

# Tulsa County Health Profile



# TULSA COUNTY HEALTH PROFILE

An Assessment of the Health  
of Tulsa County Residents

**Beverly J. Mathis, D.O.**, Chair, Tulsa City-County Board of Health

**Gary Cox, J.D.**, Director, Tulsa City-County Health Department

**Gary D. Woodruff, Ph.D.**, Assistant Director, Tulsa City-County Health Department









Dear Tulsa County Residents,

As Director of the Tulsa City-County Health Department, it is my honor to present the *Tulsa County Health Profile*. This report provides an assessment of the health of Tulsa County's population and presents information on the many factors that influence health. The availability of quality population-based health data is vital for professionals engaged in community health planning and public health improvement activities.

The Tulsa City-County Health Department is committed to working with communities to improve the health of every resident. To make lasting health improvements, it is essential that we strengthen our collective efforts to prevent illness and injuries. These efforts should include promoting healthy behaviors and assuring access to health services.

Ongoing assessment of the health of Tulsa County is an important priority for the Tulsa City-County Health Department, as is the dissemination of actionable health information. We are pleased to provide this health data to you on our website. Visit us at [www.tulsa-health.org](http://www.tulsa-health.org).

This report presents information to be utilized by healthcare providers, policy makers, educators, and members of Tulsa County communities. The work of public health in Tulsa has a long history of innovation, and we welcome you to become part of that history. May this *Tulsa County Health Profile* help us all in the pursuit of a healthier Tulsa.

Respectfully,

A handwritten signature in black ink that reads "Gary Cox".

Gary Cox, J.D.  
Director



Beverly J. Mathis, D.O.  
Chair.

Gary Burnidge, D.D.S., M.S.  
Vice Chair.

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Secretary

James O. Goodwin, J.D.

Harleen K. Grewal, M.D.

John L. Herndon

Daniel Arthrell, M.A.

E. Montez Mutzig, M.D., M.P.H., F.A.C.P.

Betty Boyd

Gary Cox, J.D.  
Director

Tulsa City-County

Health Department

5051 S. 129th E. Ave.

Tulsa, OK 74134

918.595.4400

[www.tulsa-health.org](http://www.tulsa-health.org)

AA/EEO



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TULSA CITY-COUNTY HEALTH DEPARTMENT  
PLANNING & EPIDEMIOLOGY  
(918) 595-4505

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# HOW TO READ AND USE THIS DOCUMENT

*"When planning for a year, plant corn. When planning for a decade,  
plant trees. When planning for life, train and educate people."*

- Chinese Proverb

## How to Read and Use This Document

- Purpose
- Organization
- Tables and Figures
- Time Period
- Racial/Ethnic Categories
- Data Sources

# How to Read and Use This Document

## Purpose

The Tulsa County Health Profile has been developed to reflect the breadth of public health issues at the national, state, and local level and to share information about public health issues in our community. In addition, this document may be utilized as a resource for community agencies, policy makers, interested residents, and project developers as they plan programs and interventions.

## Organization

This document is intended to be informative and user-friendly. It can be read straight through or by topics and sections. The title of each chapter is printed at the top of the page. A listing of chapter topics can be found on the back of each chapter divider. Side bar text supplements each chapter; side bar topics include definitions, frequently asked questions, Healthy People 2010 goals and objectives, and other facts and figures. References are listed at the conclusion of each chapter. The appendix section of Health Data Resources contains contact information for agencies and organizations that have been cited.

## Tables and Figures

Tables, figures, and maps accompany the chapters. For some health indicators, customized charts and figures are necessary to adequately characterize their unique attributes. However, the following chart/graph types are used to describe the majority of health indicators:

- Bar graphs – compares health indicators across categories, such as age or years.
- Line graphs and bar/line graphs – portray historical trends, usually by comparing Tulsa County rates to those of the United States.
- Pie graphs – depict a percent of total events.
- Tulsa County maps – illustrate census tract information.
- U.S. maps – represent health statistics by state, allowing a comparison of Oklahoma to the rest of the nation.

## Time Period

The Tulsa County Health Profile utilizes the most recent data available. Dates reported may vary by topic. For example, birth-related data were available through 2000, while death statistics were available through 1999. All population-dependent calculations are based on Census 2000 figures.

## HEALTHY PEOPLE 2010 OBJECTIVE

*Increase the proportion of federal, tribal, state, and local health agencies that have made information available to the public in the past year on the leading health indicators, health status indicators, and priority data needs.*

*- U.S. Department of Health and Human Services, 2000*



**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Increase the proportion of state and local public health agencies that meet national performance standards for essential public health services.*

*- U.S. Department of Health and Human Services, 2000*

## **Racial/Ethnic Categories**

Data reported by race in this publication are grouped into four racial groups: White, Black, American Indian and Alaska Native, and Asian and Pacific Islander. Ethnicity is categorized as Hispanic or non-Hispanic. It is recognized that these categories combine persons from many countries representing diverse cultures. In some instances, information is excluded due to collection methods and population size. The reader should be aware that categories of race and ethnicity are self-reported.

## **Data Sources**

The data employed in this document come from a variety of sources, including federal, state, and local databases and reports. The analyses emphasize those data sources which are readily available to the department, relying heavily on vital records (birth and death certificates), demographic data, nationally notifiable infectious disease reports, data collected by other local agencies, data from federal sources, and data from various state agencies. A major source of information which is not readily available to the department for analysis at this time is morbidity (illness) data collected by private sector clinics, practicing physicians, and hospital discharge records. The incorporation of this information into a local health assessment would be invaluable in reviewing the status of non-notifiable diseases and chronic illnesses and in computing morbidity rates for the same. Additional information regarding data sources is included, when appropriate, in each chapter of this report.



# PUBLIC HEALTH DEFINED

*“Many of the major improvements in the health of the American people have been accomplished through public health measures.”*

- Committee for the Study of the Future of Public Health, Institute of Medicine

## Public Health Defined

- Introduction
- Definition
- The Public Health System
- Historical Perspective
- Public Health in Oklahoma
- Public Health in Tulsa County
- Future Challenges

## Public Health Defined

### Introduction

In this day and age, the words *polio*, *whooping cough*, and *measles* are merely terms of the past. Just a few decades ago, these diseases were major causes of death and disability in the United States. Now people are living longer. People are living healthier. These results did not occur alone. They evolved because of the actions and decisions of professionals and agencies that represent public health practice efforts.

### Definition

The 1988 Institute of Medicine (IOM) publication *The Future of Public Health* presented a critical review of the public health system in the United States, declaring it fragmented and in disarray. This publication introduced the need to define the mission of public health, the role of government, and the means necessary to accomplish public health objectives.

As a result of this report, the mission of public health has been defined as “fulfilling society’s interest in assuring conditions in which people can be healthy . . . The mission is addressed by private organizations and individuals as well as by public agencies. But the governmental public health agency has a unique function: to see to it that vital elements are in place and that the mission is adequately addressed.”<sup>1</sup>

The three core functions of public health have been identified as assessment, policy development, and assurance.

- **Assessment:** All public health agencies are charged to “regularly and systematically collect, assemble, analyze, and make available information on the health of the community, including statistics on health status, community health needs, and epidemiologic and other studies of health problems.”<sup>1</sup>
- **Policy Development:** All public health agencies should “exercise [their] responsibility to serve the public interest in the development of comprehensive public health policies by promoting use of the scientific knowledge base in decision-making about public health and by leading in developing public health policy.”<sup>1</sup>
- **Assurance:** All public health agencies shall “assure their constituents that services necessary to achieve agreed upon goals are provided, either by encouraging actions by other entities (private or public sector), by requiring such action through regulation, or by providing services directly.”<sup>1</sup>

### DID YOU KNOW?

*The mission of public health is to “fulfill society’s interest in assuring conditions in which people can be healthy.”*

- Institute of Medicine, 1988

**HEALTHY  
PEOPLE  
2010  
GOAL**

*Ensure that federal, tribal, state, and local health agencies have the infrastructure to provide essential public health services effectively.*

*- U.S. Department of Health and Human Services, 2000*

## The Public Health System

The public health system of the United States includes governmental components at local, state, territorial, and national levels, and involves many private and quasi-governmental ancillary groups and organizations. Locally, the Tulsa City-County Health Department is the primary public health provider for the County and City of Tulsa and other surrounding communities. The Oklahoma State Department of Health has state-wide statutory responsibility for public health in Oklahoma. Nationally, responsibility for public health is shared among several federal agencies including, most prominently, the National Institutes for Health (NIH), the U.S. Public Health Service (PHS), and the Centers for Disease Control and Prevention (CDC). Private organizations active in the public health arena include the American Public Health Association (APHA), the National Association of County and City Health Officials (NACCHO), and many others.

Although the specific programs and responsibilities of individual state and local health departments vary considerably, services most often provided include the following: immunizations; reportable diseases; epidemiology; child health; tuberculosis control; health education; sexually transmitted disease control; Women, Infants, and Children (known as “WIC,” a nutritional supplement program); chronic disease screenings; family planning; prenatal care; and AIDS testing and counseling. In addition, many public health agencies also ensure food service sanitation and inspect public and private water supplies and sewage treatment facilities. Many are also involved in air pollution monitoring, hazardous waste control efforts, and vector control.

**Table 2.1**

### The Ten Essential Public Health Services

- Monitor health status to identify community health problems.
- Diagnose and investigate health problems and health hazards in the community.
- Inform, educate, and empower people about health issues.
- Mobilize community partnerships to identify and solve health problems.
- Develop policies and plans that support individual and community health efforts.
- Enforce laws and regulations that protect health and ensure safety.
- Link people to needed personal health services and assure the provision of healthcare when otherwise unavailable.
- Assure a competent public health and personal healthcare workforce.
- Evaluate effectiveness, accessibility, and quality of personal and population-based health services.
- Research for new insights and innovative solutions to health problems.

SOURCE: Public Health Functions Steering Committee, 1995.

## Historical Perspective

Public health is a concept, which has existed, in principal, since Hippocrates proposed around 400 B.C. that all diseases have natural causes. Leprosy and gonorrhea were treated with ritualistic cures in ancient times, and the Black Death of Medieval Europe was controlled by quarantine and characterized by mass burials.

Until the eighteenth century, controlling the movement of people through quarantine was the only real method employed to prevent the spread of infectious disease. Early in the 1700s, efforts to modify environmental conditions by improving living conditions and using citrus fruit to prevent scurvy aboard ships were the beginnings of more modern trends toward preventative actions to curtail disease. England was the first country to undergo the transition from rural farming to industrialization and, as a result, saw the first organized system of health protection for its population in the nineteenth century. Probably the most important initial prevention advancement came with Edward Jenner's discovery of the vaccination to prevent smallpox in 1798, which laid the foundation for immunology as a cornerstone of improving public health.<sup>2</sup>

In the United States, the first efforts to improve sanitary conditions and invoke preventative measures came somewhat later than the English movement. In 1804, New York appointed a city inspector of health who was to be responsible for sanitation, health administration, and collection of vital statistics. Development of a public health authority in New York came in response to outbreaks of epidemic diseases and the deterioration of working class areas of town resulting from large scale immigration which produced intense pressure on housing accommodations.<sup>2</sup>

Recurrent epidemics of yellow fever, cholera, smallpox, typhoid, and typhus plagued the early settlers of the United States. The New York State public health model was repeated in other states and communities, and in 1878 Congress passed a bill creating the National Board of Health. However, within five years Congress dissolved the Board in response to pressure from the states, who believed states' rights were threatened by the federal move. It was seventy years before a federal department of health was reestablished in the United States.<sup>2</sup>

Gradually states developed programs regulating vital statistics, maternal health, abortion and prostitution, sanitation to protect water and prevent adulteration of food, sewage and human waste disposal (through the construction of sewer systems), child health and hygiene in schools, and industrial and occupational diseases.

## DEFINING THE TERMS

*A federal, state, or local public health agency is a government or non-government entity authorized to provide one or more essential public health services.*

With the discovery of bacteria, viruses, fungi, and protozoa as microbial causes of disease, public health became more oriented to communicable disease control. The result of massive efforts to improve sanitary and living conditions was a rapid decrease in disease and mortality in the industrial nations. The introduction of anti-microbial agents, beginning with penicillin in the 1940s, greatly improved the survivability of persons afflicted with bacterial infections. The advent of immunizations for measles, polio, whooping cough, typhoid, tetanus, and other infectious diseases rapidly extended the life expectancy of citizens of industrial nations. Even in developing nations, pandemics of infectious disease are rare today. The decreasing danger from infectious diseases has resulted largely from the provision of safe drinking water, better handling of sewage, and improved personal hygiene and nutrition, especially during infancy.

### Public Health in Oklahoma

In Oklahoma, public health had its beginnings before statehood when the first territorial legislature was convened in Guthrie in May 1890. On October 30<sup>th</sup> of that year, the House of the new legislature created a territorial board of health and began regulating the practice of medicine in Oklahoma Territory. The bill was signed into law on December 25<sup>th</sup>. The Board was given the authority to establish quarantine; isolate, kill and/or remove animals infected by contagious or infectious disease; remove and/or cause to be removed dead, decaying, or putrid bodies or other substances that endanger the public health of persons or animals; condemn or cause to be destroyed articles of food that were impure or diseased; and superintend boards of health in counties, cities, villages, and townships of the Territory.<sup>3</sup>

On July 16, 1907, the constitution for the State of Oklahoma was adopted in convention at Guthrie. After ratification by a vote of the people on September 17, 1907, the new constitution went into effect on November 16, containing Article 5, Section 39, which provided for a board of health to be created by the legislature. The first state legislature created a state board of health to be the charge of one commissioner of health, appointed by the governor, effective August 26, 1908. The powers and duties of the commissioner included the territorial powers previously given to the territorial board of health and included the additional duties of enforcing rules and regulations for the prevention, cure, and spread of contagious or infectious diseases; establishing rules and regulations for keeping vital statistics, including births and deaths as well as marriages and divorces; looking after the interest of health and life among the citizens of the State; and investigating causes of disease, epidemics, and sanitary conditions of schools, prisons, public institutions, and other public buildings and places of public resort.<sup>3</sup>

#### DID YOU KNOW?

*There are 69 county health departments in the State of Oklahoma.*

*- Oklahoma State Department of Health, 1999*



Among the provisions was the authority to appoint in each county a superintendent of health to work with county, city, town, and township boards of health on local matters. The provision was made for township boards of health to work under the counties, but such boards may never have been established.<sup>3</sup> Many legislative changes affecting public health took place over the next several decades.

## Public Health in Tulsa County

In Tulsa County, as in many Oklahoma counties, the delivery of public health services was divided between official services provided by the County, the City, the State of Oklahoma, and a number of volunteer and private organizations. A cooperative health department of the City and County of Tulsa was established by an operating agreement on February 6, 1950, as allowed by state statute passed in 1941. The first annual report of the Tulsa City-County Health Department was issued in 1950 with the official merger of the county nurses into the city health department, creating the Tulsa City-County Health Department in April 1950. In September, the Tulsa County Public Health Association Board of Directors approved the merger of the voluntary nursing services with those of the Tulsa City-County Health Department completing the staffing of the new agency.

City-county health departments were officially established by House Bill 907 of the 25th State Legislature in 1955 (63.0.5 Section 1-210; Supp. 1963). The City and County of Tulsa adopted an Article of Agreement establishing the Tulsa City-County Health Department pursuant to the new law on October 25, 1955. The Oklahoma City-County Health Department was the only other city-county health department established in Oklahoma. The main office of the new Tulsa department, which was funded by the city and county jointly, was located at 521 N. Boulder in the Tulsa City Health Department building. Branch offices of the department following the merger were located at 808 S. Peoria, at 538 E. Oklahoma in the Variety Club Health Center, and in Collinsville, Broken Arrow, and Sand Springs.

In 1956, a new health center was built on property at the Tulsa County Fairgrounds (Expo Square Health Center) in the 4600 block of E. 15<sup>th</sup> Street. In 1954, community health centers to serve the Tulsa County were built in Broken Arrow (sold in 2001), Bixby, Collinsville, Sand Springs, and Skiatook (sold in 2000 after being closed for more than a decade). In 1971, community health centers were added in Jenks (sold in 1995), Owasso, and in the 2800 block of W. 51<sup>st</sup> Street (John Tomblin Center, which is now leased to a private business). Central Regional Health Center, located at 315 S. Utica Avenue, was originally a retail grocery store. This building was remodeled into a predominantly clinical facility in 1992, opening in January 1993. The most recent addition to the department's owned facilities is the East Regional Health

## DEFINING THE TERMS

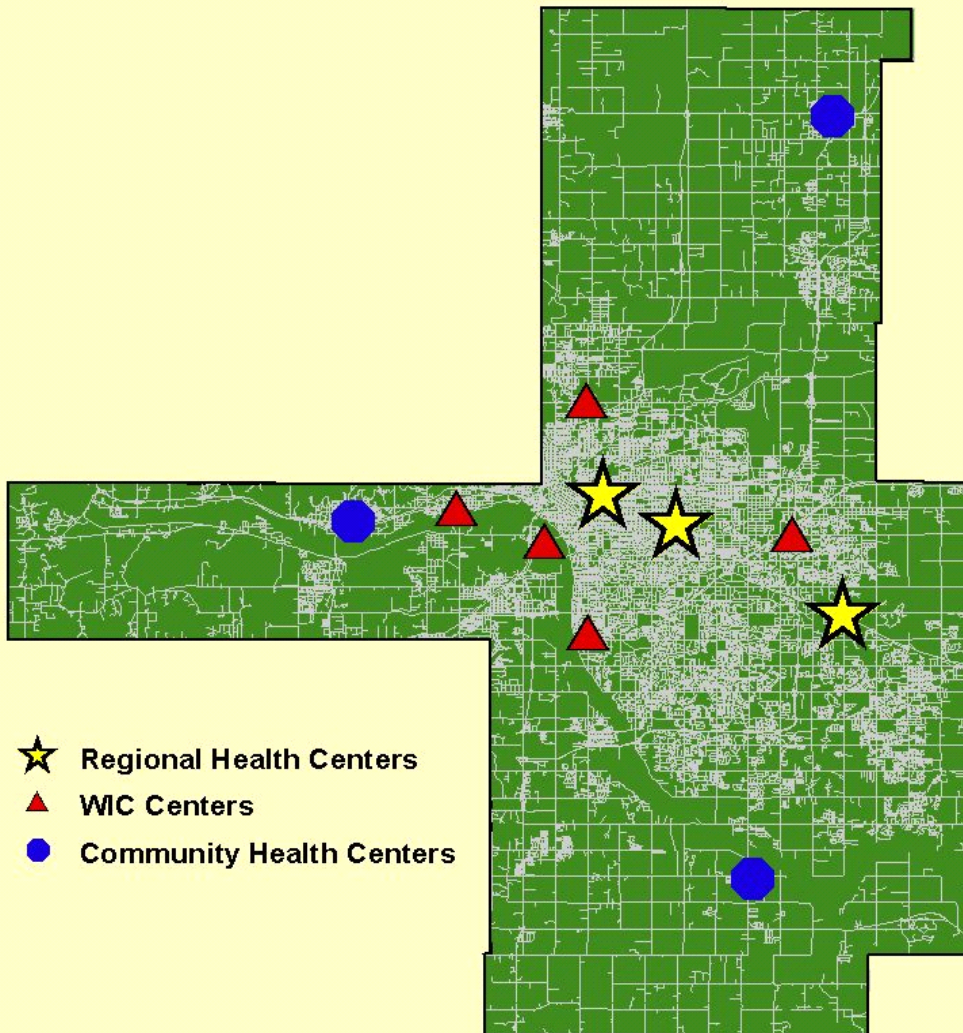
*Public health infrastructure is defined as the resources needed to deliver the essential public health services to every community – people who work in the field of public health, information and communication systems used to collect and disseminate accurate data, and public health organizations at the state and local levels in the front lines of public health.*



Center, located at 5051 S. 129th E. Avenue. This facility, which opened in March of 1998, houses the administrative unit of the Tulsa City-County Health Department, as well as a full-service health clinic. The locations of all current department facilities are displayed in **Figure 2.1**.

Figure 2.1

## TULSA CITY-COUNTY HEALTH DEPARTMENT HEALTH SERVICES LOCATIONS

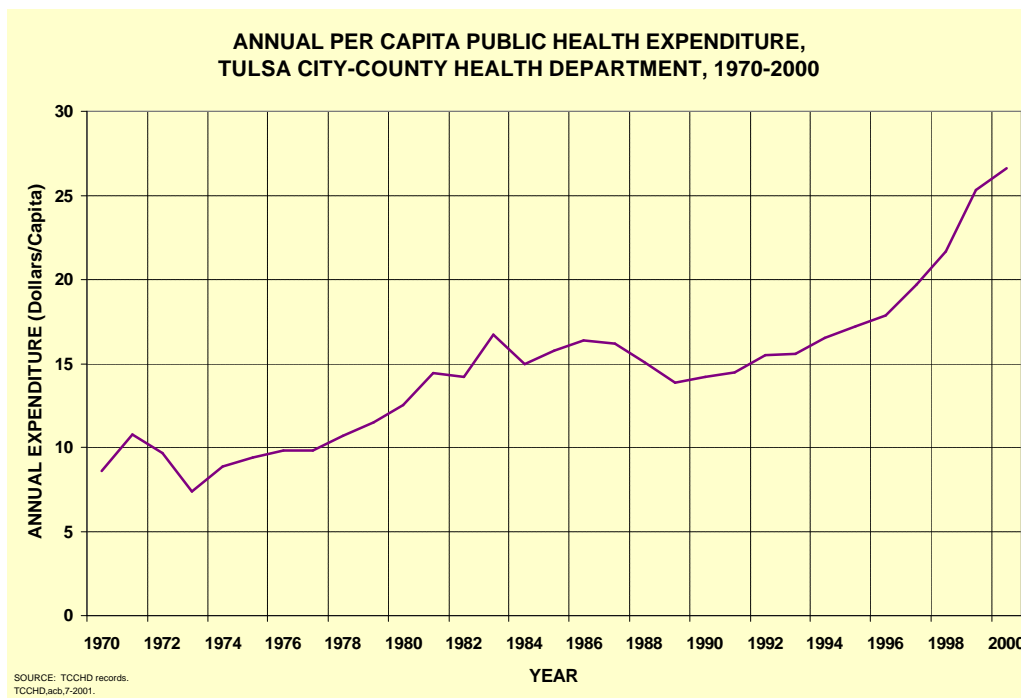


SOURCE: TCCHD records.  
TCCHD.amt,acb,1-2002.

Today, the Tulsa City-County Health Department is governed by a nine-member board of health, five members of which are appointed by the City of Tulsa and four members by Tulsa County. The City-County Board of Health selects and employs the Director of Health, who oversees the department's operations and manages the department's staff of approximately 260 full-time employees, 30 part-time employees, and several Oklahoma State Department of Health assignees in the Tulsa area.

The department's total annual operating budget is 16.6 million dollars. Approximately 47% of the department's funding is from local ad valorem (property) tax revenue, 42% comes from federal and state sources, and the remainder comes from service fees, licenses and permits, miscellaneous sources, and operating reserve. Local ad valorem tax funding was originally established by Oklahoma Statute in 1965 at a maximum rate of 1.9 mils per thousand dollars of assessed valuation. This maximum millage was increased by a vote of the people in 1974 to 2.5 mils.

Figure 2.2



The department utilizes approximately twenty-six dollars (\$26) per year per Tulsa County resident to provide this array of comprehensive, preventative health services (**Figure 2.2**). By comparison, total annual per capita healthcare expenditures in the United States are almost \$4,000 (**Figure 2.3**). Applied to Tulsa County, local expenditures for public health, on a per capita basis, represent only one-half of one percent of total healthcare expenditures in Tulsa County.

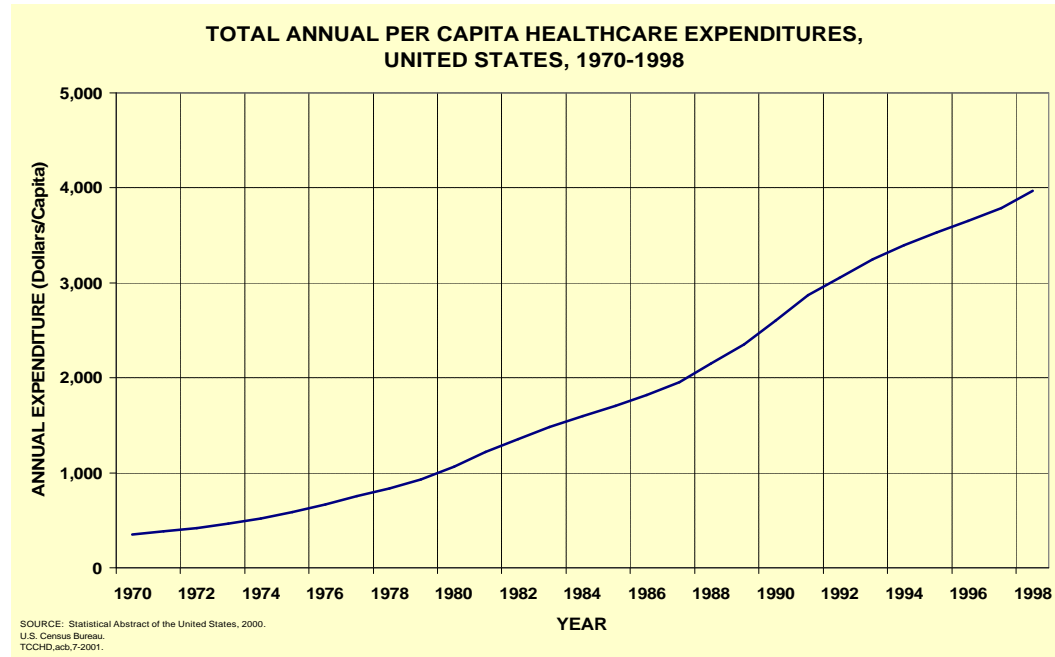
## DID YOU KNOW?

*The 3 core functions of public health are:*

- *assessment*
- *policy development*
- *assurance*

- Institute of Medicine, 1988

Figure 2.3



## Future Challenges

Public health is a vital function that requires broad public concern and support in order to fulfill society's interest in assuring the conditions in which people can be healthy. History teaches us that organized community effort to prevent disease and promote health is both valuable and effective. Yet public health in the United States has been taken for granted, many public health responsibilities have become inappropriately politicized, and public health responsibilities have become so fragmented that deliberate action is often difficult if not impossible. Restoring an effective public health system cannot be achieved by public health professionals alone. Americans must concern themselves with whether there are adequate public health services in their communities and must let their elected representatives know of their concern. The specific actions appropriate to strengthen public health will vary from area to area and must blend professional knowledge with community values.<sup>1</sup> What can you do? Get involved!

## References

- <sup>1</sup> Institute of Medicine. (1988). *The future of public health*. Washington, DC: National Academy Press.
- <sup>2</sup> Chave, S.P.W. (1984). *Oxford textbook of public health*. New York: Oxford University Press.
- <sup>3</sup> Darcey, H.J., & Fullerton, E.E. (1964). *Seventy-five years of public health in Oklahoma*: Author.





# HEALTHY PEOPLE 2010

“Health is a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity.”

- World Health Organization

## Healthy People 2010

- What Is Healthy People 2010?
- Vision
- Goals and Objectives
- Leading Health Indicators
- Tulsa County's Progress

## Healthy People 2010

### What Is Healthy People 2010?

Over the past two decades, national initiatives have been established to monitor the health status of Americans. Reducing premature deaths and preserving independence for older adults were the focus of the 1979 publication *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention*. The following year, *Promoting Health/Preventing Disease: Objectives for the Nation* was released. This report presented 226 targeted health objectives for the United States to achieve within that decade. *Healthy People 2000: National Health Promotion and Disease Prevention Objectives*, published in 1990, identified health improvement goals and objectives to be obtained by the year 2000.<sup>1</sup>

The newest document, *Healthy People 2010*, continues the trend. Healthy People 2010 establishes a comprehensive national agenda for disease prevention and health promotion. It is designed to serve as the roadmap for improving the health of all people in the United States during the first decade of the 21<sup>st</sup> century.

A profound lesson learned from Healthy People 2000 is that the United States, when challenged, can make remarkable progress in the effort to better the health of Americans. During the past decade, we have achieved significant reductions in infant mortality. Childhood vaccinations are at the highest levels ever recorded in the United States. Fewer teenagers are becoming parents. Overall, the use of alcohol, tobacco, and illicit drugs is leveling off. Death rates for heart disease and stroke have declined. Significant advances have been made in the diagnosis and treatment of cancer and in reducing unintentional injuries. However, we still have a long way to go.

Diabetes and other chronic conditions continue to present a serious obstacle to public health. Violence and abusive behavior continue to destroy homes and communities across the country. Mental disorders continue to go undiagnosed and untreated. Obesity in adults has increased 50 percent over the past two decades. Nearly 40 percent of adults engage in no leisure time physical activity. Smoking among adolescents has also increased in the past decade. And HIV/AIDS remains a serious health problem, now disproportionately affecting women and minorities.<sup>1</sup>

Healthy People 2010 will serve as a “guiding instrument” for monitoring emerging health issues, reversing unfavorable trends, and expanding past accomplishments in health.

### DID YOU KNOW?

The vision of Healthy People 2010 is “Healthy People in Healthy Communities.”

- U.S. Department of Health and Human Services, 2000



## Vision

It has become clear in recent years that an individual’s health is closely linked to the community’s health – the environment in which individuals live, work, and play. Likewise, the community’s health is greatly affected by the collective beliefs, attitudes, and behaviors of that community’s residents. That is why the vision for Healthy People 2010 is “Healthy People in Healthy Communities.”

## Goals and Objectives

Healthy People 2010 is designed to achieve two “overarching” goals: increase quality and years of healthy life and eliminate health disparities. These goals are supported by 467 specific health objectives, organized into 28 focus areas (Table 3.1).

Table 3.1

### Healthy People 2010 Focus Areas

- |   |  |
|---|--|
| 1. Access to Quality Health Services                    | 15. Injury and Violence Prevention     |
| 2. Arthritis, Osteoporosis, and Chronic Back Conditions | 16. Maternal, Infant, and Child Health |
| 3. Cancer   | 17. Medical Product Safety             |
| 4. Chronic Kidney Disease                               | 18. Mental Health and Mental Disorders |
| 5. Diabetes   | 19. Nutrition and Overweight           |
| 6. Disability and Secondary Conditions                  | 20. Occupational Safety and Health     |
| 7. Educational and Community-Based Programs             | 21. Oral Health                        |
| 8. Environmental Health                                 | 22. Physical Activity and Fitness      |
| 9. Family Planning                                      | 23. Public Health Infrastructure       |
| 10. Food Safety   | 24. Respiratory Diseases               |
| 11. Health Communication                                | 25. Sexually Transmitted Diseases      |
| 12. Heart Disease and Stroke                            | 26. Substance Abuse                    |
| 13. HIV   | 27. Tobacco Use                        |
| 14. Immunization and Infectious Diseases                | 28. Vision and Hearing                 |

SOURCE: U.S. Department of Health and Human Services, 2000.

Many objectives focus on interventions designed to reduce or eliminate illness, disability, and premature death among individuals and communities. Others focus on broader issues, such as improving access to quality health care, strengthening public health services, and improving the availability and



dissemination of health-related information. Each objective includes a baseline statistic and a target goal for the year 2010.<sup>1</sup>

### Leading Health Indicators

Healthy People 2010 identifies 10 Leading Health Indicators (**Table 3.2**), which provide a snapshot of the health of our nation. These indicators reflect the major public health concerns in the United States. For each of the ten indicators, specific objectives were derived from Healthy People 2010 to track their progress. This small set of measures will provide a snapshot of the health of the United States.

**Table 3.2**

The Ten Leading Health Indicators	
• Physical activity	• Mental Health
• Overweight and obesity	• Injury and violence
• Tobacco use	• Environmental quality
• Substance abuse	• Immunization
• Responsible sexual behavior	• Access to health care

SOURCE: U.S. Department of Health and Human Services, 2000.

Individuals, groups, agencies, and organizations are encouraged to integrate Healthy People 2010 and the Leading Health Indicators into current programs, special events, publications, and meetings. By selecting from among the national objectives, individuals and organizations can build an agenda for community health improvement and can monitor health trends over time.

### Tulsa County's Progress

Nearly all states have developed their own Healthy People plans. Most have built on national goals and objectives, but virtually all have tailored them to their specific priorities and needs. The Tulsa City-County Health Department (TCCHD) is currently in the process of establishing customized objectives that relate to the health needs of our community. Through monitoring its progress toward meeting Healthy People 2010's goals, TCCHD is able to compare the health of Tulsa County to similar communities and better evaluate how local systems can improve health disparities.

### DID YOU KNOW?

Healthy People 2010 contains 467 objectives to improve health, organized into 28 focus areas.

- U.S. Department of Health and Human Services, 2000

### DID YOU KNOW?

Healthy People 2010 has two main goals:

1. Increase quality and years of healthy life
2. Eliminate health disparities

- U.S. Department of Health and Human Services, 2000





## References

- <sup>1</sup> U.S. Department of Health and Human Services. (2000). *Healthy People 2010* (2nd ed.). Washington, DC: U.S. Government Printing Office.



# DEMOGRAPHIC OVERVIEW OF TULSA COUNTY

*"Information on the well-being of the American public is a concern for everyone living in the United States."*

- U.S. Census Bureau

## Demographic Overview of Tulsa County

- Overview
- Tulsa County Population Growth
- Geographic Distribution
- Age Distribution
- Racial/Ethnic Distribution
- Household Characteristics
- Poverty and Health Insurance

## Demographic Overview of Tulsa County

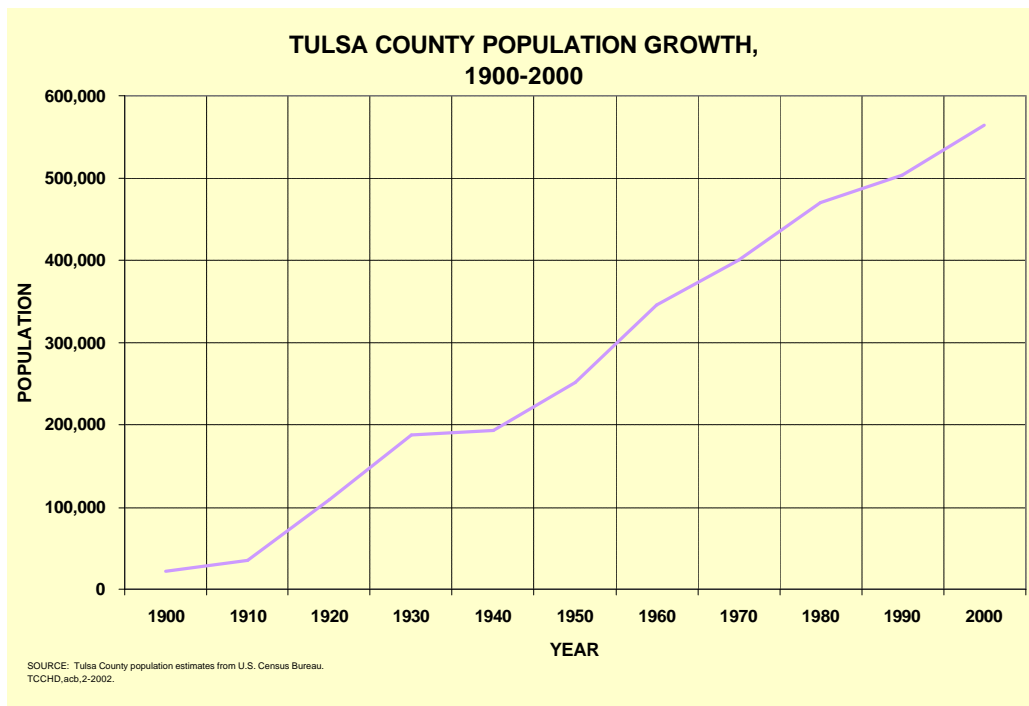
### Overview

The demographic characteristics of populations served by the public health system are fundamentally important in determining the types of services offered and the proportional distribution of human and financial resources required to serve those populations. The most fundamental, and arguably the most important single demographic characteristic, is the numeric size of the population served along with the rate at which that population is increasing or decreasing. The U.S. Census Bureau maintains a population clock which continuously estimates the resident population of the United States. As of August 2002, the Bureau estimated the population of the United States to be approximately 287,664,000.

The components of change of the U.S. population and that of cities, counties, states, and other nations are the net change resulting from births, deaths, and migration (either in or out). In the United States, one birth occurs approximately every seven seconds, one death every fourteen seconds, and one net international migrant is gained every twenty-nine seconds. This results in a gain of one U.S. resident every eleven seconds.<sup>1</sup>

### Tulsa County Population Growth

Figure 4.1



### DID YOU KNOW?

*The decade of the 1990s was the only decade of the 20<sup>th</sup> century when every state gained population.*

- U.S. Census Bureau, 2000

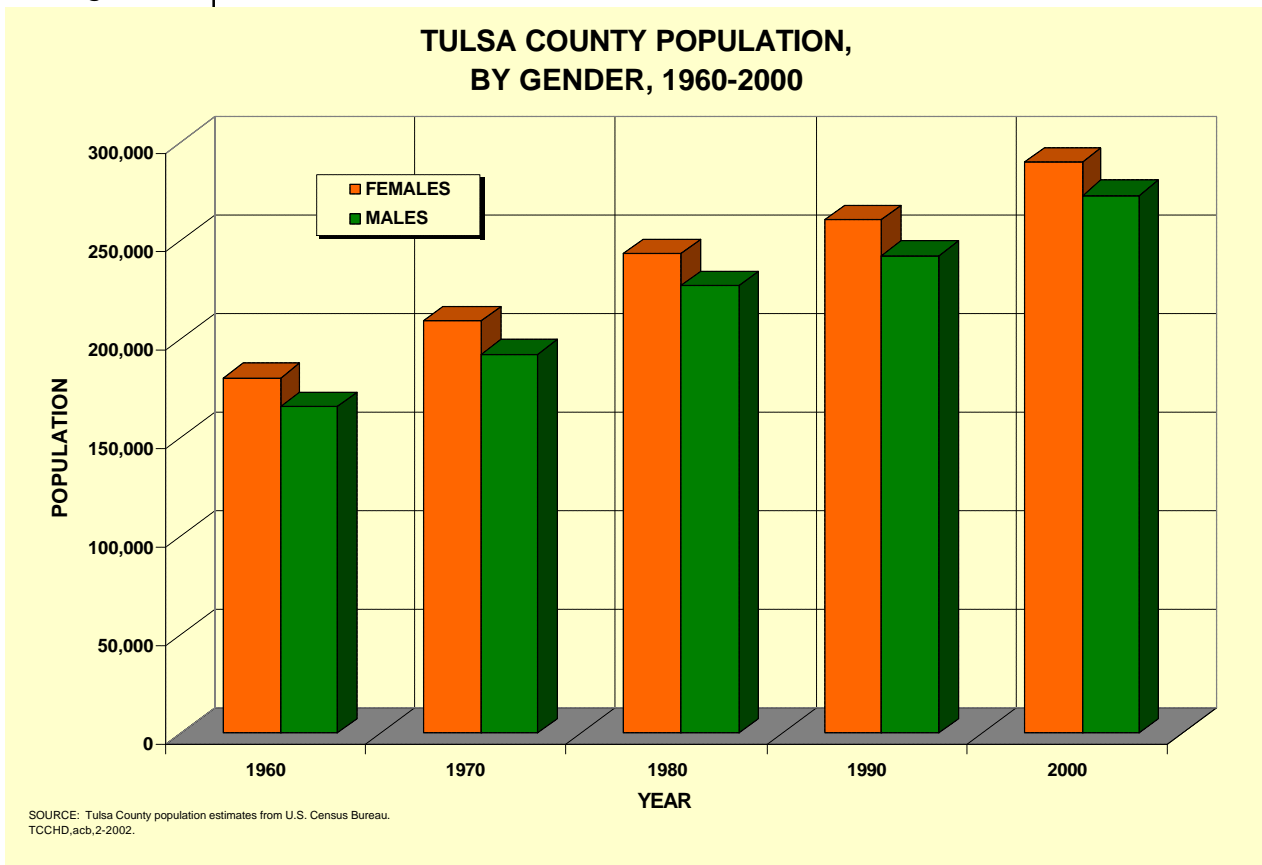
### DID YOU KNOW?

*The 33 million people added to the U.S. population between 1990 and 2000 is the largest census-to-census increase ever.*

- U.S. Census Bureau, 2000

Tulsa County’s population has increased fairly consistently since statehood in 1907 (**Figure 4.1**). Possible exceptions were the years of the 1930s (during the Depression and Dust Bowl) and during the early 1980s (following the collapse of the domestic oil industry). Although **Figure 4.1** shows a population increase during these two decades, based upon decennial census counts, declines during intercensal years may have occurred during both time periods. Local estimates by the Indian Nations Council of Governments during the early 1980s support the position that a population decrease occurred early in that decade.

Figure 4.2

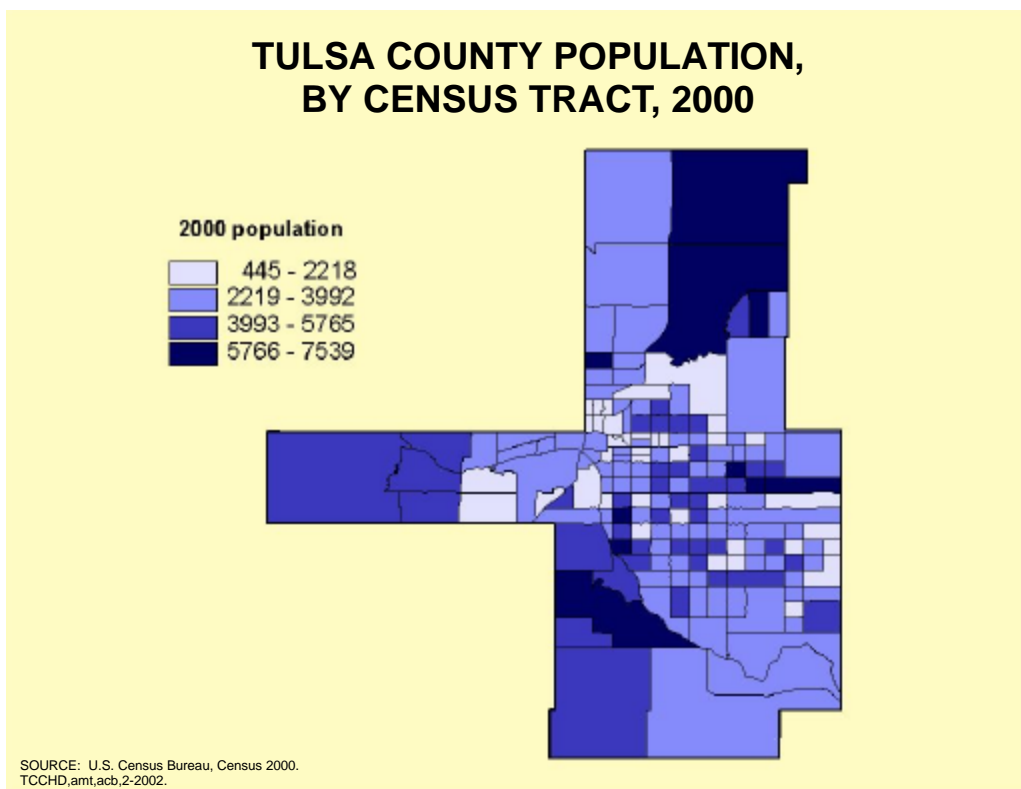


In **Figure 4.2**, the population growth of Tulsa County is differentiated by gender. The excess of females over males is characteristic of many present day populations, including that of the United States. In Tulsa County in 2000, there were nearly 3% more females in the population than males. Worldwide, more males than females are born in nearly all countries which have relatively complete birth data available. There are generally 104 to 107 males born for every 100 females in these countries.<sup>2</sup> However, excess male mortality, which begins early in life and continues through old age, rapidly erases the male advantage at birth, resulting in a higher proportion of females in the overall population.

## Geographic Distribution

The 2000 distribution of Tulsa County’s population, by census tract, is presented in **Figure 4.3**. There was noticeable population growth in the areas of mid-Tulsa and Collinsville, with many tracts experiencing increases of up to 85% during that time period. Tracts in the Jenks and Broken Arrow area also had significant increases. Conversely, some northerly census tracts in older, established neighborhoods of the City of Tulsa experienced population losses. Census tracts in the western portion of Tulsa County also encountered population loss.

Figure 4.3



## Age Distribution

The distribution of Tulsa County’s population, by age, reflects a pattern which is fairly typical of the age distribution of the U.S. population and that of other major cities. Tulsa County’s median age, which was 32.7 years in 1990, had increased to 34.4 years by 2000, reflecting the growing elderly population of the county. Both the United States and Oklahoma shared similar trends. Tulsa County’s median age is slightly younger than the state’s median age (35.5 years) and median age of the United States (35.3 years).

### DEFINING THE TERMS

*A family household has at least two members related by birth, marriage, or adoption, one of whom is related to the householder.*

### DEFINING THE TERMS

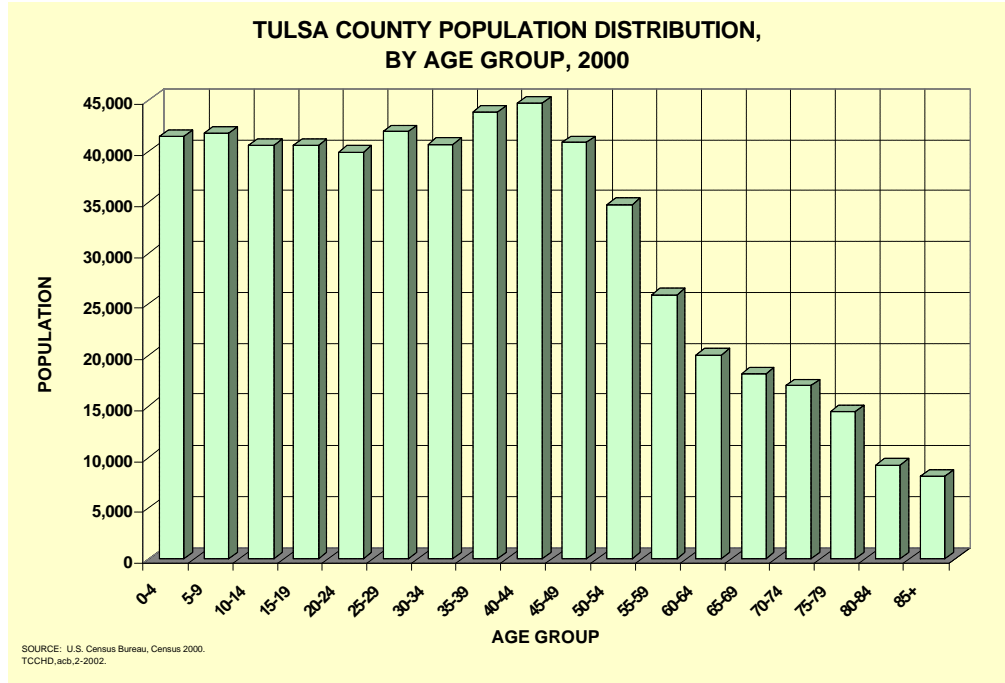
*A non-family household can either be a person living alone or a householder who shares a home with non-relatives only; for example, boarders or roommates.*

Figure 4.4

**DID YOU KNOW?**

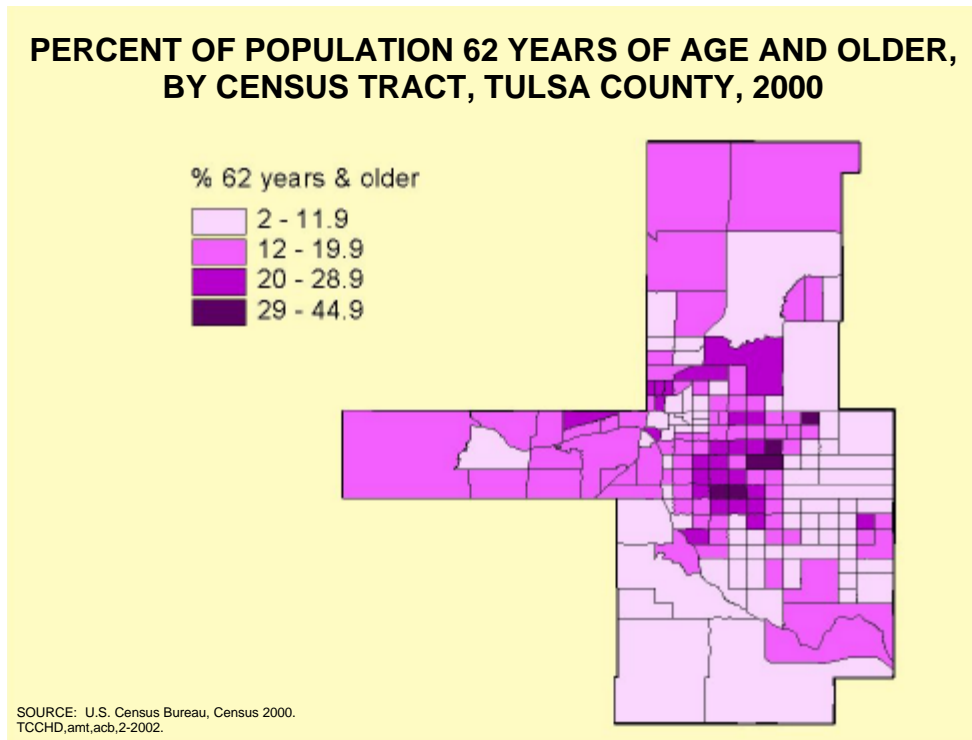
*For the first time ever, respondents to the census were allowed to indicate more than one race.*

- U.S. Census Bureau, 2000



**Figure 4.4** graphically shows the age distribution of Tulsa County’s population in 2000. The “bulge” in the population distribution reflects the so-called “Baby Boom” generation which began in 1946 following the second World War. This bulge will continue to move upward through the age distribution during the next several decades.

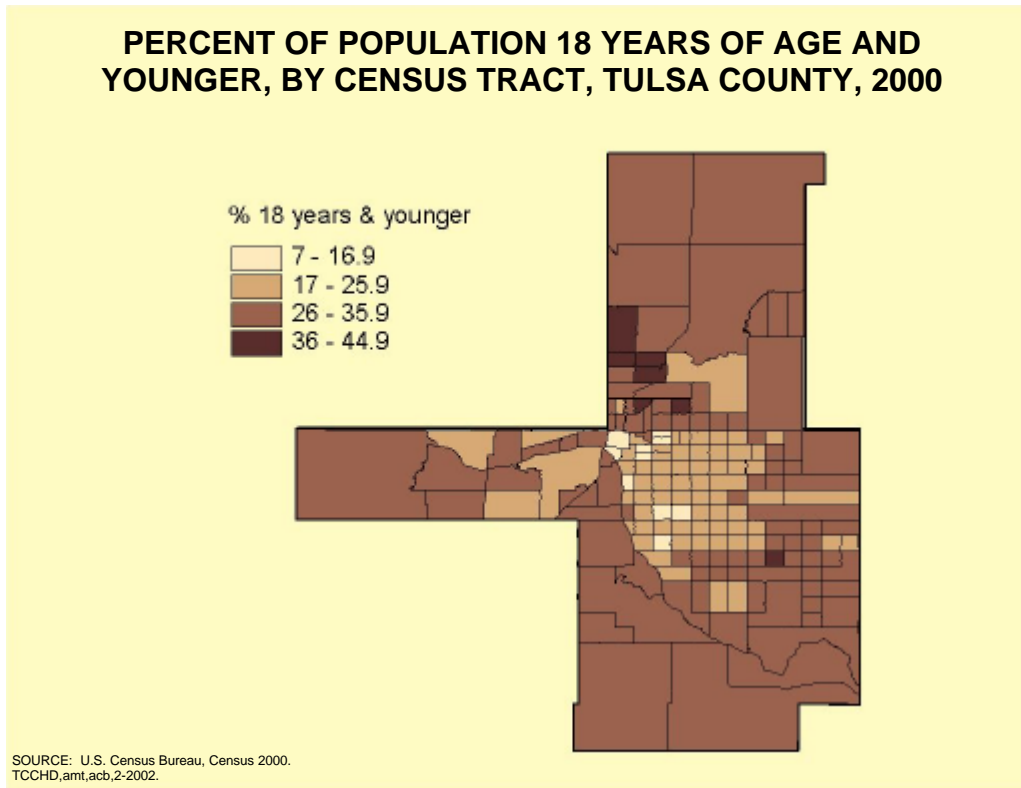
Figure 4.5





The geographic distribution of Tulsa County’s population, by age, reflects a concentration of older Tulsans in the central areas of the county, primarily in the older housing areas of the City of Tulsa (**Figure 4.5**), while the younger population, children 18 years of age and under (**Figure 4.6**) predominantly reside in the remaining census tracts in the County, e.g., rural areas in the northern, western, and southern portions of the county, in the Broken Arrow area, and in far east Tulsa County.

Figure 4.6



### Racial/Ethnic Distribution

Tulsa County’s population is predominantly white (75% in 2000) with substantial minority populations, predominantly African American and American Indian. The 2000 total minority population of the county was approximately 140,700 including almost 62,000 African Americans and just over 29,000 American Indians. Smaller populations of Asians (over 9,000) and residents of other racial groups (just over 15,000) comprised the remainder of the minority population. Approximately 25,000 of Tulsa’s residents classify themselves as “two or more races.” The county’s racial distribution is shown in **Figure 4.7**.

