period.*

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<sup>19</sup> Mayo Clinic. *Tuberculosis*. Website: <http://www.mayoclinic.com/health/tuberculosis/DS00372/DSECTION=4>

<sup>20</sup> Centers for Disease Control and Prevention. *Health Information for International Travel, 2005-2006*. Website: <http://www2.ncid.cdc.gov/travel/yb/utls/ybGet.asp?obj=tb.htm&section=dis>

<sup>21</sup> United States Census Bureau (2000). *Nevada Quick Facts*. Website: <http://quickfacts.census.gov/qfd/states/32000.html>

<sup>22</sup> Centers for Disease Control and Prevention. *Trends in tuberculosis, United States, 1998-2003*. MMWR 2004; 53:209-14. Website: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5310a2.htm>

*Black, non-Hispanics represented 12% of the cases, and Native Americans accounted for 2% of the cases. The cases are increasing, most notably, among Hispanics and Asian/Pacific Islanders.*

*According to the United States Census Bureau, Nevada is one of nine states to potentially become a minority-majority state in the coming decades. Currently, Nevada has a 39.5% minority. Hispanic residents have been increasing the most substantially in Nevada since 1999. The high immigration of Hispanic residents has a particular impact on TB rates. In the United States, 25% of all TB cases are Mexican-born immigrants; this figure exceeded 39% in Nevada in 2005.*

❖ **Older Age**

*In Nevada, TB affects those aged 40 and older the most profoundly, with those over 40 making up over 64% of the total cases in the state. Within that age group, those aged over 60 years account for 28% of the cases. Similar trends in TB cases by age group are also seen nationally.*

❖ **Substance Abuse**

*In fiscal year 2005, the Nevada State Health Division's Bureau of Alcohol and Drug Abuse (BADA) funded 38 primary prevention providers that implemented substance abuse prevention programs that serve approximately 12,155 youth and family members. BADA also funded 27 treatment organizations that provided services to 11,189 admittees in 51 locations and 30 communities throughout Nevada. These organizations give admission priority to pregnant women and injection drug users, and provide counseling and education for HIV/TB and other related issues<sup>23</sup>. Of the 112 TB cases reported in 2005, 7 cases reported excess alcohol use, 4 reported injection drug use, and 6 reported non-injection drug use<sup>24</sup>.*

❖ **Malnutrition**

*Malnutrition in relation to TB is a greater risk factor in developing countries as compared to the United States and Nevada. There are programs in Nevada to address malnutrition and hunger for children, low-income individuals and families, persons who are homeless, and older adults.*

❖ **Lack of Medical Care**

*Since obtaining and continuing proper medical treatment is imperative for TB patients and public health, access to health care is a notable issue for these individuals in several counties in Nevada. Access to health service is also an important component of testing for TB and identifying all possible cases. According to the U.S. Department of Health and Human Services, Health Resources and Services Administration (HRSA), entire counties and sections of counties in Nevada are designated as Primary Medical Care Health Professional Shortage Areas. In order to receive this designation, the area must have a shortage of primary medical care professionals and meet additional criteria. According to the US Census Bureau, Nevada ranked 47<sup>th</sup> in the nation for doctors per 100,000 resident population in 2003 (most recent data).*

*The following entire Nevada counties are considered to be Primary Medical Care Health Professional Shortage Areas: Esmeralda County, Eureka County, Humboldt County, Lander County, Lincoln County, Lyon County, Mineral County, Nye County, Pershing County, and Storey County.*

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<sup>23</sup> Nevada State Health Division, Bureau of Alcohol and Drug Abuse. Website: <http://health2k.state.nv.us/BADA/>

<sup>24</sup> Centers for Disease Control and Prevention. *Reported Tuberculosis in the United States (2005)*.

*The following Nevada counties have areas or population groups within their county lines that are considered to be Primary Medical Care Health Professional Shortage Areas: Washoe County, White Pine County, Carson City, Churchill County, Clark County, Douglas County, and Elko County.*

*HRSA also considers several areas and populations in Nevada to be underserved, Medically Underserved Area (MUA) or Medically Underserved Population (MUP). The designated MUA/MUP in Nevada include: Eastern Carson City (low income), North Las Vegas (low income), Elko County (low income, Jackpot Service Area, and West Wendover Service Area), Esmeralda County, Eureka County, Lander County, Lincoln County, Lyon County, Storey County, and Reno/Sparks Service Area (Med. Ind.).*

❖ **Residing or working in a residential care facility (prisons, nursing homes)**

*Residing in close proximity to numerous people can increase a person's risk of contracting TB, if another resident has active TB disease. This is an issue in prisons and nursing homes. According to the CDC 2005 Reported Tuberculosis in the United States, in 2005, none of the TB cases reported in Nevada were residents of a correctional facility and only one of the cases was a resident of a long-term care facility.*

❖ **Residing in a refugee camp or shelter**

*Residing in refugee camps and shelters are more substantial risk factors in developing countries with high TB rates than Nevada.*