### DEFINING THE TERMS

*Race is categorized into four groups: White, Black, American Indian and Alaska Native, and Asian and Pacific Islander.*

### DEFINING THE TERMS

*Hispanic origin is defined as those who indicate that their origin is Mexican, Puerto Rican, Cuban, Central or South American, or some other Hispanic origin. People of Hispanic origin may be of any race.*

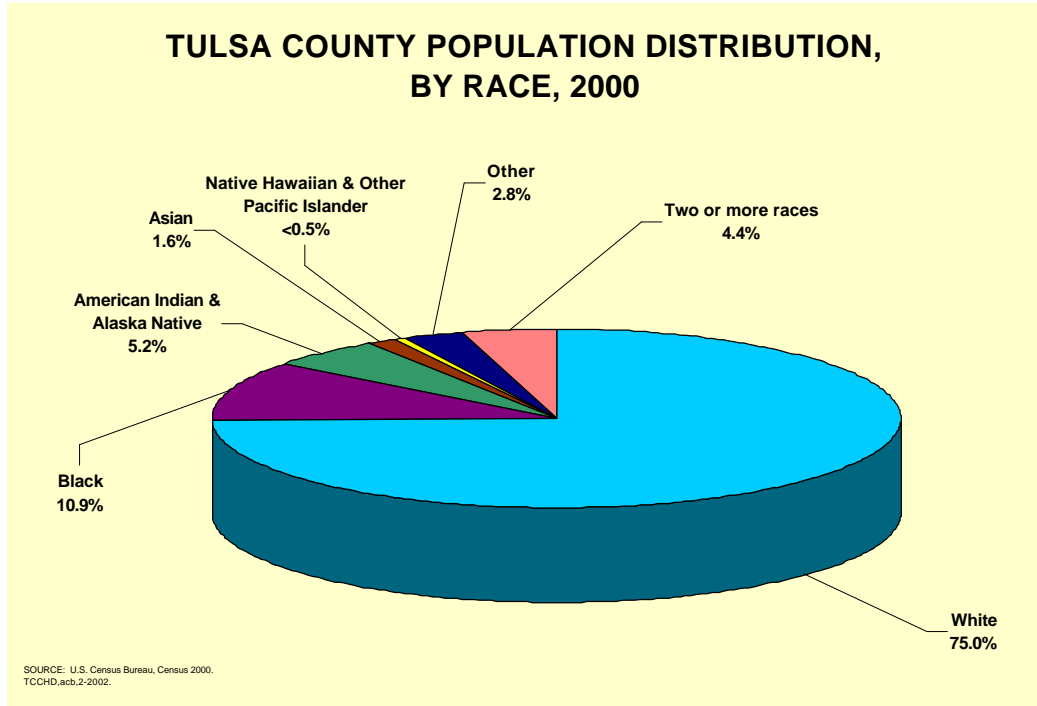


Figure 4.7

**DID YOU KNOW?**

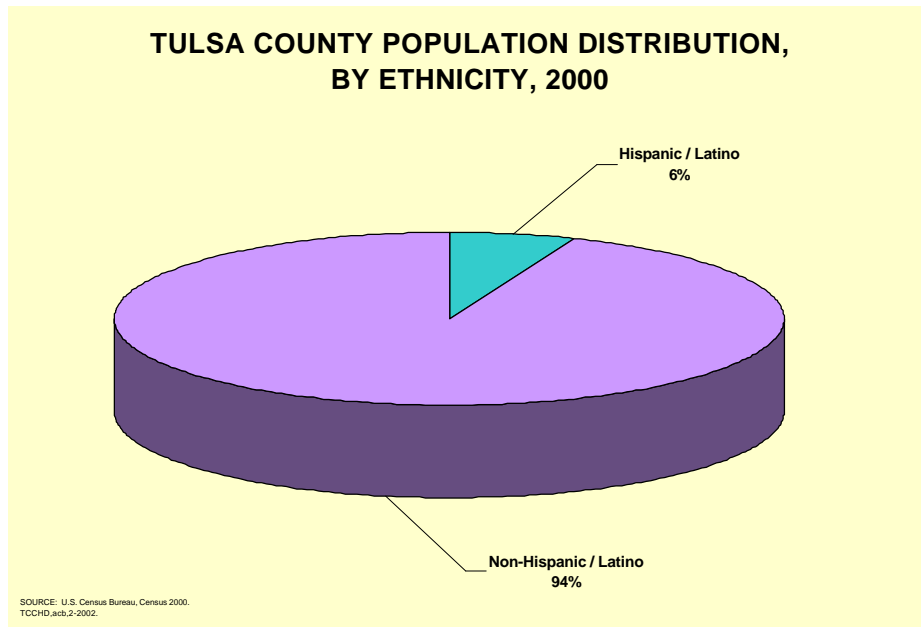
The federal government considers race and Hispanic origin to be two separate and distinct concepts.

- U.S. Census Bureau, 2000



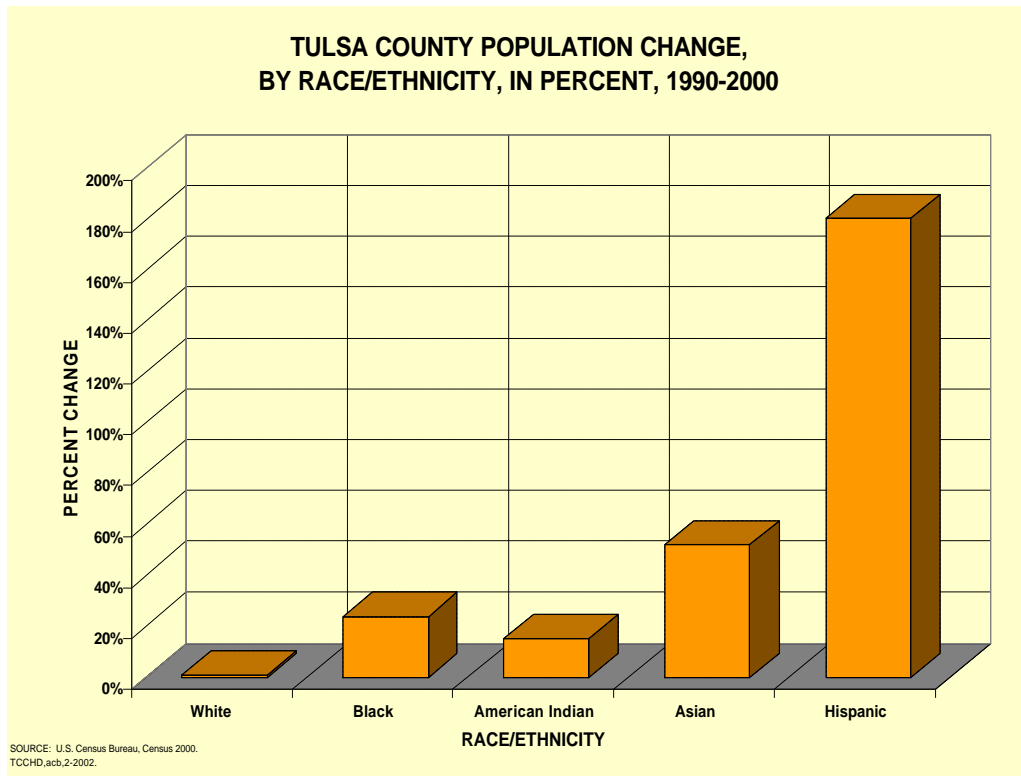
It should be noted that race and ethnicity are separate concepts. Individuals of Hispanic origin are those who indicate that their origin is Mexican, Puerto Rican, Cuban, Central or South American, or some other Hispanic origin. People of Hispanic origin may be of any race (White, Black, American Indian/Alaska Native, or Asian/Pacific Islander). Non-Hispanic refers to all people whose ethnicity is not Hispanic. **Figure 4.8** illustrates the ethnic composition of Tulsa County.

Figure 4.8



The true dynamics of the population changes occurring during the 1990s are best reflected by the percentage changes in each racial/ethnic category (**Figure 4.9**). During the ten year period from 1990 to 2000, the Tulsa County Hispanic population experienced a 181% increase, the Asian population increased by nearly 53%, the African American population increased by over 24%, and the American Indian population increased by greater than 15%. Lower percentage increases were observed by the non-Hispanic white population (slightly over 1%).

**Figure 4.9**



## Household Characteristics

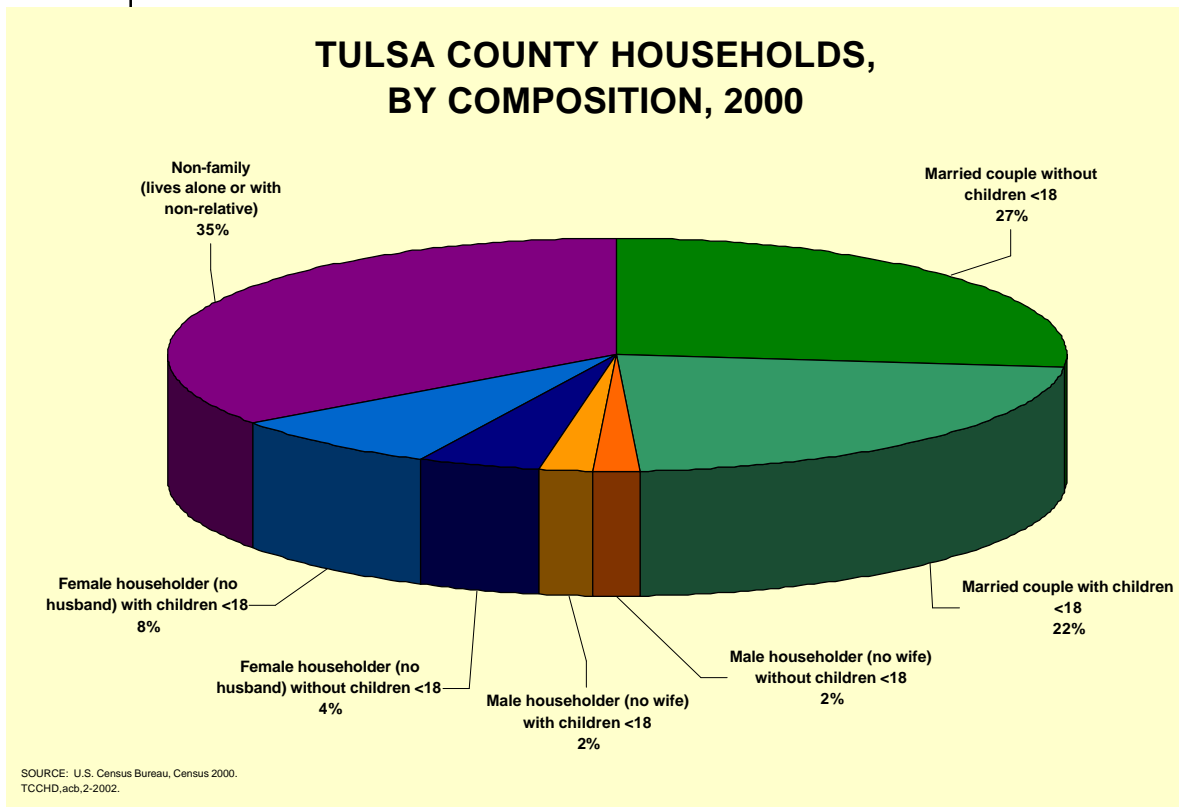
Changes have also occurred in the characteristics of Tulsa County families and households. During the decade of the 1990s, there was a significant trend away from traditional husband/wife family households toward one person, non-family, and single parent living arrangements.

In 2000, the U.S. Census Bureau identified approximately 266,900 Tulsa County households, 49% of which were characterized by husband/wife relationships. Almost 41% were single person households (predominantly elderly and young adults) and 10% were single parent households. The distribution of households by percent is presented in **Figure 4.10**.

## DEFINING THE TERMS

*Non-Hispanic refers to all people whose ethnicity is not Hispanic. Race and ethnicity are separate concepts, so the racial categories of White, Black, American Indian and Alaska Native, and Asian and Pacific Islander all contain some people of Hispanic origin.*

Figure 4.10 |



**DEFINING  
THE  
TERMS**

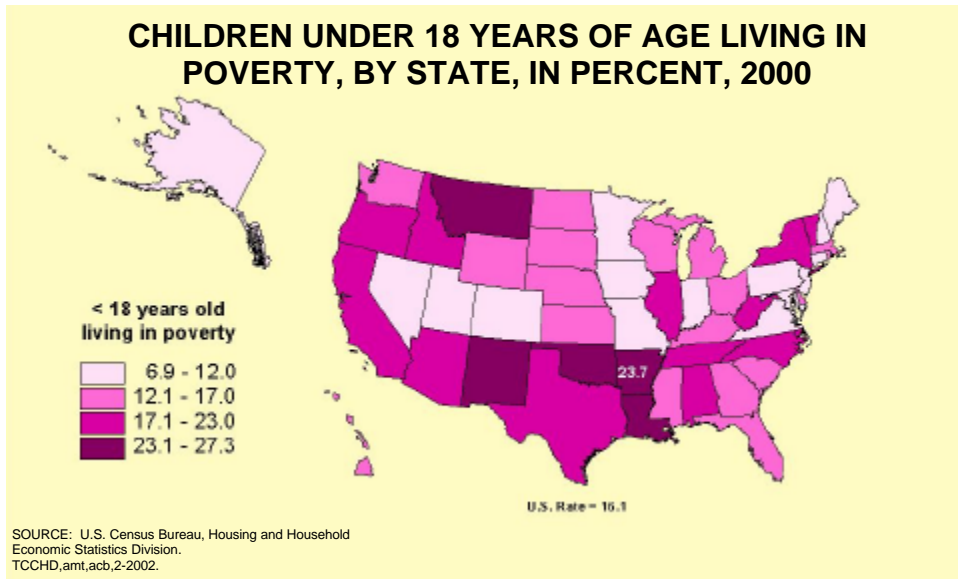
*A householder refers to the person (or one of the people) in whose name a housing unit is owned, rented, or maintained.*

**Poverty and Health Insurance**

The poverty rate – with all its implications for healthcare, housing, and education – is one of this country’s most important measures of well-being. The average poverty threshold for a family of four in 2000 was \$17,603. The average income deficit for poor families – the amount needed to raise a family out of poverty – was \$6,820.<sup>3</sup> In 2000, it was estimated that 23.7% of Oklahoma’s children under 18 years of age lived in poverty. In other states, this percentage ranged from as low as 6.9% to as high as 27.3% (**Figure 4.11**). Nationwide, the poverty rate for children under 18 years was 16.1%. Generally, states with the highest rates of children living in poverty were in the southern half of the nation.

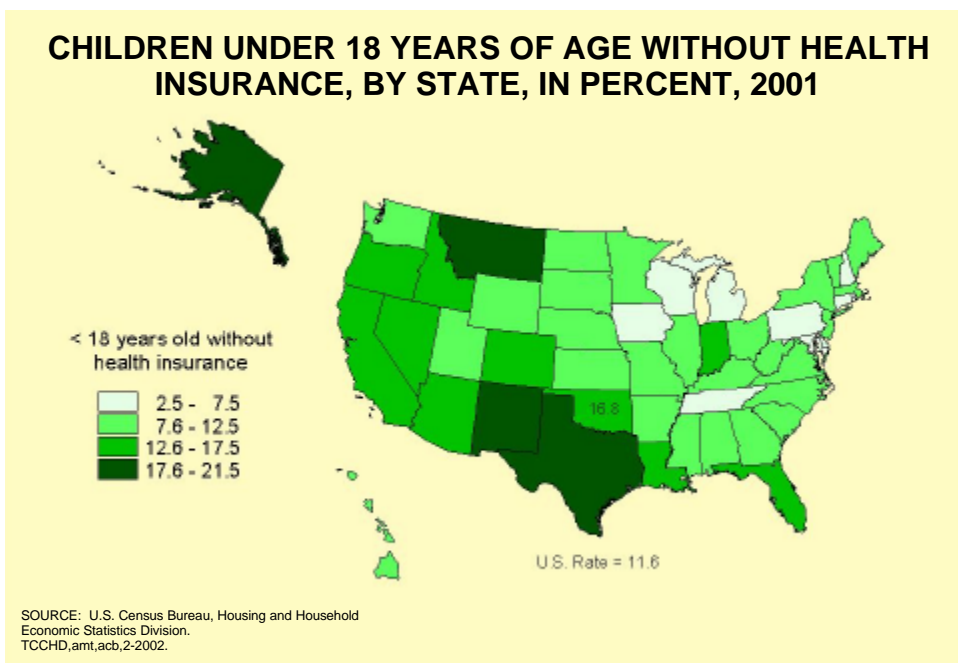
Lack of health insurance is closely associated with poverty since low income families are frequently forced to choose between either securing basic necessities or acquiring medical insurance. While the lowest income families with children often qualify for coverage under state welfare systems (in Oklahoma, under the SoonerCare Program), many low income families, especially the working poor, have no insurance coverage, either public or private. These families must go without care, pay medical primary care expenses out-of-pocket, or seek acute care in local hospital emergency rooms, which is the highest cost option available.

Figure 4.11



In Oklahoma, the percentage of children without health insurance coverage in 2001 was estimated to be 16.8%, or about one in six. Nationwide the percentage was 11.6% with individual state's percentages ranging from as low as 2.5% to as high as 21.5% (Figure 4.12). The geographic distribution of states with highest percentages of uninsured residents was similar to the distribution of higher poverty states. Southern states tended to exhibit higher uninsured rates, while northern states, especially north central states, exhibited the lowest rates of uninsured.

Figure 4.12



**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Increase the proportion of persons with health insurance.*

- U.S. Department of Health and Human Services, 2000

## References

- <sup>1</sup> U.S. Census Bureau. (2002). *U.S. POPClock projection*, from <http://www.census.gov/cgi-bin/popclock>.
- <sup>2</sup> Shryock, H.S., Seigel, J.S., & Associates. (1976). *The methods and materials of demography*. New York: Academic Press.
- <sup>3</sup> U.S. Census Bureau. (2002). *Population profile of the United States: 2000*, from <http://www.census.gov/population/www/pop-profile/profile2000.html>.



# LIFE EXPECTANCY AND MORTALITY

*"We can reverse our negative trends and begin to build a healthier state. But, it will take the hard work and dedication of all of us working together!"*

- Oklahoma State Board of Health

## Life E xpectancy and Mortality

- Overview
- Life E xpectancy
- Mortality
- Crude vs. Age-A djusted Rates
- T rends in the Leading Causes of Death
  - Heart Disease
  - Malignant Neoplasms (Cancer)
  - Cerebrovascular Diseases
  - Chronic Lower Respiratory Diseases
  - Accidents (U nintentional Injuries)
  - Diabetes Mellitus
  - Alzheimer's Disease
  - Pnuemonia & Influenza
  - Intentional S elf-Harm (Suicide)
  - Atherosclerosis

## Life E xpectancy and Mortality

### Overview

Perhaps the single most significant public health trend that has occurred within the span of human history has been the decline in premature mortality and the extension of life expectancy. The decreasing threat from infectious disease agents, resulting largely from the provision of safe water, sewage collection and treatment, improved personal hygiene, improved nutrition, and the development of antimicrobials and vaccines, has had a profound effect on premature mortality. In addition, industrialization has greatly changed the way people live and has influenced the nature of health problems in human populations. With an aging population, heart disease, cancer, and stroke now constitute the major causes of death. For the first time in our nation’s history, Alzheimer’s disease is a leading cause of death. **Table 5.1** shows the death rates for leading causes of death in the United States, comparing 1900 to 1999.

### DEFINING THE TERMS

*Mortality is the event or rate of death.*

**T able 5.1**

### Leading Causes of Death, United States, 1900 & 1999

<u>1900</u>	<u>1999</u>
1. Pneumonia & Influenza	1. Diseases of the Heart
2. T uberculosis	2. Malignant Neoplasms
3. Diarrhea, E nteritis, & U lceration of Intestines	3. Cerebrovascular Diseases
4. Diseases of the Heart	4. Chronic Lower Respiratory Diseases
5. Intracranial Lesions of Vascular Origin	5. A ccidents (U nintentional Injuries)
6. Nephritis	6. Diabetes Mellitus
7. Accidents	7. Pneumonia & Influenza
8. Malignant Neoplasms	8. A lzheimer's Disease
9. Senility	9. Nephritis, Nephrotic Syndrome, & Nephrosis
10. Diphtheria	10. S epticimia

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System. TCCHD, acb, 1-2002.



**DEFINING  
THE  
TERMS**

*Life expectancy is the number of additional years of life expected at a specified point in time.*

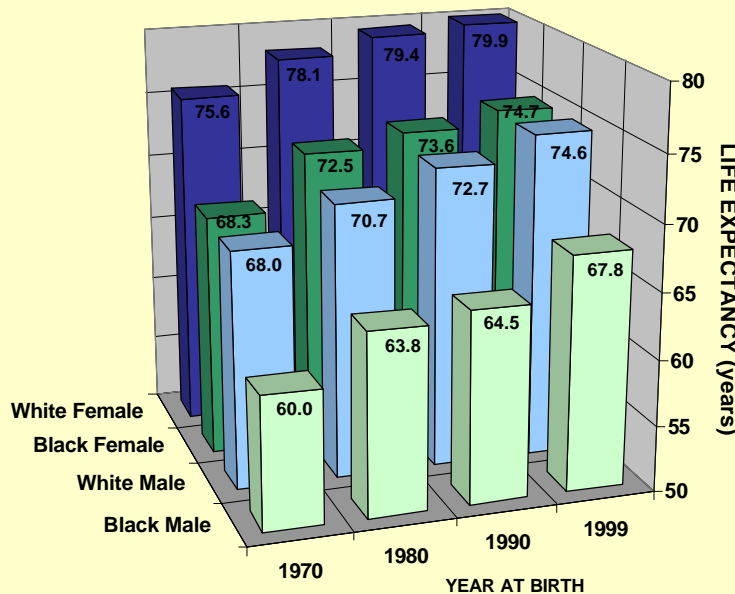
**Life Expectancy**

As a general rule, maximum life expectancy for humans is approximately a century, or about one hundred years, although few individuals live to become centenarians. Fewer still survive to the extremes of 110 years or more. The great majority of humans can expect significantly shorter life spans, although the numbers who are surviving into their 80s and 90s have significantly increased in recent decades.

Life expectancy in the United States differs greatly among racial and ethnic groups, and between genders, with females enjoying significantly longer life expectancies than males, and whites living longer than blacks. **Figure 5.1** shows life expectancy at birth for U.S. residents, by race and gender, from 1970 through 1999 and clearly depicts the increase which has occurred during that time. In 1999, the life expectancy at birth of white females in the United States was 79.9 years. In that same year, life expectancy for white males was 74.6 years. Black females could expect to survive, on average, for 74.7 years and black males for 67.8 years.

**Figure 5.1**

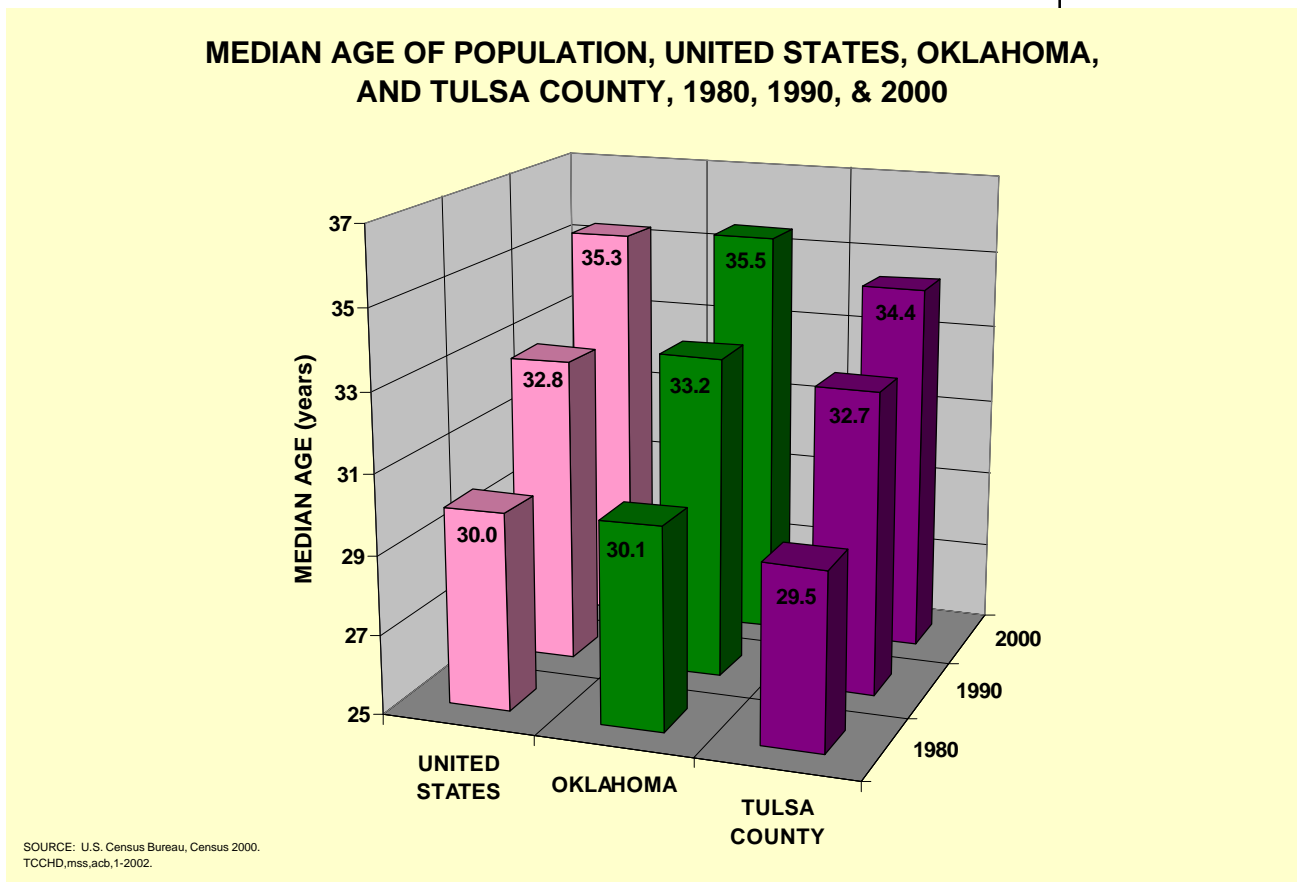
**LIFE EXPECTANCY AT BIRTH, UNITED STATES,  
BY RACE AND GENDER, 1970-1999**



SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, 2001. TCCHD,mss.acb.1-2002.

Corresponding to the longer expectation of life from birth, the median age of the U.S. population has been continually rising for many decades. In 1900 the median age of the U.S. population was 22.9 years and has continued to rise, with the exception of the years 1960 and 1970 (Vietnam War era), to an estimated 35.3 years in 2000. The increase in median age and the corresponding increase in elderly population are projected to continue at least through the year 2050, at which time the median age is projected to be 39.0 years.<sup>1</sup> In 2000 the U.S. population median age of 35.3 years was 0.9 years older than that of Tulsa County (**Figure 5.2**). Oklahoma's median age in 2000, at 35.5 years, was higher than both Tulsa County and the United States.

Figure 5.2



## Mortality

The distribution of mortality by age group is far from uniform, with the greatest numbers of deaths occurring among the elderly. The probability of dying is elevated slightly in the earliest weeks and months of life but declines rapidly to its lowest point among children before beginning a gradual, continuous rise to the oldest age groups. Infant mortality (death before age 1) is usually caused by prematurity, sudden infant death syndrome, congenital

**DID YOU KNOW?**

The top 10 causes of death account for almost 80% of all deaths in the U.S.

- National Vital Statistics System, 2001

anomalies, respiratory conditions, and perinatal infections. The leading causes of death for ages 1 through 14 include accidents, congenital anomalies, cancer, and assault (homicide). Accidents, assault, and intentional self-harm (suicide) are the leading causes of death for ages 15 through 34. Cancer, accidents, and heart disease remain leading causes of death from 35 years of age until age 55, when chronic lower respiratory diseases appear as a leading cause of death. After age 65, heart disease, cancer, stroke, and chronic lower respiratory diseases constitute the leading causes of death.

**Table 5.2** presents the ten leading causes of death for all ages for the United States, Oklahoma, and Tulsa County. Heart disease, cancer, stroke, chronic lower respiratory diseases, and accidents are the top five causes of death for all three populations. Crude death rates for all causes have risen gradually for Tulsa County from less than 800 deaths per 100,000 population in 1976 to over 900 deaths per 100,000 population in 1999 (**Figure 5.3**). Until the early 1990s, the U.S. rate was significantly higher than the Tulsa County rate; however, from 1994 to current, Tulsa County's crude death rate has continued to climb beyond the rate of the nation.

**Table 5.2**

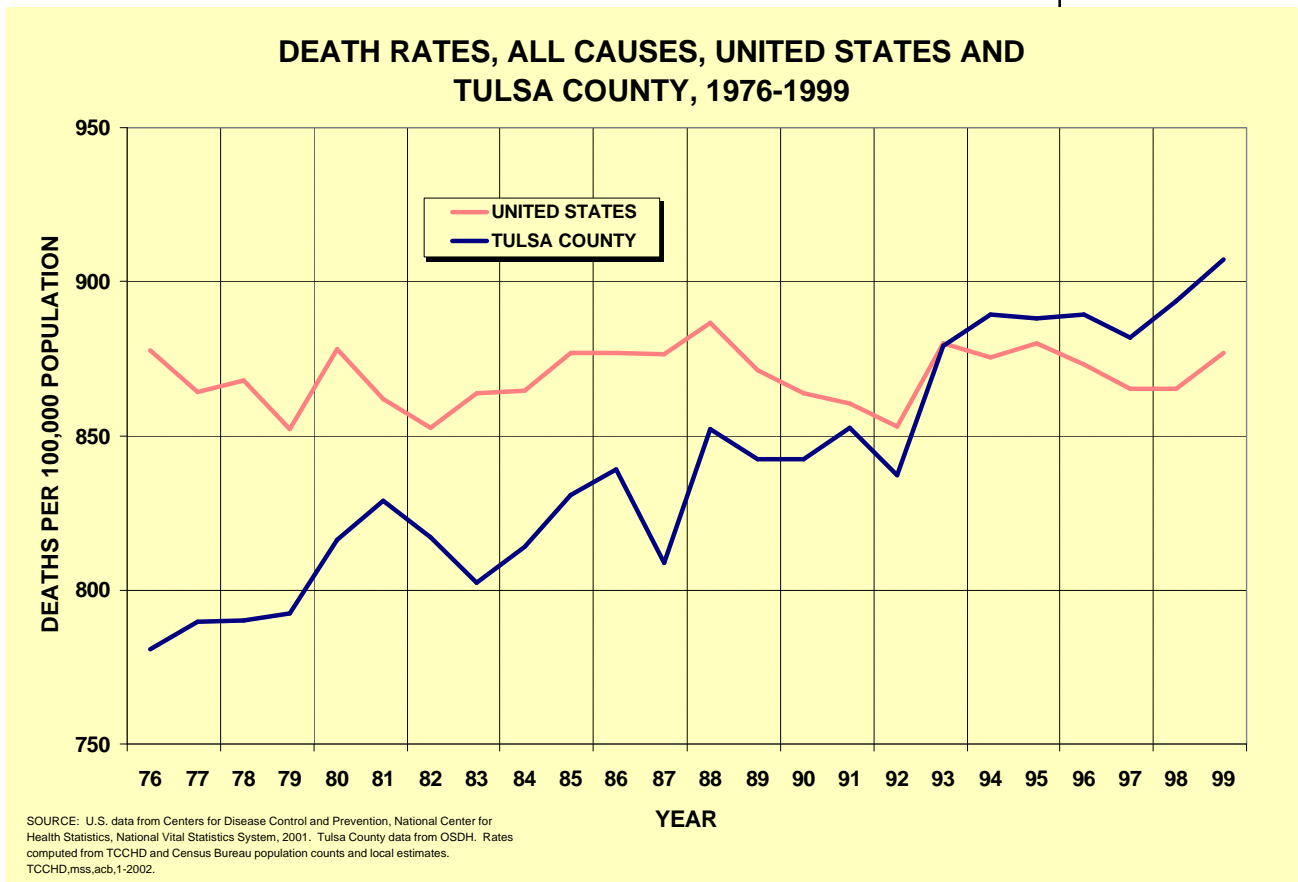
**Top 10 Causes of Death, United States, Oklahoma, & Tulsa County, 1999**

<u>United States - 1999</u>	<u>Oklahoma - 1999</u>	<u>Tulsa County - 1999</u>
1. Diseases of Heart	1. Diseases of Heart	1. Diseases of Heart
2. Malignant Neoplasms	2. Malignant Neoplasms	2. Malignant Neoplasms
3. Cerebrovascular Diseases	3. Cerebrovascular Diseases	3. Cerebrovascular Diseases
4. Chronic Lower Respiratory Diseases	4. Chronic Lower Respiratory Diseases	4. Chronic Lower Respiratory Diseases
5. Accidents (Unintentional Injuries)	5. Accidents (Unintentional Injuries)	5. Accidents (Unintentional Injuries)
6. Diabetes Mellitus	6. Influenza & Pneumonia	6. Diabetes Mellitus
7. Influenza & Pneumonia	7. Diabetes Mellitus	7. Alzheimer's Disease
8. Alzheimer's Disease	8. Alzheimer's Disease	8. Influenza & Pneumonia
9. Nephritis, Nephrotic Syndrome, & Nephrosis	9. Intentional Self-Harm (Suicide)	9. Intentional Self-Harm (Suicide)
10. Septicemia	10. Atherosclerosis	10. Atherosclerosis

SOURCE: U.S. and Oklahoma data from Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, 2001. Tulsa County data from OSDH Vital Records. TCCHD,mss,acb,1-2002.



Figure 5.3



### Crude vs. Age-Adjusted Rates

Crude death rates are an exact representation of the number of deaths which occur on an annual basis in a specific population (number of deaths per a given number of persons in the population, usually per 100,000). Crude rates can be calculated without respect to gender, race, or other differentiation. Because of the effect certain demographic variables, especially age, have on numbers of deaths occurring within a population, the computation of adjusted rates to remove the influence of these other demographic variables is often used.

Age-adjusted rates are useful when comparing death rates between two populations with different age compositions in order to compare the death experiences of the two that would occur if the age distributions were identical. Age-adjusted rates are, therefore, hypothetical and they do not accurately represent the number of deaths which actually occur in the adjusted population. By removing the influence of age, however, they enable comparisons of death rates between populations which may be experiencing identifiable differences in death rates due to other influences.

### DEFINING THE TERMS

*Age-adjusted mortality rate is the expected number of deaths that would occur if a population had the same age distribution as a standard population.*

**DID YOU KNOW?**

*More than 2,600 Americans die each day of cardiovascular diseases. That is an average of 1 death every 33 seconds.*

*Centers for Disease Control and Prevention, 2001*

**Trends in the Leading Causes of Death**

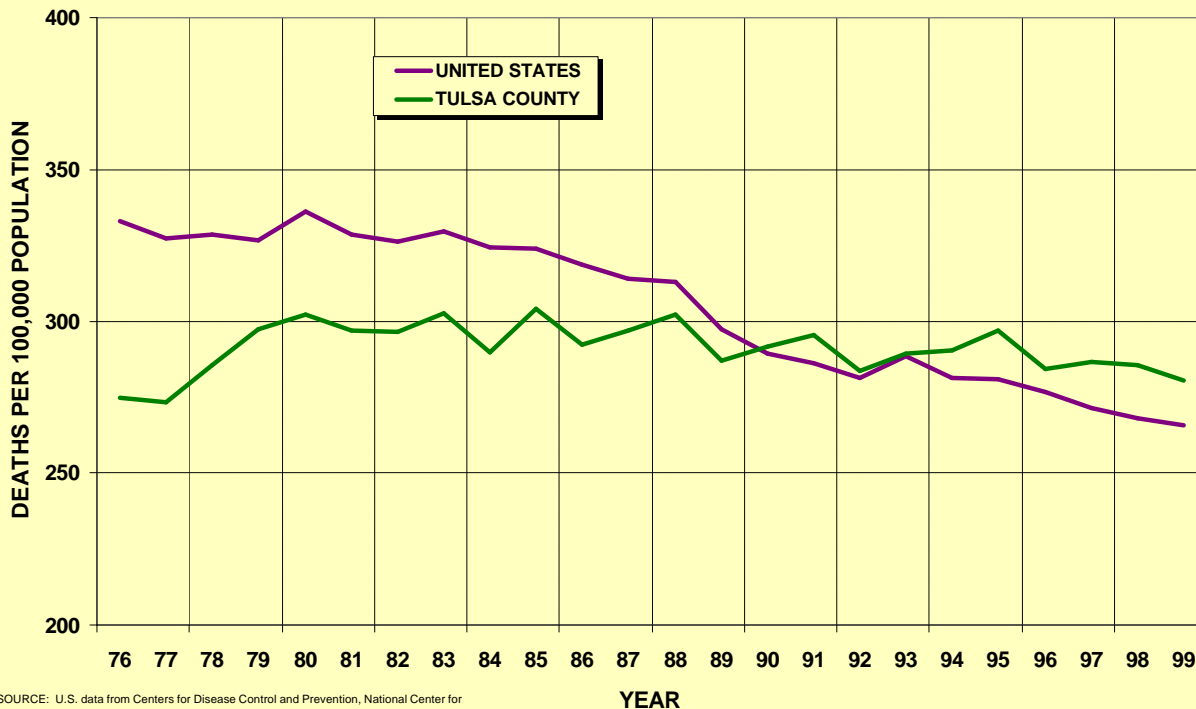
In the following discussion, the ten leading causes of death for Tulsa County (for 1999) are examined by comparing Tulsa County's crude death rates with those of the United States for the years 1976 through 1999. The reader should be mindful that changes in a population's age composition can influence the trends in crude death rates. Many causes of death are age related, i.e. certain causes are more prevalent among specific age groups. Examples are heart disease, cancer, stroke, and diabetes, which are common causes of death among the elderly and would be expected to have increased as a result of the increasing average age of the populations, all other influences being equal.

Age-adjusted death rates for some causes, by state, for the year 1999, are presented to show how Oklahoma compares with the distribution of death throughout the United States. In a few cases, other data are presented which help to explain, in greater depth, the relationships between mortality rates and age or gender. Unless otherwise noted, rates presented are crude mortality rates.

**Heart Disease**

**Figure 5.4**

**HEART DISEASE DEATH RATES, UNITED STATES AND TULSA COUNTY, 1976-1999**



SOURCE: U.S. data from Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System, 2001. Tulsa County data from OSDH. Rates computed from TCCHD and Census Bureau population counts and local estimates. TCCHD,mss.acb,1-2002.

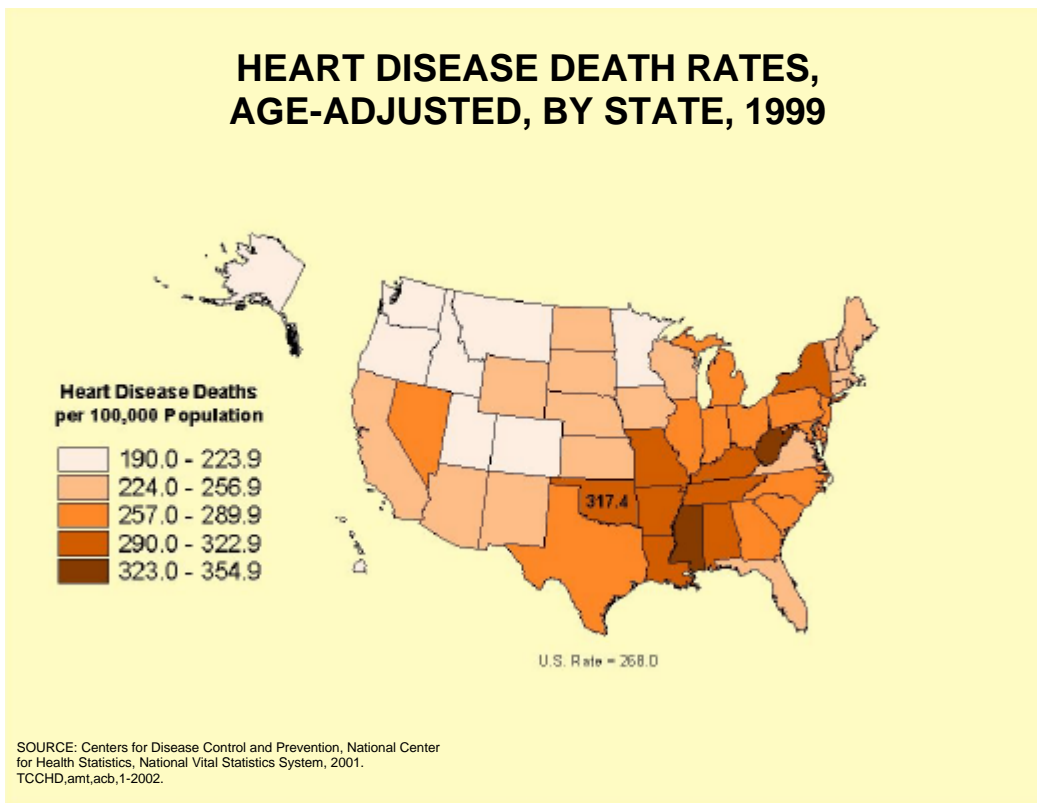


Heart disease is the leading cause of death in the United States, Oklahoma, and Tulsa County for all racial groups and both genders. Heart disease is associated with a number of dietary and lifestyle factors which include smoking, lack of exercise, diets high in fat content, obesity, and others.

**Figure 5.4** presents the crude annual heart disease death rates for Tulsa County and the United States from 1976 through 1999. Tulsa County's crude death rate rose slightly from approximately 275 deaths per 100,000 population in 1976 to over 300 in the 1980s but has since declined to approximately 280 deaths per 100,000 population in 1999. The U.S. crude death rate for heart disease has been on a gradual decline, from a rate of 333 deaths per 100,000 population in 1976 to 266 deaths per 100,000 population in 1999.

The mortality rate for this disease varies significantly across the United States. U.S. heart disease death rates are higher in the southeastern states (**Figure 5.5**). Oklahoma's 1999 age-adjusted heart disease death rate was 317.4 deaths per 100,000 population, which was significantly higher than the overall U.S. rate of 268.0. The lowest heart disease mortality states are in the Rocky Mountain region, the Pacific Northwest, Alaska, and Hawaii.

Figure 5.5



**DID YOU KNOW?**

*More than 60 million Americans have some form of cardiovascular disease, including high blood pressure, coronary heart disease, stroke, and congestive heart failure.*

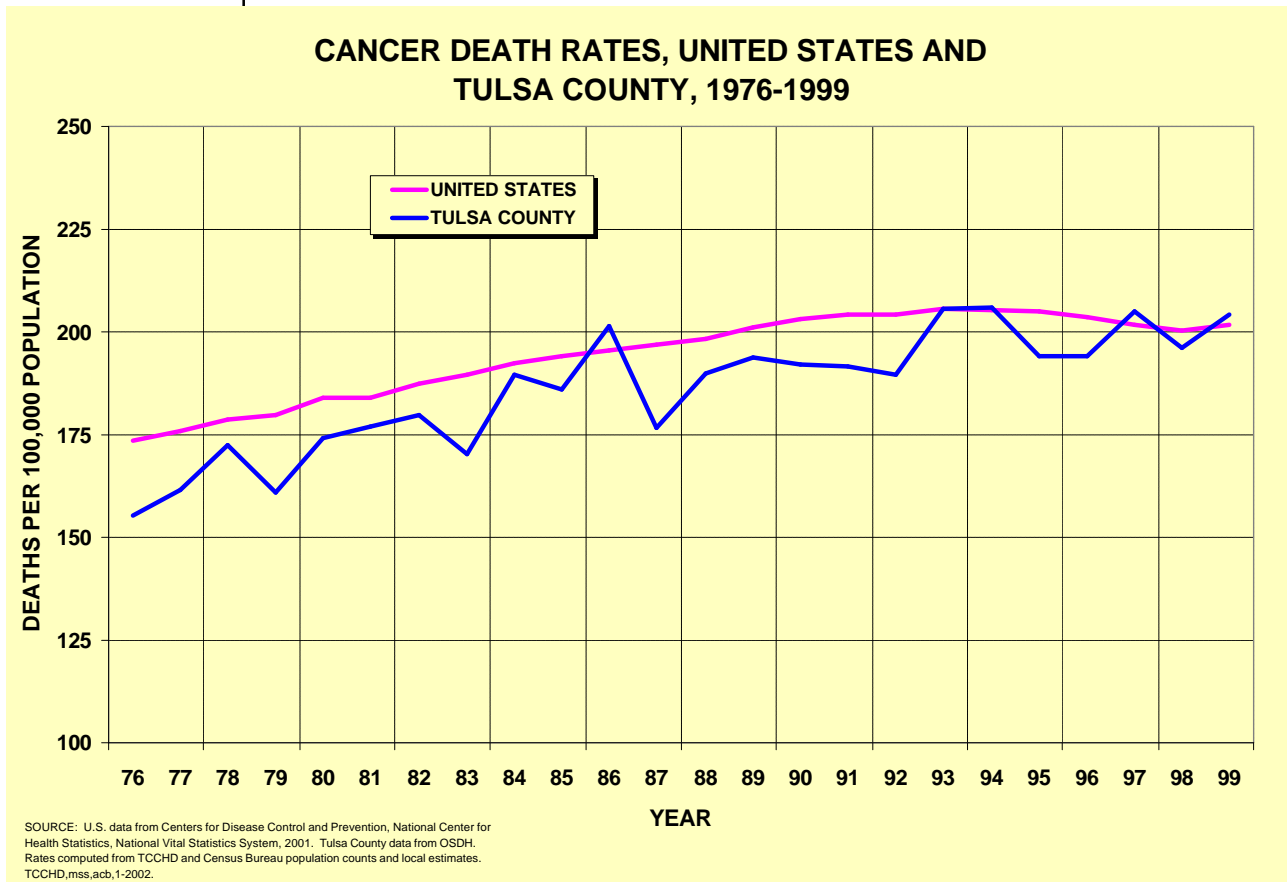
- Centers for Disease Control and Prevention, 2001

**HEALTHY PEOPLE 2010 OBJECTIVE**

*Reduce coronary heart disease deaths.*

- U.S. Department of Health and Human Services, 2000

**Figure 5.6** | **Malignant Neoplasms (Cancer)**



**DID YOU KNOW?**

*In 1999, approximately 550,000 Americans died of cancer.*

*- Centers for Disease Control and Prevention, 2001*

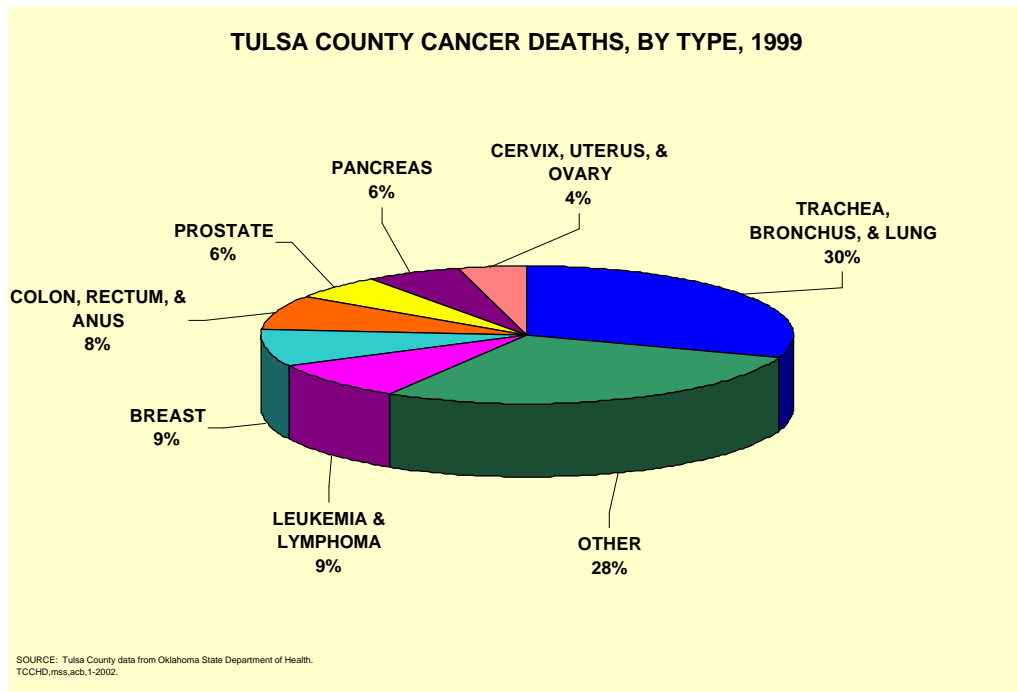
Cancer, or malignant neoplasms, is the second leading cause of death in the United States, Oklahoma, and Tulsa County. Cancer is a disease of great variety and of numerous causes and can affect many sites in the human body. Cure rates for cancer vary greatly depending upon the site and type of malignancy, and survival rates are equally as varied. Among the factors known to influence the development of cancer in humans are heredity, lifestyle (including smoking, diet, alcohol use, and drug use), stress, and environmental exposures including exposures to carcinogenic (cancer causing) agents in air and water. Cancer mortality is also influenced by income, probably because of differentials in healthcare, diet, nutrition, smoking prevalence, and other factors.

**Figure 5.6** presents the crude annual cancer death rates for Tulsa County and the United States for 1976 through 1999 and clearly reflects an increasing trend in these rates for both geographic areas. Tulsa County’s crude cancer death rate has risen from just over 150 deaths per 100,000 population in 1976 to over 200 deaths per 100,000 population in 1999, an increase of approximately 33% during this time period. During the same time, the U.S. crude death rate also increased from just under 175 deaths per 100,000 population in 1976 to just



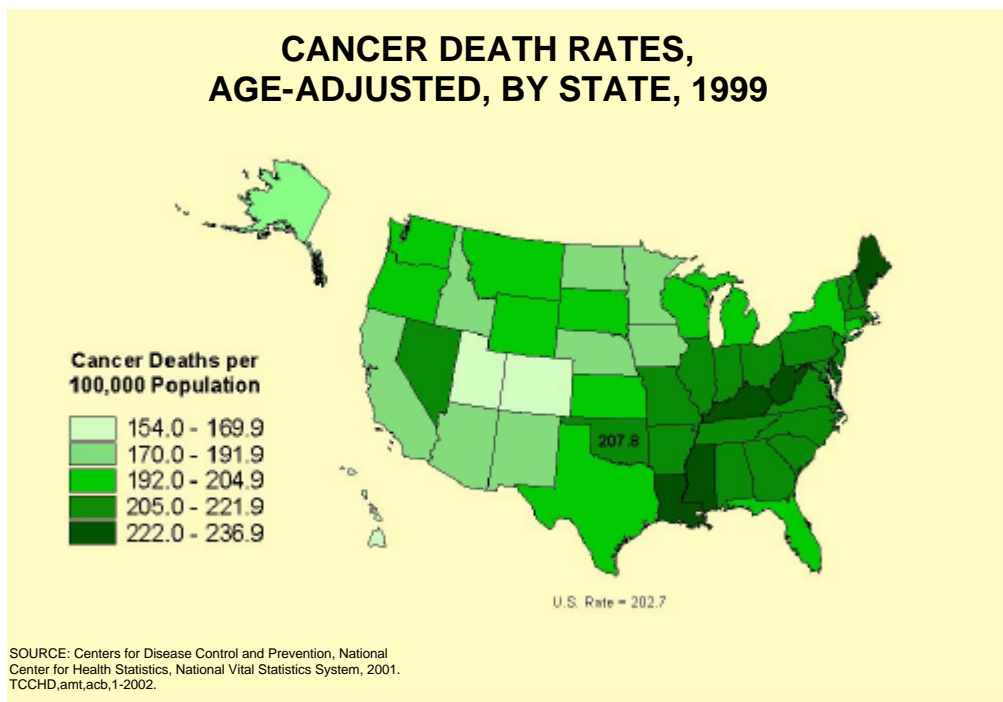


Figure 5.7



over 200 deaths per 100,000 population in 1999. Some of the increase in crude cancer death rates is likely due to the increasing median age of the population. Cancer is more prevalent among older residents, especially those over age 65. **Figure 5.7** portrays 1999 Tulsa County cancer deaths by type.

Figure 5.8



**HEALTHY PEOPLE 2010 OBJECTIVE**

*Reduce the overall cancer death rate.*

- U.S. Department of Health and Human Services, 2000

**DID YOU KNOW?**

*In 1999 cancer totaled almost 23% of all deaths in the United States*

- National Vital Statistics System, 2001

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Reduce stroke  
deaths.*

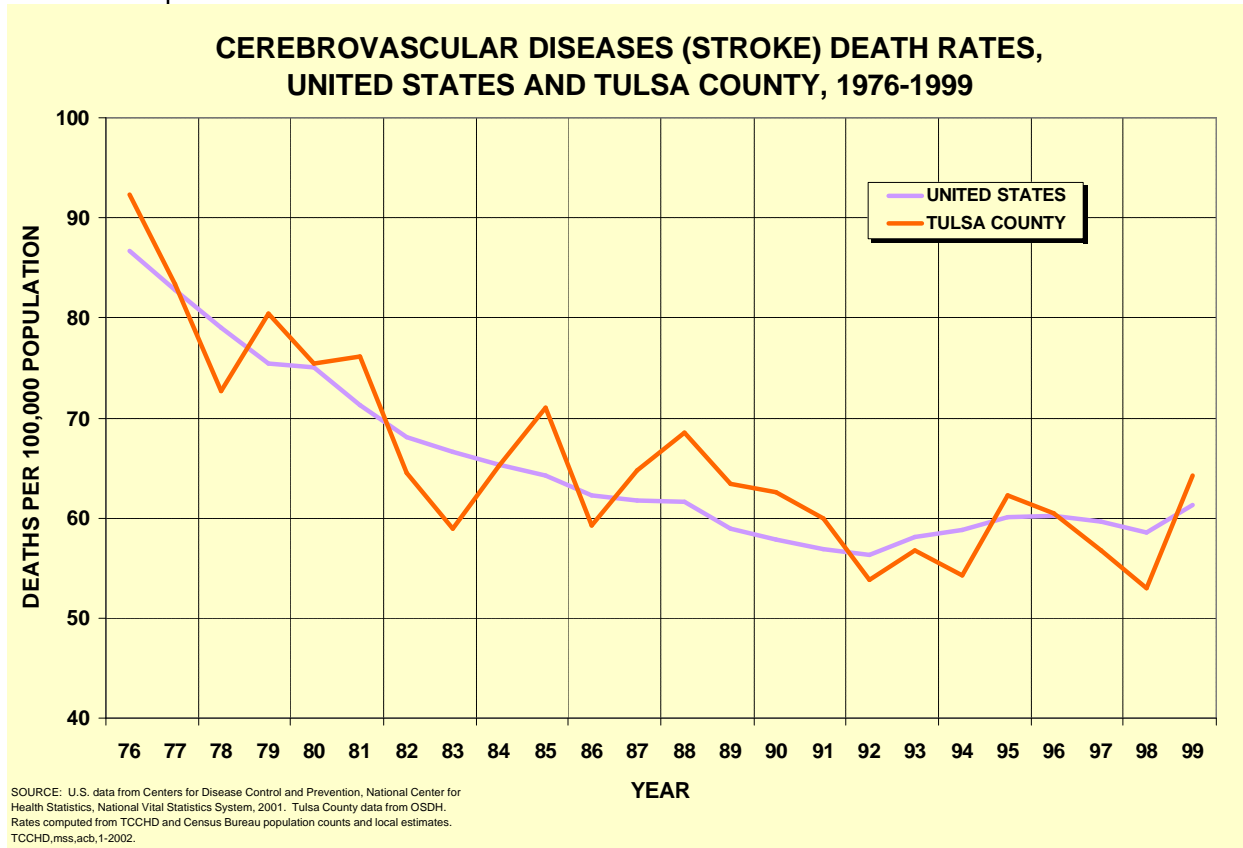
*U.S. Department  
of Health and  
Human Services,  
2000*

Age-adjusted rates for U.S. cancer deaths from 1999 are presented by state in **Figure 5.8**. Cancer death rates are significantly higher in the eastern U.S., especially in the Mississippi and Ohio Valleys and in the southeast which includes the tobacco growing states. Oklahoma's age-adjusted death rate for 1999 was 207.8 deaths per 100,000 population, slightly above the national rate of 202.7 deaths per 100,000 population.

**Cerebrovascular Diseases**

Stroke (cerebrovascular diseases) is the overall third leading cause of death in the United States, Oklahoma, and Tulsa County. Stroke mortalities overwhelmingly occur among persons 65 years of age and over. Sedentary lifestyle, diets high in fats, especially saturated animal fats, and smoking are known to be significant risk factors for cerebrovascular disease.

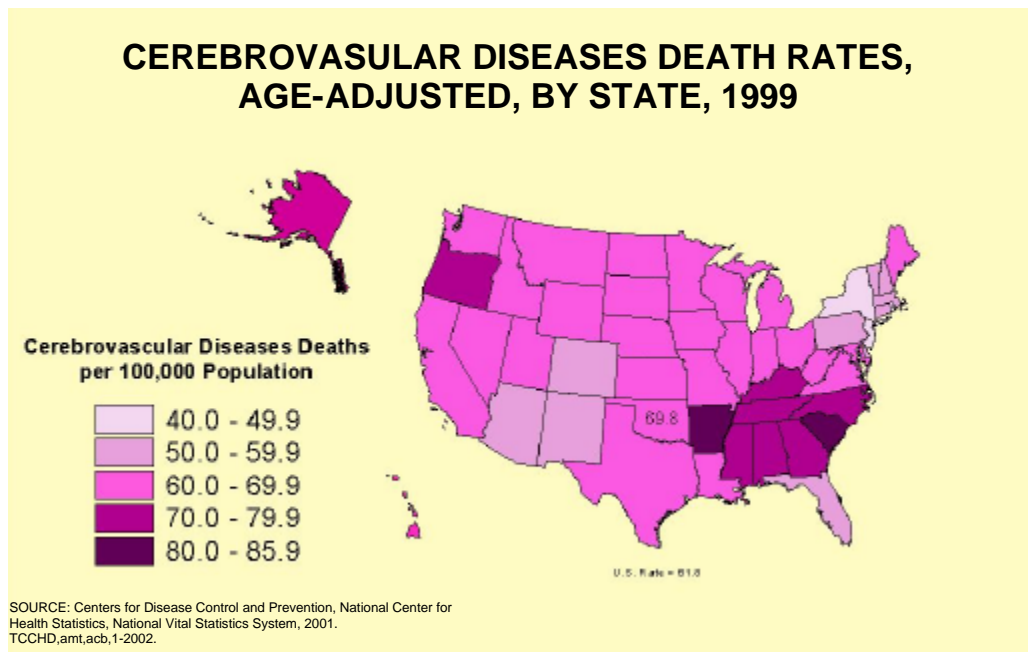
**Figure 5.9**



Tulsa County's crude death rate for cerebrovascular disease has mirrored that of the United States and has decreased from over 90 deaths per 100,000 population in 1976 to about 53 deaths per 100,000 population in 1998; however, that rate increased dramatically in 1999 to almost 65 deaths per 100,000 population (**Figure 5.9**). The U.S. rate also increased slightly in 1999, with a rate of 61.4 deaths per 100,000 population.



Figure 5.10



**DID YOU KNOW?**

Someone in the U.S. suffers a stroke every 53 seconds; every 3.1 minutes, someone dies of one.

- American Heart Association, 2002

The distribution of stroke deaths in the United States (**Figure 5.10**), based upon 1999 age-adjusted rates, clearly shows states with highest stroke death rates are in the southeastern quadrant in the U.S., where rates exceed 70 deaths per 100,000 population. Oklahoma’s rate of 69.8 deaths per 100,000 population is significantly higher than U.S. rate of 61.8. States exhibiting lowest stroke death rates are in the southwest, north central, and northern U.S., and Hawaii and Florida.

**Chronic Lower Respiratory Diseases**

The fourth leading cause of death for the United States, Oklahoma, and Tulsa County is chronic lower respiratory diseases, which include bronchitis, emphysema, asthma, and other respiratory diseases. These deaths occur primarily among those 65 years of age and older. The crude death rate of chronic lower respiratory diseases doubled for both Tulsa County and the United States during the 20 year period from 1979 through 1999 (**Figure 5.11**). Rates increased for both geographical areas, from approximately 23 deaths per 100,000 population in 1979 to 45 deaths per 100,000 population in 1999.

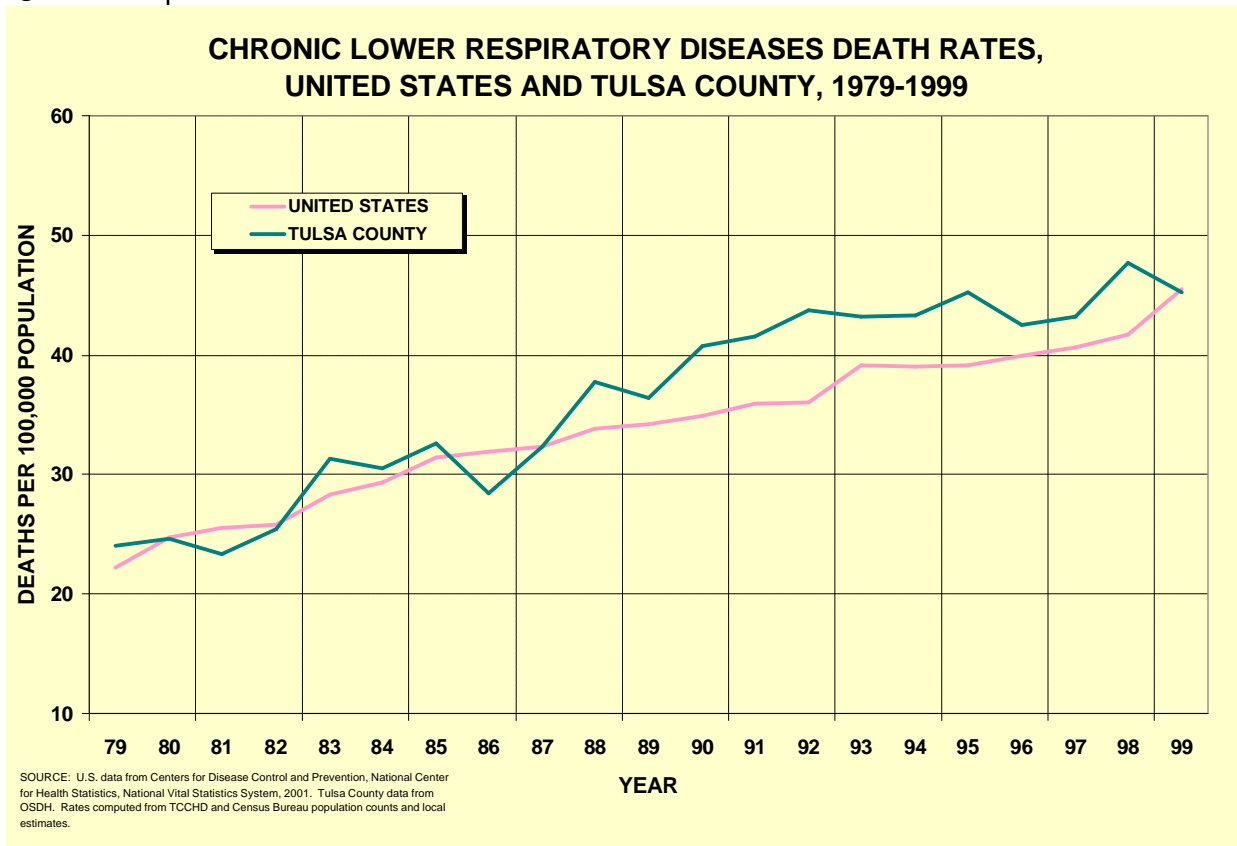
U.S. age-adjusted death rates for chronic lower respiratory diseases are graphically represented in **Figure 5.12**. States with the highest rates are somewhat scattered throughout the nation, including Wyoming, Montana, Nevada, Colorado, Kentucky, and West Virginia. States with the lowest rates

**HEALTHY PEOPLE 2010 OBJECTIVE**

Reduce asthma deaths.

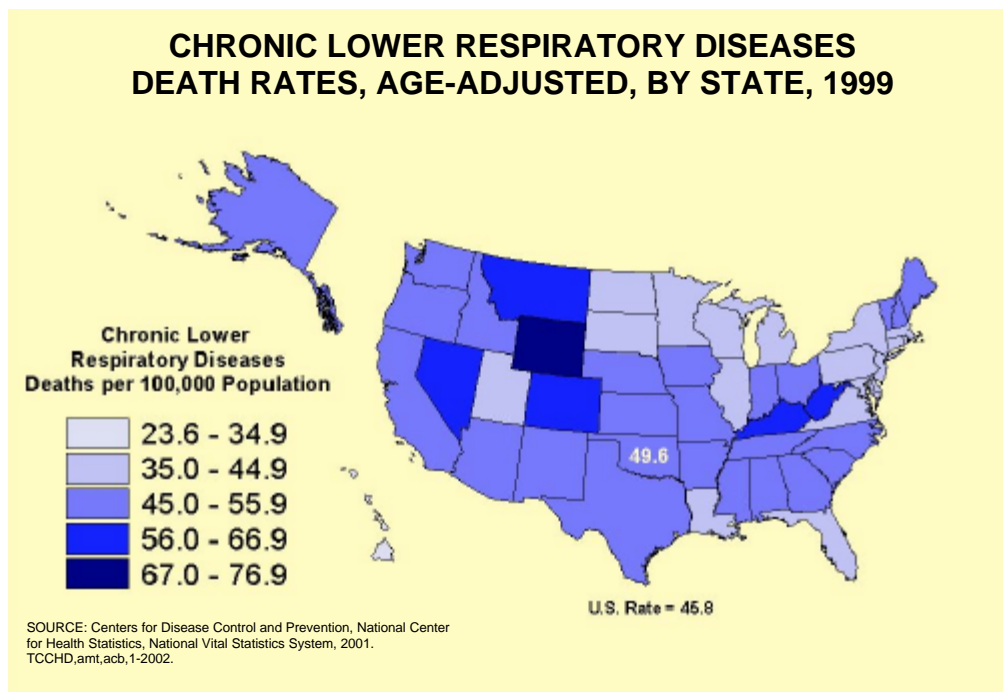
- U.S. Department of Health and Human Services, 2000

Figure 5.11 |



include those in the northern and northeastern regions. In 1999, Oklahoma's age-adjusted rate was 49.6 deaths per 100,000 population, slightly higher than the national average of 45.8.

Figure 5.12



## Accidents (Unintentional Injuries)

Accidents (unintentional injuries) were the fifth leading cause of death in the United States, Oklahoma, and Tulsa County. Unintentional injury deaths are more common among males. Although accident death rates are more than twice as high among elderly Americans (age 65 and older) as compared to the next highest rate group (15 to 24 year olds), they are a significant cause of death for all age groups.

Crude accident death rates for Tulsa County and the United States are presented in **Figure 5.13**. Death rates in Tulsa County due to accidents fell from a high of 53.4 deaths per 100,000 population in 1982 to a low of 30.3 deaths per 100,000 population in 1993 but have since started to gradually rise to a 1999 rate of 36.9. The 1999 rate for the U.S. was 35.9 deaths per 100,000 population.

The mortality rate for accidents varies significantly across the United States (**Figure 5.14**). States with the highest rates include Alaska, Mississippi, Alabama, Wyoming, and New Mexico. The northeastern states and Hawaii

### HEALTHY PEOPLE 2010 GOAL

*Reduce injuries, disabilities, and deaths due to unintentional injuries and violence.*

- U.S. Department of Health and Human Services, 2000

Figure 5.13

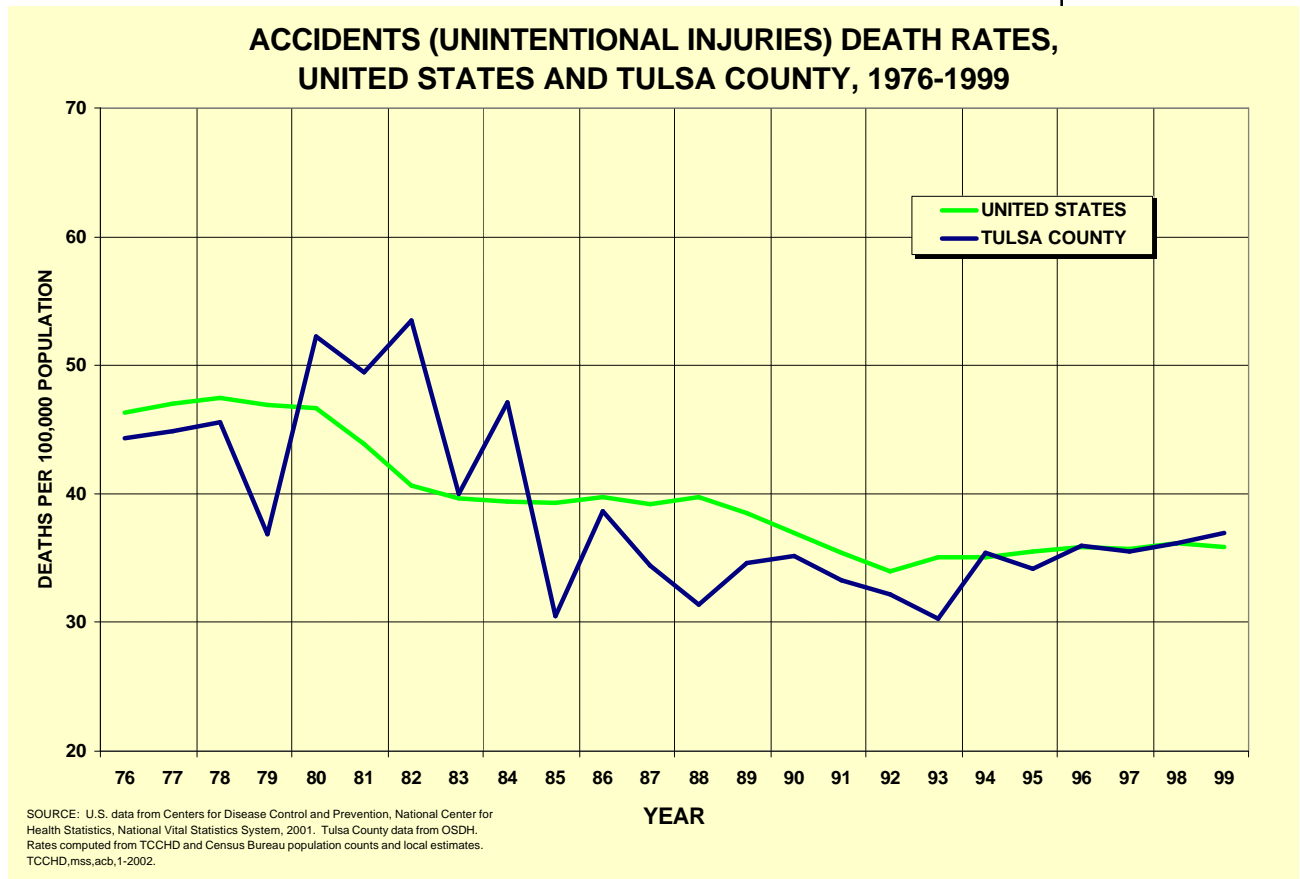
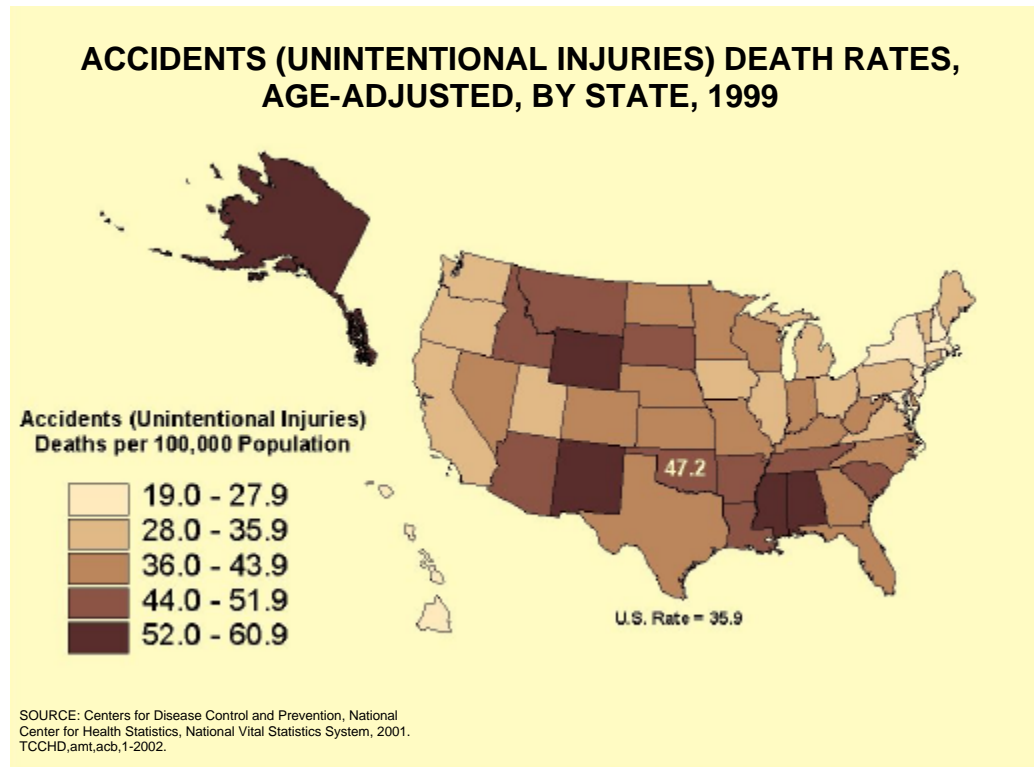


Figure 5.14

**DID YOU KNOW?**

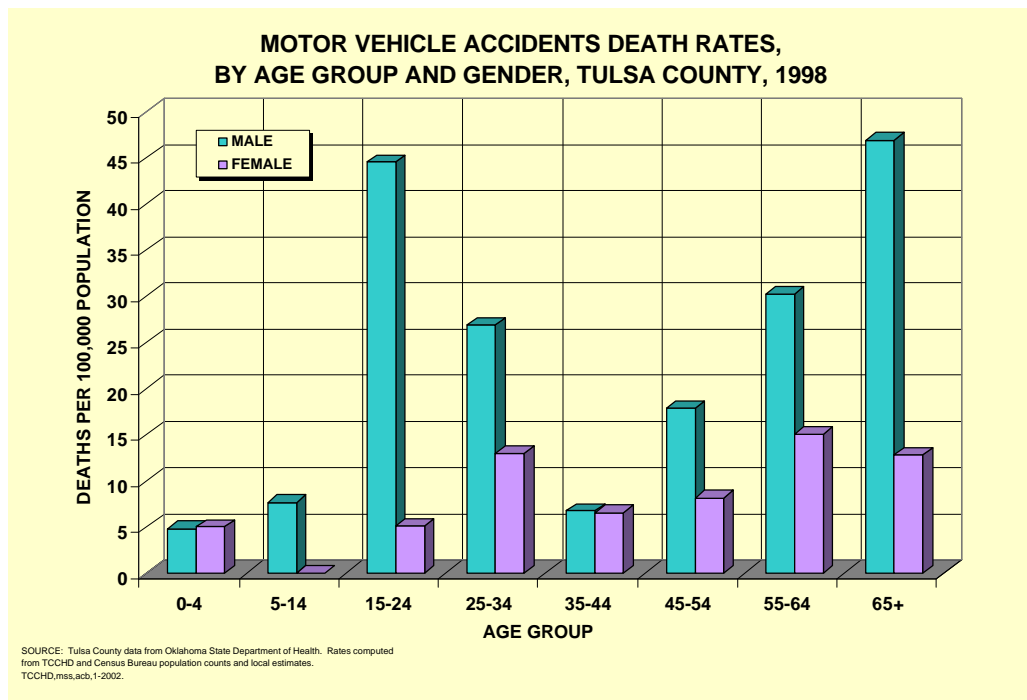
*Motor vehicle crashes are the leading cause of injury death in the United States for people aged 1-34.*

*Centers for Disease Control and Prevention, 2001*



experience the lowest rates of accidents. Oklahoma's 1999 age-adjusted accidents death rate was 47.2 deaths per 100,000 population, which was considerably higher than the overall U.S. rate of 35.9.

Figure 5.15



Motor vehicle crash deaths account for over 40% of all unintentional injury deaths in Tulsa County. Nearly twice as many traffic injury deaths occur in the 15 to 24 age group as in any other age group, except for those age 65 and over (Figure 5.15). On average, over 70% of Tulsa traffic injury deaths are males.

Since 1975, motor vehicle-related fatality rates have decreased in the U.S. by more than 25% for young motor vehicle occupants (ages 16-20). However, in 2000, an estimated 5,600 teenagers died in motor vehicle crashes. And, among passengers killed, over 60% were riding with a teenaged driver.

**DID YOU KNOW?**

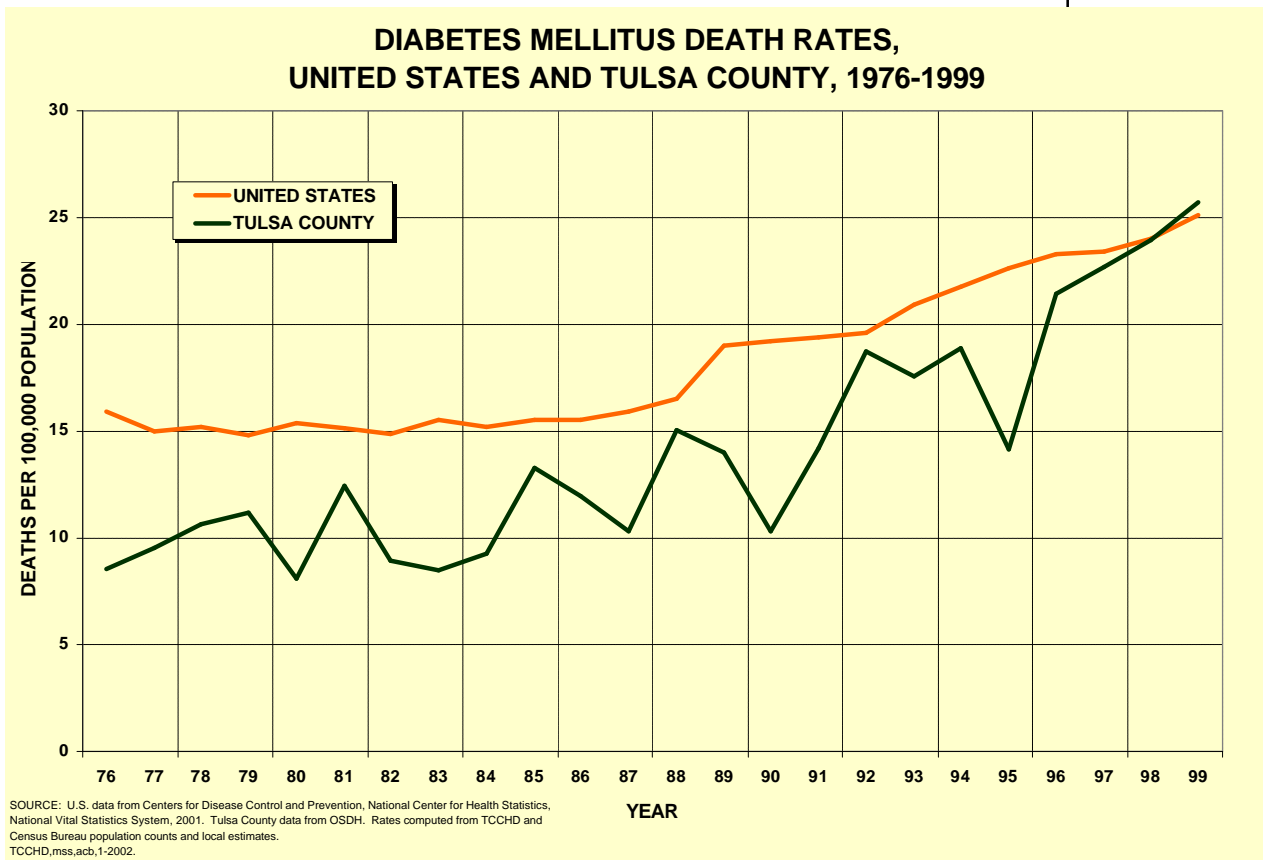
*During 1999, over 5,000 pedestrians died from traffic-related injuries in the United States.*

*- National Highway Traffic Safety Administration, 1999*

**Diabetes Mellitus**

Diabetes mellitus was the sixth leading cause of death in the United States and Tulsa County and the seventh leading cause of death in Oklahoma. While diabetes deaths occur predominantly among Americans 65 years of age and older, deaths from this cause begin to rise in the 25 to 44 year age group and exceed 20 deaths per 100,000 population among those 45 to 64 years of age. The frequency of diabetes deaths varies substantially among racial groups and by gender.

Figure 5.16

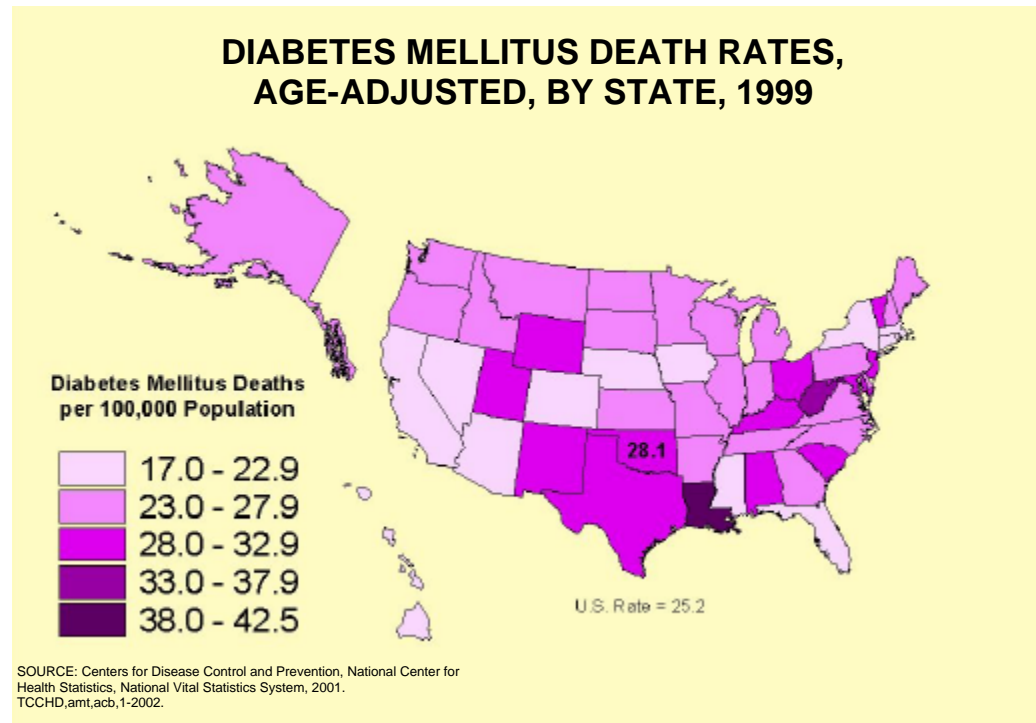




Although crude death rates for diabetes mellitus appear to have been fairly constant from 1976 through the mid 1980s, they have increased dramatically since that time. Tulsa County's crude diabetes death rate exceeded 25 deaths per 100,000 population in 1999, surpassing the U.S. rate for the first time (**Figure 5.16**).

Age-adjusted death rates for diabetes mellitus are represented in **Figure 5.17**. States with the highest rates are located predominately in the southern and eastern portions of the U.S., although Wyoming and Utah have equally high rates as well. Oklahoma's death rate for diabetes mellitus in 1999 was 28.1 deaths per 100,000 population, slightly higher than the U.S. rate of 25.2.

Figure 5.17



HEALTHY  
PEOPLE  
2010  
OBJECTIVE

*Reduce the  
diabetes death  
rate.*

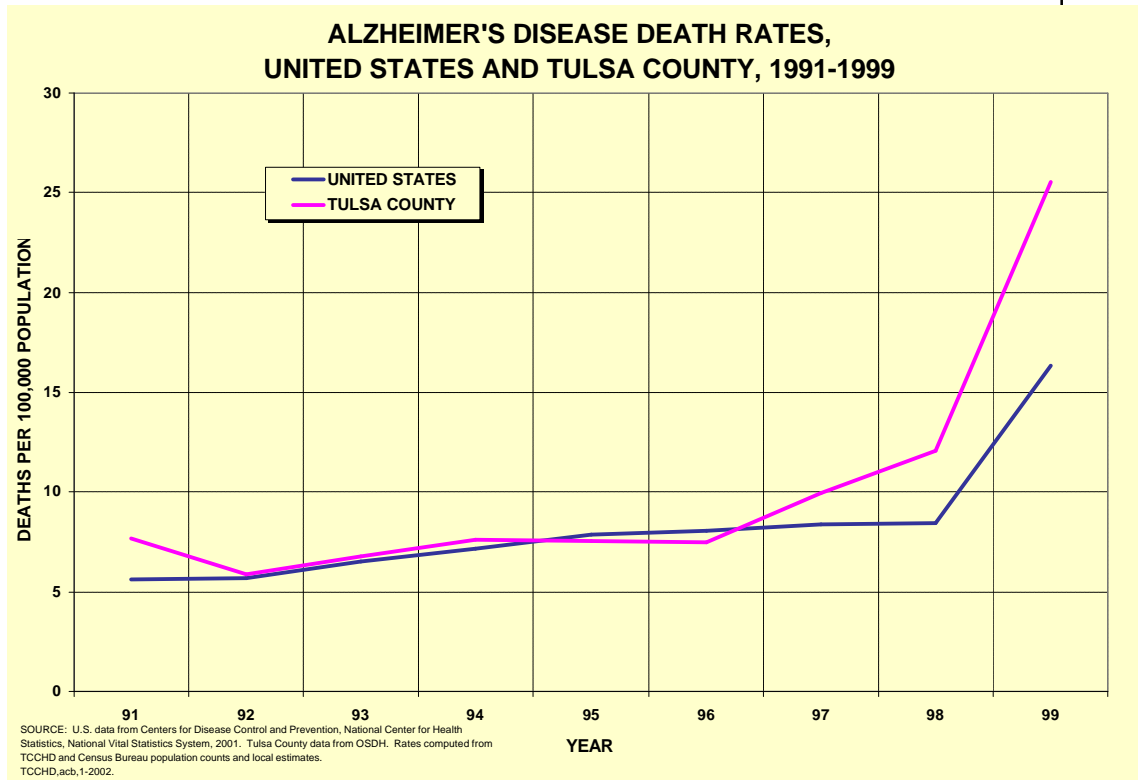
- U.S. Department  
of Health and  
Human Services,  
2000

### Alzheimer's Disease

The seventh leading cause of death in Tulsa County was Alzheimer's disease. For the first time in history, this disease became a "top 10 killer" in the United States, Oklahoma, and Tulsa County, undoubtedly due to the aging American population. Alzheimer's disease is a slowly progressive form of dementia. Risk factors include the elderly population and those with a family history of dementia.

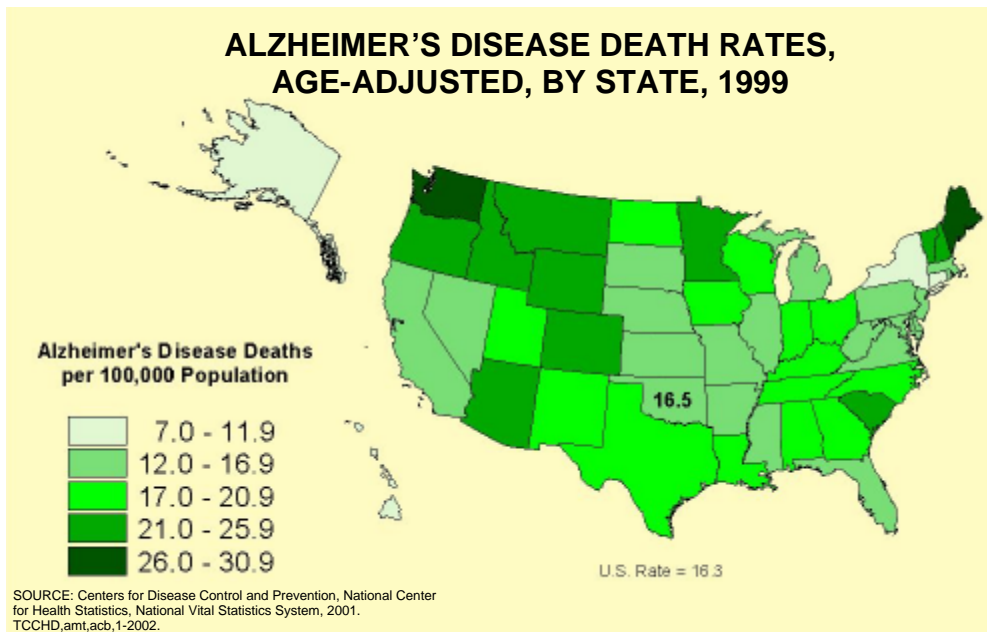
Crude death rates in Tulsa County and the United States remained fairly constant from 1991 through 1996, at a rate of approximately 6 deaths per 100,000 population. Starting in 1996, death rates for Alzheimer's disease rapidly increased to a high of 16.3 deaths per 100,000 population in the U.S. and 25.5 in Tulsa County (**Figure 5.18**).

Figure 5.18



Age-adjusted death rates for Alzheimer’s disease are illustrated in **Figure 5.19**. States with the highest rates are concentrated in the western portion of the U.S. Lowest rates are in the northeastern states, Alaska, and Hawaii. Oklahoma’s rate of 16.5 deaths per 100,000 population is above the national rate of 16.3.

Figure 5.19

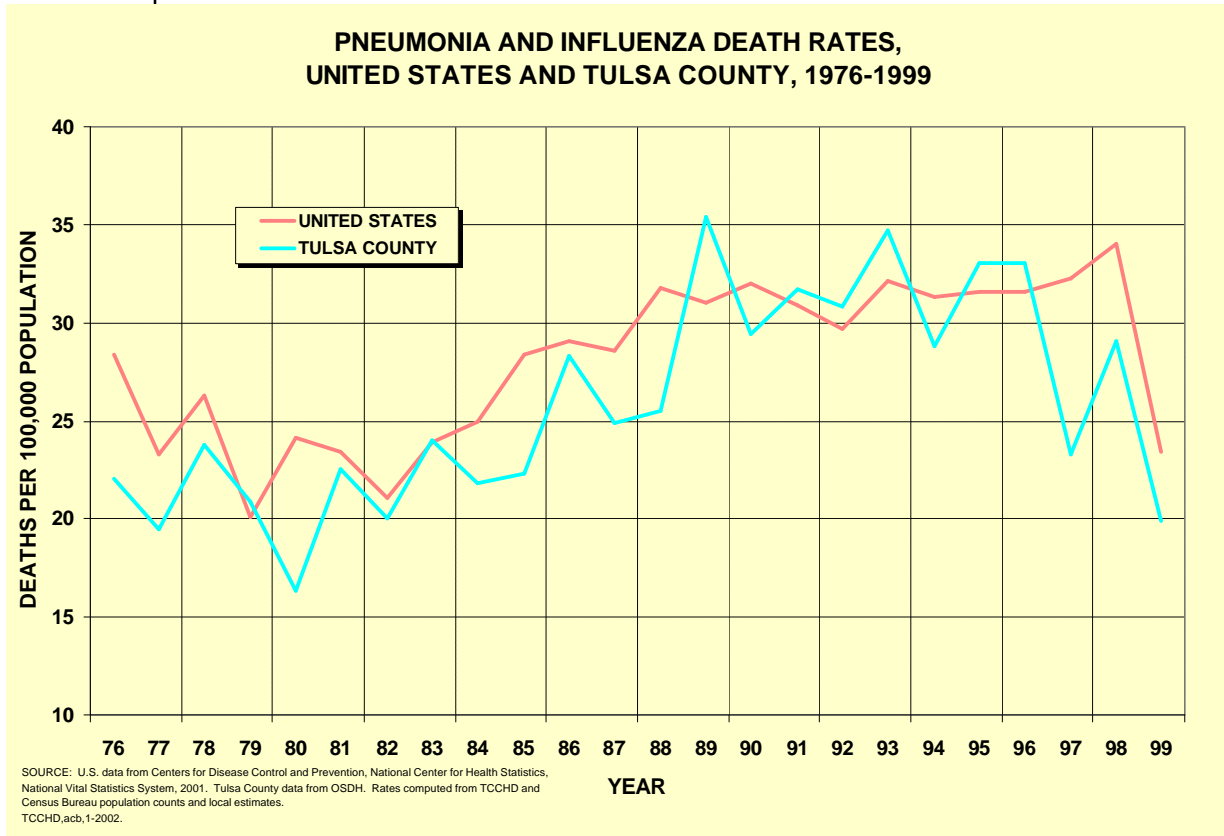


**DID YOU KNOW?**

*Alzheimer's Disease is the most common form of dementia among older people.*

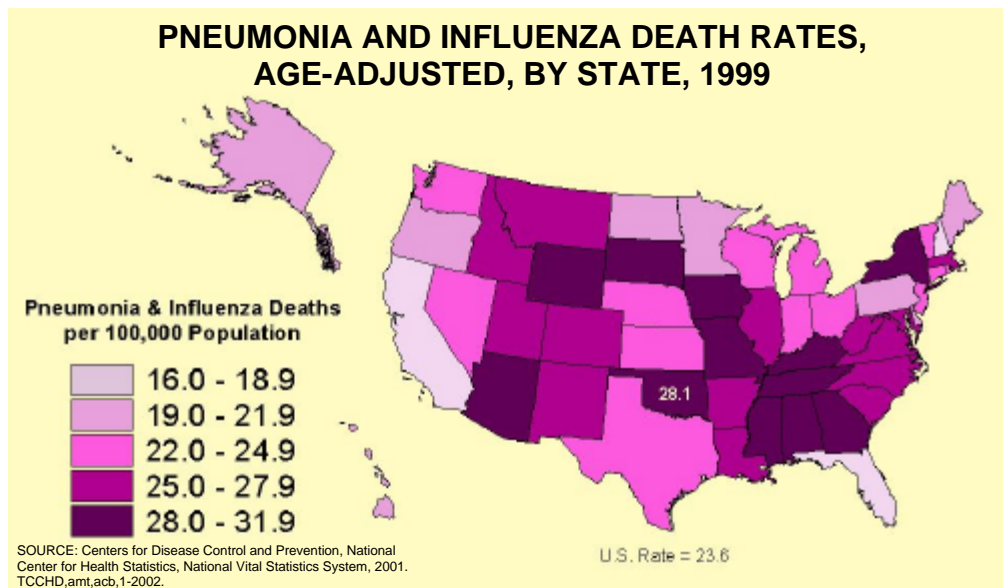
- National Institute on Aging, 2001

Figure 5.20 **Pneumonia & Influenza**



Deaths from pneumonia and influenza are the eighth leading cause of death in Tulsa County. Rates increased in Tulsa County throughout the 1980s, peaking at a rate of 35.4 in 1989. Rates were steady through the 1990s but started a rapid decline in 1996, resulting in a 1999 rate of 19.9 (Figure 5.20).

Figure 5.21



The distribution of pneumonia and influenza deaths in the United States (**Figure 5.21**), based upon 1999 age-adjusted rates, clearly shows states with highest pneumonia and influenza death rates are in the southeastern and midwestern quadrant in the U.S. Oklahoma's death rate for pneumonia and influenza was 28.1 deaths per 100,000 population. The U.S. rate for 1999 was 23.6.

**DID YOU KNOW?**

*Approximately 1,665 people died in 1999 from influenza.*

- Centers for Disease Control and Prevention, 2001

**Intentional Self-Harm (Suicide)**

The ninth leading cause of death in Tulsa County was intentional self-harm (suicide). It is likely that suicide deaths are undercounted. Classification of deaths to this cause are based upon available information, including expressed intentions of the decedent, circumstantial evidence, witness accounts, and police and autopsy data. In some cases, such as single-person traffic fatalities, single-person firearm fatalities, and substance overdoses, suicides may be classified as other causes of death.

The crude suicide death rate the United States has remained fairly constant from 1976 through 1999 (**Figure 5.22**). Although there is considerable annual variance in the number of Tulsa County deaths, the rate appears to have declined somewhat from a rate of 19.0 deaths per 100,000 population in 1982 to a rate of 12.5 in 1999.

**Figure 5.22**

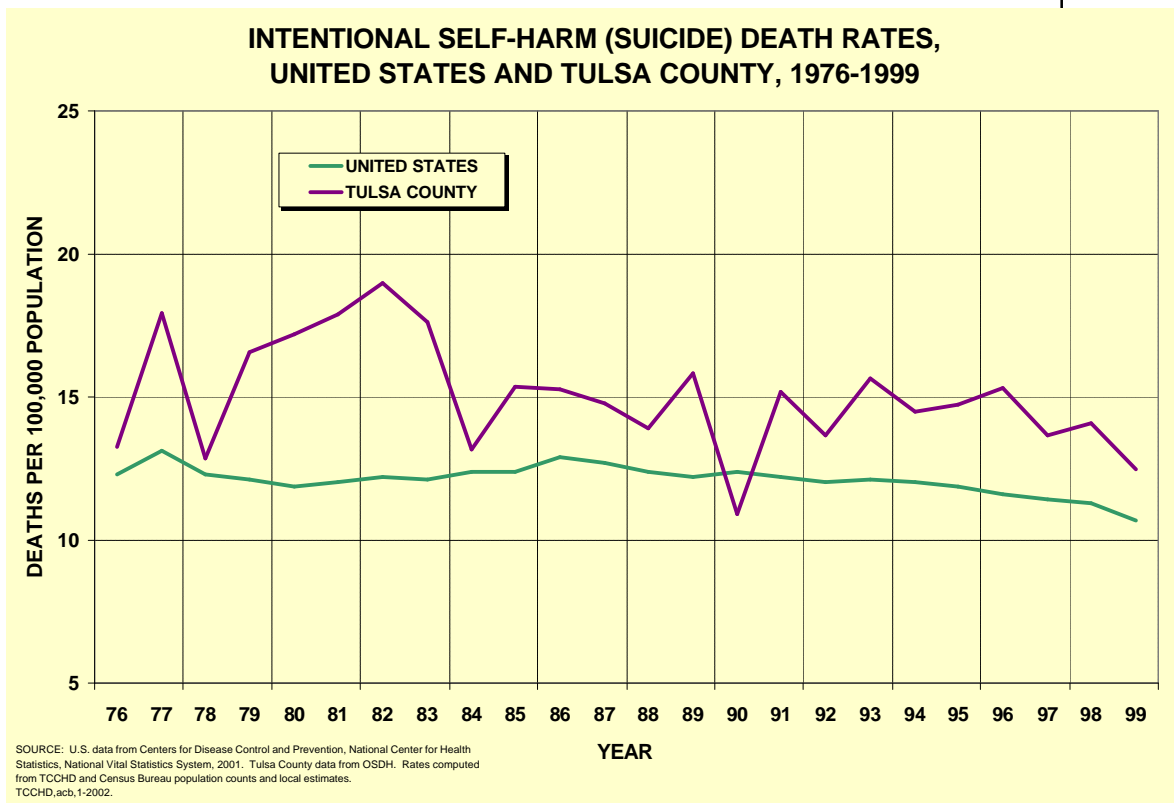
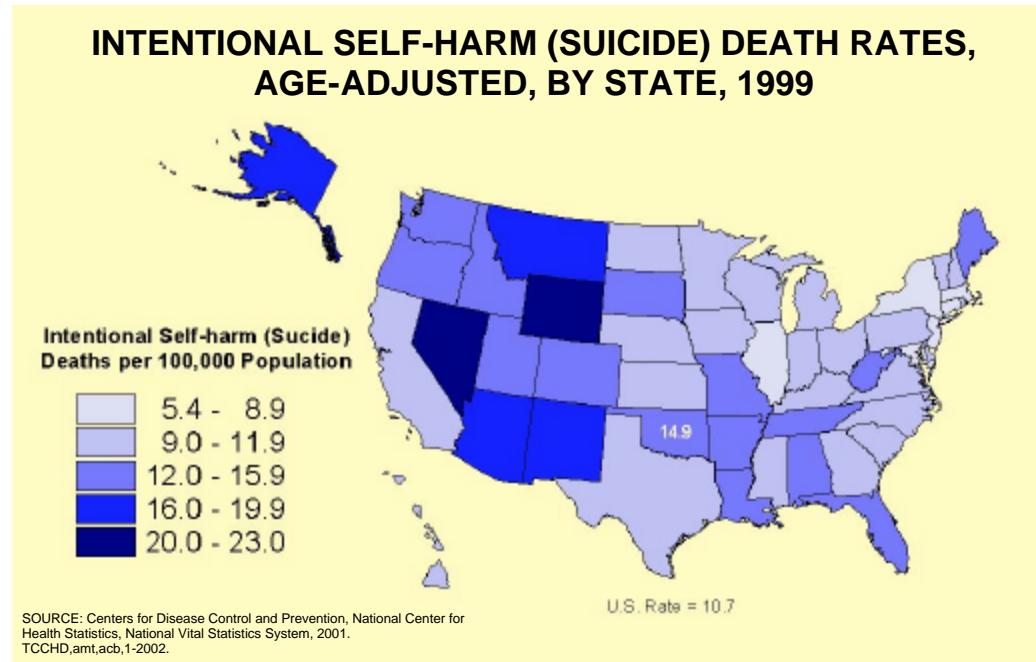


Figure 5.23

HEALTHY  
PEOPLE  
2010  
OBJECTIVE

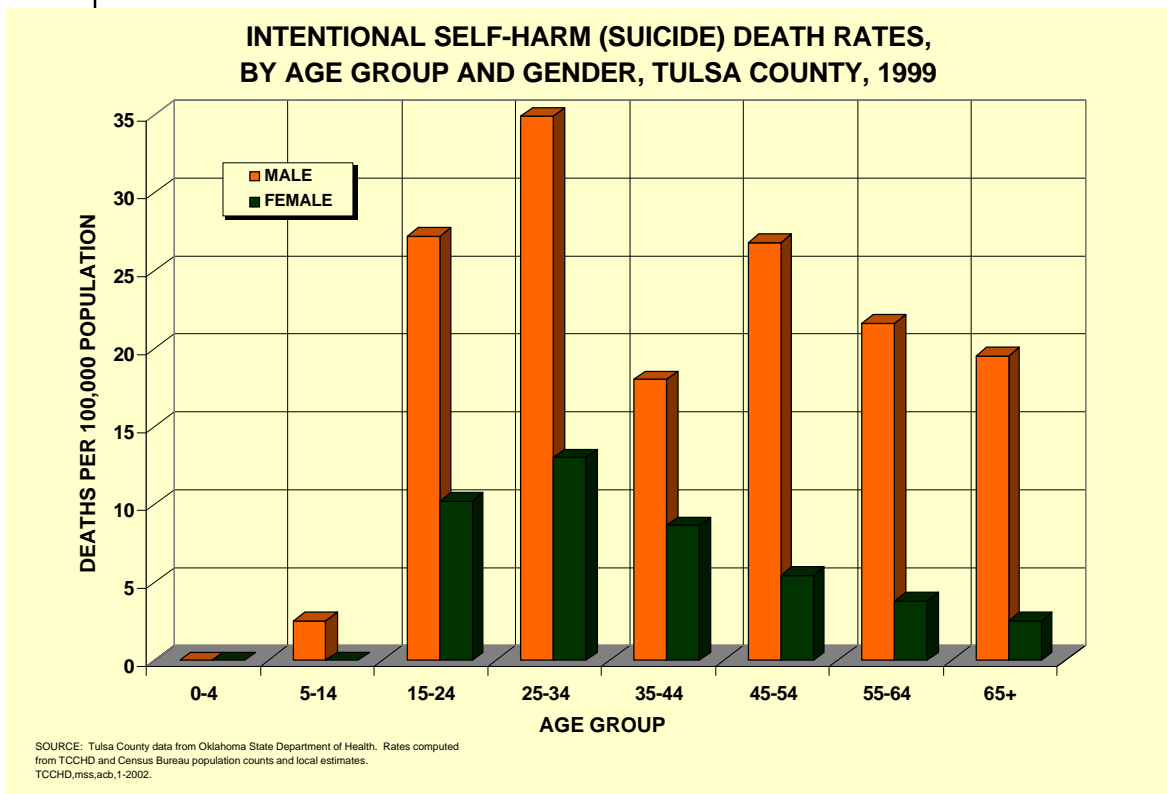
Reduce the  
suicide rate.

U.S. Department  
of Health and  
Human Services,  
2000



**Figure 5.23** illustrates the age-adjusted suicide rates in the United States during 1999. The highest rates are concentrated in the western portion of the U.S. Oklahoma’s rate of 14.9 deaths per 100,000 is higher than the national average of 10.7. States with the lowest rates of suicide deaths are in the northern and eastern portions of the U.S.

Figure 5.24



On the national level, more suicides occur among the elderly (65 years of age and older) than among any other age group. In Tulsa County, suicides by males outnumber those by females almost 3 to 1 (Figure 5.24). Although mortality data show suicides are overwhelmingly male, even among adolescents and young adults, a recent national survey suggests that females are more likely to consider or attempt suicide, yet it is males who more often succeed.<sup>2</sup>

**DID YOU KNOW?**

*Suicide is the second leading cause of death among people aged 25-34*

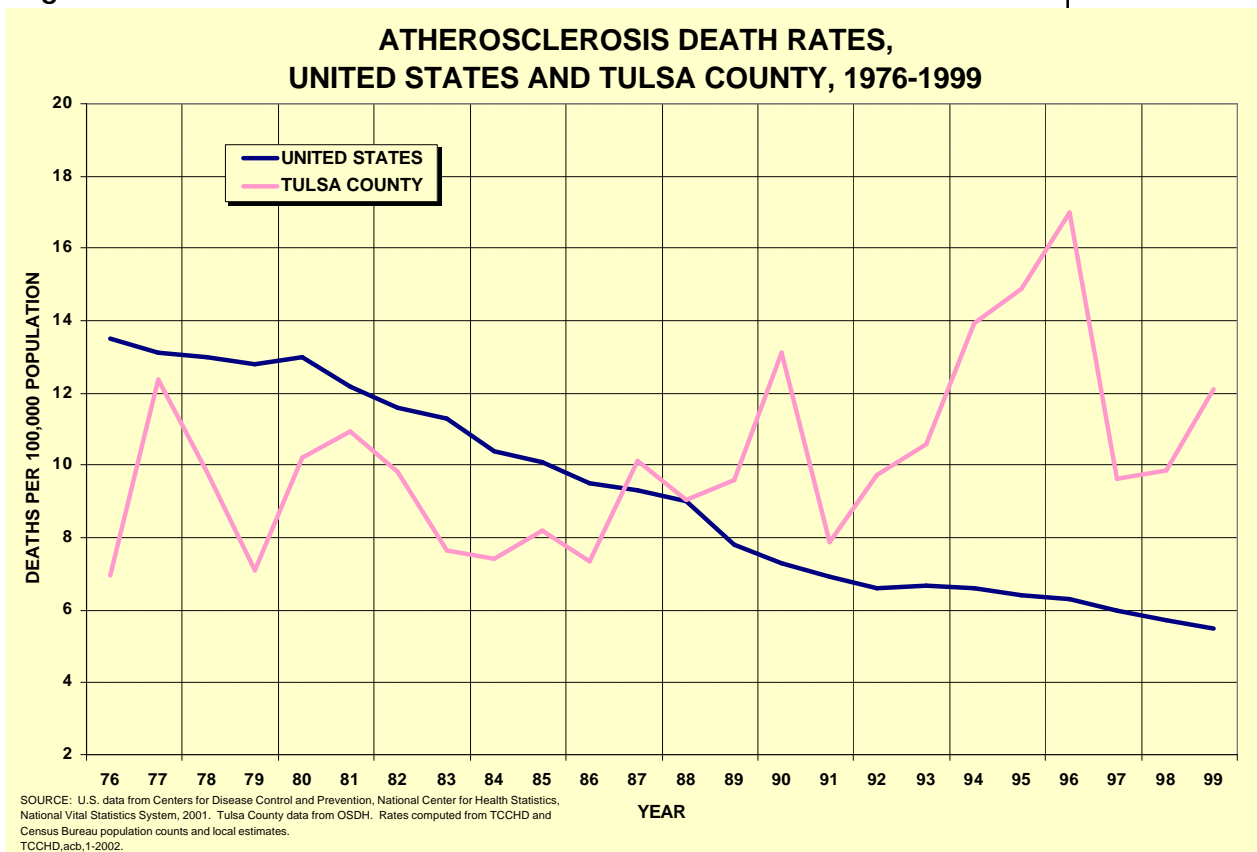
*Centers for Disease Control and Prevention, 2001*

**Atherosclerosis**

Atherosclerosis is the tenth leading cause of death for Tulsa County. Atherosclerosis is a disease in which fatty material is deposited on the wall of arteries, which narrows the arteries and eventually restricts blood flow. Risk factors include smoking, diabetes, obesity, high blood cholesterol, and a diet high in fats.