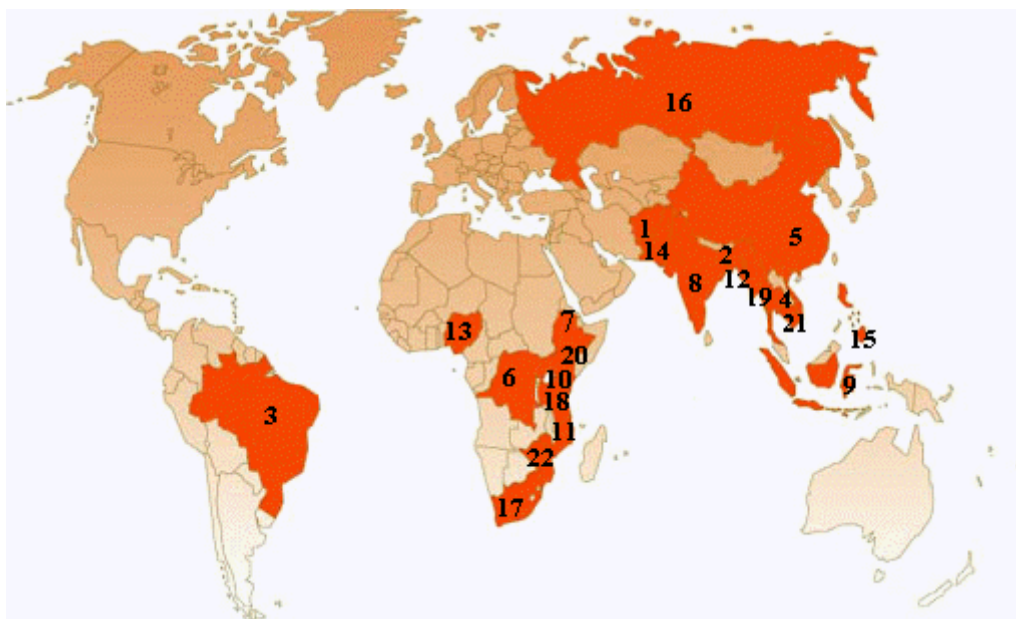
❖ **Working in the health care field**

*In order to develop active TB disease, a person usually needs to be in close contact with another person who has active TB for a prolonged period of time. Health care workers in Nevada who work with TB patients take precautions to limit their exposure to the disease while treating a patient. In 2005, only one of the TB cases reported in Nevada was a health care worker<sup>16</sup>.*

❖ **International Travel**

*Tuberculosis is more common in many other countries, and international travel increases a person's susceptibility to the disease. International travelers who expect that they could possibly have prolonged exposure to TB should receive a tuberculin skin test before leaving the United States, and a repeat test 12 weeks after returning from their travel<sup>12</sup>. The 22 countries numbered on the map on the following page, account for approximately 80% of the world's TB burden. India has the greatest TB disease burden, followed by China and Indonesia. Though the United States has had a steady number of TB cases, the total morbidity in the United States, as compared internationally, is extremely small.*

## International Tuberculosis Disease Burden



Source: Stop Tuberculosis Partnership. Website: <http://www.stoptb.org/>

# Recommendations

- ✦ According to the Centers for Disease Control and Prevention (CDC), Division of Tuberculosis Elimination, budget cuts are expected in TB funding (up to 5% per year) over the next five years that will affect state TB Programs nationwide. The State TB Program will need to anticipate what affect these budget cuts may have on current TB control and elimination activities and develop alternative strategies to maintain a comprehensive and effective TB Control Program statewide.
- ✦ In 2004, Nevada ranked 23<sup>rd</sup> in the nation for overall TB incidence rates and this ranking increased to 17<sup>th</sup> in 2005. Targeted TB control and prevention efforts should be periodically evaluated for effectiveness, modified or discontinued. New TB outreach activities will be developed and implemented based on local TB disease morbidity patterns to reduce the incidence of tuberculosis in high-risk groups.
- ✦ Foreign-born persons accounted for 71% of the active TB cases reported in Nevada in 2005, especially those persons born in the Philippines and Mexico. Community outreach programs targeting these ethnic groups should be periodically evaluated for effectiveness, modified or discontinued. New TB outreach activities will be implemented based on local TB disease patterns to reduce tuberculosis in these high-risk immigrant populations.
- ✦ Co-infection with tuberculosis and HIV was reported in 7% of the TB cases in Nevada in 2005. Nevada ranked 20<sup>th</sup> nationally for the total number of HIV cases reported in 2005 and ranked 28<sup>th</sup> for the total number of AIDS cases reported. TB screening should be provided to HIV-infected persons and TB disease evaluated for those with compatible symptoms and treated appropriately.
- ✦ Substance abuse centers/programs often provide TB screening programs to their clients. These programs should be evaluated regularly (e.g., number of clients screened for TB, number who test PPD positive, number on TB preventive therapy, number of active TB cases identified). Based on cost-effectiveness, these programs should be modified or discontinued. New TB program activities will be developed and implemented to reach this group, identified by the CDC as high-risk.
- ✦ Strategies are needed to reach homeless persons, who the CDC has identified as a high-risk group, for TB disease and hard-to-reach for TB treatment and prevention efforts. TB Programs targeting homeless persons should be assessed and implemented where needed. Programs targeting homeless persons for TB outreach are likely more cost-effective in Nevada's urban counties where TB rates are higher.