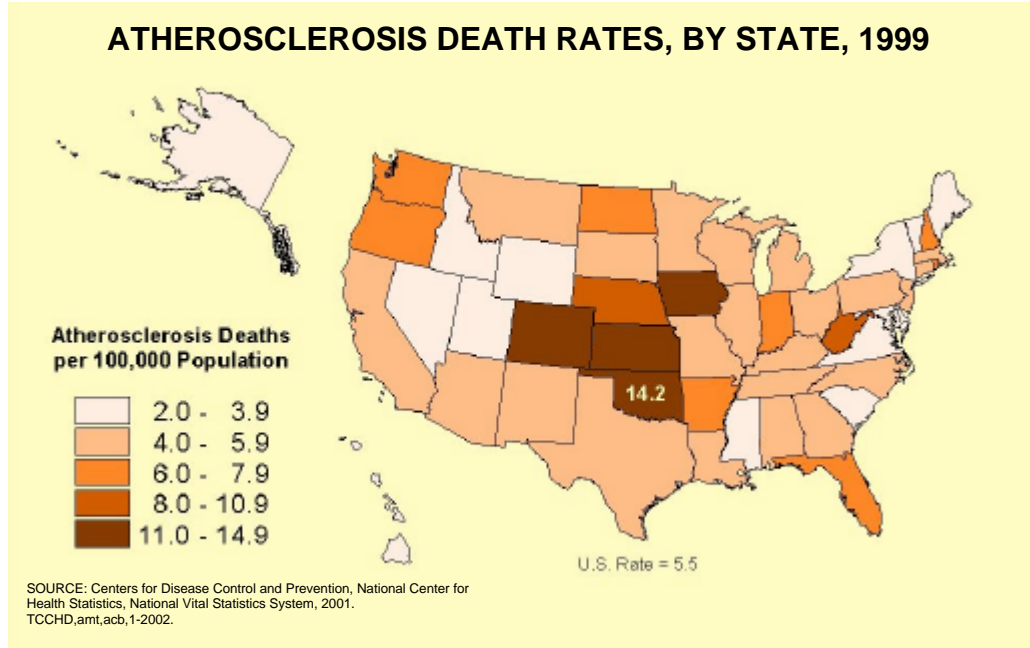
Crude death rates for atherosclerosis in the United States have declined significantly over the past twenty years, from a high of 13.0 deaths per 100,000 population in 1980 to a low of 5.5 in 1999. Tulsa County rates, on the other hand, are on an increase (Figure 5.25). In 1999, the Tulsa County rate of atherosclerosis was 12.1, slightly below the peak of 17.0 deaths per 100,000 in 1996.

Figure 5.25



Age-adjusted death rates for atherosclerosis are depicted in **Figure 5.26**. States with the highest rates are concentrated in the midwestern section of the United States. Oklahoma's atherosclerosis death rate in 1999 was 14.2 deaths per 100,000 population, the highest of any state in the U.S. The national average for that year was 5.5.

Figure 5.26



**DID YOU KNOW?**

Oklahoma has the highest rate of atherosclerosis in the United States.

- Centers for Disease Control and Prevention, 2001

**References**

- <sup>1</sup> U.S. Census Bureau. (1994). *Statistical abstract of the United States: 1994*. Washington, DC: Author.
- <sup>2</sup> Kann, L., Warren, C., Harris, W., Collins, J., Williams, B., Ross, J., et al. (1996). Youth risk behavior - United States, 1995. *Morbidity and Mortality Weekly Report*, 45(SS-4).





# INFECTIOUS AND COMMUNICABLE DISEASES

*"Be wise . . . immunize."*

- Tulsa Area Immunization Coalition

## Infectious and Communicable Diseases

- Historical Perspective
- Communicable Disease Control
- Vaccination
- Trends in Communicable Diseases
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  - Chlamydia
  - Encephalitis
  - Gonorrhoea
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  - Hepatitis B
  - Hepatitis C, Non-A and Non-B
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  - Listeriosis
  - Lyme Disease
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  - Meningococcal Disease
  - Mumps
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  - Rubella
  - Rubella
  - Salmonellosis
  - Shigellosis
  - Syphilis
  - Toxic Shock Syndrome
  - Tuberculosis
  - Typhoid Fever
- Emerging Diseases
  - West Nile Virus
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  - Anthrax
  - Botulism
  - Plague
  - Smallpox
  - Detection and Control of Emerging Diseases

## Infectious and Communicable Diseases

### Historical Perspective

The incidence and prevalence of many communicable diseases have decreased enormously in the last 50 years. These changes have been most dramatic in industrialized nations, and in recent years, in developing regions of the world where non-communicable diseases such as depression and heart disease are fast replacing infectious diseases and malnutrition as leading causes of death and disability. This change has been largely due to the collection and treatment of human waste; treatment and purification (particularly disinfection by chlorination) of water; pasteurization of milk; improved methods of processing and storing foods (especially refrigeration and freezing); the development and use of antibiotics; and the development and use of vaccines.

Unfortunately, it is becoming increasingly apparent that communicable diseases are far from being eliminated as we confront rising numbers of cases and deaths from both old and new diseases. The world is now a truly international community with unprecedented movement of people and materials between nations, which provides new opportunities for the migration of communicable diseases with each landing of an international jetliner or shipment of overseas food products.

New and re-emerging infectious diseases are challenging us to develop new methods of detection and prevention. Old diseases posing significant health problems, which had been considered effectively controlled, are again coming to the forefront. More virulent streptococcal infections have appeared as acute rheumatic fever and as the recently popularized “flesh-eating” bacteria. Pneumococci are becoming increasingly penicillin resistant, and cholera vibrios have appeared in resistant strains immune to current vaccines. Strains of *E. coli* and multi-drug-resistant tuberculosis bacilli have emerged as new threats. In the Russian Federation, diphtheria, a disease which has been all but eliminated in industrialized countries, is again epidemic.<sup>1</sup>

### Communicable Disease Control

In order to understand communicable and infectious diseases, one must first be familiar with the following terms: *host*, *environment*, *agent*, *reservoir*, and *vector*. A host is an organism (usually human or animal) that harbors a disease. The environment includes the surroundings of the organism that allow or cause disease transmission. The agent is the actual cause of the disease (bacteria, virus, etc.). Reservoirs are humans, animals, plants, soil, or inanimate organic

### HEALTHY PEOPLE 2010 GOAL

*Prevent disease, disability, and death from infectious diseases, including vaccine-preventable diseases.*

- U.S. Department of Health and Human Services, 2000

matter (feces or food) in which infectious organisms live and multiply. A vector is any living nonhuman carrier of disease that transports and serves the process of disease transmission. Vectors could include both insects and animals.

The public health prevention strategy is based upon understanding the relationships between host, environment, disease agent, and vector and interrupting that relationship by controlling, modifying, or breaking a pathway which will prevent the agent from exerting its disease-inducing capacity on the susceptible host. Public health stresses primary prevention, which attempts to keep disease from occurring at all. If this is not possible, secondary prevention seeks early detection and treatment to minimize the progression of the disease and the possibility of transmission to secondary cases.

Public health environmental efforts emphasize eliminating disease agent transmission by controlling animal, insect, and human vectors and environmental and sanitation conditions which foster the spread of disease. Environmental controls often require legal measures, which empower public health agencies to take action and reduce the spread of disease in a community.

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Reduce or eliminate indigenous cases of vaccine-preventable diseases.*

*U.S. Department of Health and Human Services, 2000*

**Vaccination**

Primary prevention efforts in the public health arena emphasize education and immunization for those diseases which are vaccine preventable. Immunization primarily targets infants and children, who, because of less developed immunological defenses, are more susceptible than adults to a variety of communicable diseases. The currently recommended childhood immunization schedule is presented as **Table 6.1**. Currently recommended adult vaccinations are shown in **Table 6.2**.

Vaccination is an essential component of public health’s disease-fighting arsenal and is one of the most cost effective interventions available today. Today’s vaccine preventable diseases were serious threats to human life in past generations. Outbreaks of diseases such as diphtheria and pertussis (whooping cough) were very common in Oklahoma and throughout the world. At the beginning of the 1900s, 160 of every 1,000 children died of an infectious disease before the age of five.

The strategy which underlies immunization protection for communities is to sustain a high level of “herd immunity.” Herd immunity is achieved when a sufficient proportion of a population is protected by vaccine to prevent the circulation of disease agents within the population. This can only be achieved by assuring that enough members of the community are not biologically susceptible to acquiring a disease that it is unable to spread through the community. Since no vaccine is 100% effective at inducing sufficient immunity in an individual, it is even more important for vaccination levels to be high and for appropriate booster vaccinations to be given.



Table 6.1

Recommended Childhood Immunization Schedule, United States, January - December 2001												
Age ▶ Vaccine ▼	Birth	1 mo	2 mos	4 mos	6 mos	12 mos	15 mos	18 mos	24 mos	4 - 6 yrs	11 - 12 yrs	13 - 18 yrs
Hepatitis B	Hep B #1	Only if mother HBsAg(-)								Hep B series		
		Hep B #2		Hep B #3								
Diphtheria, Tetanus, Pertussis			DT aP	DT aP	DT aP		DT aP			DT aP		T d
H Influenzae Type b			Hib	Hib	Hib	Hib						
Inactivated Polio			IPV	IPV	IPV					IPV		
Measles, Mumps, Rubella						MMR #1				MMR #2		MMR #2
Varicella						Varicella				Varicella		
Pneumococcal			PCV	PCV	PCV	PCV				PCV		PPV
Hepatitis A										Hep A - series		
Influenza									Influenza (yearly)			

Vaccines below this line are for selected populations

SOURCE: Approved by the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP), 2002.

Communicable diseases infect a given number of individuals in any population (in geographic areas where the diseases are active) on an ongoing basis. The rate at which a disease normally occurs within a population is referred to as an endemic rate. Epidemics occur when the base line rate of disease in a population clearly exceeds the endemic rate. For many diseases, this occurs on a seasonal basis. Since some diseases show seasonal fluctuations in endemic rates as a natural cycle, such as influenza, an epidemic rate must be identified in consideration of endemic periodic fluctuations. A worldwide epidemic is referred to as pandemic, while epidemic rates of disease among animals is referred to as epizootic.

Table 6.2

**Summary of Adolescent / Adult Immunization Recommendations**

<u>Agent</u>	<u>Primary Schedule</u>	<u>Agent</u>	<u>Primary Schedule</u>
<b>Hepatitis A Vaccine</b>	<p>HA VRIX®: T wo doses, separated by 6-12 months.</p> <p>Adults (19 years of age and older) – Dose: 1.0 mL intramuscular (IM); Persons 2-18 years of age: Dose: 0.5 mL (IM).</p> <p>VA QTA®: Adults (18 years of age and older): T wo doses, separated by 6 months. Dose: 1.0 mL intramuscular (IM); Persons 2-17 years of age: T wo doses, separated by 6-18 months; Dose: 0.5 mL (IM)</p>	<b>Poliovirus Vaccine:</b>	<p>U nimmunized adolescents/adults: IPV is recommended – two doses at 4-8 week intervals, third dose 6-12 months after second (can be as soon as 2 months) Dose: 0.5 mL subcutaneous (S C) or intramuscular (IM).</p> <p>Partially immunized adolescents/adults: Complete primary series with IPV (IPV schedule shown above). OPV is no longer recommended for use in the United S tates.</p>
<b>Hepatitis B Vaccine</b>	<p>T hree doses: second dose 1-2 months after the first, third dose 4-6 months after the first. No need to start series over if schedule interrupted. Can start series with one manufacturer's vaccine and finish with another.</p> <p>Dose (A dult): intramuscular (IM)</p> <p>Recombivax HB®: 10 µg/1.0 mL (green cap)</p> <p>E ngerix-B®: 20 µg/1.0 mL (orange cap)</p> <p>Dose (A dolescents 11-19 years): intramuscular (IM)</p> <p>Recombivax HB®: 5 µg/0.5 mL (yellow cap)</p> <p>E ngerix-B®: 10 µg/0.5 mL (light blue cap)</p> <p>Booster: None presently recommended.</p>	<b>Rubella Vaccine*</b>	<p>One dose.</p> <p>Dose: 0.5 mL subcutaneous (S C)</p>
<b>Influenza Vaccine</b>	<p>Dose: 0.5 mL intramuscular (IM)</p> <p>Given annually, each fall.</p>	<b>T etanus and Diphtheria T oxioids Combined (T d)</b>	<p>T wo doses 4-8 weeks apart, third dose 6-12 months after the second. No need to repeat doses if the schedule is interrupted.</p> <p>Dose: 0.5 mL intramuscular (IM)</p> <p>Booster: A t 10 year intervals throughout life.</p>
<b>Measles and Mumps Vaccines*</b>	<p>A t least one dose. (T wo doses of measles-containing vaccine if in college, in health care profession or traveling to a foreign country with second dose at least 1 month after the first.)</p> <p>Dose: 0.5 mL subcutaneous (S C)</p>	<b>Varicella Vaccine</b>	<p>For persons &lt;13 years of age, one dose.</p> <p>For persons 13 years of age and older, two doses separated by 4-8 weeks. If &gt;8 weeks elapse following the first dose, the second dose can be administered without restarting the schedule.</p> <p>Dose: 0.5 mL subcutaneous (S C)</p>
<b>Pneumococcal Polysaccharide Vaccine (PPV)</b>	<p>One dose for most people**</p> <p>Dose: 0.5 mL intramuscular (IM) or subcutaneous (S C)</p>	<p>*T hese vaccines can be given in the combined form measles-mumps-rubella (MMR). Persons already immune to one or more components can still receive MMR.</p> <p>**Persons vaccinated prior to age 65 should be vaccinated at age 65 if 5 or more years have passed since the first dose. For all persons with functional or anatomic asplenia, transplant patients, patients with chronic kidney disease, immunosuppressed or immunodeficient persons, and others at highest risk of fatal infection, a second dose should be given – at least 5 years after first dose.</p>	

SOURCE: Centers for Disease Control and Prevention, 2001.





## Trends In Communicable Diseases

The Centers for Disease Control and Prevention (CDC), with input from state and territorial health officials and others, establishes a list of infectious diseases that are designated as notifiable at the national level. Notifiable diseases are those for which regular, frequent, and timely information regarding individual cases is considered important for the prevention and control of the disease. As of 2002, 66 infectious diseases are designated as notifiable at the national level. Both additions to and deletions from the list under national surveillance are periodically made as diseases become more or less important from an epidemiological standpoint. The 66 notifiable infectious diseases are shown in **Table 6.3**. In this chapter, several nationally notifiable diseases, in conjunction with Tulsa County and U.S. rates for each disease, will be discussed in alphabetical order. In most cases, time trends for disease rates are shown through 2000, although the length of data available varies by disease. Tulsa County data is derived from information reported by the Oklahoma State Department of Health. Data for some years are unavailable.

**Table 6.3**

Nationally Notifiable Infectious Diseases		
Acquired Immunodeficiency Syndrome (AIDS)	Giardiasis	Rabies, animal
Anthrax	Gonorrhea	Rabies, human
Botulism	<i>Haemophilus influenzae</i> , invasive disease	Rocky Mountain spotted fever
Brucellosis	Hansen disease (leprosy)	Rubella
Chancroid	Hantavirus pulmonary syndrome	Rubella, congenital syndrome
<i>Chlamydia trachomatis</i> , genital infections	Hemolytic uremic syndrome, post-diarrheal	Salmonellosis
Cholera	Hepatitis A	Shigellosis
Coccidioidomycosis	Hepatitis B	Streptococcal disease, invasive, Group A
Cryptosporidiosis	Hepatitis B virus infection perinatal	Streptococcal toxic-shock syndrome
Cyclosporiasis	Hepatitis, C; non A, non B	<i>Streptococcus pneumoniae</i> , drug resistant, invasive disease
Diphtheria	HIV infection, adult (>=13 years)	<i>Streptococcus pneumoniae</i> , invasive in children <5 years
Ehrlichiosis	HIV infection, pediatric (<13 years)	Syphilis
Ehrlichiosis human granulocytic	Legionellosis	Syphilis, congenital
Ehrlichiosis, human monocytic	Listeriosis	Tetanus
Ehrlichiosis, human, other or unspecified agent	Lyme disease	Toxic-shock syndrome
Encephalitis	Malaria	Trichinosis
Encephalitis, California serogroup viral	Measles	Tuberculosis
Encephalitis, Eastern equine	Meningococcal disease	Tularemia
Encephalitis, Powassan	Mumps	Typhoid fever
Encephalitis, St. Louis	Pertussis	Varicella (deaths only)
Encephalitis, Western equine	Plague	Yellow fever
Encephalitis, West Nile	Poliomyelitis, paralytic	
Enterohemorrhagic <i>E. coli</i>	Psittacosis	
	Q Fever	

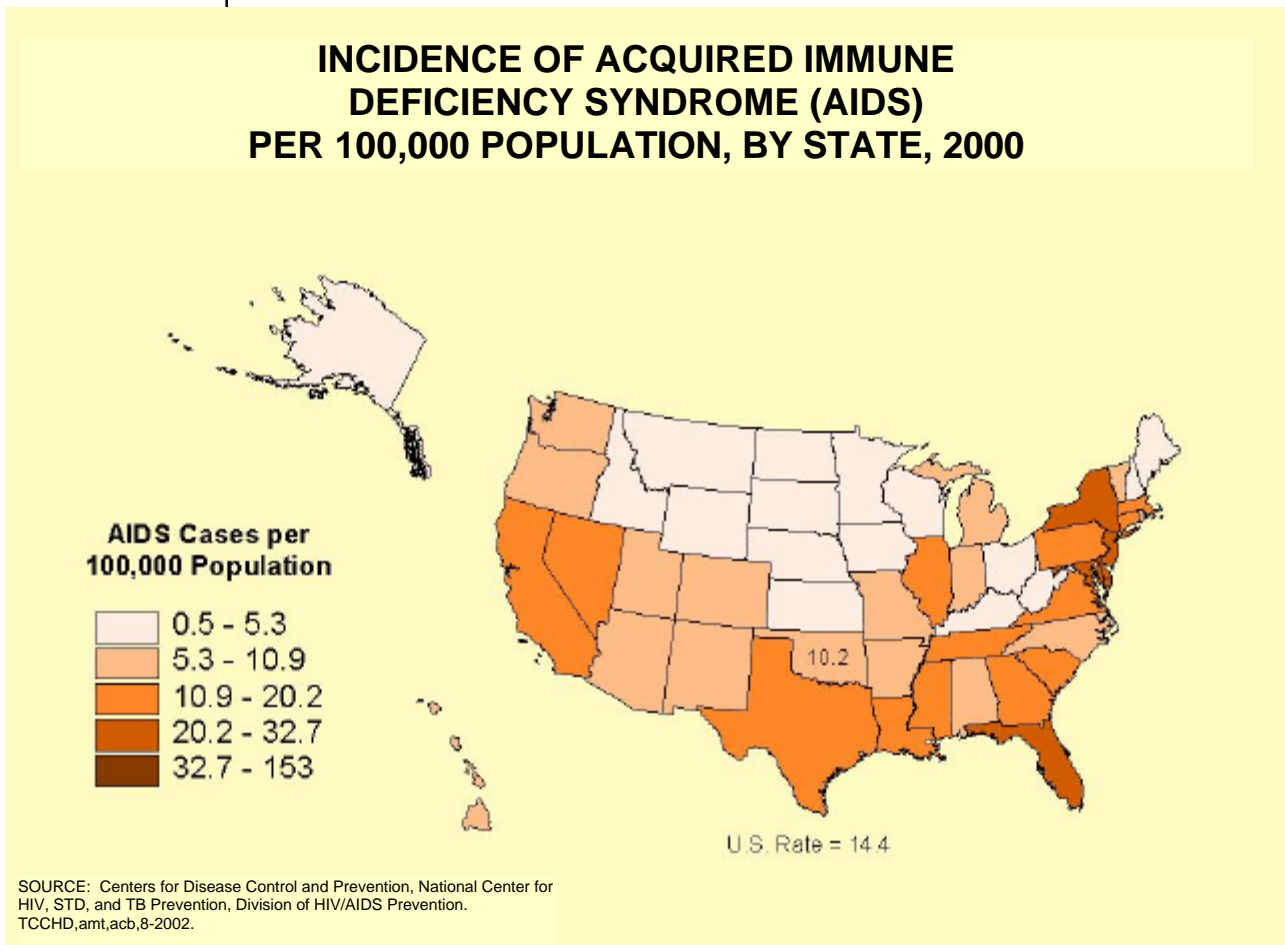
SOURCE: Centers for Disease Control and Prevention, 2002.



## Acquired Immune Deficiency Syndrome (AIDS)

AIDS is a severe, life-threatening clinical condition which was first recognized as a distinct syndrome in 1981. This disease represents the final clinical stage of infection by the Human Immunodeficiency Virus (HIV). HIV usually results in progressive damage to the immune and other organ systems, including the central nervous system. More than a dozen opportunistic infections and several cancers are associated with HIV infection. The 1993 expanded CDC definition includes individuals who have been diagnosed with HIV infection and have invasive cervical cancer, pulmonary tuberculosis, recurrent pneumonia, or a CD4+ cell count of less than 200 per micro liter or less than 14% of total lymphocytes. Counts of CD4 T-lymphocytes are used as a surrogate measure of the progression of HIV disease. As an HIV infected person's CD4 cells decline, they become increasingly susceptible to opportunistic infections.

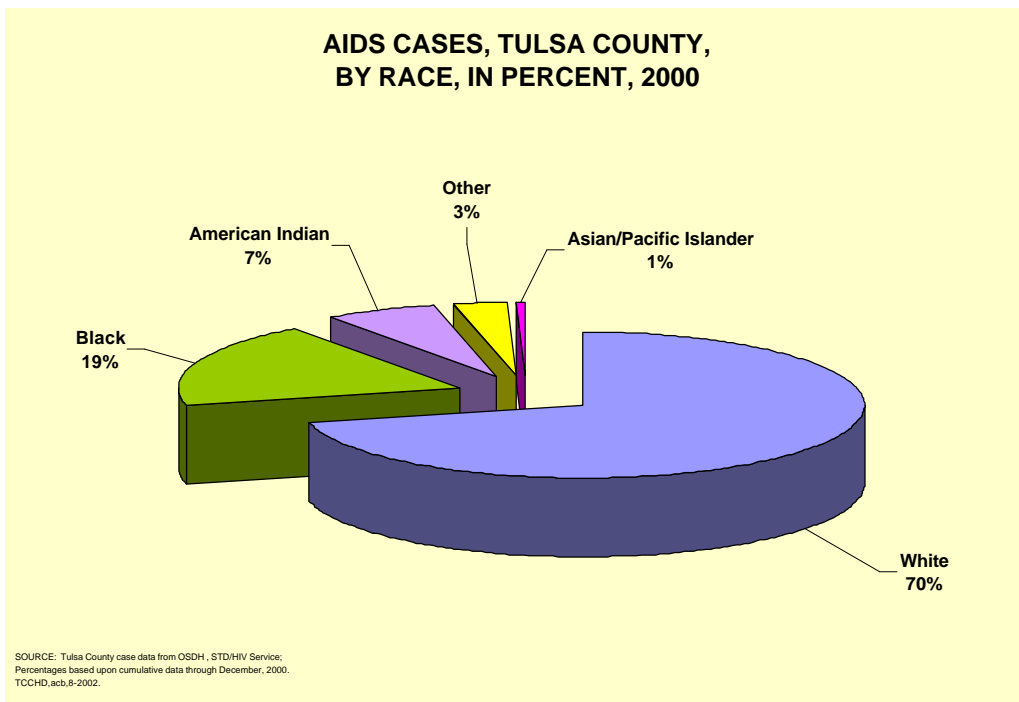
Figure 6.1



AIDS has been recorded in virtually all countries and among all racial/ethnic groups, ages, and social classes. The reservoir is humans, and the transmission is via sexual exposure or exposure to blood or tissues of infected individuals. Transmission of HIV is similar to that of the hepatitis B virus (HBV). Use of HIV contaminated needles and syringes, transfusion of infected blood or its components, and sexual contact may result in HIV transmission. From 15% to 30% of infants born to HIV infected mothers acquire HIV before, during, or shortly after birth.

The development of detectable antibodies for HIV generally occurs within one to three months of exposure, while progression of HIV infection to clinical AIDS disease occurs in an observed range from less than one year to ten years or more. Treatment with combinations of multiple drugs has recently shown significant success in slowing the progression of HIV infection into AIDS. Nationally, the rate of AIDS infections varies substantially across the United States (**Figure 6.1**) ranging, in 2000, from a low of 0.5 cases per 100,000 population in North Dakota to 153.0 cases per 100,000 population in Washington, D.C. The U.S. average rate was 14.4 per 100,000 population that year. By comparison, Oklahoma's rate was 10.2 cases per 100,000 population, placing the state well below the national average. AIDS case rates are highest along the eastern coast, the southern states, and in California, Illinois, and Nevada.

Figure 6.2



**HEALTHY PEOPLE 2010 GOAL**

Prevent HIV infection and its related illness and death.

- U.S. Department of Health and Human Services, 2000

**HEALTHY PEOPLE 2010 OBJECTIVE**

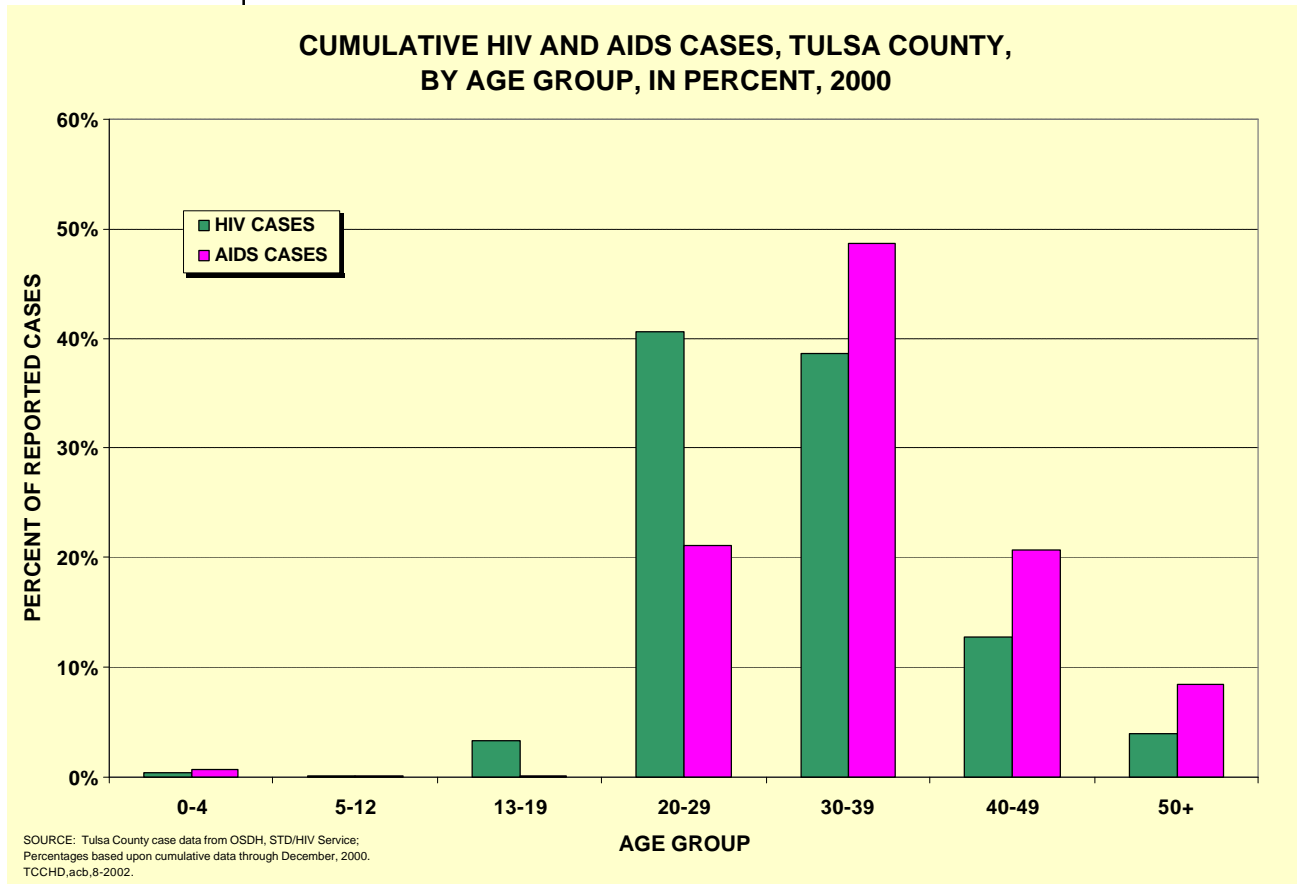
Reduce AIDS among adolescents and adults.

- U.S. Department of Health and Human Services, 2000

The AIDS epidemic began primarily among homosexual men in the early 1980s. However, more recently, the epidemic has begun to show largest rates of increase among women and minority populations. In 2000, women with AIDS comprised about 21% of the national total. AIDS incidence rates are much higher among blacks and Hispanics than among other racial/ethnic categories.<sup>2</sup> In Tulsa County, approximately 71% of AIDS cases are white, just under 20% are black, and the remainder are American Indian or Asian/Pacific Islander (**Figure 6.2**).

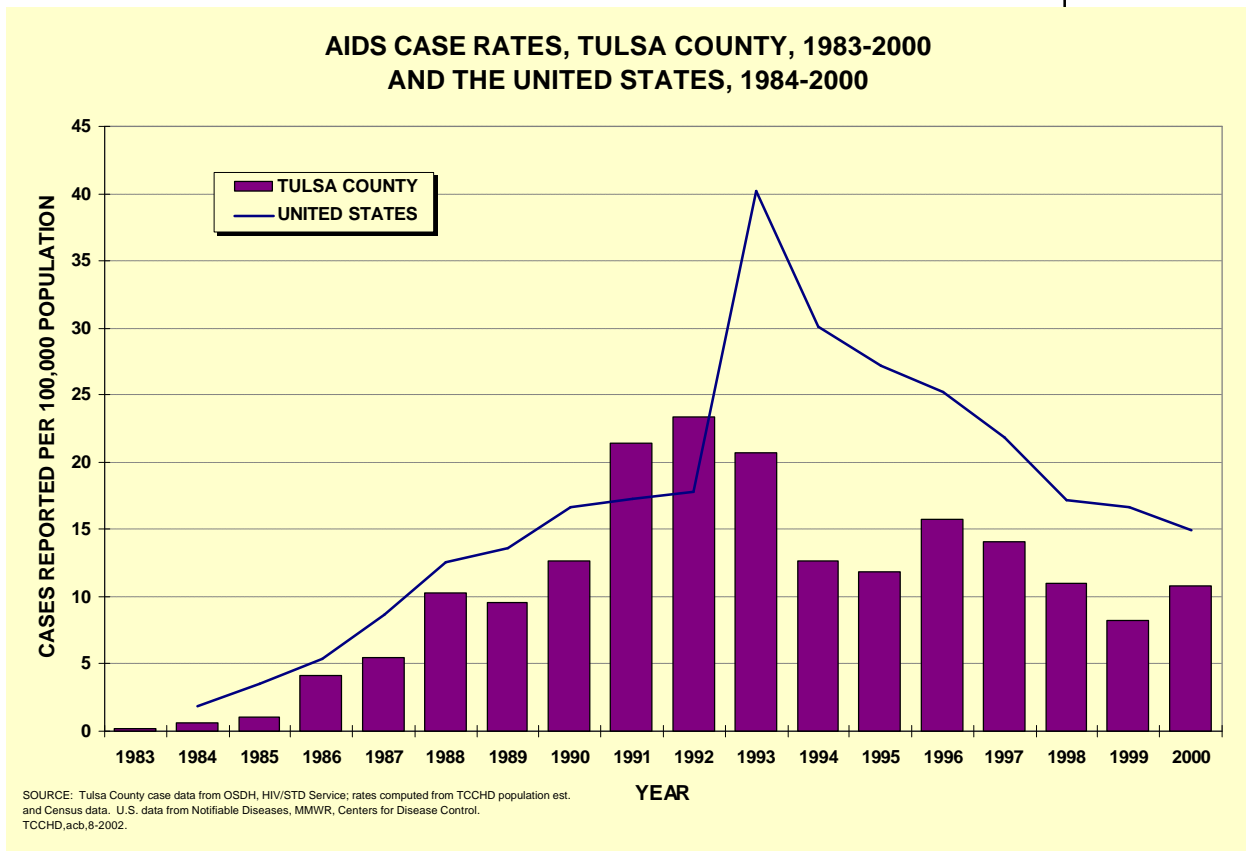
In Oklahoma, 90% of cumulative AIDS cases were male and 10% were female through December of 2000. **Figure 6.3** presents cumulative HIV and AIDS cases for Tulsa County, by age group, through 2000. Approximately 1,034 cases of AIDS had been diagnosed among Tulsa County residents by the end of 2000.

Figure 6.3



In Tulsa County, cases of reported AIDS (**Figure 6.4**) increased on an annual basis through 1992 and have since fallen by about 50%. Nationally, diagnosed AIDS cases peaked in 1993 and have also declined.

Figure 6.4



## Campylobacter Enteritis

Campylobacteriosis is an acute, enteric (involving the intestines) bacterial disease characterized by diarrhea, abdominal pain, malaise, fever, nausea, and vomiting. It is variable in severity, frequently lasting 2 to 5 days and usually no more than 10 days. Relapses can occur. The incubation period is 2 to 5 days with a range of 1 to 10 days. The disease is communicable throughout the course of the infection.

The infectious agent is *Campylobacter jejuni* and, less commonly, *C. coli*. Other *Campylobacter* organisms have been associated with diarrhea. It is estimated that 5% to 14% of diarrhea worldwide is caused by *Campylobacter*. It is an important cause of traveler’s diarrhea in developing countries. Children under five years of age and young adults have the highest incidence of illness.

The reservoir for *Campylobacter* is animals, most frequently poultry, cattle, puppies, kittens and other pets, swine, sheep, rodents, and birds. Most raw poultry meat is contaminated with *Campylobacter jejuni*. The disease is often foodborne by ingestion of organisms in undercooked chicken and pork, other

### DID YOU KNOW?

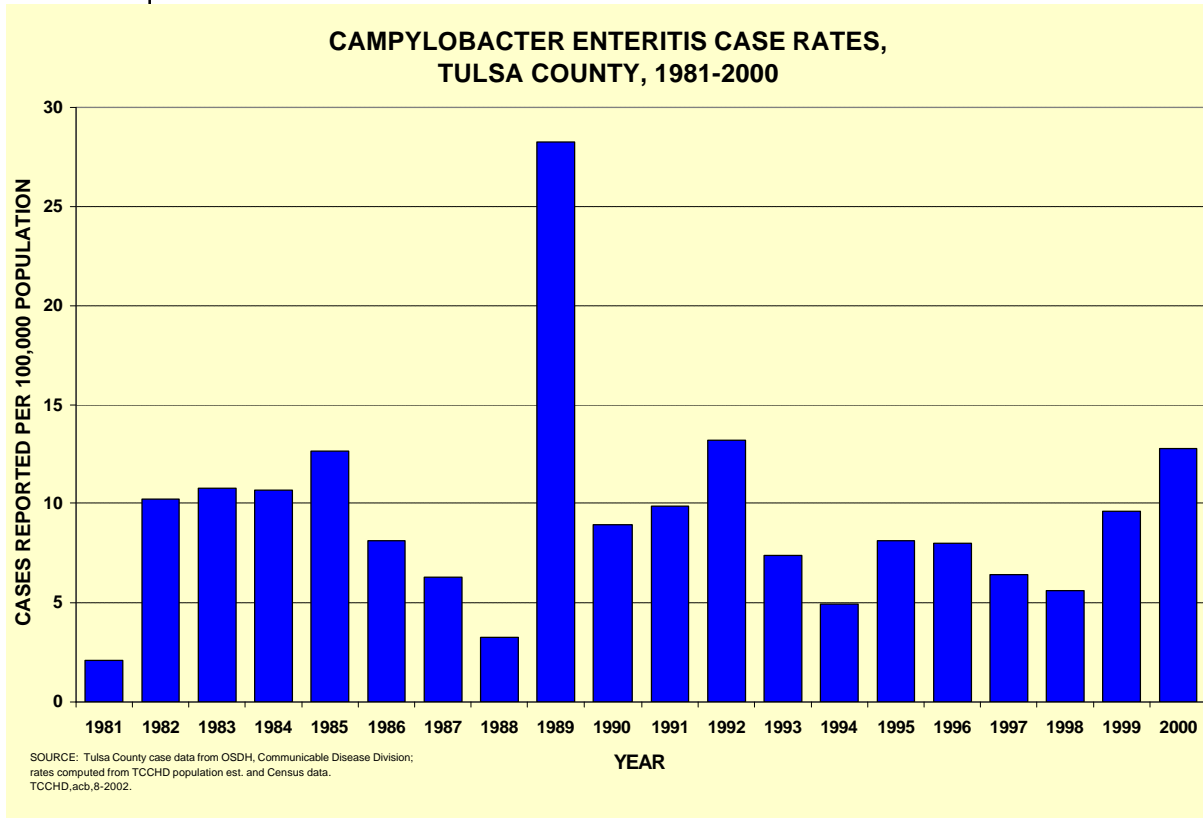
*Campylobacter* is the most commonly identified bacterial cause of diarrheal illness in the world.

- Centers for Disease Control and Prevention, 2001

contaminated food, raw milk, and water. It can also be contracted from contact with infected pets, farm animals, and infected infants. The largest number of sporadic cases in temperate climates occurs during warmer months.

Campylobacteriosis is not a nationally notifiable disease; however, it is a reportable disease in Oklahoma. In Tulsa County, case rates from 1981 through 2000 have generally averaged between 6 and 13 cases per 100,000 population (**Figure 6.5**).

Figure 6.5



## Chlamydia

Genital infections caused by *Chlamydia trachomatis* are a major cause of pelvic inflammatory disease, ectopic pregnancy, and infertility among women in the United States and are a cause of neonatal conjunctivitis and pneumonia in infants from perinatal transmission of the agent. Chlamydial infections are the most common infectious disease reported to state health departments and the CDC.

Genital infections of chlamydia are sexually transmitted and are manifested primarily in males as urethritis and in females as cervicitis. Clinical manifestations make it difficult to distinguish from gonorrheal infections which may be asymptomatic in 1% to 25% of sexually active men. Most women with

endocervical or urethral infections are asymptomatic. Complications of chronic infections may include infertility, ectopic pregnancy, and chronic pelvic pain. Infection during pregnancy may result in pre-term delivery and infection of the newborn.

The infectious agent is *Chlamydia trachomatis* in 35% to 50% of nongonococcal urethritis cases in the U.S. It is common worldwide and has increased steadily during the past two decades. The reservoir is humans. The disease is transmitted through sexual intercourse, and preventative measures are the same as those for syphilis, emphasizing abstinence or use of condoms when engaging in sexual intercourse. The incubation period is 7 to 14 days or longer. No acquired immunity has been demonstrated, and relapses of the disease are common.

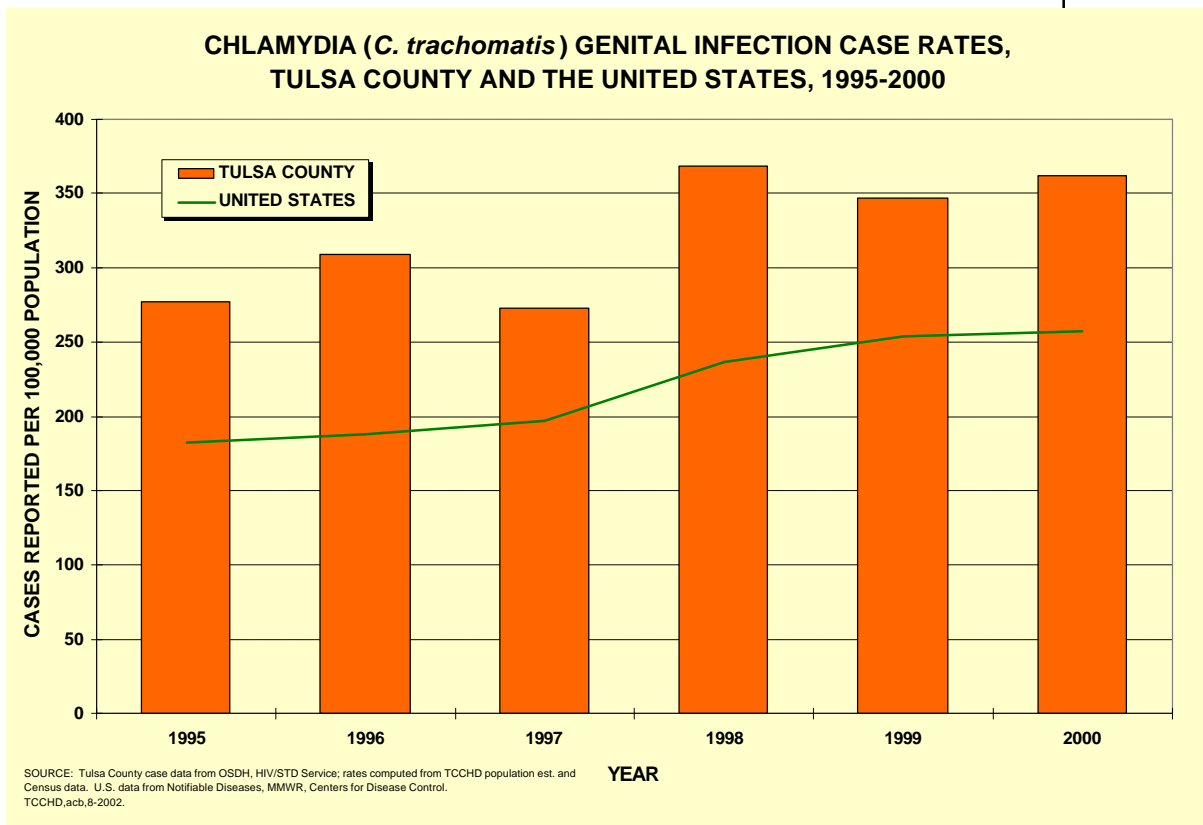
Genital infections of chlamydia did not become nationally notifiable until 1995. Since that time, national chlamydia rates have steadily increased from 182.6 cases per 100,000 population in 1995 to 258 cases per 100,000 population in 2000. By comparison, Tulsa County data show case rates ranging from about 277 cases per 100,000 population in 1995 to 362 cases per 100,000 population in 2000 (Figure 6.6).

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Reduce the proportion of adolescent and young adults with Chlamydia trachomatis infections.*

- U.S. Department of Health and Human Services, 2000

**Figure 6.6**

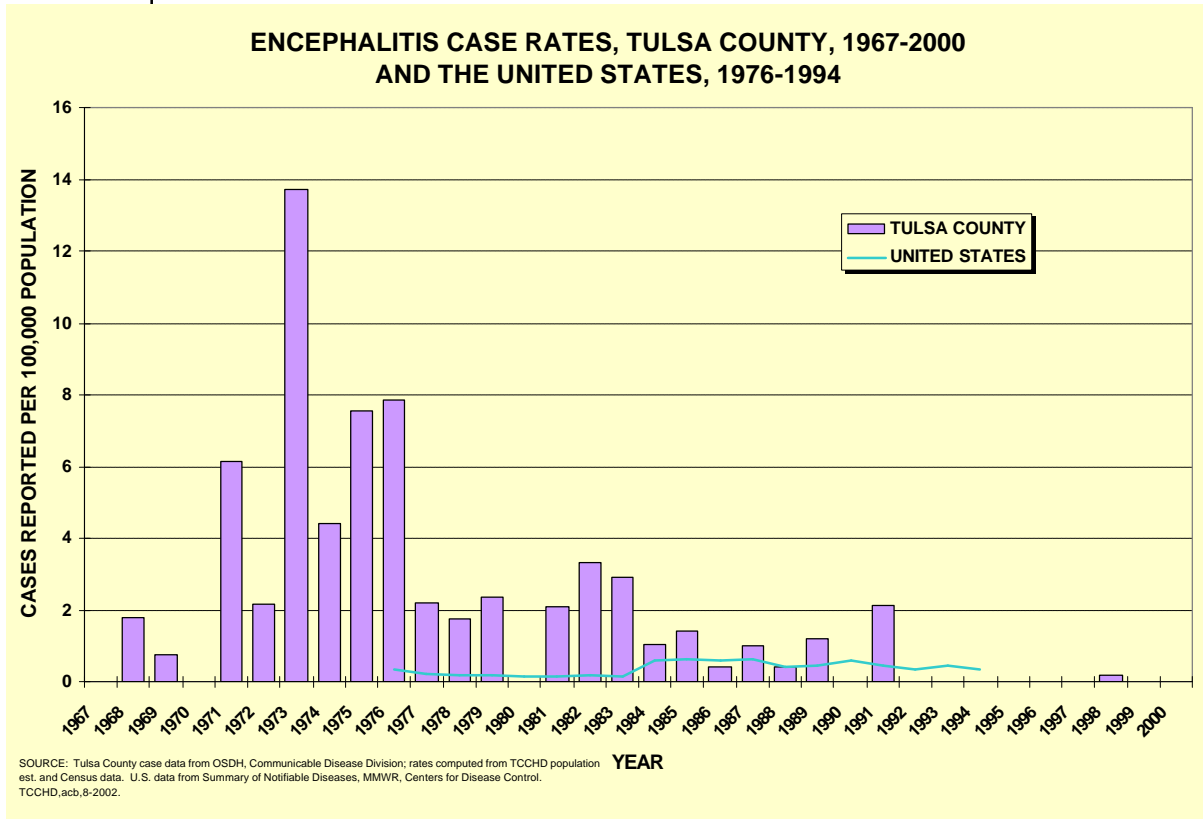


## Encephalitis

Encephalitis is an acute, inflammatory disease involving parts of the brain, spinal cord, and meninges. It has a variety of causes ranging from primary viral and bacterial agents to complications associated with other diseases including measles, mumps, protozoal infections, rubella, and adverse reactions to vaccines. While most meningitis cases are asymptomatic with mild cases occurring as febrile headaches or aseptic meningitis, severe infections are often marked by acute headache, high fever, meningeal signs, stupor, disorientation, coma, tremors, occasional convulsions, and paralysis. Case fatality rates range from 0.3% to 60% for the vector-borne viral disease. The mosquito-borne arboviral diseases including western equine encephalitis, eastern equine encephalitis, St. Louis encephalitis, and West Nile virus are transmitted by the bite of infected mosquitoes and are not directly transmitted from person to person. The incubation period for mosquito-borne encephalitis is usually 5 to 15 days. Susceptibility to clinical disease is highest in infants and older adults.

Primary encephalitis was dropped as a notifiable disease at the national level in 1995. The case rate for encephalitis in the U.S. has been less than 1 case per 100,000 population for at least the past two decades. Tulsa County's annual case rate was highest in the 1970s, peaking at just under 14 cases per 100,000 population in 1973, and has since declined to less than 1 case per 100,000 population (Figure 6.7).

Figure 6.7





## Gonorrhea

Gonorrhea is the common name for gonococcal infection of the genitourinary tract which, in street vernacular, is referred to as “clap.” It is a sexually transmitted bacterial disease limited to columnar and transitional epithelium, which manifests itself differently in males and females in course, severity, and symptom. In males, a discharge from the urethra appears within 2 to 7 days after infecting exposure. Infection may be self-limiting and may occasionally result in a chronic carrier state. In females, an initial urethritis or cervicitis occurs a few days after exposure and frequently is too mild to be noticed. In about 20% of cases, there is uterine invasion, often in conjunction with the menstrual period, and untreated infections can lead to risk of infertility and ectopic pregnancy. Asymptomatic endocervical infection is common, and in females and homosexual males pharyngeal and anarectal infections are common.

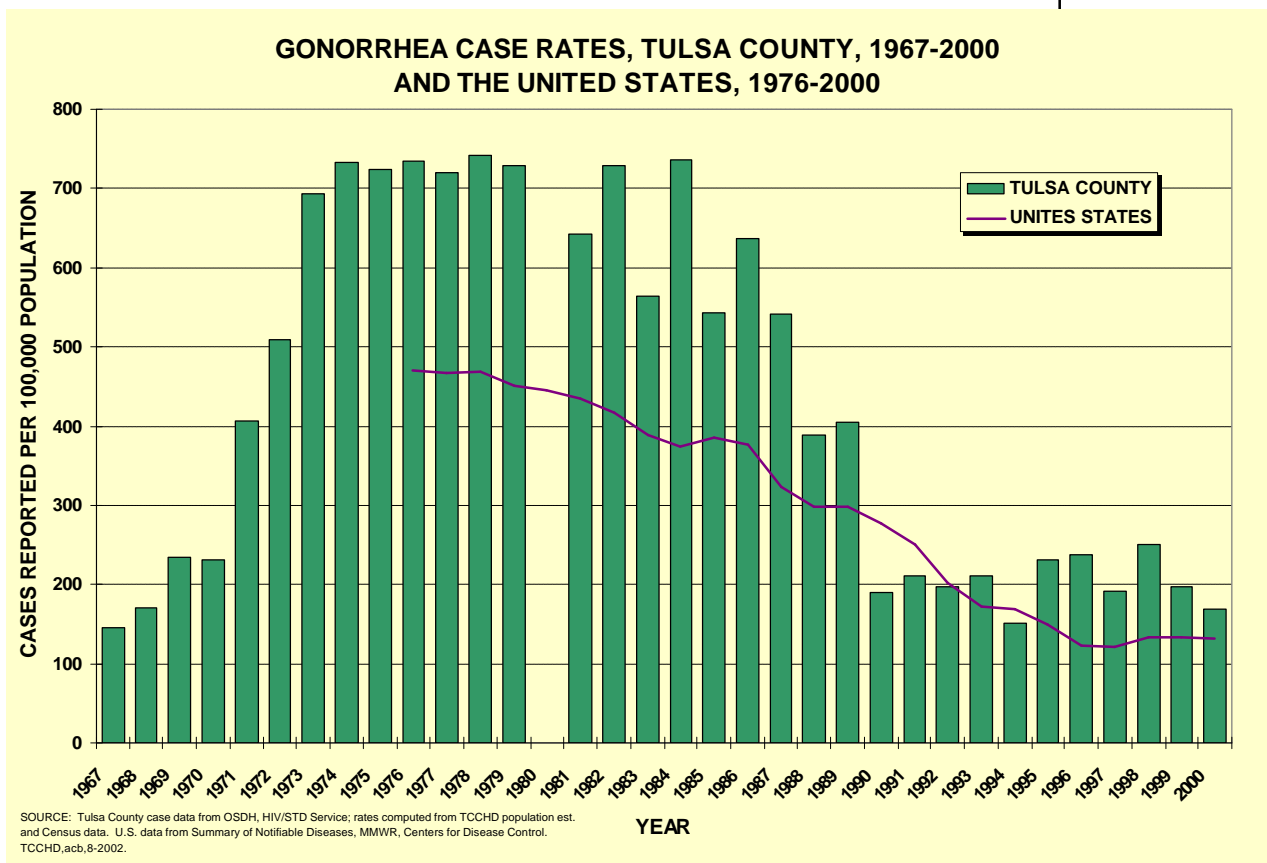
Septicemia may occur in 0.5% to 1% of all gonococcal infections. Death is rare except among those who develop endocarditis when appropriate antibiotic treatment is delayed.

### DID YOU KNOW?

*There were 1,418 Oklahoma teenagers (age 15 - 19) diagnosed with gonorrhea in 1999.*

*- Oklahoma State Department of Health, 2000*

Figure 6.8



**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Reduce  
gonorrhea.*

- U.S. Department  
of Health and  
Human Services,  
2000

The infectious agent is *Neisseria gonorrhoeae*. Gonorrhea is common worldwide, affecting both genders, especially sexually active adolescents and young adults. In children, it is considered an indicator of sexual abuse.

The reservoir for gonorrhea is humans, and transmission is by contact with exodates from mucus membranes of infected people, almost entirely as a result of sexual activity. The incubation period is usually 7 to 10 days, but sometimes longer. The period of communicability may extend for months in untreated individuals, but effective therapy ends communicability within hours. Susceptibility is general, and preventative measures are the same as those for syphilis including safer sexual practices, i.e., abstinence, monogamy, and consistent and correct use of condoms with all partners.

Gonorrhea case rates have declined for both the U.S. and Tulsa County, beginning in the mid 1970s. The U.S. rate in the mid 1970s was approximately 470 cases per 100,000 population. This rate declined to about 132 cases per 100,000 population in 2000. Tulsa County's rate was significantly higher than the national rate in the mid to late 1970s, exceeding 700 cases per 100,000 population during that time. Through the 1980s and especially during the 1990s, the rate has fallen to an average of about 200 cases per 100,000 population (**Figure 6.8**).

**Hepatitis A**

Hepatitis A, also known as infectious hepatitis, is a viral disease usually characterized by abrupt onset of fever, malaise, anorexia, nausea, and abdominal discomfort, which is followed within a few days by jaundice (yellowing of the skin). The disease varies in clinical severity from mild cases, lasting one to two weeks, to severely disabling, which may last several months in rare cases.

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Reduce  
hepatitis A.*

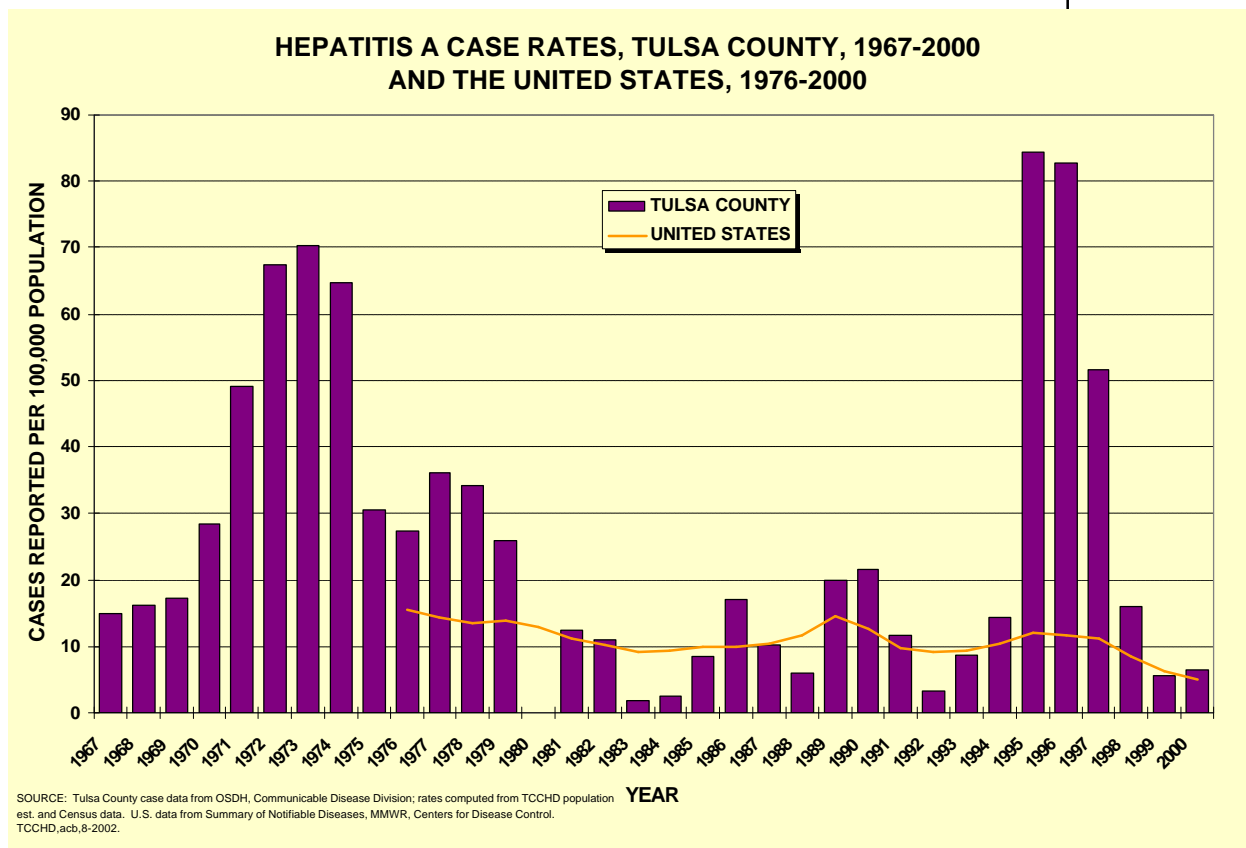
- U.S. Department  
of Health and  
Human Services,  
2000

The infectious agent is the hepatitis A virus (HAV), which has been classified as hepatovirus. It is transmitted person to person by the fecal-oral route. The infectious agent is found in feces, reaching peak levels during the week to two weeks before onset of symptoms, diminishing soon after liver dysfunction or symptoms appear. Hepatitis A is transmitted most often within private households, although the disease receives considerable notoriety as a cause of common source outbreaks occurring through contaminated water, food, and the consumption of raw shellfish. Many common source outbreaks result from infected food handlers preparing sandwiches, salads, and other foods which are not cooked. For this reason, handwashing is considered a primary preventative measure in controlling the disease. While uncommon, hepatitis A can be transmitted by blood through transfusion, contaminated blood products, or needle sharing. Sexual transmission has also been reported.



Hepatitis A rates have significantly declined nationally over the past decade. In 1989, a rate of 14.43 cases per 100,000 population was reported, compared to the 2000 rate of 6.39 cases per 100,000 population. Historically, Tulsa County hepatitis A case rates were at their highest point in the early 1970s (**Figure 6.9**), peaking at over 70 cases per 100,000 population in 1973. There was, however, another peak between 1995 and 1997, resulting in a rate of 84.4 per 100,000 population. Since that time, hepatitis A case rates have dropped to a rate of 4.94 per 100,000 population in 2000.

**Figure 6.9**



## Hepatitis B

Hepatitis B infections, also known as serum hepatitis, may be clinically recognized in only a small proportion of cases since fewer than 10% of children infected and only 30% to 50% of adults infected develop symptomatic disease. The onset involves anorexia, vague abdominal discomfort, nausea, and vomiting with frequent progression to jaundice. Fever may be absent or mild and severity may range from inapparent cases to fulminating fatal disease resulting from acute hepatic necrosis. In North America, 0.5% of adults carry chronic hepatitis infections. An estimated 15% to 20% of these individuals die

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Reduce  
hepatitis B.*

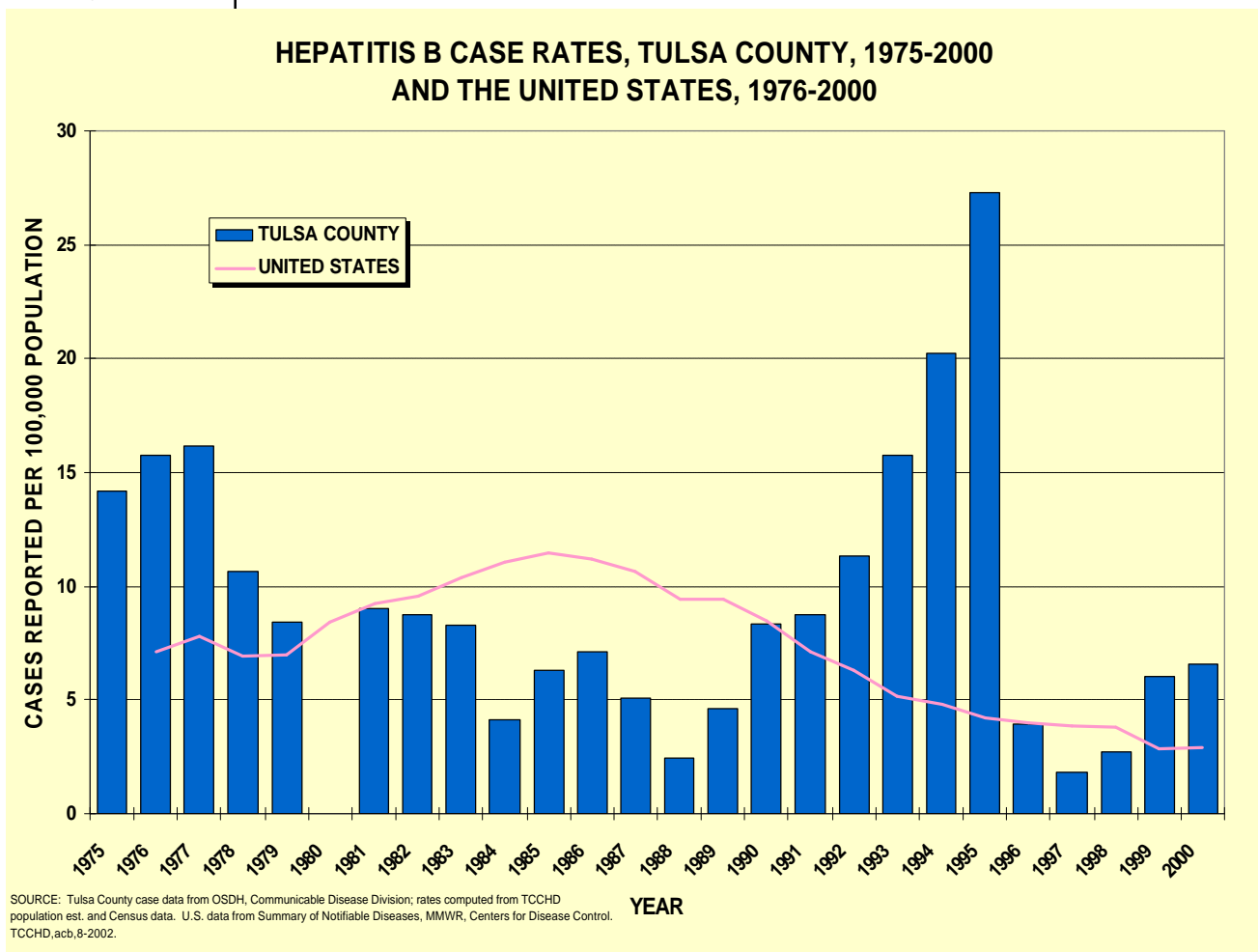
- U.S. Department  
of Health and  
Human Services,  
2000

prematurely of either cirrhosis or cancer of the liver. It has been estimated that up to 80% of all liver cancer (hepatocellular carcinoma) worldwide may result from hepatitis B infection.

The infectious agent for hepatitis B is the hepatitis B virus (HBV). The virus occurs worldwide and is endemic. In North America, it is believed that infection is most common in young adults. The reservoir is humans, although chimpanzees are susceptible, and closely related viruses are found in some other animals. Overall, about 5% of the U.S. adult population carries the hepatitis B antibody, and the hepatitis B surface antigen is found in virtually all body secretions and excretions, although only blood, saliva, semen, and vaginal fluids have been shown to be infectious.

Transmission occurs by exposure to infected body fluids including transfusion of blood and blood products, needle sharing and needle sticks, and tattooing. Sexual and perinatal transmission occur from mucous membrane exposure to infectious blood and body fluids.

**Figure 6.10**



The incubation period for hepatitis B is usually 45 to 180 days, averaging 60 to 90 days. All persons who carry the hepatitis B virus antigen are potentially infectious, though in varying degrees. Susceptibility is general, with the disease being milder in children and in infants who are usually asymptomatic.

Two types of inactivated vaccines against hepatitis B have been licensed in the United States and are currently in use. Routine childhood immunization is recommended. Adults at high risk should also receive hepatitis B immunization. These include injecting drug-users, sexually active homosexual and bisexual men, heterosexual men and women, inmates of correctional facilities, and healthcare and public safety workers who perform tasks which involve contact with blood or blood-contaminated body fluids.

Nationally, reported cases of hepatitis B rose from about 7 cases per 100,000 population in the late 1970s to peak at about 11 cases per 100,000 population in the mid 1980s and have since declined to below 3 cases per 100,000 population in 2000 (**Figure 6.10**). During the mid 1970s in Oklahoma, hepatitis B case rates were about 15 per 100,000 population and declined steadily to about 2 cases per 100,000 population by 1988. Since that time, perhaps partly as a result of increased awareness brought about by the blood-borne pathogens exposure control rules, reported cases have increased. In 2000, the Tulsa County hepatitis B rate was 6.57 per 100,000 population.

### Hepatitis C, Non-A and Non-B

Of the Non-A and Non-B hepatitis viruses, hepatitis C may be the most recognized. Like hepatitis B, it can be transmitted by exposure to contaminated blood and plasma and contaminated needles and syringes, especially among injecting drug users. However, percutaneous exposure accounts for less than half of hepatitis C cases in the United States. The risk of transmission by household contact and sexual activity has not been well defined.

Onset of viral hepatitis C disease is insidious and includes anorexia, vague abdominal discomfort, nausea, and vomiting, with progression to jaundice less frequently than hepatitis B. Approximately 75% of infections are inapparent but can progress to rare fulminating fatal disease. Chronic liver disease may develop and include active hepatitis in most cases, or less frequently, cirrhosis. The infectious agent is the hepatitis C virus (HCV). About 20% of acute viral hepatitis cases in the United States are caused by hepatitis C with prevalence being highest among injecting drug users. Hemodialysis patients account for 10% to 20% of cases and 1% to 5% of cases are due to high risk sexual activity, healthcare worker exposures, and family contacts of HCV infected persons.

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Increase hepatitis B vaccine coverage among high-risk groups.*

- U.S. Department of Health and Human Services, 2000

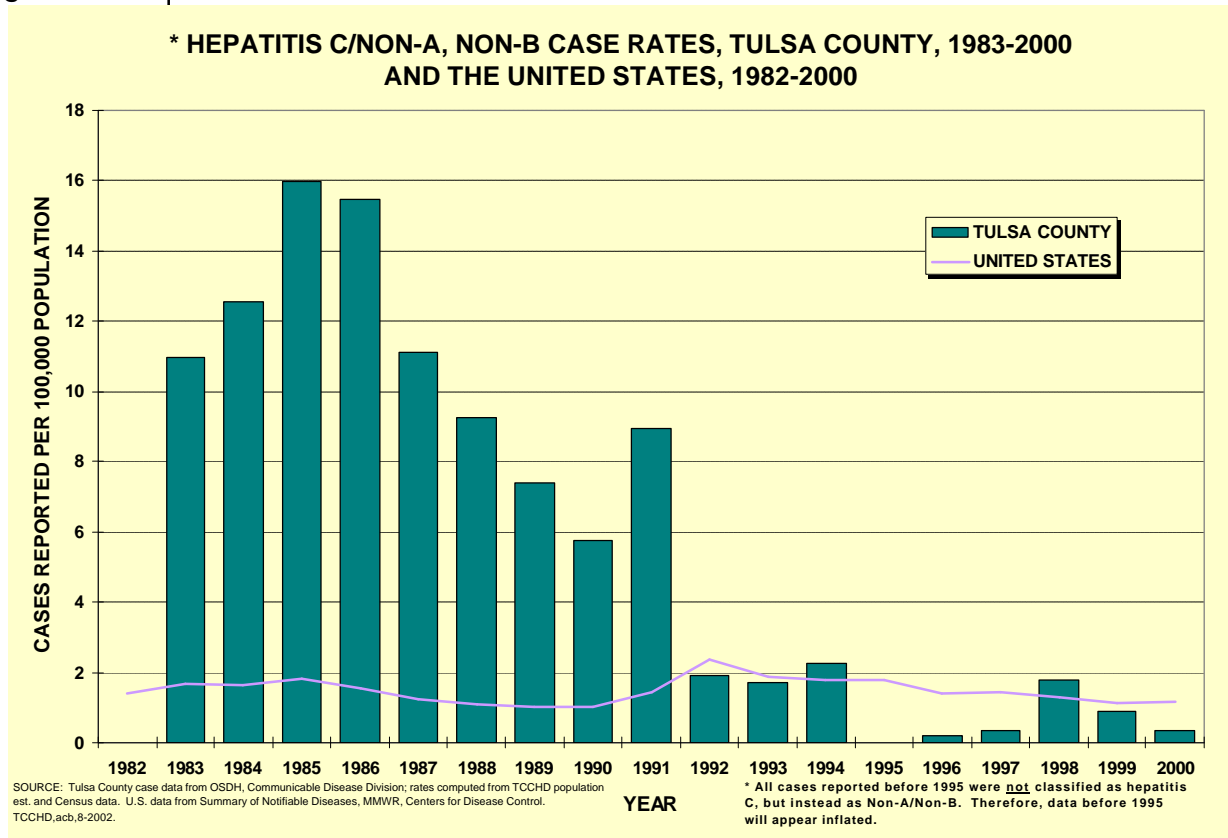
**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Increase the proportion of persons with chronic hepatitis C infection identified by state and local health departments.*

- U.S. Department of Health and Human Services, 2000



Figure 6.11



**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Reduce  
hepatitis C.*

- U.S. Department  
of Health and  
Human Services,  
2000

The incubation period ranges from 6 to 7 weeks. Infection is communicable for one or more weeks before onset of symptoms and susceptibility to the disease is general. Epidemic measures for control of hepatitis C are the same as those for hepatitis B.

Hepatitis C, Non-A and Non-B case rates are reported in **Figure 6.11** for Tulsa County and the United States from 1982 through 2000. Nationwide, these forms of viral hepatitis have averaged about 1 to 3 cases per 100,000 consistently throughout the period. Tulsa County rates have gradually decreased since the early 1990s. In 1991, the case rate was 9.1 cases per 100,000 population. In 2000, the case rate was less than 1 case per 100,000 population. It should be noted that only cases of acute hepatitis C are reported to CDC.

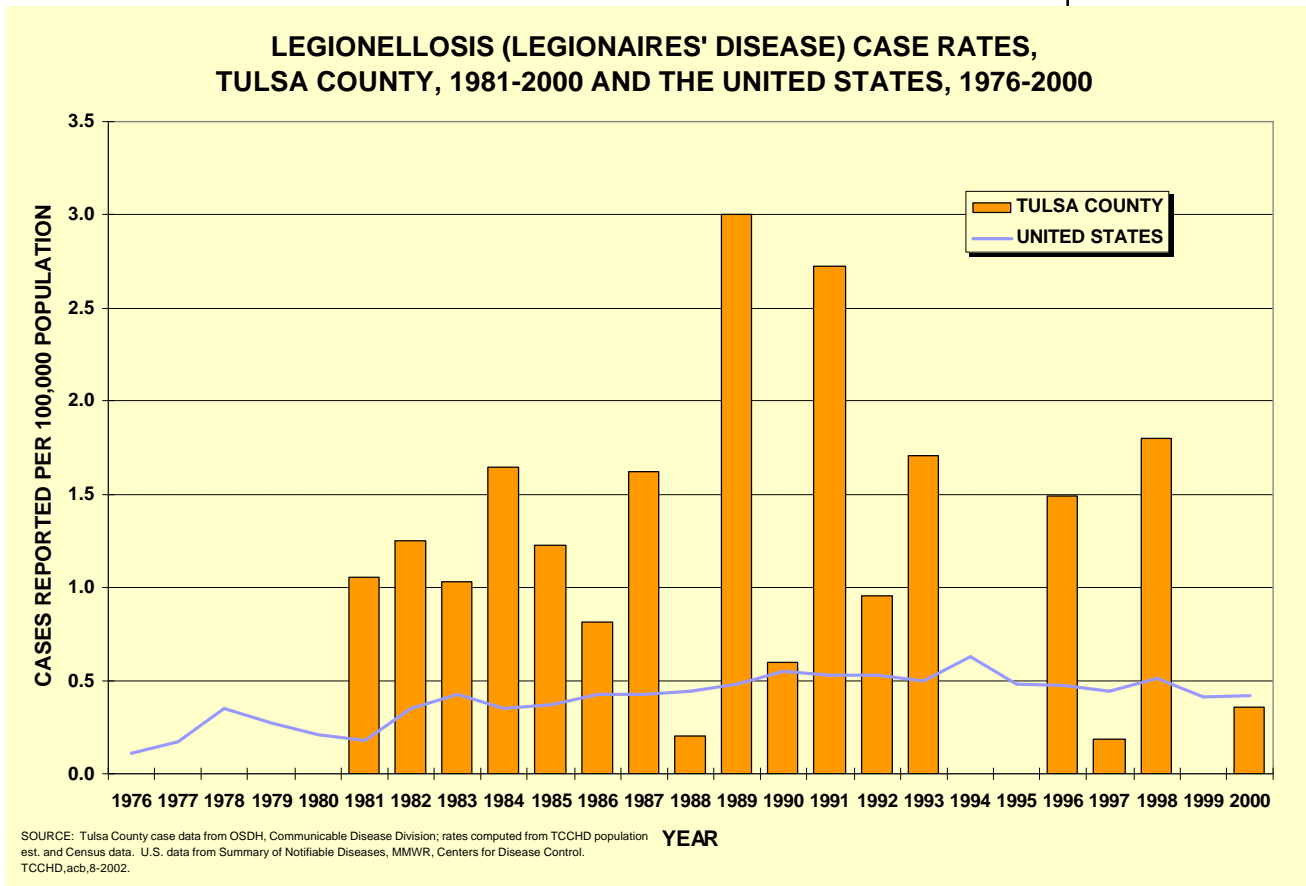
**Legionellosis**

Legionellosis is an acute bacterial disease, which has two recognized, distinct clinical and epidemiological manifestations: Legionnaires' disease and Pontiac fever. Both are characterized initially by anorexia, malaise, myalgia, and headache, followed within a day by rapidly rising fever and associated chills,



and usually a nonproductive cough, abdominal pain, and diarrhea. Progression of the disease at this point differs between the Legionnaires' and Pontiac fever strains with the former producing chest radiographs revealing patchy or consolidated areas as the disease rapidly progresses into pneumonia and ultimately into respiratory failure in as high as 39% of hospitalized cases. Pontiac fever, on the other hand, is not associated with pneumonia or death, and patients recover spontaneously in 2 to 5 days without treatment.

Figure 6.12



Legionnaires' disease and its infectious agent, the bacterium *Legionella pneumophila*, derive their names from the 1976 outbreak, which led to their discovery. One hundred fifty-two (152) attendees at a state American Legion convention in Philadelphia in July of that year were hospitalized with respiratory symptoms from a mysterious illness, which ultimately resulted in 22 deaths from pneumonia following rapid progression of the disease. The patients were among several thousand attending the convention and stayed at three or four separate hotels. Oddly, there was no evidence of increased respiratory disease among Philadelphia residents, nor was there any indication of secondary spread. The outbreak was eventually



**DID YOU  
KNOW?**

*Legionellosis is a nationally notifiable disease; however, less than 10% of estimated cases are reported due to under-diagnosis and under-reporting.*

*- Centers for Disease Control and Prevention, 2001*

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Reduce infections caused by key foodborne pathogens.*

*- U.S. Department of Health and Human Services, 2000*

related to exposure of the aerosols from cooling tower water contaminated by *Legionella* bacteria. Legionellosis is not a new disease and has been found to have occurred as early as 1947 with a documented outbreak in 1957 in Minnesota. It has been identified throughout North America, Australia, Africa, South America, and Europe. Sporadic cases and outbreaks are most often summer and autumn phenomena, although cases occur throughout the year. Attack rates are usually low compared to the population at risk (0.1% - 5%), although Pontiac fever has had an attack rate of about 95% in several outbreaks.

The reservoir for legionellosis is predominantly water including air conditioning cooling towers, evaporative condensers, humidifiers, whirlpool spas, respiratory therapy devices, and decorative fountains. It has also been isolated from hot and cold water taps in showers, hot tubs, and in the natural environment from creeks, ponds, and banks associated with these water bodies. The organism survives for months in tap and distilled water.

Evidence supports airborne transmission of the disease although other modes are possible. Person-to-person transmission has not been documented. The illness occurs more frequently in older individuals, especially those over 50 years of age and especially in patients who smoke, have diabetes, chronic lung disease, renal disease, cancer, or are immunocompromised. It is extremely rare in persons under 20 years of age.

The incubation period for Legionnaires' disease is 2 to 10 days, typically 5 to 6 days, and for Pontiac fever is 5 to 66 hours, most often 24 to 48 hours.

In Tulsa County, case rates for Legionnaires' disease average less than 2 cases per 100,000 population per year (**Figure 6.12**). The nationwide rate averages about one half of the Tulsa County rate.

**Listeriosis**

Listeriosis is a bacterial disease which may result in an acute, mild feverish illness, sometimes with influenza-like symptoms. Onset may be sudden with fever, intense headache, nausea, vomiting, and signs of meningeal irritation, or it may be subacute. It can result in delirium and coma and occasionally in collapse and shock.

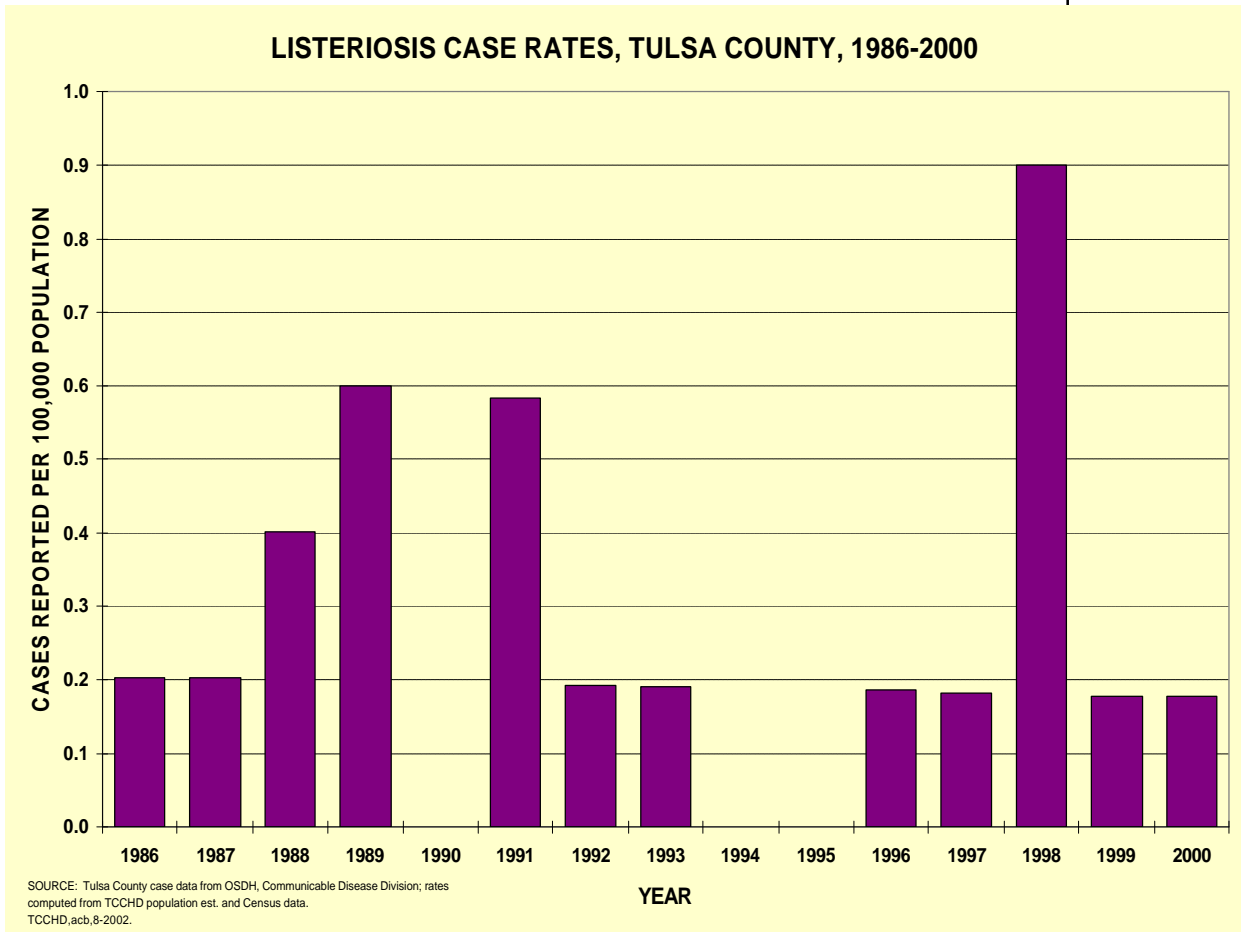
Listeriosis manifests itself as meningoencephalitis and/or septicemia in newborns and adults. It can cause abortion. Since symptoms are sometimes mild, it may be especially dangerous in pregnant women who transfer the infection to the fetus. Infants may be stillborn, born with septicemia, or develop meningitis in the neonatal period even to asymptomatic mothers.



The case fatality rate is 30% in newborn infants and approaches 50% when onset occurs within the first four days of birth.

Highest risk groups are neonates, the elderly, immunocompromised individuals, and pregnant women. Case fatality rates among non-pregnant adults of 35% have been reported, being 11% in those under 40 years of age, and 63% in those over 60 years of age.

Figure 6.13



The infectious agent is *Listeria monocytogenes*. About 30% of clinical cases occur within the first three weeks of life, and in non-pregnant adults infection occurs mainly after the age of 40. The principal reservoir of the organism is soil, forage, water, mud, and silage. Seasonal use of silage as fodder for animals is frequently followed by increased incidents of listeriosis in animals. Other reservoirs include infected domestic and wild animals. Soft cheeses can support the growth of *Listeria* and have caused outbreaks.

Transmission of listeriosis has been associated with ingestion of raw or contaminated milk, soft cheese, contaminated vegetables, and ready-to-eat

meats. A substantial portion of sporadic cases results from foodborne transmission. Neonate infections are transmitted from mother to fetus in utero or during passage through the infected birth canal.

The incubation period is variable from 3 to 70 days with an estimated median of 3 weeks. Fetuses and newborn infants are highly susceptible, while children and young adults are generally resistant to the disease. It is frequently superimposed on other debilitating illnesses such as cancer, organ transplantation, diabetes, and AIDS, and there is little evidence of acquired immunity.

Preventative measures include avoidance of potentially infectious material and proper precautions in handling aborted fetuses and sick and dead animals that may have died of encephalitis. The use of untreated manure on vegetable crops should be avoided, raw vegetables should be washed thoroughly before eating, and only pasteurized dairy products should be used.

Tulsa County rates range from 0 to 1 cases per 100,000 population on an annual basis (**Figure 6.13**). Listeriosis is not a nationally notifiable disease.

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

**Lyme Disease**

*Reduce Lyme disease.*

Lyme disease is a zoonotic, tick-borne disease, which is characterized by distinctive slowly expanding skin lesions referred to as “erythema migrans” (60% of cases), systemic symptoms, and neurologic, rheumatologic, and cardiac involvement which may persist from months to years. Early symptoms are intermittent and changing, typically beginning in summer as a rash and including malaise, fatigue, fever, headache, and stiff neck which may last for several weeks. Weeks to months after onset, early neurologic abnormalities appear which can include aseptic meningitis, cranial neuritis, including facial palsy, and other motor, sensory, and neurologic symptoms which may become chronic.

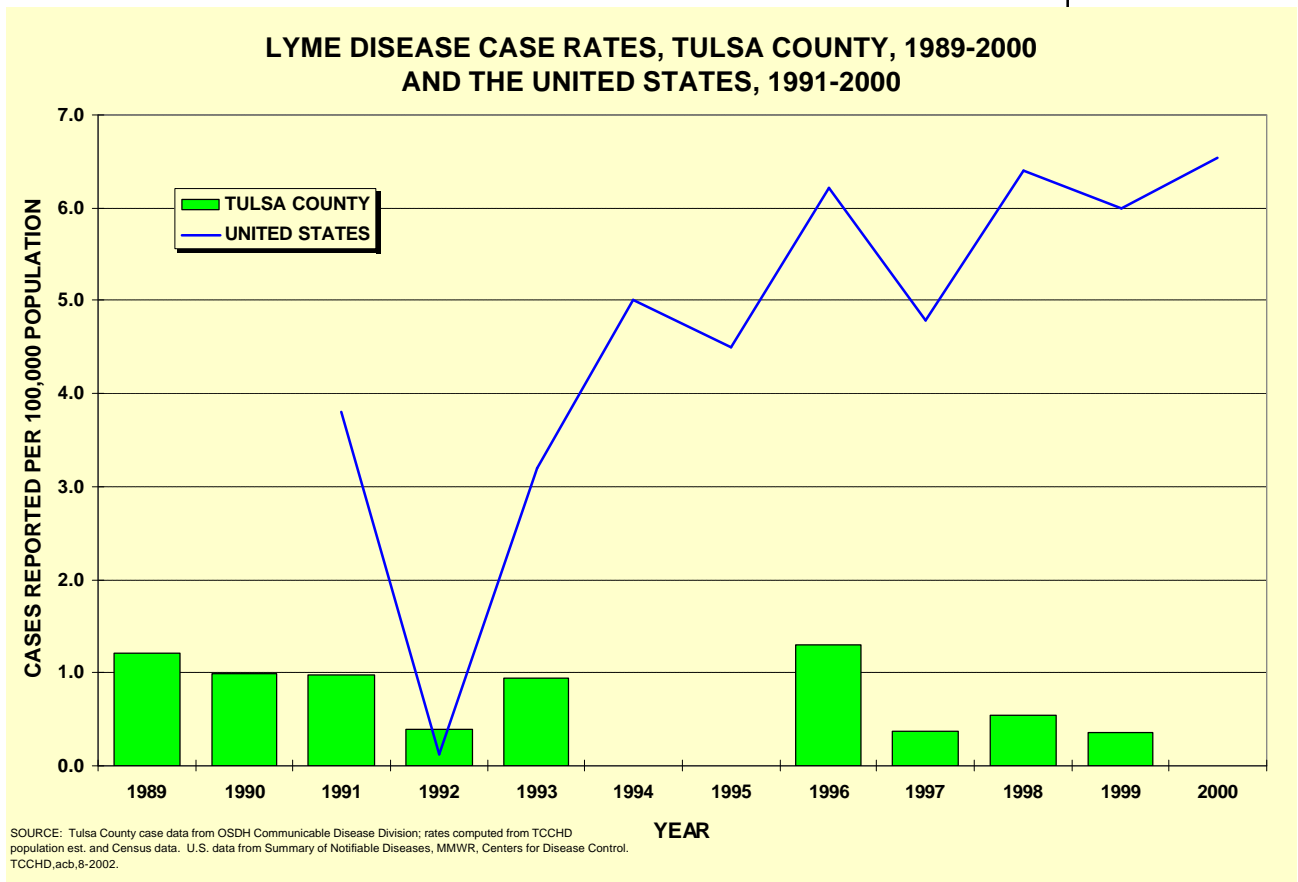
The infectious agent in North America is a spirochete, *Borrelia burgdorferi*. The agent was first identified in 1982. In the northeastern and midwestern United States, the enzootic transmission cycle is maintained in wild rodents and other animals, including deer, which serve as an important maintenance host for the adult vector ticks. The disease is apparently entirely tick-borne with no evidence of transmission from person to person, although rare case reports of congenital transmission have occurred.

In the United States, endemic areas for Lyme disease are predominantly along the Atlantic coast, Massachusetts to Maryland, and into the upper midwest. Cases have been reported in nearly all states and in Canada. In experimental animals, transmission of the disease does not occur until the tick has been

attached for 24 hours or longer. Preventative measures include avoiding tick infested areas, minimizing exposure of unprotected limbs, and appropriate use of tick repellents.

There is substantial annual variance in case reports for Lyme disease in the United States with 4 to 7 cases reported per 100,000 population during 1991-2000. In Tulsa County, Lyme disease is rare, with generally fewer than 1 case per 100,000 population reported annually (Figure 6.14).

Figure 6.14



## Malaria

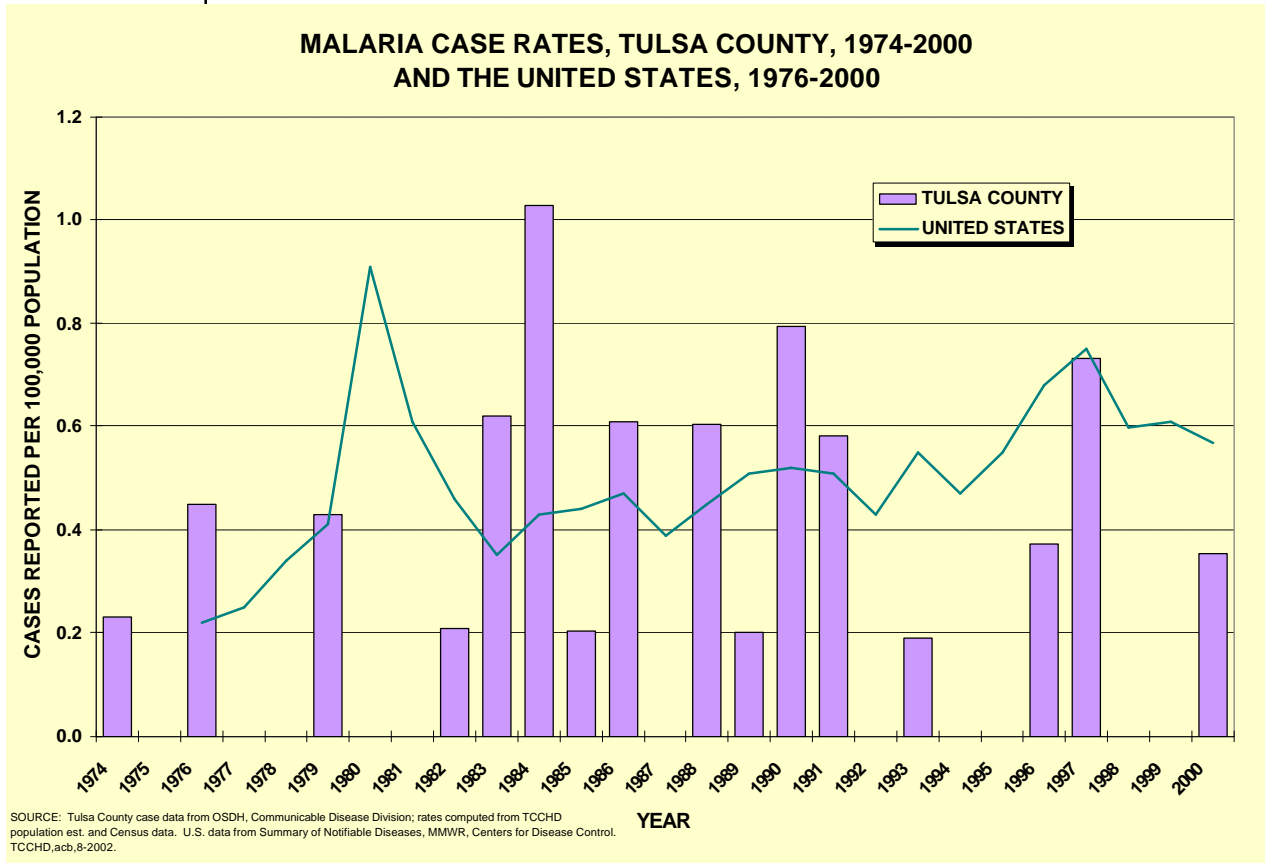
Malaria is a parasitic disease transmitted by the bite of a malaria-infected mosquito. There are four known sporozoan parasites, which together comprise the infectious agents for this disease. Endemic malaria no longer occurs in many temperate zone countries but is still a major cause of illness and death in tropical and sub-tropical areas, where transmission occurs in the forest fringes of South America, southeast Asia, south Asia, and parts of sub-Saharan Africa. In the United States, several outbreaks of locally acquired malaria have been

documented since the mid-1980s, although most cases of malaria are imported by travelers returning from malaria endemic areas where they have acquired the disease.

Although there is some variation in seriousness of the malarial infection depending upon the specific sporozoan agent, symptoms generally include onset of fever, chills, sweats, cough, respiratory distress, and headache which may become cyclical over periods of one to several days and in the most serious infections progress to shock, kidney and liver failure, acute encephalopathy, pulmonary and cerebral swelling, disorientation and delirium, and eventually coma and death.

The reservoir for the malarial parasite is humans, although non-human primates are known to be naturally infected by malarial species, which can, though rarely, infect humans.

Figure 6.15



The incubation period between infective bite and onset of clinical symptoms ranges from 7-14 days to 7-30 days, depending upon the infectious agent. In temperate areas, at least two strains are associated with incubation periods of several months.

Malaria case rates for the United States, while variable, have generally risen from just over 0.2 cases per 100,000 population in 1976 to just under 0.6 cases per 100,000 population in 2000. Malaria case rates for Tulsa County range from 0 to 1 case per 100,000 population and average near the national rate (Figure 6.15).

### Meningococcal Disease

Meningococcal disease is an acute illness characterized by sudden onset with fever, intense headache, nausea and vomiting, stiff neck, and often a pink rash. Delirium and coma often follow, and cases may exhibit sudden prostration.

The agent is *Neisseria meningitides*, and the reservoir is humans. Disease transmission occurs by direct contact, including respiratory droplets, from the noses and throats of infected people. The incubation period varies from 2 to 10 days and averages 3 to 4 days. Susceptibility to the clinical disease is high among infants and children and generally low among adults.

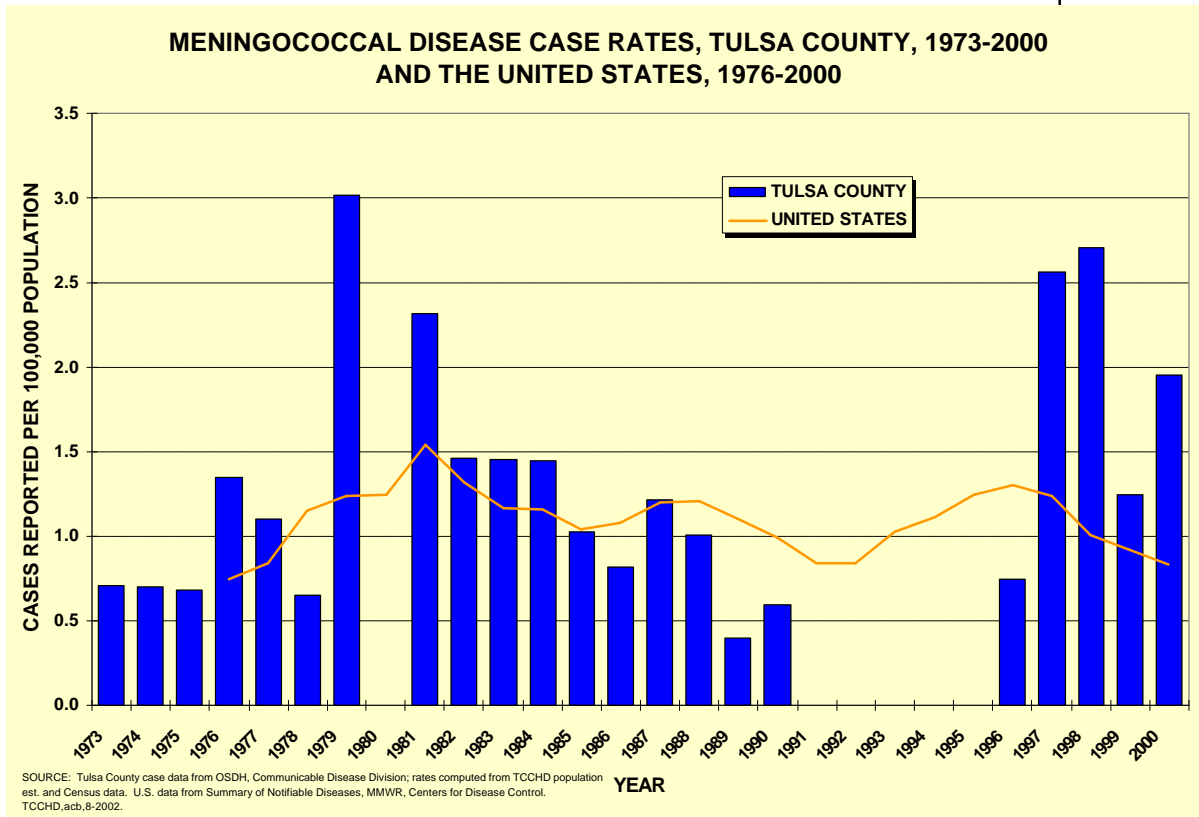
Meningococcal disease case rates for the United States average at 1 case per 100,000 population. Tulsa County's case rate was highest in 1979 at 3.0 cases per 100,000 population and in 1998 at 2.7 cases per 100,000 population (Figure 6.16).

Figure 6.16

HEALTHY  
PEOPLE  
2010  
OBJECTIVE

Reduce  
*meningococcal*  
disease.

- U.S. Department  
of Health and  
Human Services,  
2000

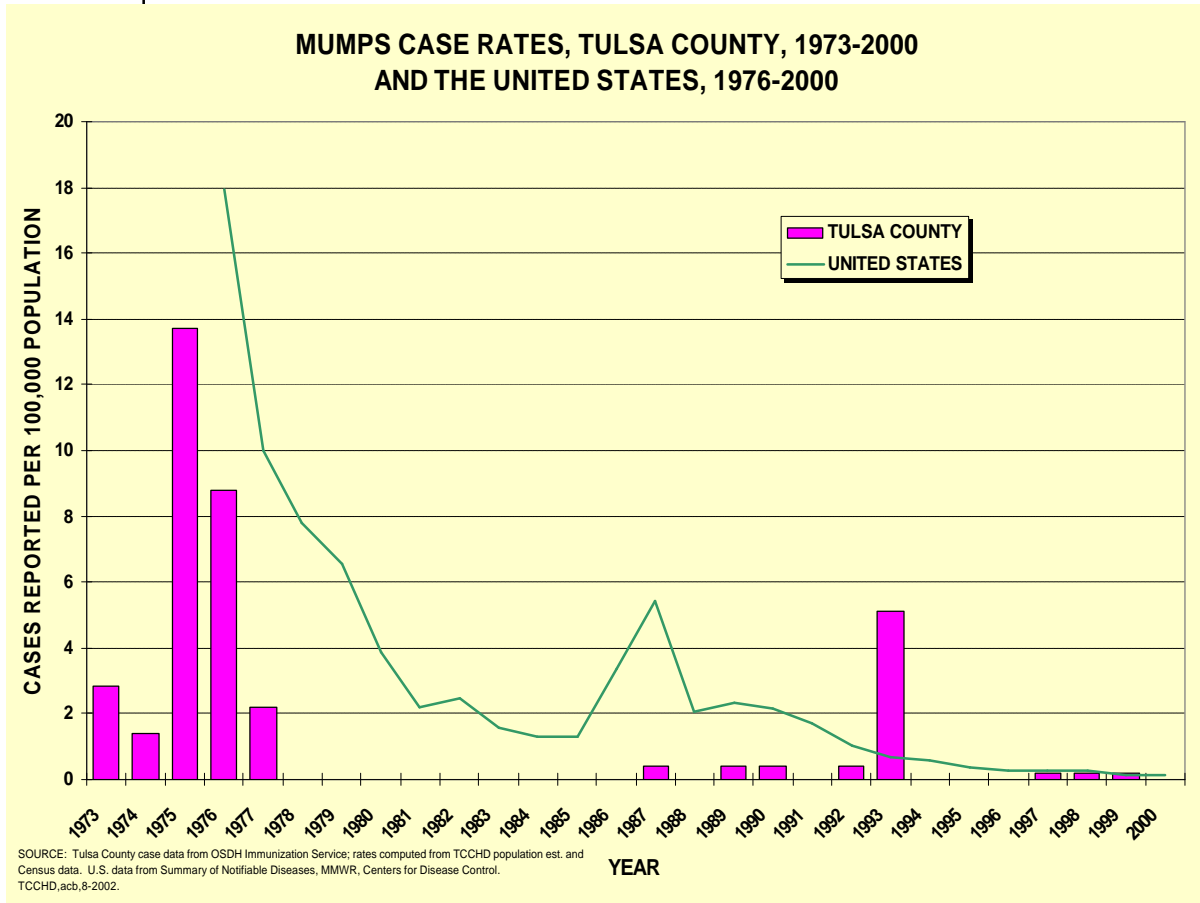


SOURCE: Tulsa County case data from OSDH, Communicable Disease Division; rates computed from TCCHD population est. and Census data. U.S. data from Summary of Notifiable Diseases, MMWR, Centers for Disease Control, TCCHD.acb.8-2002.

## Mumps

Mumps is an acute, contagious viral disease, which produces painful swelling in one or more salivary glands and other glandular tissue and often involves the nervous system. Orchitis (inflammation of the testes) occurs in 20%-30% of postpubertal males and oophoritis (inflammation of the ovaries) in about 5% of postpubertal females. Central nervous system involvement is frequent and usually involves aseptic meningitis and, rarely, encephalitis.

Figure 6.17



The infectious agent is the mumps virus, which is spread by droplets and direct contact with the saliva of an infected person. The reservoir is humans, and the incubation period is 12-24 days, averaging 18 days. Immunity is generally lifelong following infection, and most adults born before 1957 are considered to have been naturally infected and immune.

The development and licensing of the mumps virus vaccine, especially live attenuated mumps virus vaccine in late 1967, has dramatically reduced the incidence of mumps in the United States (**Figure 6.17**). In 1968, over 152,000 cases of mumps occurred in the United States, but by 2000, fewer than 350 cases were reported nationwide. Since 1973, the highest mumps case rate in



Tulsa County was just under 14 cases per 100,000 population (1975). With the exception of 5.1 cases per 100,000 population occurring in 1993, mumps rates have been 0 to 0.4 per 100,000 annually since 1978.

### Pertussis

Pertussis, commonly known as whooping cough, is an acute, contagious bacterial disease involving the respiratory tract. It is most prevalent among infants and children. The disease is characterized by repeated periods of violent coughing during which the patient is unable to breathe. Coughing episodes are sometimes followed by characteristic gasps or high-pitched “whoops” when inhalation occurs. The coughing series frequently ends with the expulsion of clear mucus and may be followed by vomiting.

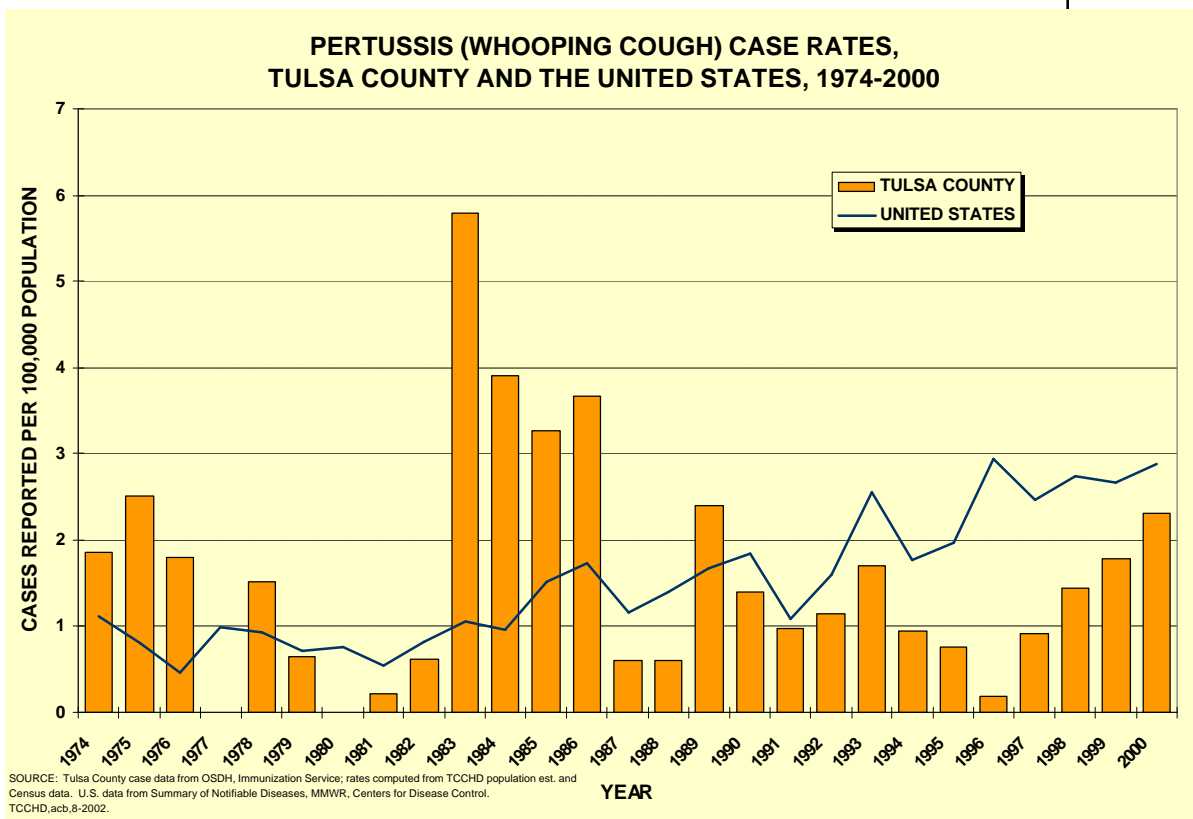
The infectious agent is the bacterium *Bordetella pertussis*. A similar but milder disease, parapertussis, is caused by the bacterium *Bordetella parapertussis*. Humans are the reservoir for both diseases, which are transmitted primarily by direct contact with discharges from respiratory mucus membranes of infected persons, probably by airborne droplets discharged during coughing. The incubation period is commonly 6-20 days. The disease is highly communicable in its early stages but becomes negligible in about 3 weeks.

### DID YOU KNOW?

Although pertussis is a vaccine-preventable disease, almost 7,300 cases were reported in the U.S. during 1999.

- Morbidity and Mortality Weekly Report, 2001

Figure 6.18



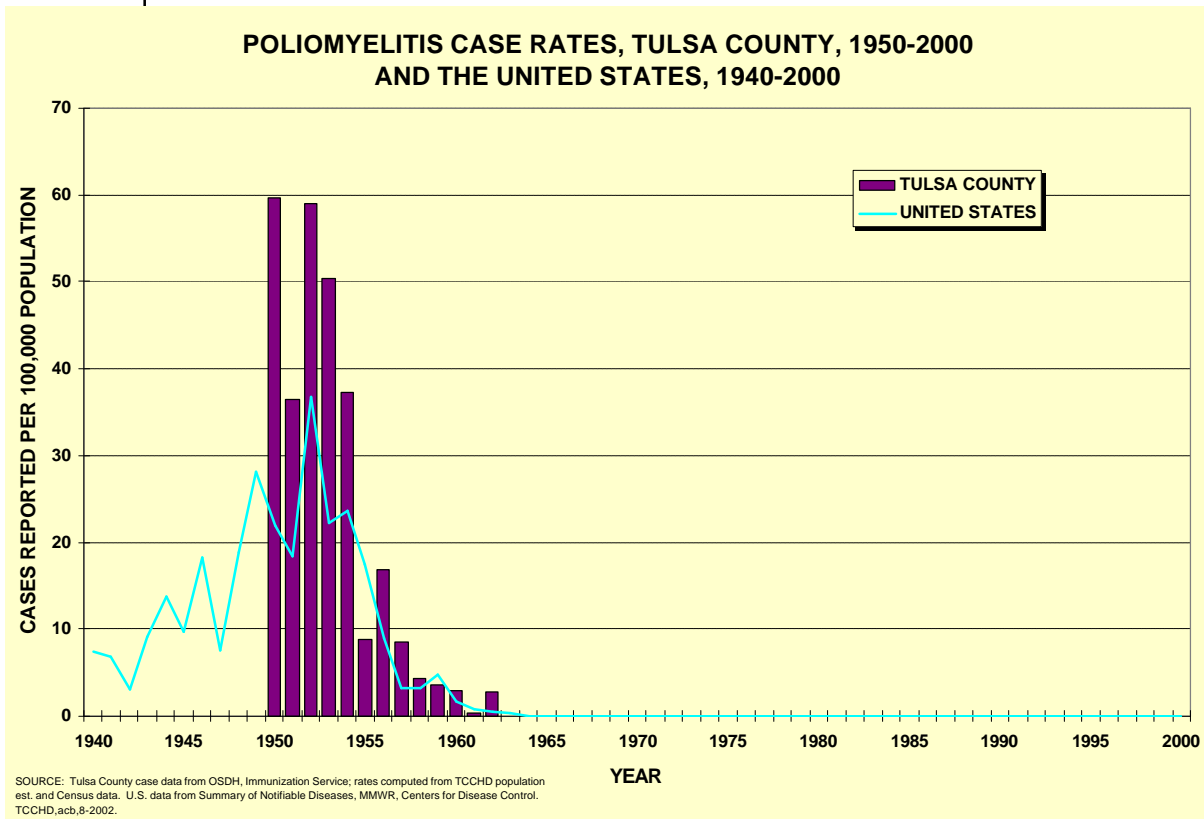
Pertussis incidence reached its peak in the United States during the 1930s, annually killing 9,000 to 12,000 Americans before widespread use of pertussis vaccine was begun during the 1940s, after which case rates declined rapidly. Nationwide, pertussis case rates had fallen to less than 1 reported case per 100,000 population by the late 1970s and early 1980s, but rates rose dramatically beginning in the mid-1980s and peaked at almost 3 cases per 100,000 population in 1996, and again in 2000. A similar rise in pertussis was noted in Tulsa County during the mid-1980s (**Figure 6.18**).

### Poliomyelitis

Poliomyelitis, commonly known as polio or infantile paralysis, is a viral infection of the gastrointestinal tract with subsequent spread to the regional nodes and, in some cases, to the nervous system. Minor illness includes symptoms of fever, malaise, headache, nausea, and vomiting, but more than 90% of infections are inapparent or result only in fever.

If the disease progresses to serious illness, severe muscle pain and stiffness of the neck and back may occur. If paralysis resulting from spread to the nervous system occurs, the maximum extent of paralysis is reached in 3 to 4 days. The paralysis site is dependent upon the location of affected nerve cells with legs being affected more frequently than arms. Paralysis of respiratory system

Figure 6.19



muscles or those necessary for swallowing can result in life threatening conditions. Paralysis which persists beyond sixty days is likely to be permanent.

The infectious agent for poliomyelitis is poliovirus serotypes P1, P2, and P3. Humans are the reservoir for this disease, usually people with inapparent infections. The mode of transmission is primarily person-to-person, principally through the fecal-oral route, although pharyngeal spread can be important in some cases. In rare instances, milk, food, and other materials contaminated with feces can act as vehicles. The incubation period for poliomyelitis is commonly 7-14 days for paralytic cases. The communicable period has not been precisely determined, although the virus is known to persist in the feces for several weeks.

Poliomyelitis was a dreaded disease of children in the United States and in Tulsa County during the early 1950s (**Figure 6.19**). Development and widespread use of polio vaccine rapidly decreased incidence of the disease from approximately 58,000 cases nationally and nearly 160 cases locally in 1953 to virtual elimination by the mid-1960s. Since 1995, fewer than 20 cases of poliomyelitis have been reported in the United States.

## Rabies

Rabies is an acute viral disease which is very rare among humans in the United States. The disease is invariably fatal and manifests itself as acute encephalomyelitis. Onset symptoms include headache, fever, malaise, and a sense of apprehension on the part of the affected individual. Excitability is frequent, and the disease rapidly progresses to paralysis affecting swallowing muscles resulting in fear of water; hence the common name “hydrophobia.” Delirium and convulsions are usually followed by fatal respiratory paralysis in 2-6 days or longer.

The infectious agent is the rabies virus. Rabies is primarily a disease of animals and is transmitted to humans only by direct contact. The virus is transmitted in saliva of a rabid animal through introduction by a bite or scratch, through mucus membranes, or rarely through an unrelated skin break. The incubation period is usually 3-8 weeks but can be as short as 9 days or as long as 7 years. Dogs and cats are communicable for 3-7 days before onset of clinical signs and throughout the course of the disease.

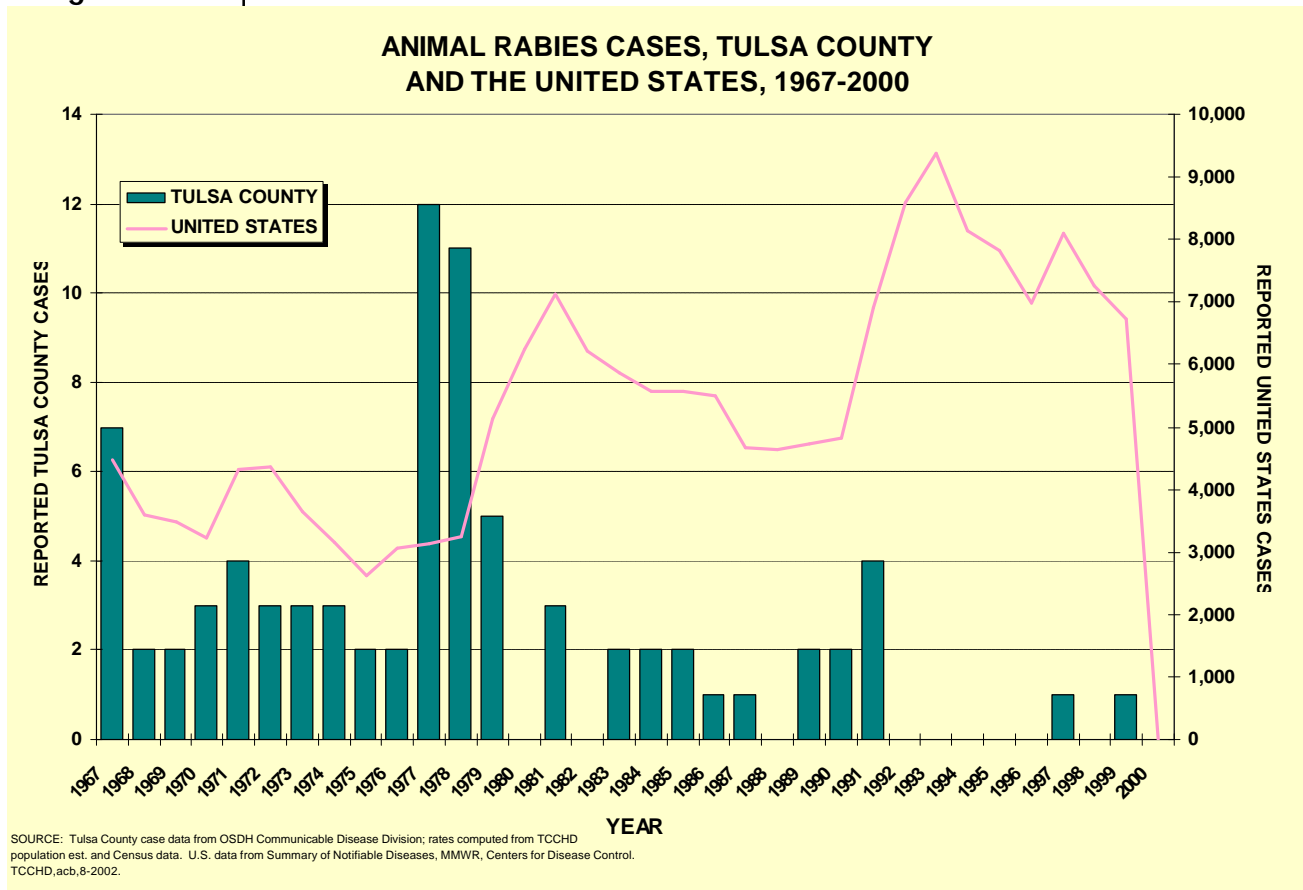
All mammals are susceptible to the rabies virus, and the reservoir includes many wild and domestic animals such as dogs, foxes, coyotes, wolves, skunks, raccoons, bats, and others. Nationally, the reported number of animal rabies cases has risen from 3,000 cases per year in the late 1970s to 9,000 cases per

## DID YOU KNOW?

*Between 1990 and 1999, there were 52 reported cases of poliomyelitis in the United States.*

- Morbidity and Mortality Weekly Report, 2001

Figure 6.20



**DID YOU KNOW?**

Over 90% of patients with RMSF are infected from April through September

- Centers for Disease Control and Prevention, 2000

year during the 1990s (**Figure 6.20**). In Tulsa County, the greatest number of reported animal rabies cases in recent years was 12 and 11 cases in 1977 and 1978, respectively. Since 1991, only two animal rabies cases have been reported in Tulsa County. Skunks are the primary reservoir for rabies in this area.

**Rocky Mountain Spotted Fever**

Rocky Mountain spotted fever (RMSF) is one of a group of tick-borne diseases which are clinically similar and occur widely throughout the world. In the case of Rocky Mountain spotted fever, the infectious agent is *Rickettsia rickettsii*. The most common vector for the disease in the eastern and southern United States is the American dog tick and, in southwestern states, occasionally, the Lone Star tick. The disease is characterized by sudden onset of moderate to high fever, malaise, deep muscle pain, severe headache, chills, and, in about half of cases, a rash which appears on the extremities on about the third day following onset, later spreading to palms, soles of feet, and to much of the body.



Although fatality rates in untreated cases range between 13% and 25%, death is uncommon with proper treatment. Tetracycline and chloramphenicol are effectively used. Despite effective treatment, 3% to 5% of U.S. cases in recent years have been fatal. Unfortunately, in 1993, the highest incidence rates in the U.S. were in North Carolina and Oklahoma. Despite its name, Rocky Mountain spotted fever is rarely reported in the Rocky Mountain region.

Adult males are most frequently infected in western states while incidence is highest among children in the eastern states. Since the disease is tick-borne, it is primarily a warm weather illness of April through September.

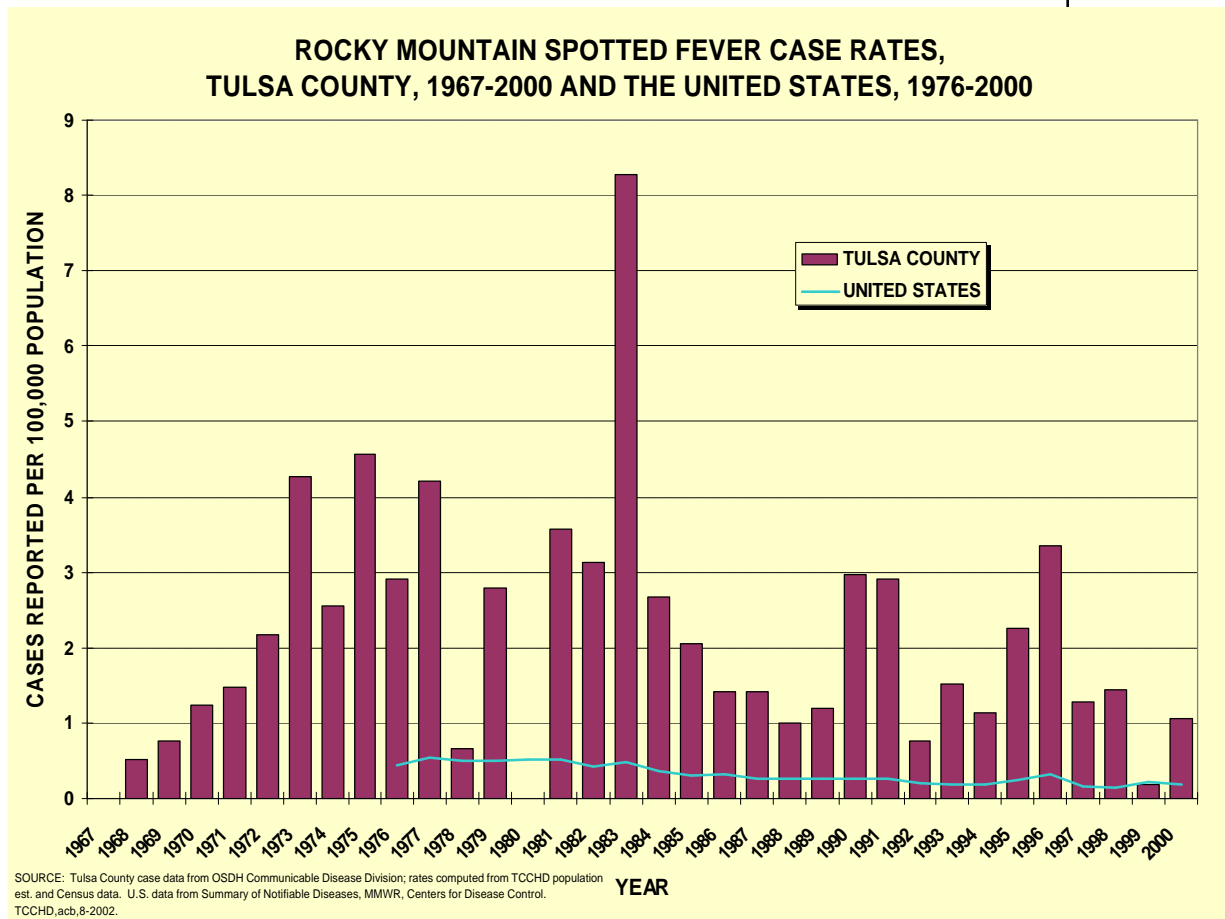
The rickettsiae can be transmitted to dogs and other domestic and wild animals, but animal infections are normally subclinical. The disease cannot be transmitted from person to person. An infected tick must remain attached for 4 to 6 hours and feed on blood during that time in order for human infections to occur. It is possible for contamination to occur via breaks in the skin or by mucus membrane exposure if ticks are crushed or feces of ticks come in contact with these surfaces. The incubation period following exposure is 3 to 14 days.

**DID YOU KNOW?**

*RMSF is the most severe and most frequently reported rickettsial illness in the U.S.*

- Centers for Disease Control and Prevention, 2000

Figure 6.21



There is no licensed vaccine in the United States for public use. The best preventative measure is avoidance of tick-infested areas, use of repellents, and controlling ticks in yards and on domestic pets.

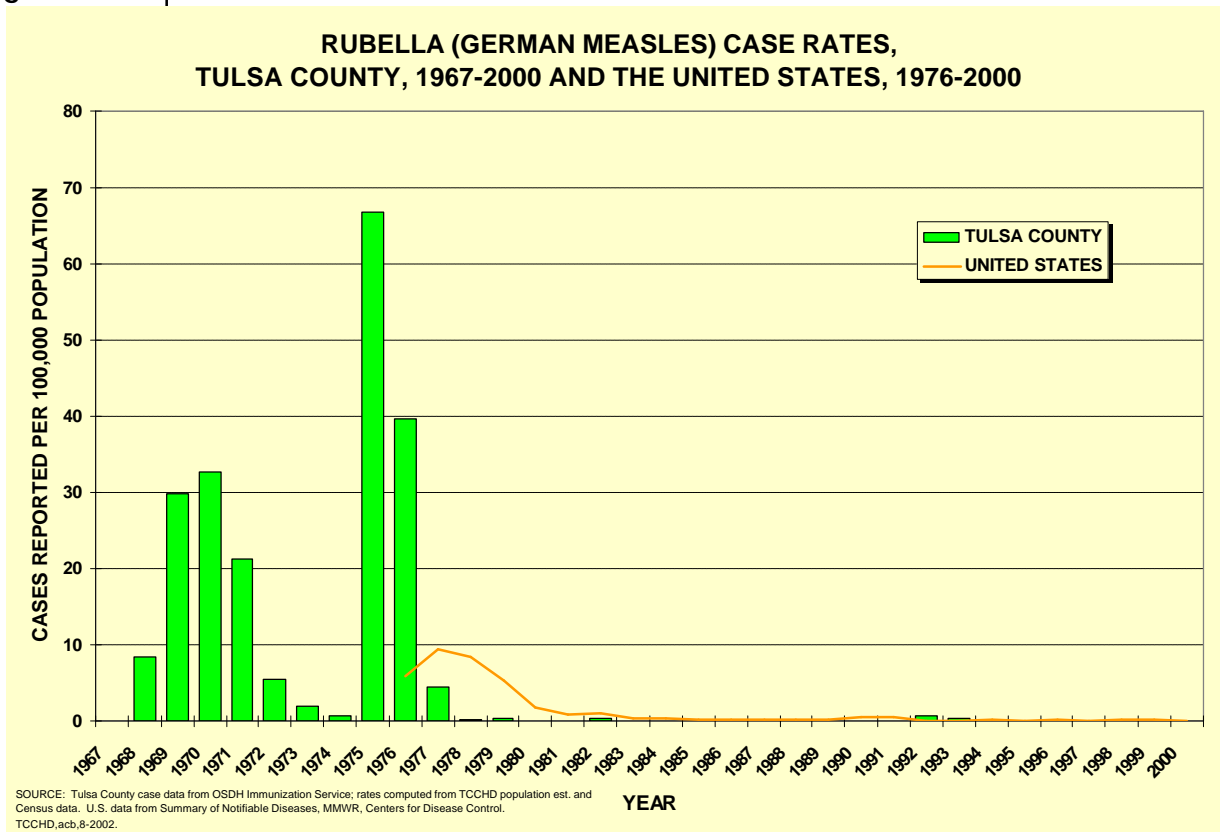
Fewer than 0.3 cases of Rocky Mountain spotted fever are reported per 100,000 U.S. residents each year. In Tulsa County, however, 1 to 4 cases typically have been reported per 100,000 population annually since the mid-1980s. Historically, RMSF cases were highest in this area from the mid-1970s through the mid-1980s. The highest number of cases was reported in 1983 when more than 8 cases per 100,000 population occurred in Tulsa County (Figure 6.21).

### Rubella

Rubella, also known as German measles, is largely a disease of the past due to the development and widespread use of rubella virus vaccine licensed in mid-1969. Rubella vaccine is more than 90% effective in producing apparently lifelong protection against the disease. Today's near absence of rubella is in sharp contrast to widespread epidemics which occurred in schools prior to vaccine development.

The disease itself is mild and produces a rash similar to rubeola (red measles) in half or more of cases along with low grade fever. Adults may experience

Figure 6.22



SOURCE: Tulsa County case data from OSDH Immunization Service; rates computed from TCCHD population est. and Census data. U.S. data from Summary of Notifiable Diseases, MMWR, Centers for Disease Control. TCCHD, acb, 8-2002.



headache, malaise, and conjunctivitis. Arthralgia, arthritis, and encephalitis are complications which may occur, especially among adults.

Rubella can be a critical disease in that it frequently produces anomalies in the developing fetuses of pregnant women who experience the infection during early pregnancy. Congenital rubella syndrome is responsible for producing a variety of congenital malformations in up to 90% of infants born to women who experience rubella during the first trimester of pregnancy. The risk of congenital malformations declines sharply to 10% to 20% by the 16<sup>th</sup> week and is rare after the 20<sup>th</sup> week of gestation.

The infectious agent for rubella is the rubella virus. The virus occurs worldwide and is endemic in areas where vaccination is not practiced. The reservoir is humans, and the disease is spread through contact with nasopharyngeal secretions of infected people by droplet spread or direct contact. The incubation period is typically 16 to 18 days, and cases are contagious from about one week before and at least four days after onset of rash.

With the exception of sporadic outbreaks in isolated years, rubella cases have become rare in the United States and in Tulsa County since the late 1970s. Years of sporadic increases included 1990 and 1991 at the national level, and a few cases were reported in 1992 and 1993 in Tulsa County. Only 176 cases were reported nationwide in 2000; however, no cases occurred in Tulsa County during that year (**Figure 6.22**).

## Rubeola

Rubeola is the common measles of the past and is also known as hard measles or red measles. It is a highly contagious, acute viral disease accompanied by fever, conjunctivitis, cough, and the typical red, blotchy rash, which appears on the 3<sup>rd</sup> to 7<sup>th</sup> day of infection. The disease is most severe in infants and adults with complications including otitis media (inflammation of the middle ear), pneumonia, diarrhea, and encephalitis. Rubeola is caused by the measles virus. It is vaccine preventable with live, attenuated measles virus vaccine, which is recommended for all susceptible persons born in 1957 or after and produces active immunity for life in more than 95% of individuals. The immunity level is increased to as high as 99% with a second dose.

The disease reservoir is humans. Measles is highly infectious and is spread by airborne droplet nuclei and through direct contact with nasal or throat secretions of infected persons. Less commonly, it can be spread by articles freshly soiled by nose and throat secretions. Because of its communicability,

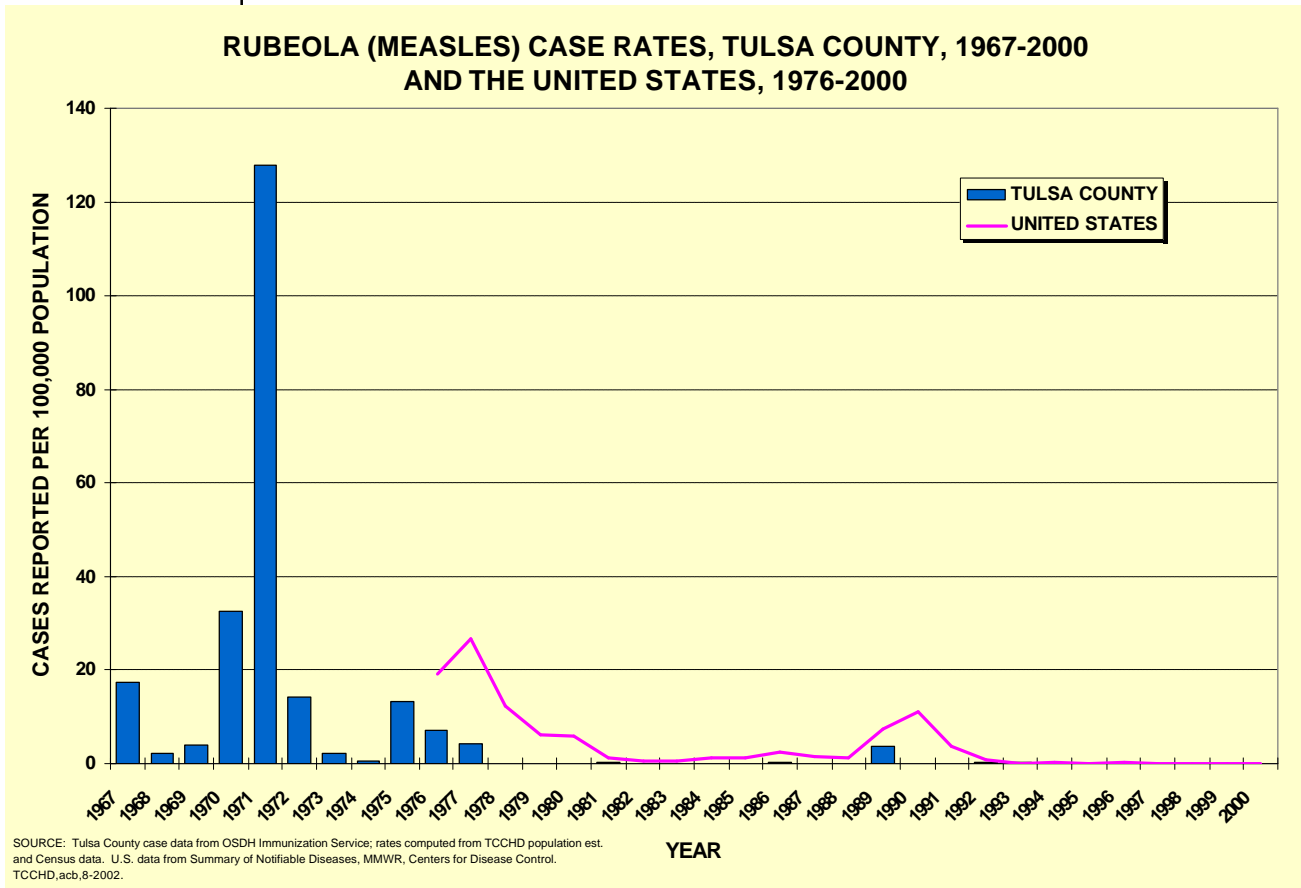
### DID YOU KNOW?

*The name rubella is derived from Latin, meaning "little red."*

- Centers for Disease Control and Prevention, 2001



Figure 6.23



herd immunity of 94% or greater is necessary to interrupt community transmission of the disease. Measles has an incubation period of about 10 days, on average.

Prior to licensure of measles vaccine, outbreaks of the disease were common in the United States and varied greatly from year to year. Reported cases nationwide averaged around 400,000 to 500,000 during the 1940s through mid-1960s. Tulsa County data, available for 1950 and subsequent years, also show significant year-to-year variations in reported cases, ranging from fewer than 100 to more than 2,300 cases during the peak years of the 1950s. Since widespread immunization for the disease, rubeola is rare, both nationally and in Tulsa County, except for sporadic outbreaks in some years since 1980 (Figure 6.23). Only 86 cases were reported nationwide in 2000, and no Tulsa County cases were reported during that year. Recently, a joint committee of the World Health Organization, the PanAmerican Health Organization, and the Centers for Disease Control and Prevention agreed that global measles eradication is technically feasible and recommended adoption of a target date for that eradication during 2005-2010.<sup>3</sup>

## Salmonellosis

Salmonellosis is a disease caused by numerous serotypes of *Salmonella* bacteria, which are pathogenic to both people and animals. Strains of this bacterial agent are responsible for causing typhoid and paratyphoid fevers, the former of which has been of great historical importance. The most frequently reported salmonella strains are *Salmonella typhimurium* and *Salmonella enteritidis*, although there are about 2,000 known serotypes.

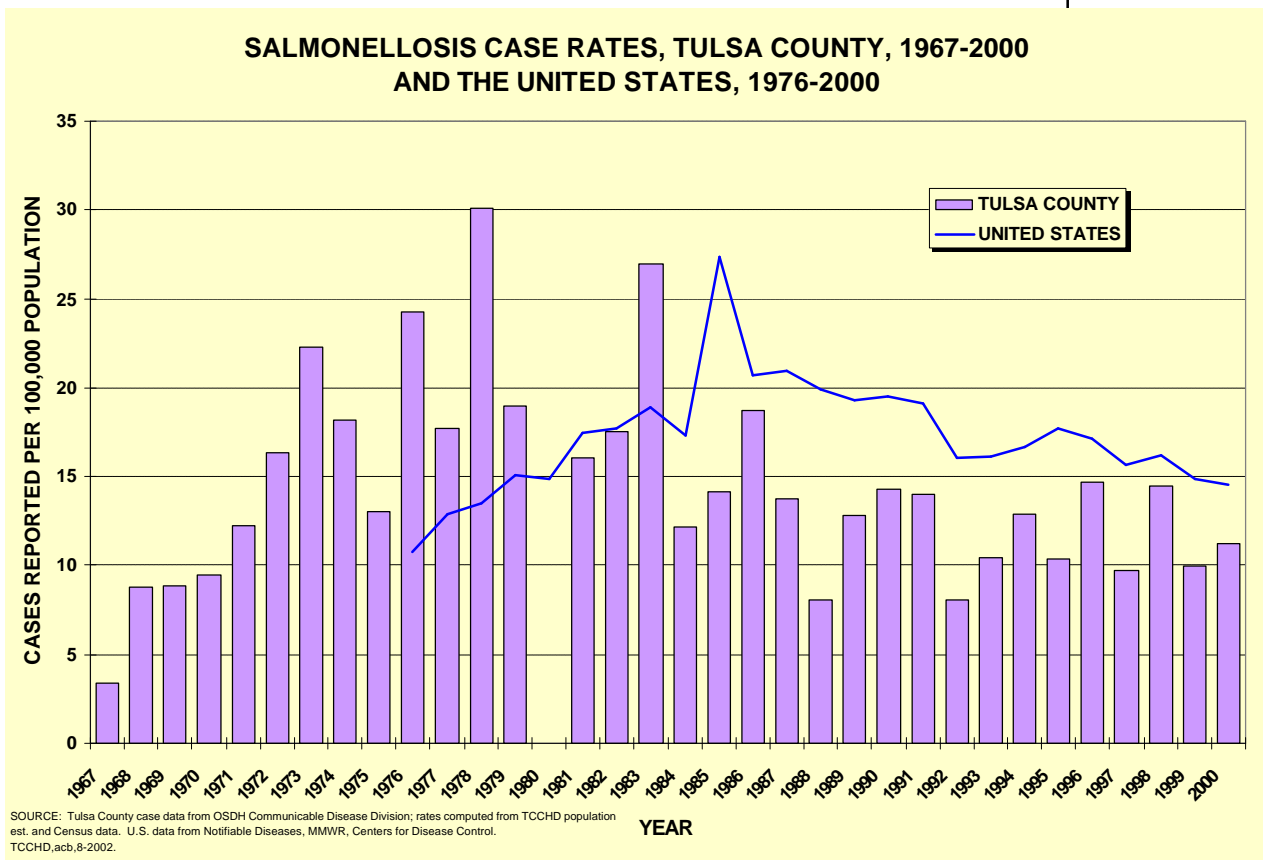
Typically, Salmonellosis manifests itself with sudden onset of headache, abdominal pain, diarrhea, nausea, and sometimes vomiting. Dehydration may be severe, and the disease is most serious among the very young, the very old, and persons with suppressed immune systems. Infection can occasionally localize in any tissue of the body, producing abscesses. Fever is a normal manifestation, and anorexia and diarrhea often persist for several days. Death is uncommon except in very high risk cases.

Figure 6.24

### HEALTHY PEOPLE 2010 OBJECTIVE

Increase the proportion of consumers who follow key food safety practices.

- U.S. Department of Health and Human Services, 2000



The disease occurs worldwide and is often classified as a foodborne disease because contaminated food is a predominant mode of transmission. Domestic and wild animals provide the disease reservoir including poultry, swine, cattle,

**DID YOU KNOW?**

*Campylobacter and salmonella are the most frequently reported foodborne illnesses in the U.S.*

- U.S. Department of Health and Human Services, 2000

**DID YOU KNOW?**

*In 1999, over 40,000 cases of Salmonellosis were reported in the U.S.*

- Morbidity and Mortality Weekly Report, 2001

rodents, and pets such as iguanas, turtles, chicks, dogs, and cats. In recent years, Salmonellosis outbreaks have been traced to consumption of raw fruits and vegetables as well as contaminated eggs and egg products.

The disease is spread by ingestion of organisms on food derived from infected animals or contaminated by feces from infected animals or persons. The infection is transmitted to farm animals by infected feeds and fertilizers from meat scraps, tankage, and other sources. Fecal-oral transmission among humans is significant because of symptomatic diarrhea. Outbreaks from food sources are often traced to processed meat products, inadequately cooked poultry and poultry products, inadequately cooked eggs and egg-containing products, raw milk, dairy products, and foods contaminated by feces from infected food handlers. Cross-contamination of uncooked foods also occurs through inappropriate storage of potentially contaminated meat products (e.g., raw poultry) above uncooked or table ready, prepared foods. Use of knives and other utensils, which have been used to process contaminated meat products and are subsequently employed in handling or cutting fruits and vegetables, is also a source of cross-contamination.

The incubation period for Salmonellosis can be 6 to 72 hours, but is typically 12 to 36 hours. Cases are infectious throughout the course of the disease, which may last from several days to several weeks.

Preventive measures include cooking poultry, ground beef, and eggs thoroughly before eating. It is essential to wash hands, kitchen work surfaces, and utensils with soap and water immediately after they have been in contact with raw meat or poultry.

Salmonella case rates for the United States generally average 15 to 20 cases per 100,000 population, having risen from about 10 cases per 100,000 population in the mid-1970s to peak at over 20 cases per 100,000 population in the mid-1980s before declining somewhat in recent years (**Figure 6.24**). In Tulsa County, reported cases rose from the mid-1960s to peak during the late 1970s and early 1980s at an average of about 20 cases per 100,000 population and have gradually declined to around 10 to 15 cases per 100,000 population during the 1990s, somewhat below the national rate for this disease.

**Shigellosis**

Shigellosis is an acute, bacterial dysentery disease, which is characterized by diarrhea, fever, nausea, vomiting, and cramps and can cause convulsions in young children. The disease is usually self-limiting, lasting an average of 4 to 7 days. The seriousness of the disease and its associated case fatality rate are related to the age of the host and the specific bacterial strain. Although



susceptibility is general, the disease is most severe in young children and the elderly.

The pathogenic *Shigellae* bacteria are classified into four serogroups including *S. dysenteriae*, *S. flexneri*, *S. boydii*, and *S. sonnei*. Of these, *Shigella dysenteriae* is frequently associated with the most serious cases of the disease and with severe complications resulting in case fatality rates as high as 20% among hospitalized cases. *Shigella sonnei* typically produces a disease of short course and negligible case fatalities.

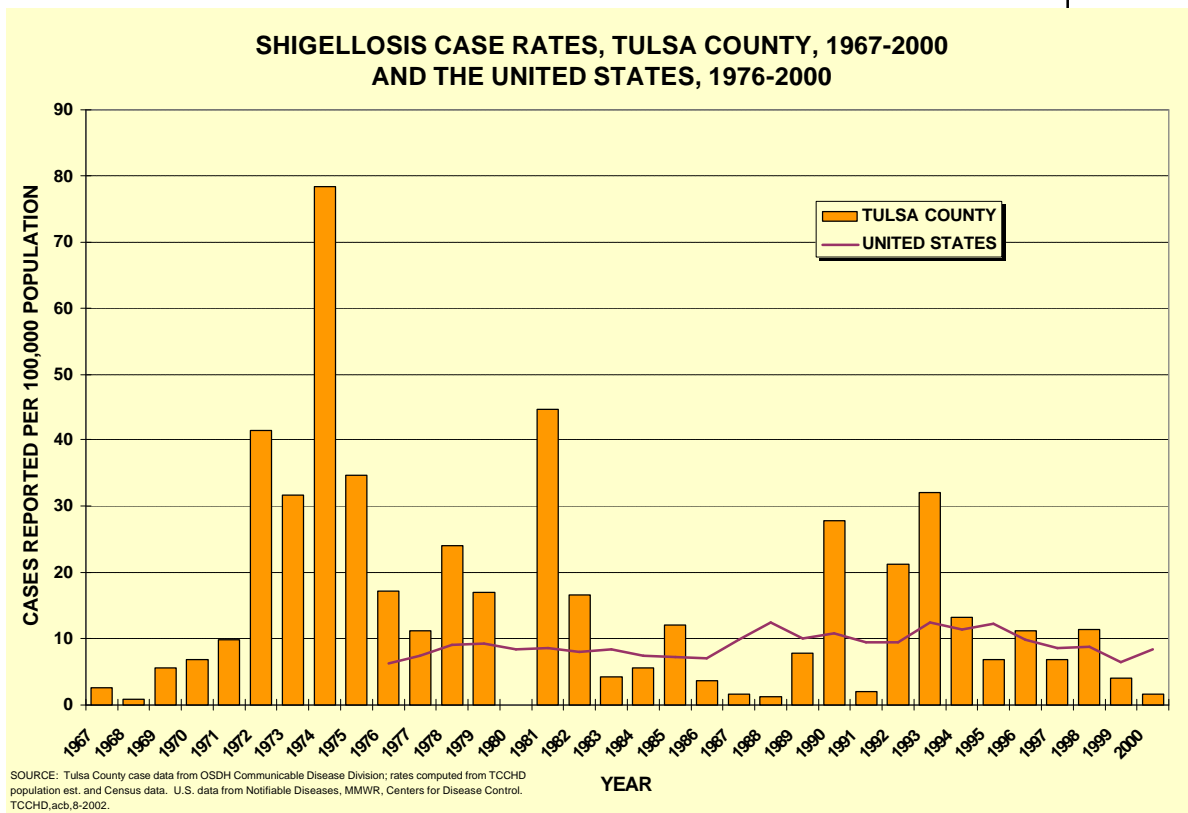
Shigellosis occurs worldwide and is responsible for about 600,000 deaths each year, two thirds (2/3) of which are among children under ten years of age. The reservoir is humans, although outbreaks are known to occur among primate colonies. The disease is transmitted by direct or indirect fecal-oral transmission from patients or carriers. Ingestion of very few organisms produces infection, making proper handwashing extremely important in interrupting the transmission cycle. Transmission through direct physical contact and by contamination of food, water, and milk is important. Flies are known to carry the organism from fecal material to non-refrigerated food items, which support their survival and multiplication. The incubation period is generally 1 to 3 days, and cases remain infectious for up to four weeks after the illness or in rare cases much longer.

**DID YOU KNOW?**

*Every year, about 18,000 cases of shigellosis are reported in the U.S.*

- Centers for Disease Control and Prevention, 2000

**Figure 6.25**



## DID YOU KNOW?

In 1999, there were 35,628 reported cases of syphilis (all stages) in the U.S. This is a 74% decrease in cases from 1990.

Morbidity and Mortality Weekly Report, 2001

Outbreaks in institutions such as daycare centers with secondary transmission to family members occur on a sporadic basis and have been difficult to control locally. Aggressive education about the importance of handwashing and hygiene is an effective preventative measure. Sporadic foodborne shigellosis outbreaks occur in the United States and locally as a result of infectious food handlers. One such food related outbreak resulted in several hospitalizations and one death in Tulsa several years ago. Case rates for shigellosis have been gradually rising in the United States since the mid-1970s, increasing from approximately 6 cases per 100,000 population at that time to about 12.5 cases per 100,000 population in 1993 (**Figure 6.25**). In Tulsa County, shigellosis occurs sporadically, with rates varying significantly from year to year from fewer than 5 cases per 100,000 population to over 30 cases per 100,000 population. Shigellosis cases were generally higher during the 1970s peaking at nearly 80 cases per 100,000 population during 1974.

## Syphilis

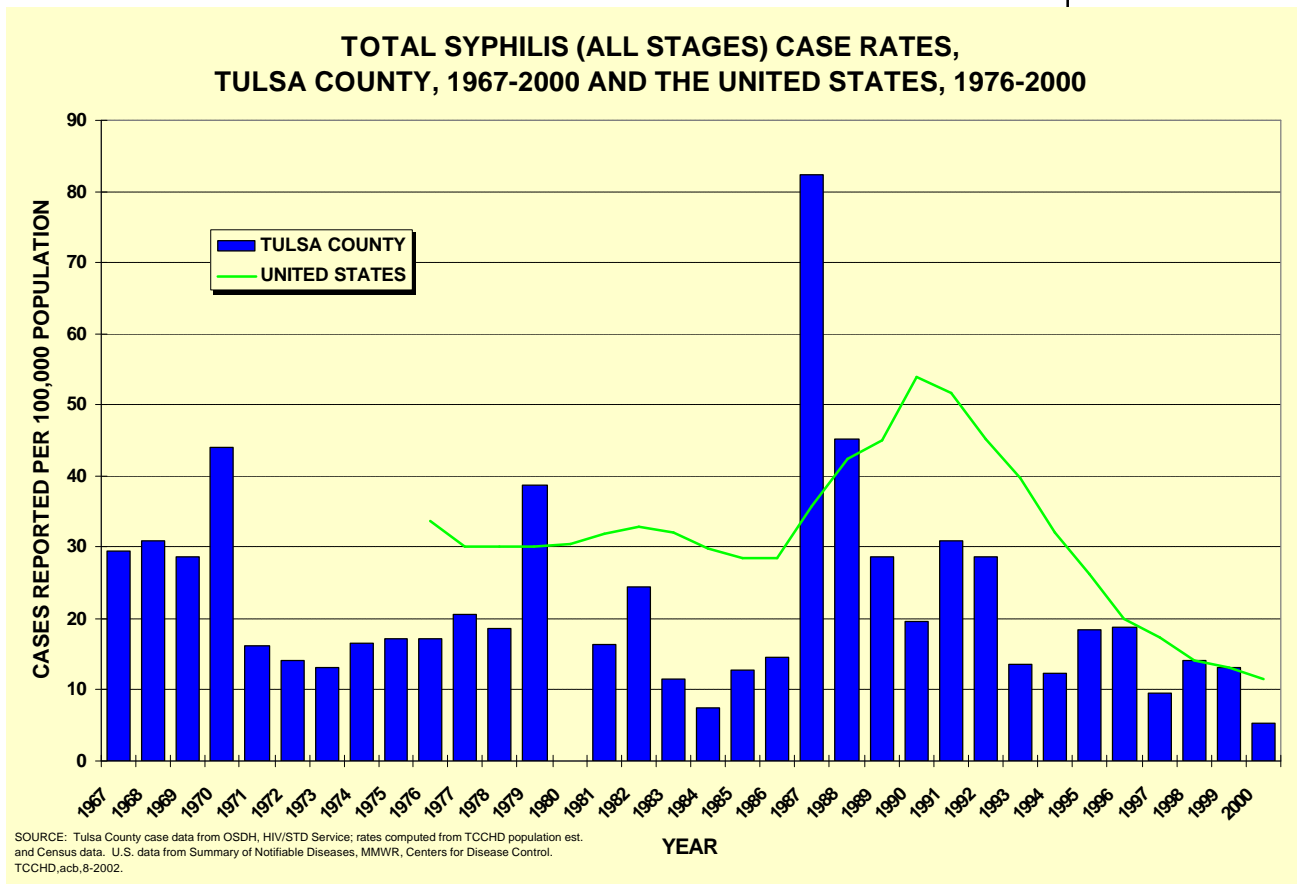
Syphilis is a sexually transmitted disease with both acute and chronic manifestations occurring during three stages: primary, secondary, and latent. About three weeks into the primary stage, following initial infection, a primary lesion (chancre) appears as a painless ulcer at the site of the initial invasion. Without treatment, after 4 to 6 weeks the initial chancre will begin to resolve, and in about one third (1/3) of cases a secondary eruption will appear along with a classic rash involving the palms and soles of the feet. Without treatment, the secondary manifestations will resolve within a few weeks or up to twelve months. About one third (1/3) of untreated cases will enter a clinically latent period for weeks or years. Infectious lesions may recur during early years of latency. Latency can continue through life or, unpredictably, five to twenty years after initial infection. Disabling lesions can occur on the aorta, or soft tumors (gummas) may appear on skin, viscera, bone, or mucosal surfaces. Central nervous system disease, manifested as acute meningitis, may evolve at any time during secondary or early latent syphilis. While early stages of the disease rarely cause death or serious disability, latent syphilis is responsible for impaired health and shortened life spans.

The infectious agent in syphilis is the spirochete *Treponema pallidum*, which is widespread throughout the world, primarily among sexually active young people. In the United States, it is most prevalent among persons in their twenties and in urban areas. Prevalence was high among homosexual men in the late 1970s and early 1980s but has since decreased.

The reservoir for syphilis is humans, and the disease is transmitted by direct contact with infectious exodates from early lesions of skin and mucus membranes and by contact with body fluids and secretions of infected people

during sexual contact through saliva, semen, blood, and vaginal discharges. Fetal infection can occur through placental transfer or at delivery. The incubation period for the disease is usually three weeks but may range from ten days to three months. The communicable period for syphilis is variable and indefinite, extending through the primary and secondary stages and occurring during the first four years of latency. Adequate penicillin treatment usually ends infectivity within 24 to 48 hours. While susceptibility is universal, only about 30% of exposures result in infection.

Figure 6.26

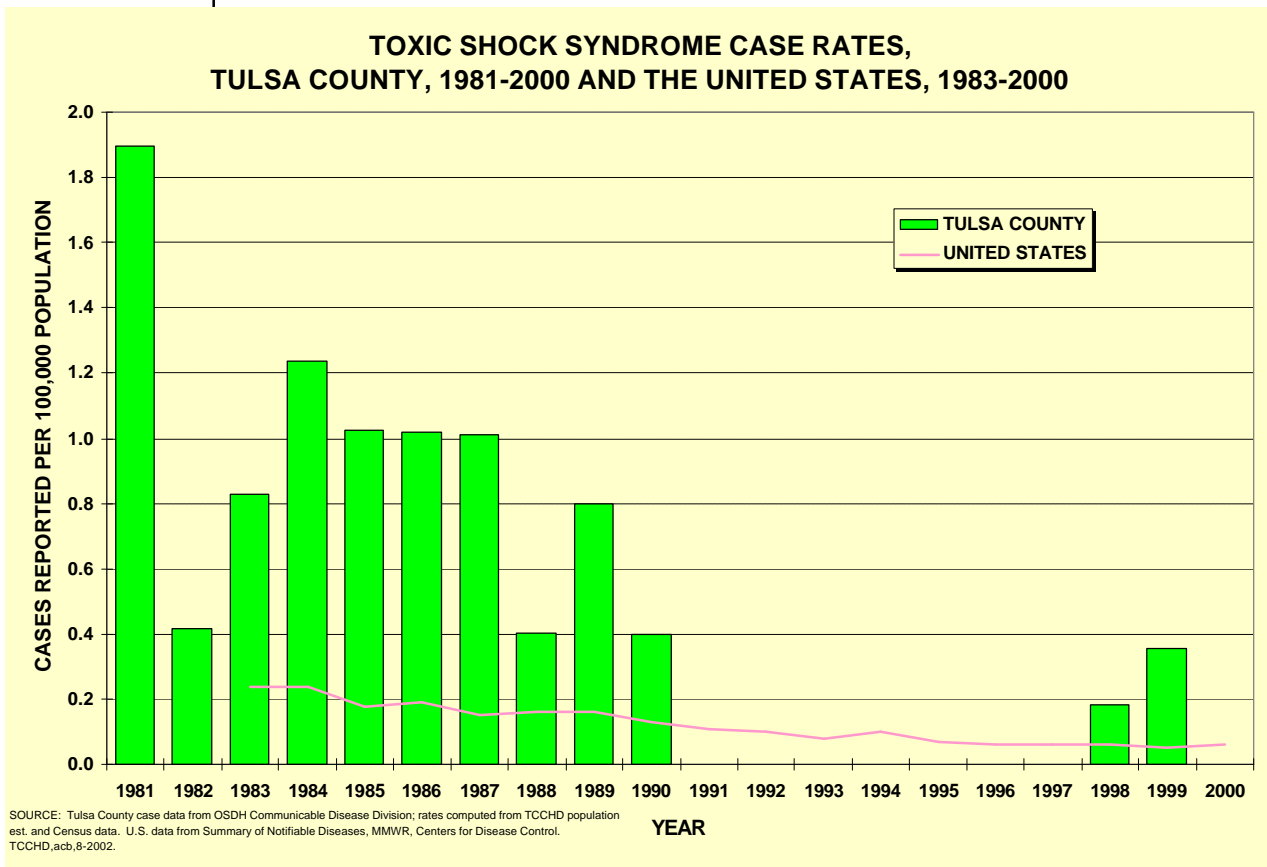


Total reported syphilis cases in the United States averaged about 30 per 100,000 population from the mid-1970s through the mid-1980s before increasing dramatically to peak in 1990 at nearly 54 cases per 100,000 population. Case rates have declined since that time to fewer than 12 cases per 100,000 in 2000. In Tulsa County, total syphilis case rates have generally varied from 10 to 30 cases per 100,000 population since 1967, with some exceptions. They were generally lower during the early 1970s through the mid-1980s with the County experiencing a rise similar to the national increase during the late 80s to early 90s followed by a similar decline (**Figure 6.26**).

## Toxic Shock Syndrome

Toxic shock syndrome is a serious illness with sudden onset characterized by high fever, vomiting, watery diarrhea, and myalgia followed by hypertension and shock in the most severe cases. The acute phase is accompanied by a “sunburn-like” rash, and 1 to 2 weeks following onset, flaking and peeling of the skin occurs, especially on palms and soles of feet. Organ systems involved in the illness can include gastrointestinal, muscular, mucus membrane, renal, hepatic, hematologic, and the central nervous systems.

Figure 6.27



Toxins produced by strains of the bacterium *Staphylococcus aureus* have been associated with most cases of toxic shock syndrome. During early identification of the disease, most cases of toxic shock syndrome occurred in women during menstruation and most with vaginal tampon use. Today, only 55% of cases are reported to be associated with menstruation. Other risk factors include use of contraceptive diaphragms, vaginal contraceptive sponges, and infections following childbirth or abortion. Toxic shock syndrome associated with the menstrual period can be avoided by use of less absorbent tampons or by intermittently using tampons during the menstrual cycle.



Nationally, rates of toxic shock syndrome have steadily declined since 1983 when 0.2 cases were reported per 100,000 population. In 2000, the rate had declined to fewer than 0.1 cases per 100,000 population (**Figure 6.27**). Tulsa County case rates for toxic shock syndrome have also declined since data were first collected in 1981 but have been significantly higher than the national rate throughout the decade of the 1980s, being almost 2 cases per 100,000 population in 1981 and declining to 0.4 case per 100,000 population by 1990. Since that time, fewer than 5 cases of toxic shock syndrome have been reported in Tulsa County.

## Tuberculosis

Tuberculosis, commonly known as TB today and historically as “consumption,” is a mycobacterial disease, which is a major cause of disability and death throughout much of the world. The initial infection often goes unnoticed, and reactivity to the tuberculin skin test appears within a few weeks after initial infection. Early lung lesions often heal leaving little residual change with the exception of pulmonary or tracheobronchial lymph node calcifications. Ninety to ninety-five percent (90% - 95%) of those initially infected will enter the latent phase and remain at risk of reactivation of the disease throughout their lives. Only approximately 5% of normal cases and 50% of HIV infected cases will progress directly to pulmonary tuberculosis or to other involvements following initial infection.

The reservoir for tuberculosis is humans and, in some areas, other mammals including primates, cattle, badgers, and swine. Tuberculosis is transmitted by airborne droplet nuclei containing the mycobacterium produced by people with pulmonary or laryngeal tuberculosis who express the agent during coughing, sneezing, or singing. Long-term exposure to some contacts, as in households, may lead to a 30% risk of infection and a 1% to 5% chance of the infection progressing to disease within a year. Epidemics have been reported among people congregated in enclosed spaces such as shelters for the homeless, hospitals, schools, prisons, and office buildings. In recent years, there has been growing concern over outbreaks of multi drug-resistant TB which challenge the abilities of the public health and medical infrastructure to bring them under control.

The incubation period of tuberculosis from initial infection to significant tuberculin reaction or development of primary lesion is 4 to 12 weeks, while subsequent progression to pulmonary or extrapulmonary TB is greatest within the first 1 to 2 years and may persist for life. HIV infection accelerates the risk of development of clinical tuberculosis.

Morbidity and mortality rates increase with age and are higher among males than females in the older age groups. TB rates are also typically higher among

### DID YOU KNOW?

*In 1999, there were 17,531 reported cases of tuberculosis in the U.S.*

*- Morbidity and Mortality Weekly Report, 2001*

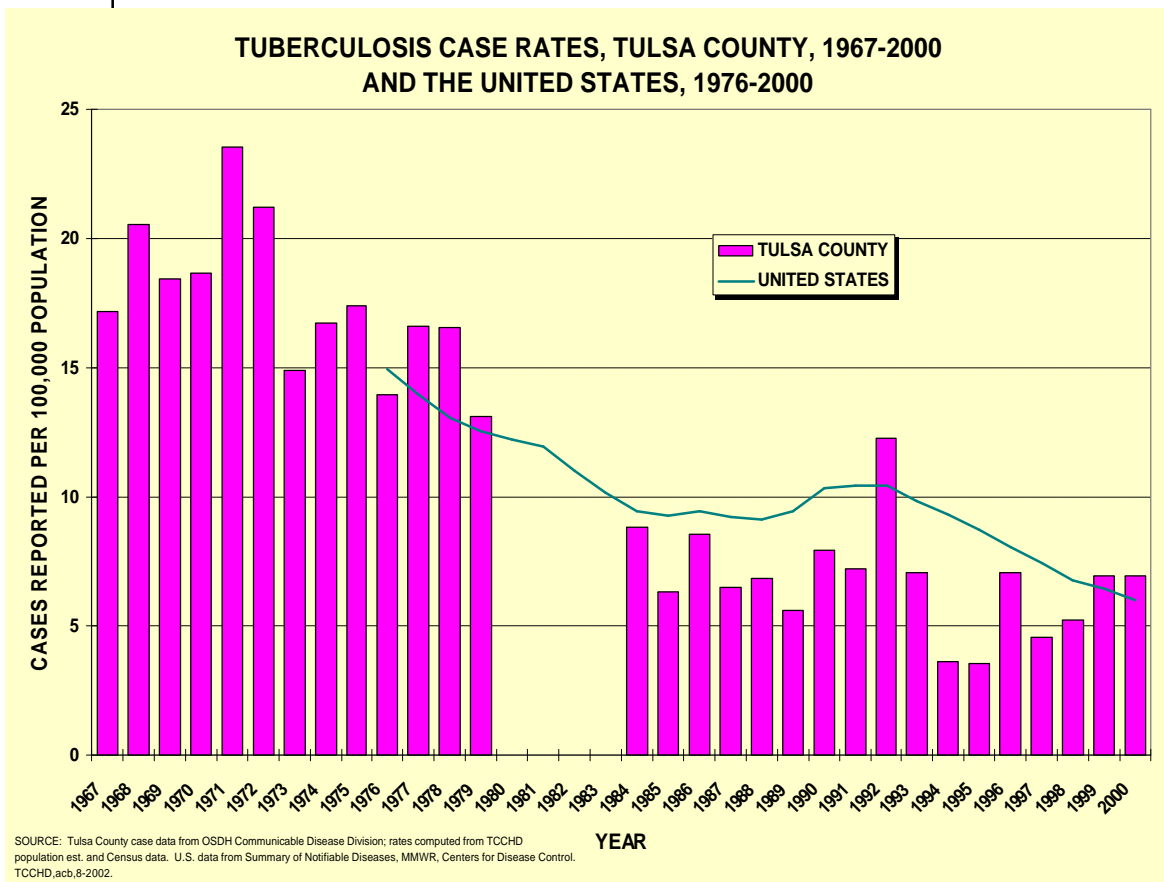
### HEALTHY PEOPLE 2010 OBJECTIVE

*Reduce tuberculosis.*

*- U.S. Department of Health and Human Services, 2000*

the poor and in cities as contrasted with rural areas. Nationally, reported incidence of tuberculosis is highest in southeastern states and in Alaska, California, New York, Hawaii, and Washington, D.C. The overall U.S. rate for 2000 was 6.01 cases per 100,000 population. Oklahoma's TB incidence rate for that year was above the national average at 6.92 cases per 100,000 population. TB rates were highest during the decade of the 1940s in the United States and steadily declined into the mid-1980s when they stabilized at about 25,000 cases per year. Tulsa County's reported new active cases of tuberculosis were generally in the range of 160 to 180 cases in the early 1950s and steadily declined to around 30 to 40 cases annually after the mid-1980s. Tuberculosis case rates are shown in **Figure 6.28** for the United States and Tulsa County.

Figure 6.28



## Typhoid Fever

Typhoid fever is a serious bacterial disease characterized by insidious onset of fever, severe headache, malaise, anorexia, and nonproductive cough, with constipation occurring more commonly than diarrhea. About 25% of white patients develop “rose” spots on the trunk. Many mild and atypical infections

also occur. If untreated, severe forms can produce intestinal hemorrhaging or perforation, cerebral dysfunction including mental dullness and slight deafness, and a case fatality rate of 10%, which is reduced to less than 1% with proper treatment.

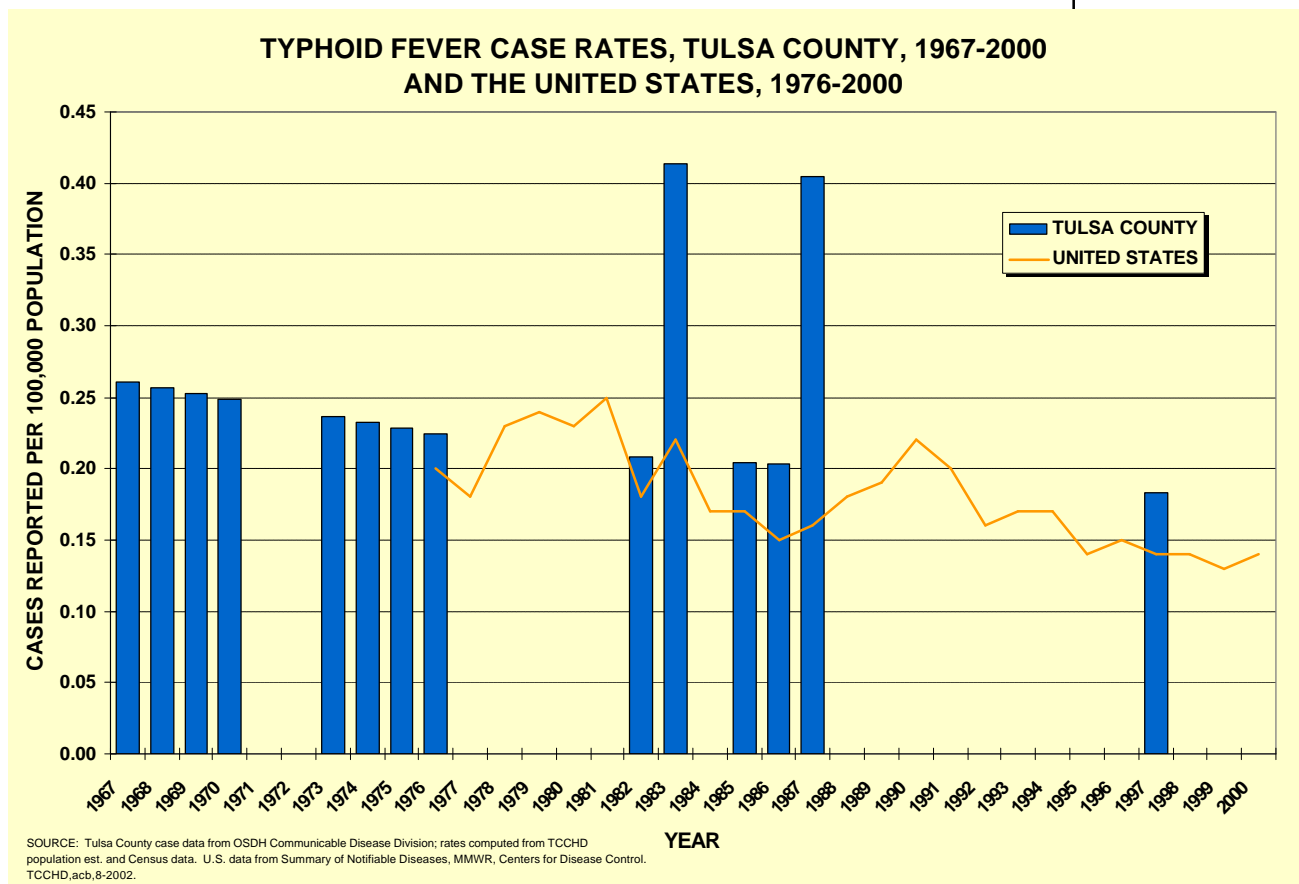
Annually, typhoid fever is responsible for an estimated 17 million disease cases and about 600,000 deaths worldwide, mostly in underdeveloped countries. In the United States, fewer than 400 cases are reported annually today as compared to nearly 2,500 reported cases in 1950. The development of improved sanitary sewer facilities and appropriate protection and treatment of drinking water supplies has enormously reduced the incidence of typhoid fever in the United States. The infectious agent of typhoid fever is *Salmonella typhi*. The reservoir is humans and, rarely, domestic animals. The disease is transmitted by food and water contaminated by feces and urine of patients and carriers. Important vehicles in some countries include contaminated shellfish (especially oysters), raw fruits and vegetables fertilized by sewage, contaminated milk and milk products, and foods infected by flies carrying the infectious agent. The incubation period depends upon the size of the infective dose and usually ranges from 1 to 3 weeks. Susceptibility to typhoid is general and is increased for those who are HIV positive.

**DID YOU KNOW?**

*In the U.S., about 400 cases of typhoid fever occur each year, and 70% of these are acquired while traveling internationally.*

- Centers for Disease Control and Prevention, 2001

**Figure 6.29**



Sporadic typhoid fever cases in the United States result in reported case rates of approximately 0.15 cases per 100,000 population today. These rates have slowly declined from greater than 0.2 cases per 100,000 population in the late 1970s (**Figure 6.29**). Typhoid fever is rare in Tulsa County with case rates similar to the national rates in those years in which cases occur.

## Emerging Diseases

Today, in the United States, approximately 25% of physician visits are attributable to infectious diseases.<sup>4</sup> Interestingly, despite all of our past successes in controlling infectious and communicable disease, we are confronted today with an increasing list of new diseases and reemerging old disease enemies, which threaten the health of the United States, as well as the rest of the world. Within the past 25 years, dozens of new infectious diseases have appeared which have affected millions of people.

## West Nile Virus

West Nile virus is a mosquito-borne virus that made its first appearance in the United States in the New York City area during the summer months of 1999. The virus is spread by the bite of an infected mosquito; there is no evidence to suggest that West Nile virus can be spread from person to person or from animal to person. The incubation period ranges from 3 to 15 days. Most people who become infected with West Nile virus will have either no symptoms or only mild ones. Symptoms include fever, headache, and body ache, occasionally with skin rash and swollen lymph glands. On rare occasions, infection can result in a severe and sometimes fatal illness known as West Nile encephalitis (an inflammation of the brain). The risk of severe disease is higher for persons 50 years of age and older; however, all residents of areas where virus activity has been identified are at risk of infection. A dead bird found in Tulsa County in July 2002 produced Tulsa's first positive test for West Nile virus.

## Hantavirus

Hantavirus pulmonary syndrome (HPS) was discovered in May of 1993, when an outbreak of unexplained pulmonary illness occurred in the Four Corners region of the U.S. Hantavirus is carried by rodents, such as deer mice, cotton rats, and rice rats. These rodents shed the virus in their urine, droppings, and saliva. The virus is usually transmitted to people when they breathe in air that is contaminated with the virus. Hantavirus cannot be transmitted from person to person. The incubation period is still unknown, although it appears that symptoms may develop between 1 and 5 weeks after exposure to infected

### DID YOU KNOW?

*Just over 300 total cases of hantavirus pulmonary syndrome have been reported in the United States.*

- Centers for Disease Control and Prevention, 2002

rodents and their droppings. Early symptoms of hantavirus pulmonary syndrome include fatigue, fever, and muscle aches. Additional symptoms may include headaches, dizziness, chills, and abdominal problems, such as nausea, vomiting, diarrhea, and abdominal pain. The late symptoms of HPS (4 to 10 days after the initial phase of illness) include coughing and shortness of breath. The chances of becoming infected are low. Individuals at risk include those with exposure to rodent droppings, urine, or nesting materials.

## Anthrax

Anthrax is an acute disease caused by the infectious agent *Bacillus anthracis*. Anthrax is seen in hoofed animals, but it also infects humans. The three forms of the disease are inhaled, cutaneous, and intestinal. Symptoms may vary, depending on how the bacteria was contracted, but usually occur within 1 week of exposure. Initial symptoms may resemble the common cold or influenza. After several days, the symptoms may progress to severe difficulty breathing, shock, and sometimes death. Anthrax cannot be passed from person to person; therefore, it is not considered a contagious disease. Infection can be prevented by administering antibiotics (penicillin, doxycycline, and fluoroquinolones) to those persons exposed.

## Botulism

Botulism is a muscle-paralyzing disease caused by a toxin made by a bacterium called *Clostridium botulinum*. There are three types of botulism: foodborne, infant, and wound. Foodborne botulism occurs when a person ingests pre-formed toxin that leads to illness within a few hours to days. Symptoms begin within 6 hours to 2 weeks (most commonly between 12 and 36 hours) after eating toxin-containing food. Symptoms include double vision, blurred vision, drooping eyelids, slurred speech, difficulty swallowing, dry mouth, and muscle weakness that descends through the body. Paralysis of breathing muscles can cause a person to stop breathing and die unless mechanical ventilation is provided. Botulism is not spread from person to person. A supply of antitoxin against botulism is maintained by the CDC.

## Plague

Plague is an infectious disease of animals and humans caused by the bacterium *Yersinia pestis*, which is found in rodents and their fleas in many areas of the world. Pneumonic plague occurs when *Yersinia pestis* infects the lungs. The first signs of illness in pneumonic plague are fever, headache, weakness, and cough productive of bloody or watery sputum. The pneumonia progresses over

## DID YOU KNOW?

*In 2000, approximately 138 cases of botulism were reported in the U.S.*

- Centers for Disease Control and Prevention, 2002

2 to 4 days and may cause septic shock and, without early treatment, death. Person-to-person transmission of pneumonic plague occurs through respiratory droplets, which can only infect those who have face-to-face contact with ill patients. Early treatment of pneumonic plague is essential. Several antibiotics are effective, including streptomycin, tetracycline, and chloramphenicol. There is no vaccine against plague. Prophylactic antibiotic treatment for 7 days will protect persons who have had face-to-face contact with infected patients.

## Smallpox

Smallpox infection was thought to be eliminated from the world in 1977; however, there is suspicion that certain countries and terrorist groups may have access to smallpox. Smallpox is caused by variola virus. The incubation period ranges from 7 to 17 days (most commonly 12 days) following exposure. Initial symptoms include high fever, fatigue, and head and back aches. A characteristic rash, most prominent on the face, arms, and legs, follows in 2-3 days. The rash starts with flat red lesions that evolve at the same rate. Lesions become pus-filled and begin to crust early in the second week. Scabs develop and then separate and fall off after about 3 to 4 weeks. The majority of patients with smallpox recover, but death occurs in up to 30% of cases. Smallpox is spread from one person to another by infected saliva droplets that expose a susceptible person having face-to-face contact with the ill person. Persons with smallpox are most infectious during the first week of illness because that is when the largest amount of virus is present in saliva. However, some risk of transmission lasts until all scabs have scaled off. Routine vaccination against smallpox ended in 1972. The level of immunity, if any, among persons who were vaccinated before 1972 is uncertain; therefore, these persons are assumed to be susceptible. The United States currently has a limited emergency supply of smallpox vaccine. There is no proven treatment for smallpox, but research to evaluate new antiviral agents is ongoing. Patients with smallpox can benefit from supportive therapy and antibiotics for any secondary bacterial infections that occur.

### DID YOU KNOW?

*Smallpox is rated among the most dangerous of all potential biological weapons, with far-reaching ramifications.*

- Centers for Disease Control and Prevention, 1999

## Detection and Control of Emerging Diseases

The challenge for public health is to develop surveillance systems which monitor conditions and prevent the emergence and spread of these new and potentially more dangerous pathogens before they overrun the capacity of our response infrastructure. Early detection and control of biological events depends on a strong and flexible public health system at the local, state, and federal levels. The public health system continually evaluates current plans and strives for improvements in order to better the health of Tulsa County, the State of Oklahoma, and the United States.

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# ENVIRONMENTAL HEALTH

"Our communities are only as healthy as the air our children breathe,  
the water they drink, the earth they will inherit."

- President William Jefferson Clinton

## Environmental Health

- Introduction
- The Regulatory Structure
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## Environmental Health

### Introduction

Morbidity and mortality are greatly influenced by environmental factors, including both intentional and unintentional exposures to environmental agents. The environmental modes of spread discussed in this chapter are primarily exposures to environmental contaminants in food, water, the work place, insect and animal vectors, and indoor and outdoor air.

### The Regulatory Structure

Assuring that public health is not adversely affected by environmental contaminants in food, water, or air is a responsibility which has been given by law to all levels of government including local, state, and federal agencies. At the federal level, protection of the nation's food supply and regulation of the pharmaceutical industry lies with the U.S. Food and Drug Administration (FDA), which regulates food industry processing, manufacturing, packaging, and additives. Federal rules governing purification and testing of drinking water and treatment and disposal of wastewater, including both domestic sewage and industrial wastewater, are primarily regulated by the U.S. Environmental Protection Agency (EPA) through cooperative agreements with states, including permitting systems for discharges of wastewater.

The EPA also governs disposal of solid and liquid wastes on land and in landfills through underground injection and incineration. Protection of outdoor air is also assured at the federal level by the EPA through air quality protection legislation and subsequent rules, which are enforced by cooperative agreements with states. These regulations include not only major categories of pollutants, but more recently, toxic and hazardous air emissions.

Generally, occupational exposures to toxic and hazardous substances in the workplace, regardless of the mode of exposure, are governed by the U.S. Occupational Safety and Health Administration (OSHA), in cooperation with state occupational, safety, and health agencies. Some state departments of public health are involved in enforcement of state and federal environmental laws and regulations. In other states, separate state environmental agencies are delegated regulatory authority. Some local public health departments are involved in enforcement of state and local environmental laws and regulations within their respective jurisdictions.

In Oklahoma, assuring the safety of the food supply is ultimately in the hands of the Oklahoma State Department of Health. In Tulsa County, the responsibility lies with the Tulsa City-County Health Department. Regulation of ambient air

### HEALTHY PEOPLE 2010 GOAL

*Promote health  
for all through a  
healthy  
environment.*

*- U.S. Department  
of Health and  
Human Services,  
2000*

quality, public and private water supply and sewage treatment, disposal of industrial wastewater, and disposal of toxic and hazardous wastes are regulated by the Oklahoma Department of Environmental Quality.

### Modes of Contaminant Exposure

There are three primary modes by which humans are exposed to chemical and microbial contaminants in the environment which may adversely affect their health. These are inhalation, ingestion (eating and drinking), and absorption (mainly contaminant exposures through the skin).

Inhalation is potentially a major source of contaminant exposure from both outdoor (ambient) and indoor air, primarily because of the large volumes of air which are breathed during daily activities. Air contaminants can include particulates (solids, mists, and aerosols), gases, (organic vapors, process and combustion emissions), and biological contaminants (molds, fungi, bacteria, and viruses). Ingestion sources generally include foods which may be contaminated by pesticides, viruses, bacteria, and processing contaminants, and water which may contain bacteria, viruses, parasites, and toxicants. Absorption can involve a wide variety of organic compounds (solvents, cleaning agents, fuels), inorganic compounds, pesticides, fungicides, and herbicides.

### Effects of Environmental Agents

Chemical and biological contaminant exposures can lead to acute effects (immediate illness or death) or chronic effects (long-term), which may occur over days, weeks, or years.

Many chemical agents including solvents, degreasers, cleaners, heavy metals, pesticides, organic vapors, herbicides, fungicides, and pharmaceuticals can have acute toxic effects on the human body. Acute effects also result from pathogenic infections from biological agents such as molds, fungi, bacteria, protozoa, and viruses. Many produce gastrointestinal and/or respiratory symptoms. Symptoms of acute infections can range from mild discomfort to serious complications, depending upon the agent, and can even result in death, particularly among the immunocompromised, the very young, or the very old.

Chronic toxic effects from environmental contaminants are also greatly varied. Some environmental contaminants may produce long-term, ill-defined symptomatic illnesses as a result of individual chemical sensitivities. These may produce only mild malaise and/or fatigue in the exposed individuals. Others result in a variety of biochemical dysfunctions of internal organs. Organs most commonly affected or “targeted” include liver, kidney, and reproductive organs. Another chronic effect of some classes of toxic agents is carcinogenicity (cancer-causing). *The Ninth Report on Carcinogens* identified 47 agents,

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

Reduce the proportion of persons exposed to air that does not meet the U.S. Environmental Protection Agency's health-based standards for harmful air pollutants.

- U.S. Department of Health and Human Services, 2000

substances, mixtures, or exposure circumstances known to be human carcinogens and an additional 171 agents, substances, mixtures, or exposure circumstances reasonably anticipated to be human carcinogens.<sup>1</sup> Many of these substances are, or have been, commonly used in industrial processes and/or consumer products for years resulting in the potential exposure of large numbers of humans. Exposure to carcinogenic substances in the environment may be followed by a 10 to 25 year latency period before the carcinogenic effects of the compound actually produce malignancies in human tissue. Because of this lag time, it is often very difficult to relate the development of cancer in individuals to prior exposures to carcinogenic compounds in the environment. This is particularly complicated by intentional exposures to carcinogenic compounds such as cigarette smoke, which has been found to contain dozens of carcinogenic substances.

## Water Quality

Both surface and sub-surface water quality are greatly affected by human activities and by the natural environment. There are a great variety of water pollutants, some of which accumulate and are not removed by natural processes; others are biodegraded by natural degradation processes or undergo chemical changes over time. Organic pollutants such as oxygen-demanding chemicals, fats, oils, and organic materials including animal and human waste usually break down through natural purification processes over time. Inorganics, including chlorides (salts), calcium, and magnesium (hardness) can remain unchanged for decades.

Heavy metals such as lead, zinc, cadmium, mercury, and chromium are often toxic to aquatic life and terrestrial life and are often long lasting in the aquatic environment as they undergo gradual reduction and/or oxidation, combine with other chemicals, or adhere to solids and precipitate into sediment. Solids in water include suspended and colloidal solids as well as dissolved solids such as the inorganic salts previously mentioned. Pathogenic organisms such as bacteria, viruses, pathogenic protozoa, and parasitic worms are significant water pollutants which have the potential to adversely affect the health of humans and other animals. Most toxicants in water result from human activities via industrial discharges, application of agricultural and landscaping chemicals, or through other sources.

Pollution controls for water range from preventing contamination to the control of contaminated process waters which are discharged to surface water and/or waste treatment systems. Non-point sources of pollution include run-off via storm water from urbanized and rural areas and contain virtually any materials which are subject to washing by precipitation into receiving streams. Water recycling and volume reduction of process and wastewater are effective controls as well as are evaporation and reuse of water. Wastewater treatment, whether applied to industrial or domestic wastewater, is also often employed to reduce contaminant loading to receiving water sources.

## HEALTHY PEOPLE 2010 OBJECTIVE

Increase the proportion of persons served by community water systems who receive a supply of drinking water that meets the regulations of the Safe Drinking Water Act.

- U.S. Department of Health and Human Services, 2000



## Water Supply and Delivery Systems

The primary source of drinking water for most of Tulsa County is the City of Tulsa which treats water at the Mohawk Water Treatment Plant in north Tulsa and the A.B. Jewel Water Treatment Plant in east Tulsa County. Tulsa supplies drinking water to the cities of Sand Springs, Jenks, Owasso, Sperry, and Skiatook and has supply connections to Bixby and Broken Arrow. Raw water to supply the needs of the City of Tulsa system and that of surrounding towns supplied by the city are two lakes on Spavinaw Creek (Lake Spavinaw and Eucha) in Delaware County and Oologah Lake on the Verdigris River in Rogers County. The City of Tulsa also owns water rights in Hudson Lake on the Grand River system in northeast Oklahoma.

The City of Bixby, in addition to purchasing water from Tulsa, maintains its own water treatment plant, utilizing water from Bixhoma Lake in Wagoner County, southeast of the City of Bixby. Broken Arrow water is supplied by a treatment facility operated by the Pryor Industrial District which draws water from the Grand River in Mayes County and also has the capability of drawing and treating water from the Verdigris River east of the City of Broken Arrow.

### Diseases Associated with Drinking Water

A variety of diseases may be transmitted through water by contact of contaminated water with mucus membranes during recreation or by ingestion. General classes of disease-producing organisms responsible for waterborne transmission of disease include pathogenic bacteria, viruses, pathogenic protozoa, and parasitic worms.

In Tulsa County and the United States, it is unusual to observe outbreaks of disease which are clearly traceable to drinking water. Occasional contamination of municipal drinking water systems do occur, however, and because of the large numbers of people served by some systems, the effects can be wide spread, involving hundreds and, in some cases, thousands of consumers.

The Centers for Disease Control and Prevention (CDC) reported only 7 waterborne outbreaks in 1997 and 10 in 1998, causing an estimated 2,038 persons to become ill. No deaths were attributed to the outbreaks. Of the 17 reported outbreaks, 7 were attributed to treatment deficiency, 5 to the distribution system, 4 to untreated groundwater, and 1 to an unknown cause. Of the outbreaks with known infectious etiology, 6 were caused by parasites (4 from *Giardia*; 2 from *Cryptosporidium*) and 4 by bacteria (3 from *E. coli* O157:H7; 1 from *Shigella sonnei*). Chemical poisoning (from copper) was associated with 2 outbreaks. The etiologic agent was not identified for the remaining 5 outbreaks.<sup>2</sup>

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

Reduce waterborne disease outbreaks arising from water intended for drinking among persons served by community water systems.

- U.S. Department of Health and Human Services, 2000





## Diseases Associated with Water Recreation

Diseases contracted through water recreation (swimming, wading, fishing, skiing, and other body contact sports) usually result from ingestion of contaminated, untreated water and body contact with contaminated water, especially contact with mucus membranes.

During 1997 and 1998, the CDC received a total of 32 reported outbreaks of disease associated with recreational waters (defined as swimming pools, whirlpools, hot tubs, spas, water parks, and fresh and marine surface waters), including 18 outbreaks of gastroenteritis, 4 outbreaks of meningoencephalitis, 8 outbreaks of dermatitis, 1 outbreak of Pontiac fever, and 1 outbreak of leptospirosis. The outbreaks caused illness in an estimated 2,128 persons. The etiologic agents involved in the outbreaks included *Cryptosporidium parvum*, *Naegleria*, *E coli* O157:H7, *Shigella sonnei*, Norwalk-like virus, *Leptospira*, *Legionellae*, and *Pseudomonas aeruginosa*. During 1997-1998, the majority of the outbreaks resulted from exposure to lake water, swimming pools, and hot tubs.<sup>2</sup>

## Subsurface Waste Disposal

Underground burial of domestic and industrial wastes has long been a common disposal technique throughout the world. Most wastes buried in this manner have been solid materials which were not amenable to storage in surface impoundments or discharge into receiving streams. Local community dumps, often burned to reduce volume, were common throughout the U.S. and in Tulsa County prior to the 1960s when regulations requiring sanitary landfilling of wastes went into effect. Home incineration in “burn barrels” was also common in many parts of Tulsa County during this time, particularly in lower income and in rural areas. More stringent requirements for sanitary landfill siting and containment of leachates and a diminishing supply of available land in Tulsa County and in most urban areas have resulted in increased use of municipal incineration to dispose of wastes. The Ogden Martin Trash-to-Energy Plant on West 21<sup>st</sup> Street in Tulsa burns municipal wastes from the City of Tulsa and surrounding communities and generates steam for use by local industry. This facility was born out of the need to reduce volumes of solid waste entering area landfills and preserve landfill space for the future.

## Air Quality

Efforts by government at all levels to improve air quality in the United States by regulating emissions of atmospheric pollutants began in earnest in the 1960s. This effort was the result of the deterioration of air quality culminating in

### DID YOU KNOW?

*In the past decade, more than 15,000 swimmers have gotten sick from swimming in recreational water.*

- Centers for Disease Control and Prevention, 2002

### HEALTHY PEOPLE 2010 OBJECTIVE

Increase the proportion of assessed rivers, lakes, and estuaries that are safe for fishing and recreational purposes.

- U.S. Department of Health and Human Services, 2000

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

Increase use of alternative modes of transportation to reduce motor vehicle emissions and improve the Nation's air quality.

- U.S. Department of Health and Human Services, 2000

several air pollution episodes of several days' duration in the 1950s and early 1960s in urban areas of both Europe and the U.S. which resulted in several hundred needless deaths. In addition to health hazards, air pollution can also be responsible for safety hazards resulting from reduced visibility, which in extreme cases may affect aircraft operations and cause personal discomfort such as eye irritation and respiratory difficulties. Esthetic effects of air pollutants include loss of clarity in the atmosphere due to the presence of particulates and/or photochemical, smog, and the presence of objectionable odors in the atmosphere, especially those associated with ammonia and sulfur containing mercaptans.

Economic losses from air pollution can result from damage to materials, vegetation, and crops from exposure to excessive concentration of gases such as sulfur dioxide, oxides of nitrogen, and ozone. Some materials also suffer from deterioration by exposure to specific air contaminants including metal corrosion by acid-forming pollutants, darkening of light colored paints, cracking of rubber by ozone, and deterioration of nylon from sulfur dioxide.

Major sources of air pollutant emissions include a wide variety of industrial sources, mobile sources such as auto, truck, and bus traffic, electric power-generating plants, incinerators, and natural sources such as fires, dust storms, and volcanoes. Emissions of air contaminants are controlled by a wide variety of methods including process changes which prevent or reduce emission generation at the source, vapor recovery, catalytic mufflers, equipment used to reduce industrial emissions such as baghouses, scrubbers, and catastrophes, and modifications of fuel to reduce mobile source emissions. Air pollutants can be classified into several groups including criteria pollutants, regulated pollutants, toxic pollutants, hazardous pollutants, and non-regulated pollutants. Each grouping is governed by group-specific emission control rules based upon the group's characteristics.

### Criteria Air Pollutants

National Ambient Air Quality Standards specifying average and maximum concentrations of six criteria contaminants have been established by the EPA. The Clean Air Act of 1970 and subsequent revisions required the establishment of standards for the criteria pollutants, the ambient concentrations of which are based upon protecting public health (primary standards) and protecting public welfare (secondary standards). Air contaminants covered by these regulations include sulfur dioxide, particulate matter, carbon monoxide, ozone, nitrogen dioxide, and lead. **Table 7.1** shows the national ambient air quality standards for these contaminants. Air quality monitoring sites are located throughout Tulsa County (**Figure 7.1**) for the purpose of determining the concentrations of criteria pollutants in the ambient atmosphere.

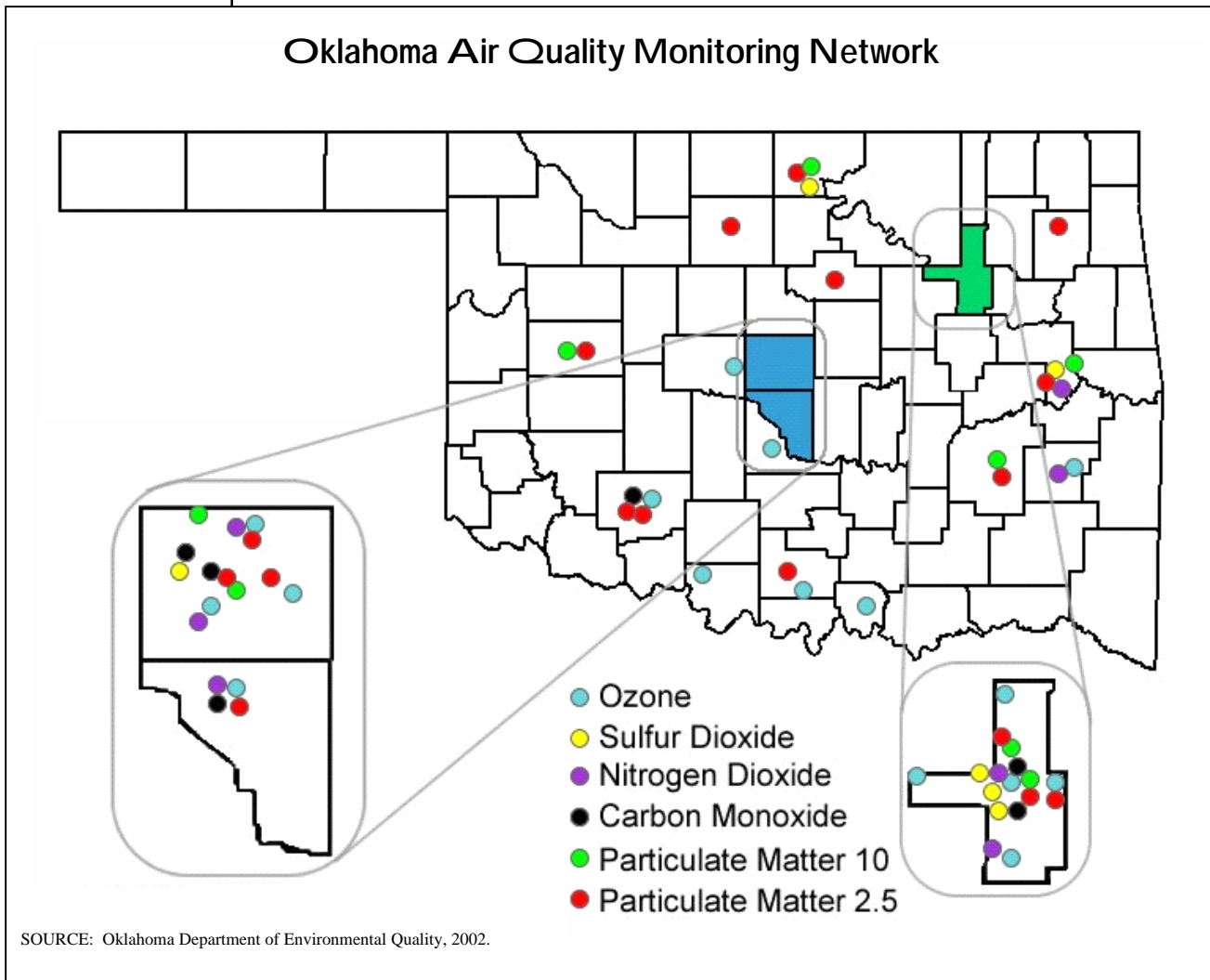
Table 7.1

National Ambient Air Quality Standards				
PRIMARY STANDARDS			SECONDARY STANDARDS	
Pollutant	Average Type	Concentration <sup>a</sup>	Average Type	Concentration <sup>a</sup>
CO	8-hour <sup>b</sup>	9 ppm (10 mg/m <sup>3</sup> )	No Secondary Standard	
	1-hour <sup>b</sup>	35 ppm (40 mg/m <sup>3</sup> )	No Secondary Standard	
Pb	Maximum Quarterly Average <sup>h</sup>	1.5 ppm	Same as Primary Standard	
NO <sub>2</sub>	Annual Arithmetic Mean <sup>h</sup>	0.053 ppm (100 ug/m <sup>3</sup> )	Same as Primary Standard	
O <sub>3</sub>	1-hour <sup>ej</sup>	0.12 ppm (235 ug/m <sup>3</sup> )	Same as Primary Standard	
	8-hour <sup>i</sup>	0.08 ppm (157 ug/m <sup>3</sup> )	Same as Primary Standard	
PM-10	Annual Arithmetic Mean <sup>d</sup>	50 ug/m <sup>3</sup>	Same as Primary Standard	
	24-hour <sup>e</sup>	150 ug/m <sup>3</sup>	Same as Primary Standard	
PM-2.5	Annual Arithmetic Mean <sup>d,f</sup>	15 ug/m <sup>3</sup>	Same as Primary Standard	
	24-hour <sup>g</sup>	65 ug/m <sup>3</sup>	Same as Primary Standard	
SO <sub>2</sub>	Annual Arithmetic Mean <sup>h</sup>	0.03 ppm (80 ug/m <sup>3</sup> )	3-hour <sup>b</sup>	0.50 ppm
	24-hour <sup>b</sup>	0.14 ppm (365 ug/m <sup>3</sup> )		(1300 ug/m <sup>3</sup> )

<sup>a</sup> Parenthetical value is an approximately equivalent concentration  
<sup>b</sup> Not to be exceeded more than once per year  
<sup>c</sup> Attained when the expected number of days per calendar year with maximum hourly average  
<sup>d</sup> Not to be exceeded by the 3-year average of the annual mean concentrations  
<sup>e</sup> Not to be exceeded by the 3-year average of the annual 99th percentile concentrations  
<sup>f</sup> May be spatially averaged over several "community-oriented" sites in an area  
<sup>g</sup> Not to be exceeded by the 3-year average of the annual 98th percentile concentrations  
<sup>h</sup> Never to be exceeded  
<sup>i</sup> Not to be exceeded by the 4th highest annual value averaged over a 3 year period  
<sup>j</sup> Revoked for all Oklahoma counties on December 29, 1997

SOURCE: Oklahoma Department of Environmental Quality, 2002.

Figure 7.1



## Pollutant Standards Index

In an effort to provide better public information about the quality of community air on a daily basis, the Environmental Protection Agency developed the Pollutants Standards Index (PSI), which is reported nationwide in all metropolitan areas with populations exceeding 200,000. The index converts measured pollutant concentrations in a community's air to numbers on a scale of zero to five hundred, with one hundred corresponding to the ambient air quality standard established by the Clean Air Act. For example, an ozone concentration of 0.12 ppm is equivalent to a PSI level of 100. **Table 7.2** lists the index values as they relate to health effects along with cautionary statements.

Table 7.2

General Health Effects and Cautionary Statements			
Index Value	PSI Descriptor	General Health Effects	Cautionary Statements
Up to 50	Good	None for the general population.	None required.
50 to 100	Moderate	Few or none for the general population.	None required.
100 to 200	Unhealthful	Mild aggravation of symptoms among susceptible people, with irritation symptoms in the healthy population.	Persons with existing heart or respiratory ailments should reduce physical exertion and outdoor activity. General population should reduce vigorous outdoor activity.
200 to 300	Very Unhealthful	Significant aggravation of symptoms and decreased exercise tolerance in persons with heart or lung disease; widespread symptoms in the healthy population.	Elderly and persons with existing heart or lung disease should stay indoors and reduce physical activity. General population should avoid vigorous outdoor activity.
Over 300	Hazardous	Early onset of certain diseases in addition to significant aggravation of symptoms and decreased exercise tolerance in healthy persons. At PSI levels above 400, premature death of ill and elderly persons may result. Healthy people experience adverse symptoms that affect normal activity.	Elderly and persons with existing disease should stay indoors and avoid physical exertion. At PSI levels above 400, general population should avoid outdoor activity. All people should remain indoors, keeping windows and doors closed, and minimize physical exertion.

SOURCE: U.S. Environmental Protection Agency, 2002.

### Indoor Air Pollution

The quality of indoor air in buildings is impacted by numerous variables including local climate, the heating, ventilation, and air conditioning (HVAC) systems, construction techniques, contamination sources both within and outside the building, and the activities of building occupants. Generally, when assessing

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

Improve food employee behaviors and food preparation practices that directly relate to foodborne illnesses in retail food establishments.

- U.S. Department of Health and Human Services, 2000

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

Reduce foodborne illnesses.

- U.S. Department of Health and Human Services, 2000

potential problems with indoor air quality, attention should be paid to identifying potential sources of contamination, whether indoors or outdoors, and the effect the HVAC system has on the concentration and distribution of the contaminants within the building.

**Food Safety**

Illness resulting from the consumption of contaminated food is a potential exposure which affects us all. Foodborne diseases cause an estimated 76 million illnesses and 5,000 deaths in the United States each year.<sup>3</sup> A variety of diseases may be caused by agents transmitted in foods including bacterial, viral, parasitic, and fungal diseases, illnesses caused by toxic plants and animals, and those caused by chemical contaminants.

The task of ensuring the safety of the food supply requires involvement at many different levels. Food production on the farm requires attentiveness to the judicious and proper use of pesticides and herbicides to prevent harmful residues from reaching the consumer either because of inappropriate application or application of inappropriate chemicals. Fish and animals, whether farm raised or harvested from the wild, have the potential of carrying microbial and parasitic pathogens and accumulations of potentially harmful chemical and pharmaceutical residues if inappropriately managed or harvested from unsafe areas. The preparation and packaging industry is responsible for ensuring the cleanliness and wholesomeness of products they process for consumption through the retail or wholesale market. The storage, wholesale marketing, and transportation industries must be attentive to appropriate storage life and environment as food is transported, marketed, and stored. Attentiveness to proper holding temperatures, humidity, vermin control, and deterioration are important elements at this stage. The retail marketing industry must also concern itself with storage life and storage environment after products reach the store shelf and before purchase by the consuming public.

Precautions which should be taken during food preparation are similar whether foods are prepared in restaurants or in the home kitchen, the primary differences relating to the scale of the activities. Hot and cold storage temperatures are extremely important in assuring food safety. Frozen foods should be kept at 10° F or below. Refrigerated foods must be stored at temperatures below 40° F to inhibit the growth of pathogenic bacterial agents. Proper cooking temperatures and times to ensure the destruction of pathogens, particularly on meats, is critical. This has become increasingly important in recent years with the increasing number of cases of gastrointestinal infections from *E coli* O157:H7, Salmonella in raw and undercooked eggs, and bacterial and viral pathogens in raw oysters. Recommended meat cooking temperatures to ensure proper destruction of disease agents are 165° F for 15 seconds for poultry and stuffed foods, 155° F for 15 seconds for ground meats, and 145° F for 15 seconds for



other foods, such as seafood products and pork. Ground beef should never be eaten rare or medium rare.

## Foodborne Disease Outbreaks

Each year, several foodborne outbreaks are investigated in Oklahoma and Tulsa County. State and local health departments are the lead agencies for investigating foodborne disease outbreaks in the U.S. with the results reported to the CDC through a collaborative surveillance system. Timely reporting of suspected foodborne illnesses greatly improves the likelihood that the etiologic agent and specific food(s) involved can be positively identified and appropriate follow-up action taken. Disease microorganisms are easily transmitted in food, often by the fecal-oral route, by carriers who unknowingly may be infected and are shedding the organisms. Only through timely reporting of suspected and confirmed foodborne illnesses can local health authorities conduct epidemiological investigations to determine the source of the infection and intervene to prevent a continuation of the outbreak.

The most recent summary of the foodborne disease outbreak surveillance system of the United States involved the period 1993 through 1997. During that time, a total of 2,751 outbreaks of foodborne disease were reported which resulted in 86,058 persons becoming ill. Among those outbreaks for which the etiology was determined, bacterial pathogens caused the largest percentage (75%) and the largest percentage of cases (86%). *Salmonella* serotype Enteritidis accounted for the largest number of outbreaks, cases, and deaths, most of which were attributed to eating eggs. Chemical agents caused 17% of the outbreaks and 1% of cases; viruses caused 6% of outbreaks and 8% of cases; and parasites caused 2% of outbreaks and 5% of cases. Of the reported disease outbreaks, most were attributed to delicatessens, cafeterias, and restaurants. Less frequently, schools, picnics, churches, camps and other group settings were implicated. Between 1993 and 1997, just over 21% of all reported foodborne outbreaks in the U.S. were attributed to food consumed in private residences.<sup>3</sup>

Generally, foodborne outbreaks attributed to chemical, parasitic, and viral agents are distributed fairly uniformly throughout the year. By contrast, outbreaks of bacterial etiology are much more common in the warm weather months of April through September, presumably as a result of improper cold holding temperatures of foods during the summer months when increased outdoor picnics and similar activities are conducted allowing for the explosive growth of bacterial agents.

Some of the more frequently implicated foods in foodborne illness outbreaks are beef, poultry (turkey and chicken), fish and shellfish, salads, and fruits and vegetables. Eggs have become more frequently associated with foodborne outbreaks of *Salmonella* in recent years. Another cause of foodborne illness

## DID YOU KNOW?

*Foodborne infections cause 76 million illnesses and 5,200 deaths in the United States each year.*

- Centers for Disease Control and Prevention, 2002

## HEALTHY PEOPLE 2010 OBJECTIVE

Reduce infections caused by key foodborne pathogens.

- U.S. Department of Health and Human Services, 2000



outbreaks is cross-contamination of ready-to-serve foods with raw food pathogens on unwashed cutting boards, knives, hands, and utensils.

**Table 7.3**

**AGENTS OF FOODBORNE ILLNESS**

ETIOLOGIC AGENT	INCUBATION PERIOD	CLINICAL SYNDROME
<b>Bacterial</b>		
<i>Bacillus cereus:</i>		
Vomiting toxin	1-6 hours	Vomiting; some patients with diarrhea; fever uncommon
Diarrheal toxin	6-24 hours	Diarrhea; abdominal cramps, and vomiting in some patients; fever uncommon
<i>Brucella</i>	Several days to several months; usually >30 days	Weakness, fever, headache, sweats, chills, arthralgia, weight loss, splenomegaly
<i>Campylobacter jejuni/coli</i>	2-10 days; usually 2-5 days	Diarrhea (often bloody), abdominal pain, fever
<i>Clostridium botulinum</i>	2 hours-8 days; usually 12-48 hours	Illness of variable severity; common symptoms are diplopia, blurred vision, and bulbar weakness; paralysis, which is usually descending and bilateral, might progress rapidly
<i>Clostridium perfringens</i>	6-24 hours	Diarrhea, abdominal cramps; vomiting and fever uncommon
<i>Escherichia coli:</i>		
Enterohemorrhagic ( <i>E. coli</i> O157:H7 & others)	1-10 days; usually 3-4 days	Diarrhea (often bloody), abdominal cramps (often severe), little or no fever
Enterotoxigenic (EPEC)	6-48 hours	Diarrhea; abdominal cramps, nausea; vomiting and fever less common
Enteropathogenic (EPEC)	Variable	Diarrhea, fever, abdominal cramps
Enteroinvasive (EIEC)	Variable	Diarrhea (might be bloody), fever, abdominal cramps
<i>Listeria monocytogenes:</i>		
Invasive disease	2-6 weeks	Meningitis, neonatal sepsis, fever
Diarrheal disease	Unknown	Diarrhea, abdominal cramps, fever
Nontyphoidal <i>Salmonella</i>	6 hours-10 days; usually 6-48 hours	Diarrhea, often with fever and abdominal cramps
<i>Salmonella</i> Typhi	3-60 days; usually 7-14 days	Fever, anorexia, malaise, headache, and myalgia; sometimes diarrhea or constipation
<i>Shigella</i> spp.	12 hours-6 days; usually 2-4 days	Diarrhea (often bloody), often accompanied by fever and abdominal cramps
<i>Staphylococcus aureus</i>	½-8 hours; usually 2-4 hours	Vomiting; diarrhea
<i>Streptococcus</i> , group A	1-4 days	Fever, pharyngitis, scarlet fever, upper respiratory infection
<i>Vibrio cholerae:</i>		
O1 or O139	1-5 days	Watery diarrhea, often accompanied by vomiting
Non-O1 and non-O139	1-5 days	Watery diarrhea
<i>Vibrio parahaemolyticus</i>	4-30 hours	Diarrhea
<i>Yersinia enterocolitica</i>	1-10 days; usually 4-6 days	Diarrhea, abdominal pain (often severe)

SOURCE: Centers for Disease Control and Prevention, 2002.



Table 7.3 (continued)

AGENTS OF FOODBORNE ILLNESS		
Chemical		
Marine toxins:		
Ciguatoxin	1-48 hours; usually 2-8 hours	Usually gastrointestinal symptoms followed by neurologic symptoms (including paresthesia of lips, tongue, throat, or extremities) and reversal of hot and cold sensation
Scombroid toxin (histamine)	1 minute-3 hours; usually <1 hour	Flushing, dizziness, burning of mouth and throat, headache, gastrointestinal symptoms, urticaria, and generalized pruritis
Paralytic or neurotoxic shellfish	30 minutes-3 hours	Paresthesia of lips, mouth or face, and extremities; intestinal symptoms or weakness, including respiratory difficulty
Puffer fish or tetrodotoxin	10 minutes-3 hours; usually 10-45 minutes	Paresthesia of lips, tongue, face, or extremities, often following numbness; loss of proprioception or floating sensations
Heavy metals - Antimony - Iron - Cadmium - Tin - Copper - Zinc	5 minutes-8 hours; usually <1 hour	Vomiting, often metallic taste
Monosodium glutamate (MSG)	3 minutes-2 hours; usually <1 hour	Burning sensation in chest, neck, abdomen, or extremities; sensation of lightness and pressure over face or heavy feeling in chest
Mushroom toxins:		
Shorter-acting toxins  - Muscimol - Muscarine - Psilocybin - <i>Coprinus artremataris</i> - Ibotenic acid	2 hours	Usually vomiting and diarrhea, other symptoms differ with toxin  - Confusion, visual disturbance - Salivation, diaphoresis - Hallucinations - Disulfiram-like reaction - Confusion, visual disturbance
Longer-acting toxins	6-24 hours	Diarrhea and abdominal cramps for 24 hours followed by hepatic and renal failure
Parasitic		
<i>Cryptosporidium parvum</i>	2-28 days; median: 7 days	Diarrhea, nausea, vomiting; fever
<i>Cyclospora cayetanensis</i>	1-11 days; median: 7 days	Fatigue, protracted diarrhea, often relapsing
<i>Giardia lamblia</i>	3-25 days; median: 7 days	Diarrhea, gas, cramps, nausea, fatigue
<i>Trichinella</i> spp.	1-2 days for intestinal phase; 2-4 weeks for systemic phase	Fever, myalgia, periobital edema, high eosinophil count
Viral		
Hepatitis A	15-50 days; median: 28 days	Jaundice, dark urine, fatigue, anorexia, nausea
Norwalk family of viruses, small round-structured viruses (SRSV)	15-77 hours; usually 24-48 hours	Vomiting, cramps, diarrhea, headache
Astrovirus, calicivirus, others	15-77 hours; usually 24-48 hours	Vomiting, cramps, diarrhea, headache
SOURCE: Centers for Disease Control and Prevention, 2002.		

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

Increase the proportion of consumers who follow key food safety practices.

- U.S. Department of Health and Human Services, 2000

Foodborne infections can cause a variety of symptoms, such as fever, fatigue, chills, abdominal pain, nausea, lack of appetite, vomiting, rash, diarrhea, and dehydration. **Table 7.3** lists some of the common foodborne diseases, etiologic agents, incubation periods, and the clinical symptoms observed in conjunction with each agent.

### **Public Health Protective Measures**

Protection of the consuming public from foodborne illness hazards is largely the responsibility of federal, state, and local public health authorities. Federal involvement generally relates to ensuring the safety of the food supply at the production level and in the preparation, packaging, and transportation industry through efforts of the U.S. Department of Agriculture and the U.S. Public Health Service. State and local public health agencies are involved in food protection and safety at the wholesale and storage level, on a local basis, and in retail marketing and restaurant food preparation.

Health Department sanitarians routinely inspect retail mobile vendors, supermarkets, cafes, cafeterias, farmers' markets, and temporary vendors as well as wholesale manufacturers, warehouses, and institutions preparing food in the Tulsa area. All of these inspections are aimed at reducing the incidence of foodborne disease and providing assurance to the public that food sold for public consumption at these facilities meets standards of wholesomeness and cleanliness. Important components of the department's activities in Tulsa County include annual training of food handlers working in the 3,400 Tulsa area food service businesses as well as a food service manager training program conducted in cooperation with the Oklahoma Restaurant Association, Tulsa Community College, Tulsa Technology Center, and OSU Extension. These training programs, available in English and Spanish, are designed to provide the basic understanding of the fundamentals of food preparation, appropriate hot and cold storage, and other skills necessary to ensure food safety.

### **Control of Disease Vectors**

Vectors are animals or insects that transmit disease-producing organisms from one host to another. There are many vectors of public health significance including rodents, mosquitoes, flies, roaches, ticks, and fleas. These insects and animals have been responsible for a significant proportion of the world's disease burden during the course of human history and some continue to be of substantial public health significance today.

Most disease vectors are not targeted for control on a widespread scale by the public health infrastructure, either because widespread control is not cost effective or the threat to human health is not sufficient to warrant widespread intervention. In Tulsa County, the two disease vectors which have been traditionally targeted for control efforts are rats and mosquitoes.

## Rodent Control

The rodents of primary concern in Tulsa County are rats and mice. Both are responsible for substantial economic loss in the human environment by contaminating and consuming large quantities of food and animal feed. Rats and mice spread a number of diseases both directly by contaminating food with urine and feces and indirectly through infestations of rodent fleas and mites. Rodent-borne diseases of particular significance include Hantavirus, rat-bite fever, plague, Salmonellosis, and leptospirosis.

House mice, because of their small size and relatively limited range of travel, are more appropriately controlled by individual home and business owners. They are typically nocturnal and will feed on virtually anything with a preference for cereal grains and cereal products. Generally, mice do not require as much water as rats and can live in a dry habitat. Their activities are often evidenced by accumulations of gnawed materials and droppings. Mice infestations of food establishments can rapidly reach serious proportions unless efforts are made to control access to storage areas by rodent-proofing openings around pipes, doors, windows, and other entry points. Permanent removal of harborage and food sources will eliminate mice as well as rat populations.

Rats, because of their larger size and greater range of travel, are more appropriate targets for community and public health control intervention efforts. Roof rats (*Rattus rattus*) and Norway rats (*Rattus norvegicus*) are the two common rats of urban infestation significance. Adult Norway rats, which are the most common urban rats in Tulsa County, range in size from twelve to eighteen inches from nose to tail tip. Norway rats are burrowing rodents that burrow into earth banks, along walls, and under rubbish and concrete slabs that are located close to sources of food and water. Rats require up to one ounce of water daily and will consume almost any type of food including garbage. They normally feed at night but can be seen feeding during the day if there is crowding and if they are particularly hungry.

Control of rats should emphasize rodent-proofing of structures, trapping and poisoning, and, if necessary, eliminating water sources by filling low areas where water collects and stands, repairing pipes and water hoses that drip, and eliminating the drip from air conditioning condensers. Food elimination should emphasize rat-proofing garbage and refuse containers and eliminating grains, seed, dog food, and other outdoor food sources from access to rodents. Removal of harborage, such as lumber, rocks, debris, and vegetation close to buildings will make them less attractive for rat infestation. Permanent removal of harborage and food sources will eliminate rat populations.

Traps are useful for rodent control where poisons may be hazardous and rodents may be bait shy. Types of traps include snare traps, multiple-catch traps, and glue boards which can be baited with peanut butter, nuts, bacon, and gum drops.

### HEALTHY PEOPLE 2010 OBJECTIVE

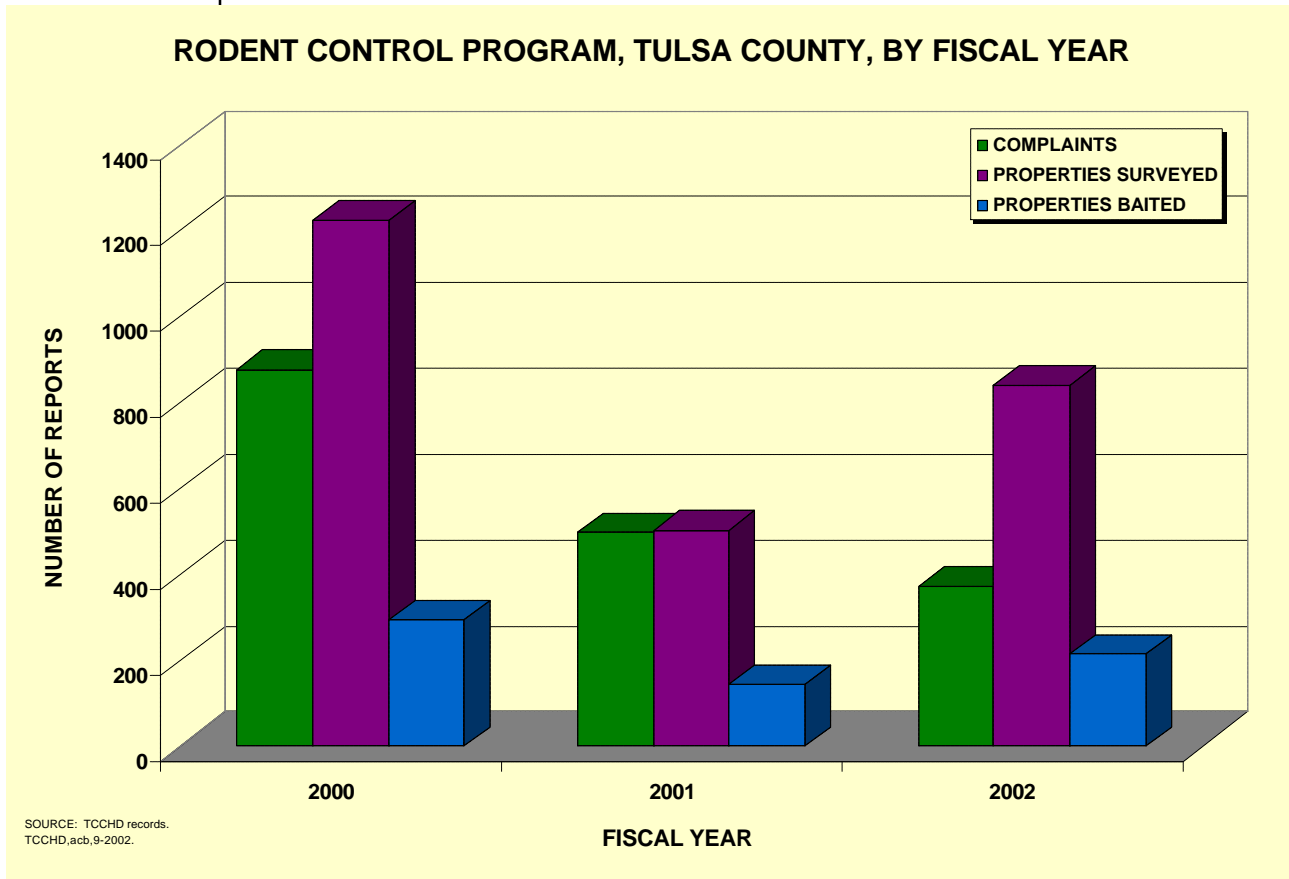
Minimize the risks to human health and the environment posed by hazardous sites.

- U.S. Department  
of Health and  
Human Services,  
2000

Poisons include three categories: anticoagulants, single dose poisons, and fumigants. Anticoagulants, which prevent blood from clotting and cause death by internal hemorrhaging, are considered to be the safest forms because of their relatively low toxicity to man.

The Tulsa City-County Health Department’s current rodent control program is based on a 1996 survey of selected target areas within the City of Tulsa. Following this survey’s confirmation of active rodent populations, a partnership was formed with the City of Tulsa to address the rat problem. Primary funding for this program is provided by the City of Tulsa, with Health Department staff administering and operating the program in conjunction with the City of Tulsa’s Neighborhood Inspections Division. This program started in May 1999. **Figure 7.2** graphically displays the complaints received, properties surveyed, and properties baited by fiscal year.

Figure 7.2



### Mosquito Control

Although the disease most often associated with mosquitoes is malaria, the U.S. experiences only a few cases of malaria each year, and most are linked to overseas travelers. In other parts of the world, 400,000,000 cases of malaria

with one to two million deaths each year are blamed upon this insect. The mosquito-borne disease of greatest concern for Americans is encephalitis. eastern equine encephalitis, western equine encephalitis, St. Louis encephalitis, and West Nile encephalitis are the most commonly reported mosquito-borne diseases in the United States.

It is difficult to effectively control mosquitoes in many locations because of the inaccessibility of breeding areas. Control is most effective when exercised at the larval stage, since no mosquito can enter the adult biting stage without having gone through larval stages in water. In many cases, a very small quantity of water will support the larval stage. Therefore, controlling collections of suitable water available to mosquitoes is of basic importance. Citizen effort to eliminate temporary pools of water can aid enormously in reducing mosquito numbers, although elimination of some species of mosquito production, such as tree hole species, is nearly impossible.

The Tulsa-City County Health Department has maintained a mosquito control program since the 1950s. The program consists of both surveillance and abatement activities. The surveillance system includes maintaining traps which are used to collect mosquitoes for counting and subsequent identification. The trapping activities are undertaken in conjunction with the Oklahoma State Department of Health and University of Oklahoma Biological Survey. The mosquitoes are being testing for West Nile virus and species identification.

The abatement portion of the mosquito control program relies both upon larvicide activities to control the mosquito hatch and upon adulticide activities to eliminate adult mosquitoes. The program, which operates April through October during the warm weather months, uses ultra low volume (ULV) sprayers for adult mosquito control. Approximately \$16,000 annually is spent on mosquito control pesticides, and about 200 hours of spray time is required during an average mosquito population season.

Of the at least twenty-four species of mosquitoes which have been identified in Tulsa County, five species are considered to be the main disease vectors. These include *Culex tarsalis*, *Culex pipiens*, *Culex quinquefasciatus*, *Anopheles quadrimaculatus*, and *Aedes albopictus*, the Asian tiger mosquito, which has recently moved into this area. Western encephalitis is spread by the mosquito species *Culex tarsalis*, while St. Louis encephalitis is spread by both *Culex pipiens* and *Culex quinquefasciatus*. The primary vector for West Nile virus is the *Culex pipiens* mosquito.

Biting mosquitoes result in a significant number of complaints to the Tulsa City-County Health Department each year with most of the complaints coming from within the City of Tulsa and north of the river between Tulsa and Sand Springs. Between 1978 and 2001, the number of Tulsa County mosquito complaints averaged below 1,400 annually. However, that number has dramatically

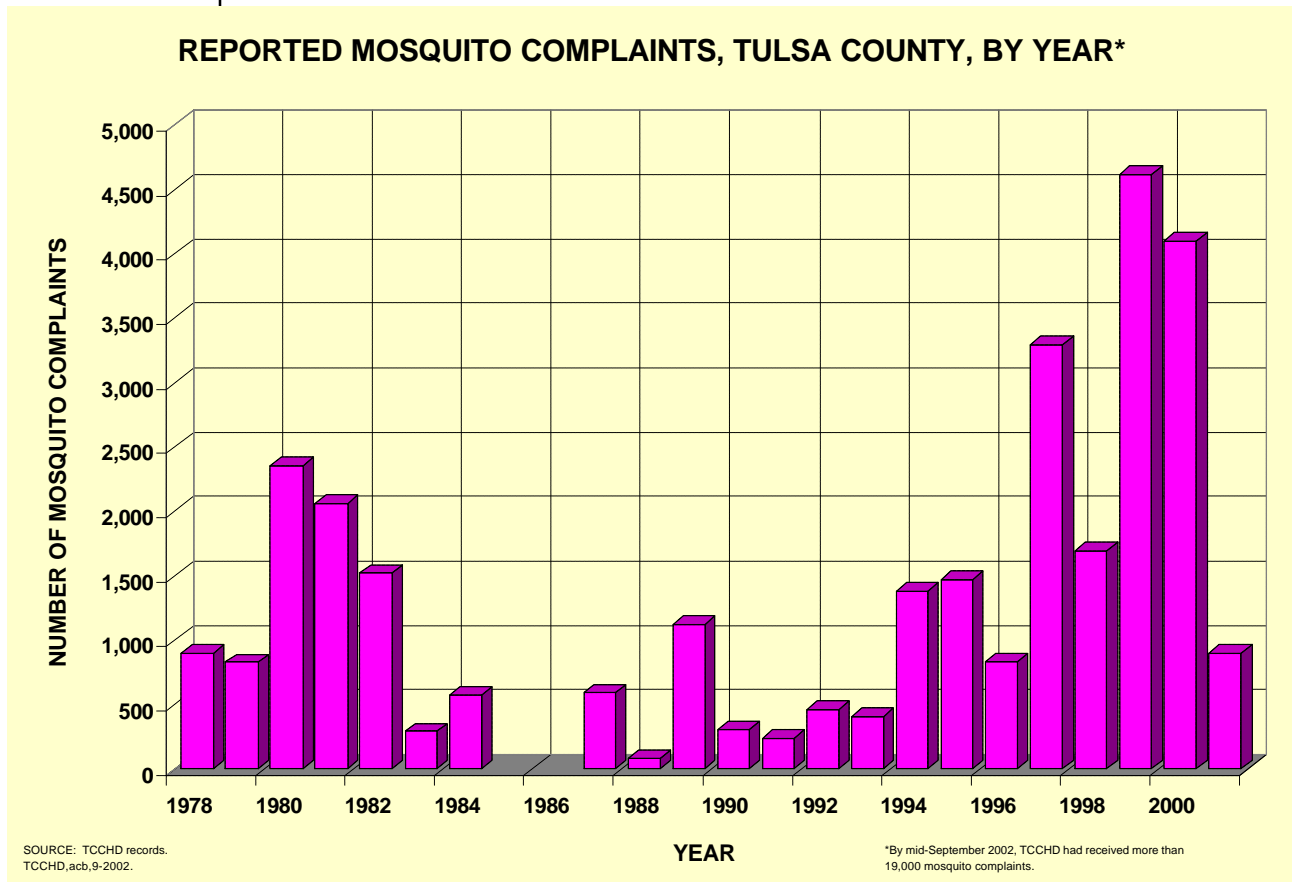
## DID YOU KNOW?

*Arboviral encephalitis costs an estimated \$150 million annually.*

- Centers for Disease Control and Prevention, 2002

increased since the emergence of West Nile virus in Tulsa County. By mid-September 2002, over 19,000 mosquito complaints were received by the Tulsa City-County Health Department. **Figure 7.3** displays the distribution of mosquito complaints for 1978 through mid-September 2002.

Figure 7.3



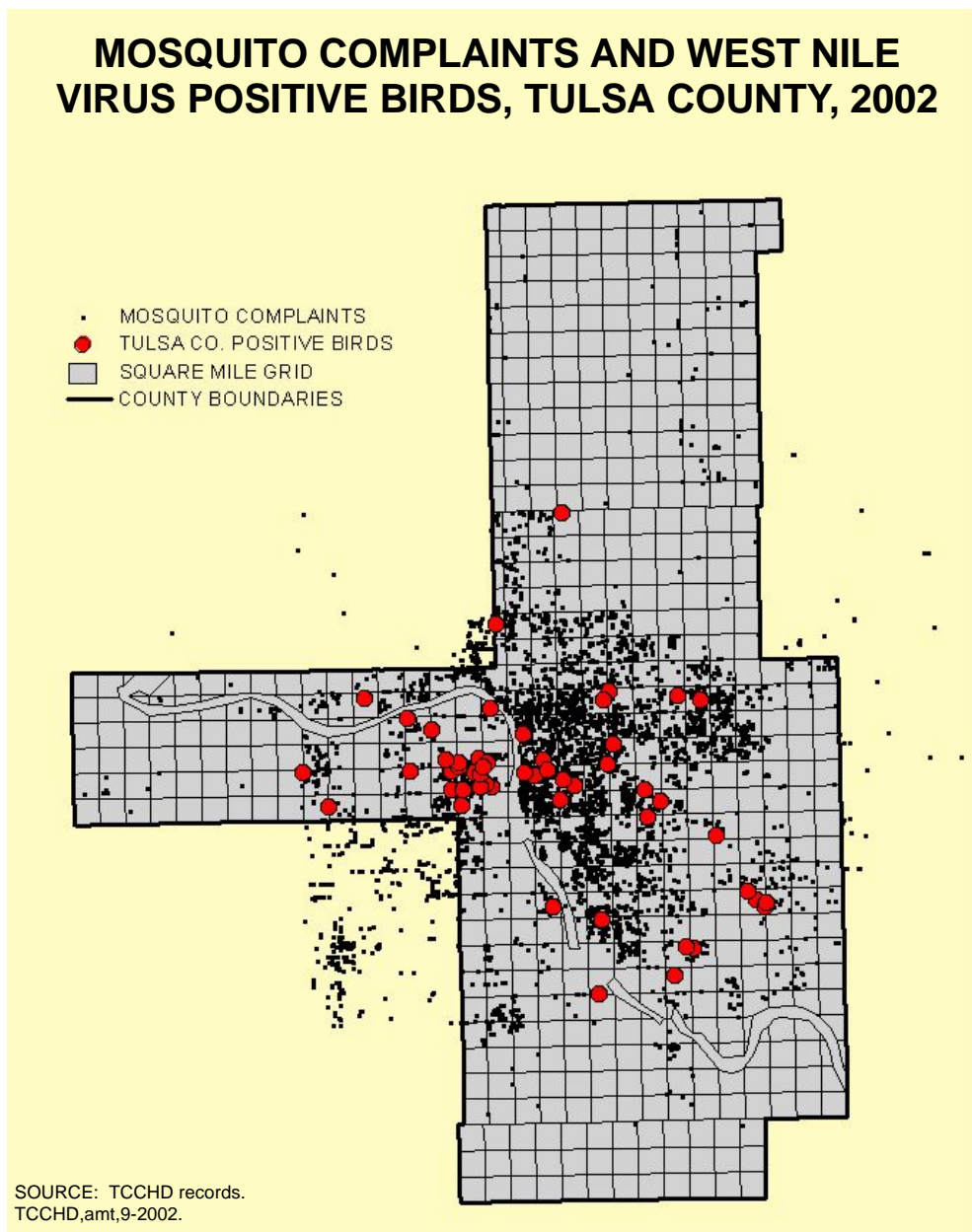
### Dead Bird Surveillance

Beginning mid-summer of 2001, the Tulsa City-County Health Department formed a partnership with the Oklahoma State Department of Health to monitor and collect dead birds for the purpose of testing for West Nile virus. During the 2001 season, 75 dead bird complaints were received and 30 were tested, of which none were positive for West Nile virus. As of mid-September 2002, over 2,000 dead bird complaints were received, over 450 collected, and more than 340 shipped for testing. Of those, approximately 54 tested positive for West Nile virus (**Figure 7.4**). A dead bird found in July 2002 produced the first positive test for West Nile virus in Tulsa County and the State of Oklahoma.





Figure 7.4



## References

- <sup>1</sup> U.S. Public Health Services. (2001). *Ninth report on carcinogens*. Research Triangle Park: National Toxicology Program.
- <sup>2</sup> Centers for Disease Control and Prevention. (2000). Surveillance for waterborne-disease outbreaks - United States, 1997-1998. *Morbidity and Mortality Weekly Report*, 49(SS-04), 1-38.
- <sup>3</sup> Centers for Disease Control and Prevention. (2000). Surveillance for foodborne-disease outbreaks - United States, 1993-1997. *Morbidity and Mortality Weekly Report*, 49(SS-01), 1-64.





# HEALTH RISKS AND HEALTH BEHAVIORS

“The roots of chronic diseases are grounded in a limited number of health-damaging behaviors practiced by people every day for much of their lives.”

- National Center for Chronic Disease Prevention and Health Promotion

## Health Risks and Health Behaviors

- Overview
- Violent Behavior
  - Homicide
  - Aggravated Assault
  - Forcible Rape
  - Child Abuse and Neglect
  - Domestic Violence
- Risk Taking and Self Responsibility
  - Tobacco Use
  - Drug Use
  - Alcohol
  - Sexual Behavior
- Healthy Behavior and Self Preservation
  - Weight and Exercise
  - Screening Tests
  - Immunizations
  - Seatbelt and Helmet Use

## Health Risks and Health Behaviors

### Overview

Our behavior as individuals is, perhaps, the most important single determinant of our individual state of health. Although genetic, social, and environmental factors determine much of our predisposition for developing diseases, many of the influences which affect our overall health are behavior related. We all make conscious decisions with regard to risk taking in terms of use and abuse of substances which adversely impact our health, and we make dietary choices which can either improve or reduce our health status. Other risk taking behavioral choices include abusive or violent behavior, seatbelt use, drinking and driving, and failure to wear protective devices in activities at work and at play which can cause exposures to chemical or physical hazards. We consciously choose to protect ourselves through acquiring appropriate immunizations against disease and undergoing screening tests for diseases. All of these behaviors have the potential to enhance or detract from the quality and length of our lives.

Promoting individual preventive action through education, immunizations, screening tests, and, in some cases, treatment is a cornerstone activity of public health. This chapter presents a broad range of information pertaining to both positive and negative behavior in recognition of the importance of behavior modification in promoting community and public health improvement.

### Violent Behavior

As a nation, the United States has earned the dubious reputation of being an extremely violent country. It is certainly the most violent of the highly industrialized nations, with a homicide rate being higher overall, and especially for young males, than any other industrialized nation.<sup>1</sup>

It is possible to interrupt the progression of violence in our society, but it will require the efforts not only of government but also of individuals, community groups, organizations representing physical and mental health, medicine, education, law, social services, and religion. The public health approach to preventing violence focuses on changing individual knowledge, skills, and attitudes, and increasing community awareness about the causes and preventions of violence. As part of these strategies, it is important to introduce school-based curricula which teach coping, communication, and mediation skills.

Approximately 1.4 million violent crimes (defined as murder/nonnegligent manslaughter, forcible rape, robbery, and aggravated assault) were reported to

### DID YOU KNOW?

*Violent crime is composed of four offenses: murder and nonnegligent manslaughter, forcible rape, robbery, and aggravated assault.*

- Federal Bureau of Investigation, 2001

### DID YOU KNOW?

*One violent crime occurs every 22.1 seconds.*

- Federal Bureau of Investigation, 2001

**DID YOU KNOW?**

*One murder is committed every 33.9 minutes.*

- Federal Bureau of Investigation, 2001

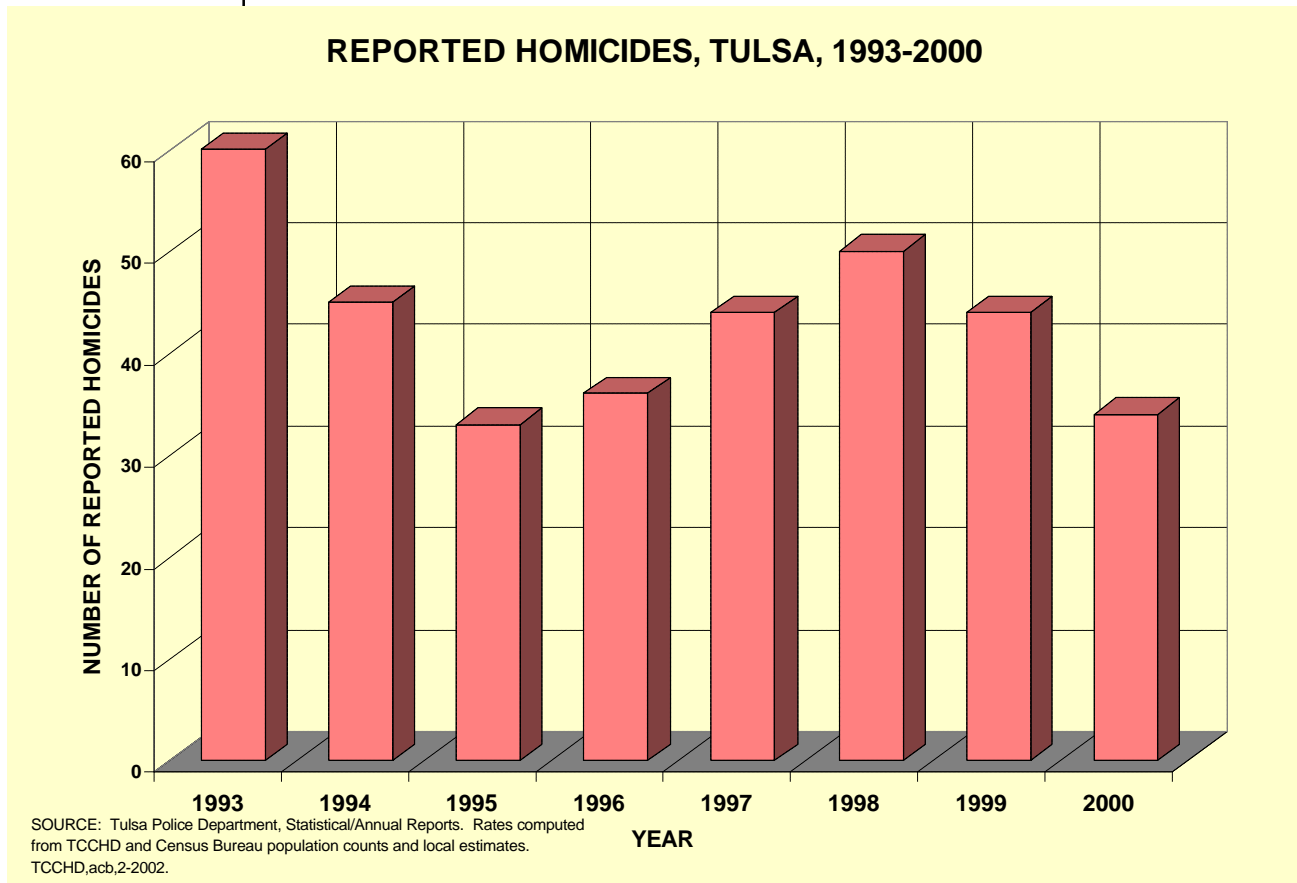
the nation’s law enforcement agencies in 2000. This calculates to a rate of 605 violent crimes per 100,000 population. Of the estimated 625,000 persons arrested for violent crimes in 2000, approximately 83% were males, 84% were adults, and 60% were white. Persons under the age of 25 constituted 44% of all violent crime arrestees.

**Homicide**

Murder is defined as the willful killing of one human being by another. Any death due to a fight, argument, quarrel, assault, or commission of a crime is included. This offense is scored by law enforcement officials on the basis of their investigation and does not include the findings of a court or the decision of a prosecutor. Manslaughters, suicides, accidental deaths, and justifiable homicides are excluded from this category.

The estimated number of persons murdered in the United States in 2000 was 15,517, a rate of 5.5 per 100,000 population. According to 2000 supplemental homicide data, males comprised 76% of the murder victim total. By age, the greatest percentage of victims (almost 90%) were persons ages 18 and older,

**Figure 8.1**



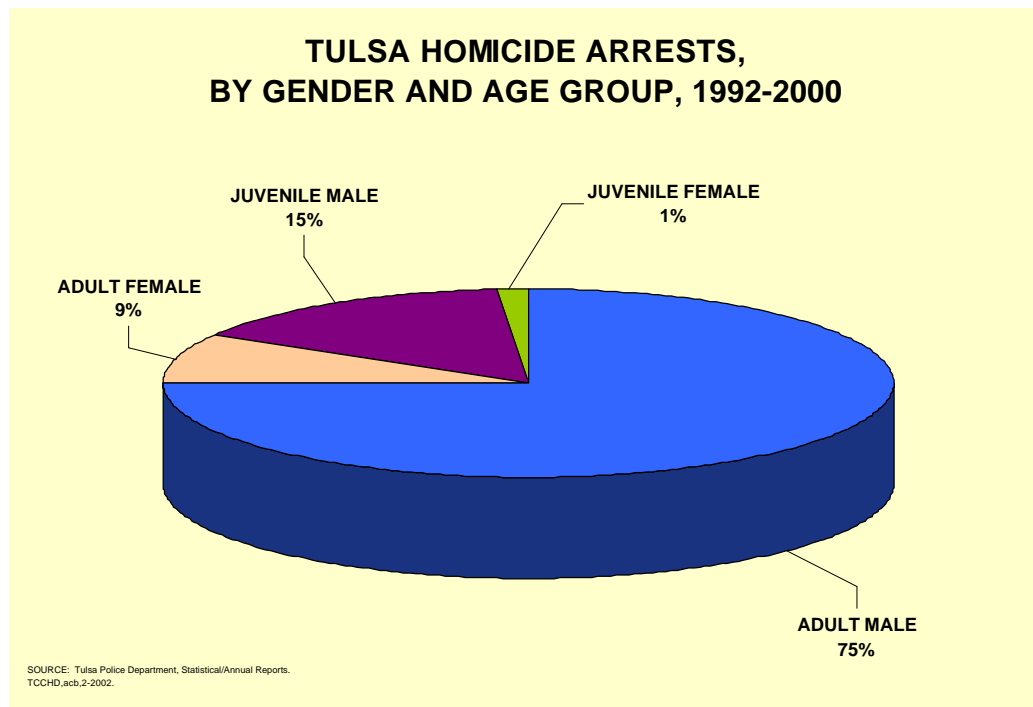
and 45% were between the ages of 20 and 34. Of the victims for whom race was known, 49% were white, 48.5% were black, and persons of other races accounted for the remaining 2.5%.

Over 90% of murder offenders in 2000 were male, and over 91% were adults. Of all offenders, approximately 69% were between the ages of 17 and 34. Blacks accounted for 51.4% of those offenders, whites for 46.1%, and persons of other races for the remainder.

Oklahoma law enforcement agencies reported a total of 181 homicides in 2000, a 22% decrease from 1999. Firearms were employed in almost 60% of all reported murders. The use of a knife or other cutting device was involved in 17%. The murder of one family member by another accounted for 21% of all murders; just over 4% resulted from one spouse killing the other.

The number of reported homicides in Tulsa varied significantly during the 1990s, from a high of 60 in 1993 to a low of 33 in 1995 (Figure 8.1). Between 1998 and 2000, Tulsa County’s homicide rate ranked 15<sup>th</sup> of Oklahoma’s 77 counties. By comparison, Oklahoma County ranked 12<sup>th</sup>. Approximately 90% of Tulsa’s homicide arrests from 1992 through 2000 were males, of which 84% were adults and 16% were juveniles (Figure 8.2). Females comprised only 10% of homicide arrests during that time period of whom only 1% were juveniles.

Figure 8.2



**HEALTHY PEOPLE 2010 OBJECTIVE**

Reduce homicides.

- U.S. Department of Health and Human Services, 2000

**DID YOU KNOW?**

*Of the 15,500 murders reported in 2000, 13.4% were committed by family members of the victim.*

- Federal Bureau of Investigation, 2001



**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Reduce  
physical  
assaults.*

- U.S. Department  
of Health and  
Human Services,  
2000

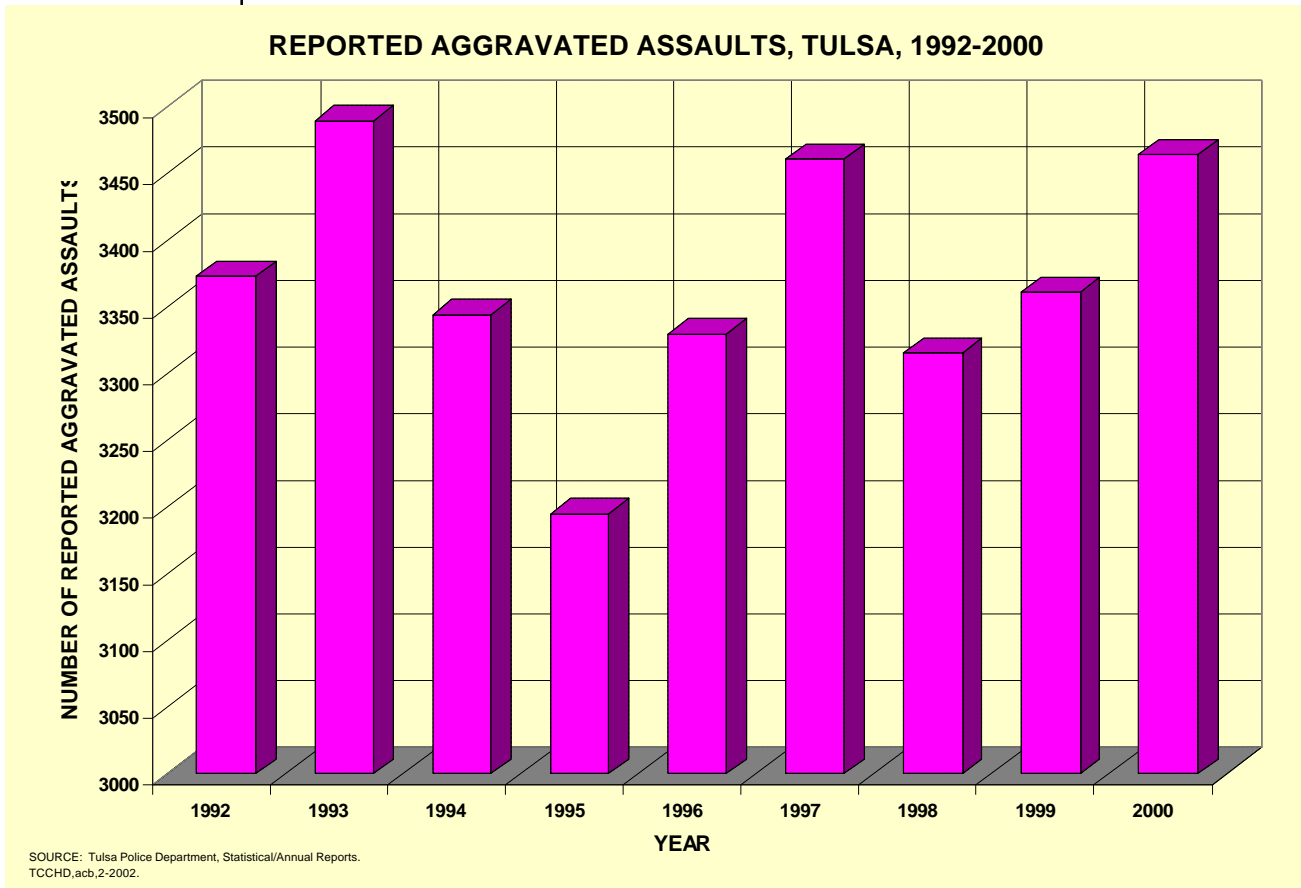
**Aggravated Assault**

Aggravated assault is defined as an unlawful attack by one person upon another for the purpose of inflicting severe or aggravated bodily injury. This type of assault is usually accompanied by the use of a weapon or by means likely to produce death or great bodily harm. Attempts are included, since it is not necessary that an injury results when a gun, knife, or other weapon is used which could and probably would result in serious personal injury if the crime were successfully completed.

Over 910,000 aggravated assaults were reported in the United States in 2000. By race, 63.5% of the estimated 478,417 persons arrested were white, 34% were black, and other races comprised the remainder. Persons under the age of 25 were the offenders in almost 40% of aggravated assault arrests, and just under 80% were male.

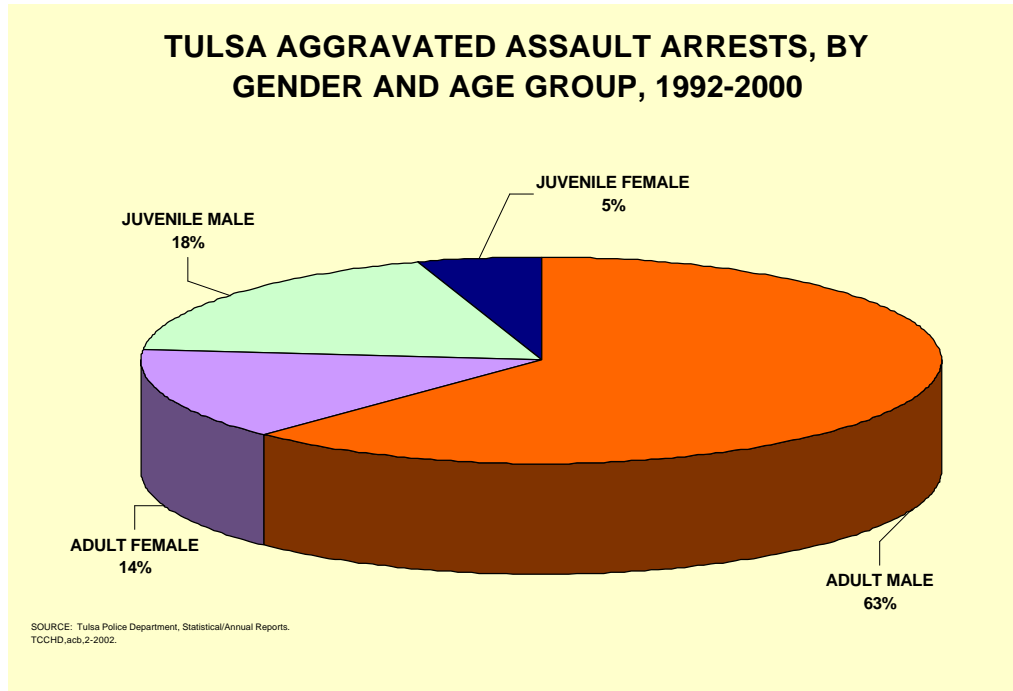
**Figure 8.3** shows the number of assaults reported by the Tulsa Police Department from 1992 through 2000. The number of reports was notably varied, ranging from 3,195 in 1995 to 3,464 in 2000. Arrests for aggravated assaults in Tulsa were 81% male from 1992 through 2000. Approximately

**Figure 8.3**



18% of those arrested were juvenile males, while only 5% were juvenile females. Adult females comprised 14% of assault arrests during the time period (**Figure 8.4**).

**Figure 8.4**



**HEALTHY PEOPLE 2010 OBJECTIVE**

*Reduce the annual rate of rape or attempted rape.*

- U.S. Department of Health and Human Services, 2000

**Forcible Rape**

Forcible rape is the forcible carnal knowledge of a female against her will. Assaults or attempts to commit rape by force or threat of force are also included; however, statutory rape (without force) and other sex offenses are excluded. Rape is divided into two categories: rape by force and attempt to rape.

In 2000, just over 90,000 forcible rapes were reported in the United States. Law enforcement across the country arrested an estimated 27,500 persons for forcible rape in 2000. Of those arrested, approximately 45% were under the age of 25 and 64% were white.

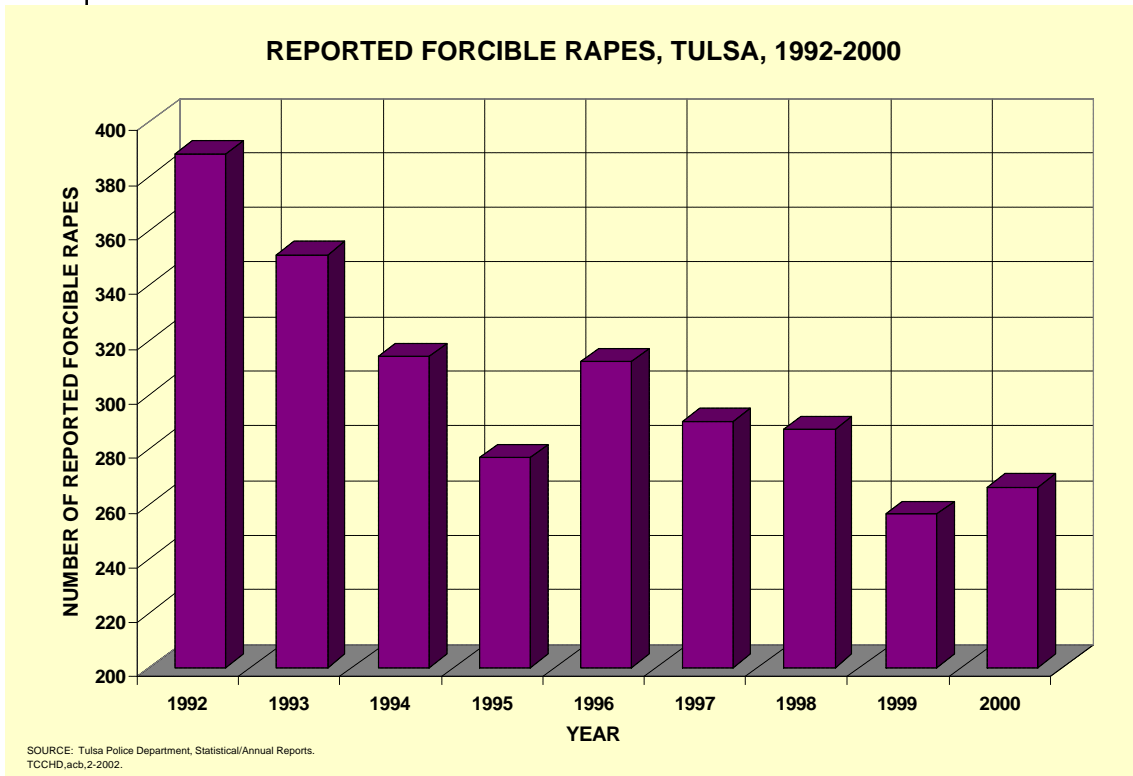
Of the 1,422 total reported rapes in Oklahoma in 2000, almost 87% were classified as rape by force. For the time period between 1998 and 2000, Tulsa County ranked third among Oklahoma counties with 53.4 rapes per 100,000 population. Only Oklahoma County and Kay County ranked higher. In 2000, 266 rapes were reported by the Tulsa Police Department, a 31% decrease from

**DID YOU KNOW?**

*Law enforcement across the country arrested over 27,000 persons for forcible rape in 2000.*

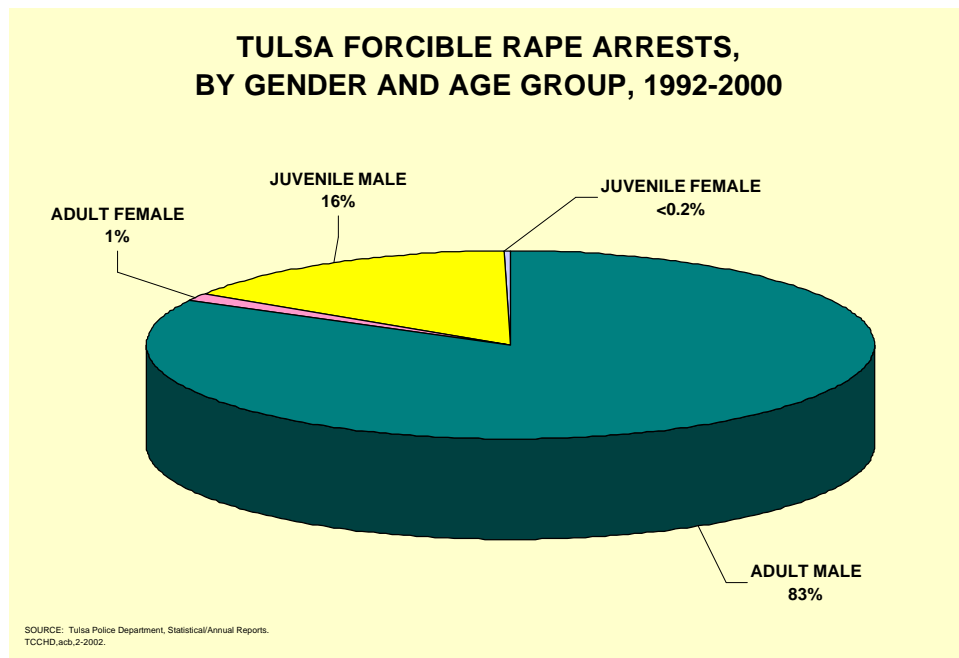
- Federal Bureau of Investigation, 2001

Figure 8.5



the 388 rapes reported in 1992 (**Figure 8.5**). Tulsa Police Department arrests for rape from 1992 through 2000 were approximately 99% male and included 16% juvenile males during the time period (**Figure 8.6**).

Figure 8.6



**DID YOU KNOW?**

*One forcible rape occurs every 5.8 minutes.*

- Federal Bureau of Investigation, 2001

## Child Abuse and Neglect

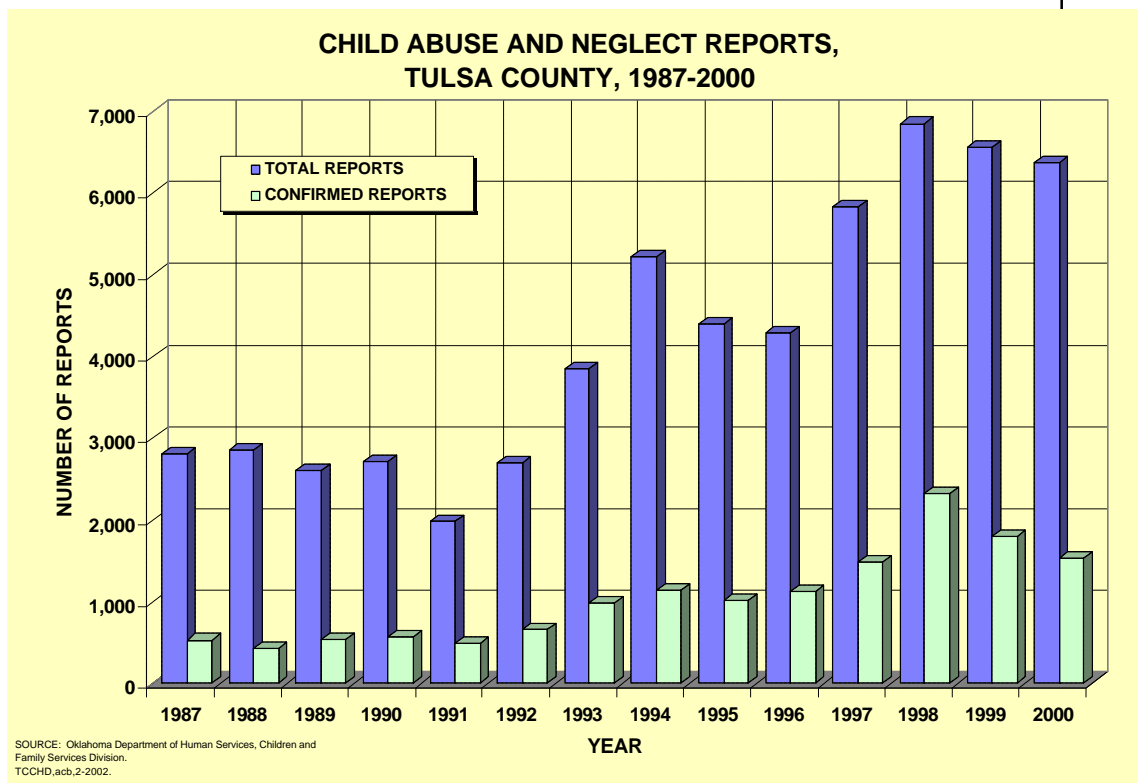
Since 1950, the overall annual death rate for U.S. children under 15 years of age has declined substantially with reductions in unintentional injuries, pneumonia, influenza, cancer, congenital anomalies, and infectious diseases. However, during the same time period, homicide rates among children tripled and suicide rates increased four fold. In a study recently published by the Centers for Disease Control and Prevention, U.S. rates for child homicides were compared with all of the 26 world countries with populations over 1 million in the high income group (based upon gross national product). The homicide rate for children was 5 times higher in the U.S. than for all of the other 25 countries combined. The U.S. child suicide rate was twice as high as that of all of the other 25 countries combined and the overall firearm-related death rate for U.S. children was nearly 12 times higher than that for the other 25 countries combined.<sup>2</sup>

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

Reduce maltreatment and maltreatment fatalities of children.

- U.S. Department of Health and Human Services, 2000

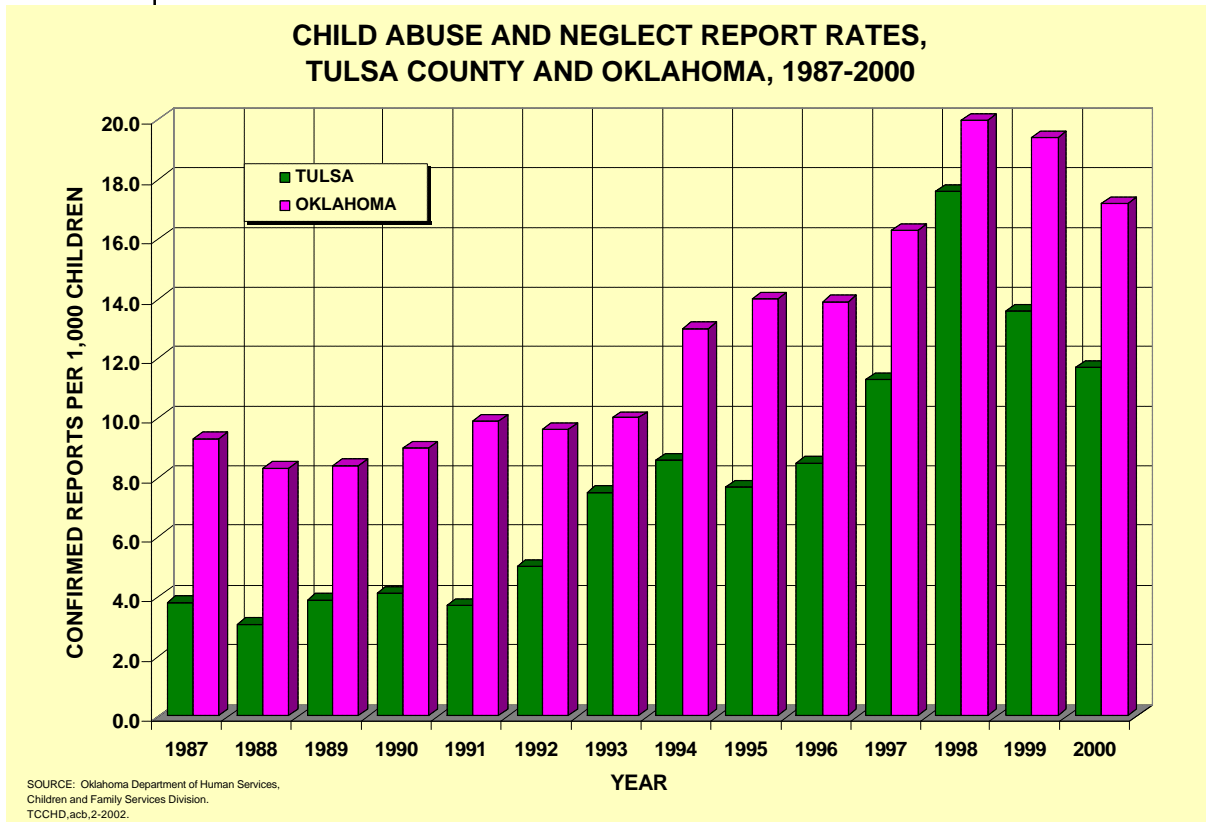
Figure 8.7



In recent years, cases of child abuse and neglect in Tulsa County and Oklahoma have increased. This is due, in part, to better reporting as a result of increased awareness and better case identification by concerned citizens, law enforcement, teachers, and members of the medical and social service communities. Numbers of both total abuse and neglect reports and confirmed

reports increased significantly in the 1990s over the late 1980s in Tulsa County. During the fiscal year 2000, the Oklahoma Department of Human Services received almost 6,400 child abuse and neglect reports for Tulsa County, of which approximately 24% were confirmed (Figure 8.7). Tulsa County's child abuse and neglect report rate in 2000 was 11.7 confirmed reports per 1,000 children, significantly less than the state rate of 17.2 (Figure 8.8).

Figure 8.8



## Domestic Violence

The Oklahoma Bureau of Investigation defines domestic abuse as threatening, causing, or attempting to cause serious physical harm between family or household members. Domestic abuse includes such offenses as murder, sex crimes, assault, and assault and battery. Family or household members are defined as spouses, former spouses, present spouses of former spouses, parents, foster parents, children, persons otherwise related by blood or marriage, those living in the same household, or those who formerly lived in the same household. Also included in this category are persons in dating relationships (defined as courtships or engagement relationships) or someone with whom they had a child.

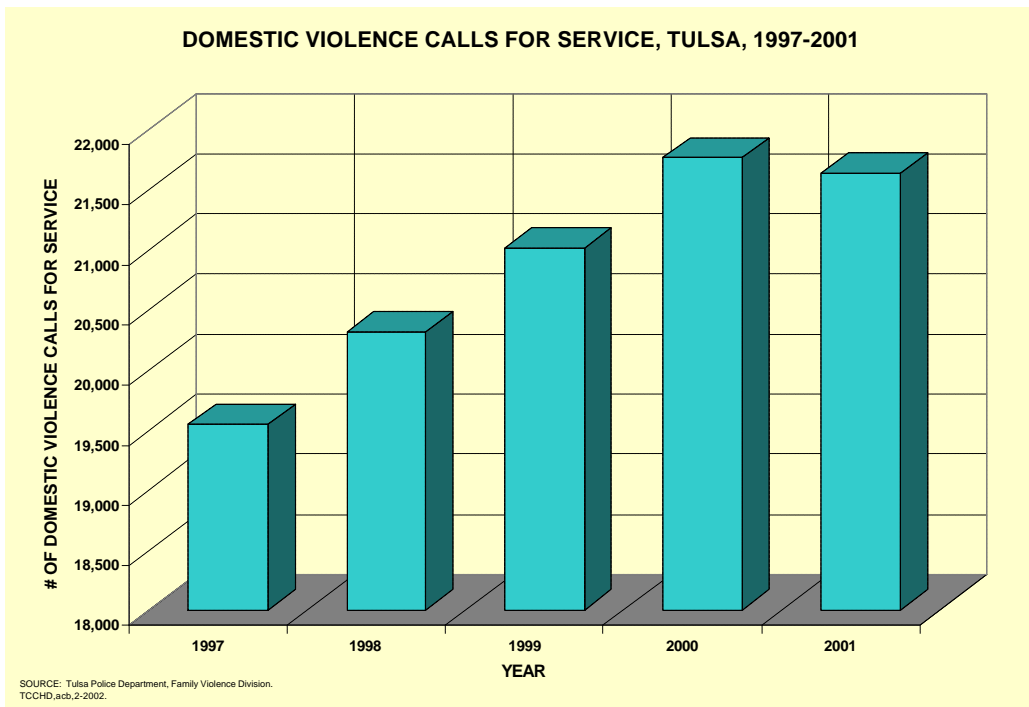
Violence against women has created a substantial public health problem in the United States. Estimates from the National Crime Victimization Survey indicate that women accounted for 85% of the victims among the more than 790,000 victims of intimate violence (defined as violence committed by a current/former spouse or boy/girlfriend) in 1999. Intimate partner violence rates differed greatly based on the age of the victim. While the overall per capita rate of intimate partner violence against women was 5.8 victimizations per 1,000 in 1999, among females age 16-25, the rate was 15.6. Black and white females experienced intimate partner violence at similar rates for every age group examined, except those between the ages of 20 and 24. For this age, there were 29 victimizations per 1,000 black women and 20 per 1,000 white women. Most victims of intimate partner violence did not face an offender who was armed with a weapon. Between 1993 and 1999, approximately 83% of female victims faced an unarmed offender. During that same time period, 5% of female victims sustained serious injuries, 41% suffered minor injuries, and 4% were raped or sexually assaulted and suffered unspecified injuries. Only 54% of intimate partner violence against women was reported to the police.<sup>3</sup>

**DID YOU KNOW?**

*Almost 10% of male victimizations stemmed from intimate partner violence between men.*

- U.S. Department of Justice, 2002.

**Figure 8.9**



According to the FBI’s Uniform Crime Reporting Program, intimate partner homicides accounted for 11% of all murders in 1999. Females were much more likely (74%) than males to be murdered by an intimate partner. In fact, females were almost 3 times more likely to have been homicide victims of intimates than were males. Between 1993 and 1999, an intimate was

**HEALTHY PEOPLE 2010 OBJECTIVE**

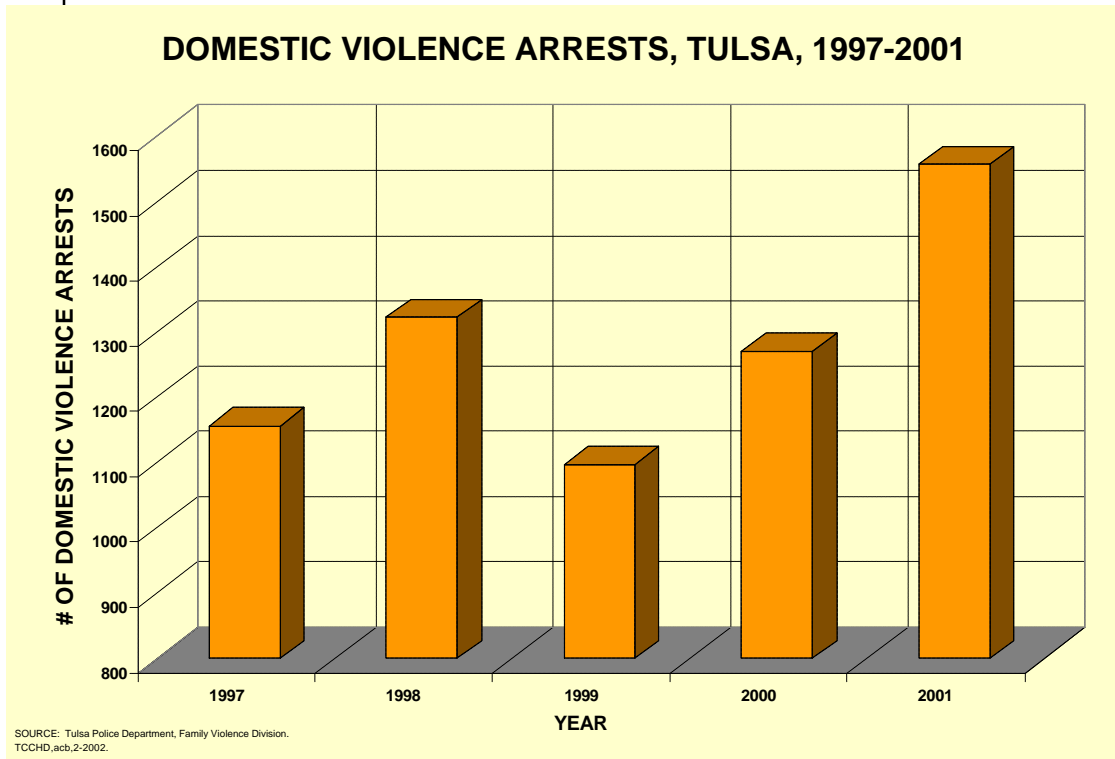
*Reduce the rate of physical assault by current or former intimate partners.*

- U.S. Department of Health and Human Services, 2000

responsible for 32% of homicides among women age 20-24 and almost 40% of homicides among women age 35-49.

Arrests for domestic abuse in Oklahoma increased from just under 15,000 arrests in 1991 to just over 22,000 arrests in 2000, an increase of approximately 33%. In 2001, the Tulsa Police Department received close to 21,637 domestic violence calls for service, a 10% increase from the 19,545 in 1997 (**Figure 8.9**). Arrests for domestic violence in 2001 equaled 1,558, a 25% increase from the 1,157 arrests in 1997 (**Figure 8.10**).

Figure 8.10



### Risk Taking and Self Responsibility

Daily living carries with it some risk of illness, injury, or death in many routine household, occupational, and recreational activities. We as humans recognize that there is a certain degree of risk, however small, in nearly all activities. The probability of encountering adverse events can be remote, such as being hit by a falling meteorite, or more likely, being involved in a debilitating or fatal traffic accident, being exposed to a hazardous substance in the workplace, or developing the early stages of a chronic disease.

Accidents and unintentional events over which we have no control often affect our lives without warning. Effective behavior modifying decisions which might preclude their occurrence cannot be made in such cases. In most cases, however, we consciously evaluate the risks of suffering adverse consequences



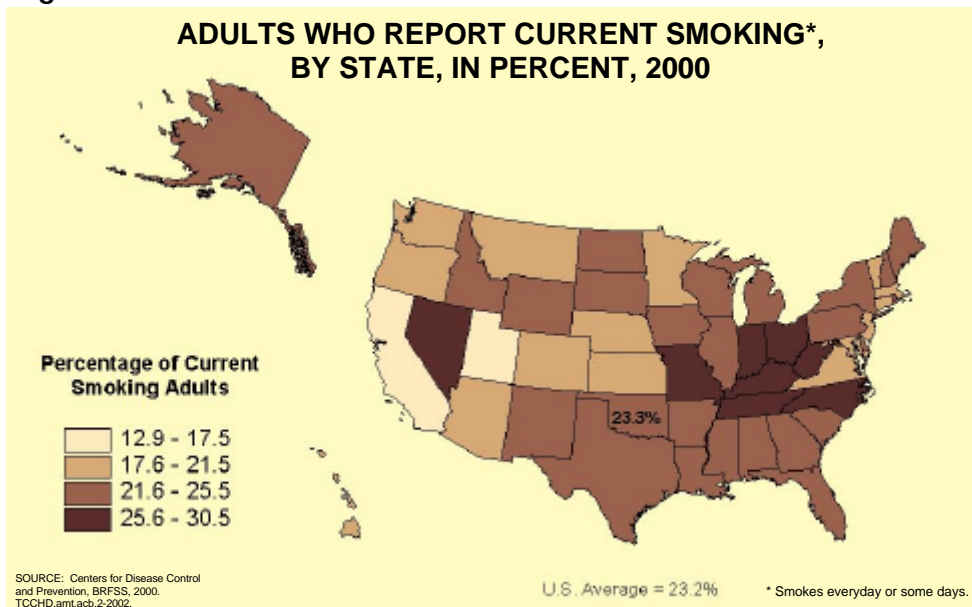
from behaviors we know to be potentially harmful, such as smoking, reckless driving, or using harmful drugs and even intentionally expose ourselves to risky but stimulating recreational activities. However, risk taking decisions should be made from a basis of knowledge and personal understanding of the hazards involved. Preventive health education is intended to provide this base of understanding and therefore is a function of public health in the United States. Taking responsibility for one’s own actions and reducing risk is a basic necessity of insuring healthy behavior and healthy lifestyles. It must include not only avoiding unacceptable risks but also availing one’s self of early warning screening tests which can often prevent progression of early disease precursors into debilitating and sometimes fatal consequences.

The use and abuse of substances, both legal and illegal, result from conscious individual decision-making. Despite the known and suspected health problems associated with use and overuse of these substances, many Americans are willing to accept the risks associated with their use. Most data available to assess the prevalence of substance use and abuse in the United States is derived from surveys and police and court data, which reflect arrests and convictions of persons involved in the use of illegal substances.

### Tobacco Use

Tobacco use remains the leading cause of preventable death in the United States, causing more than 400,000 deaths each year and resulting in an annual cost of more than \$50 billion in direct medical costs. Cigarette smoking and inhalation of secondary smoke has been associated with a number of adverse health effects, including cancers of the respiratory system, emphysema, heart disease, cerebrovascular disease, asthma, low birth weight, and others.

Figure 8.11



### HEALTHY PEOPLE 2010 GOAL

*Reduce illness, disability, and death related to tobacco use and exposure to secondhand smoke.*

- U.S. Department of Health and Human Services, 2000

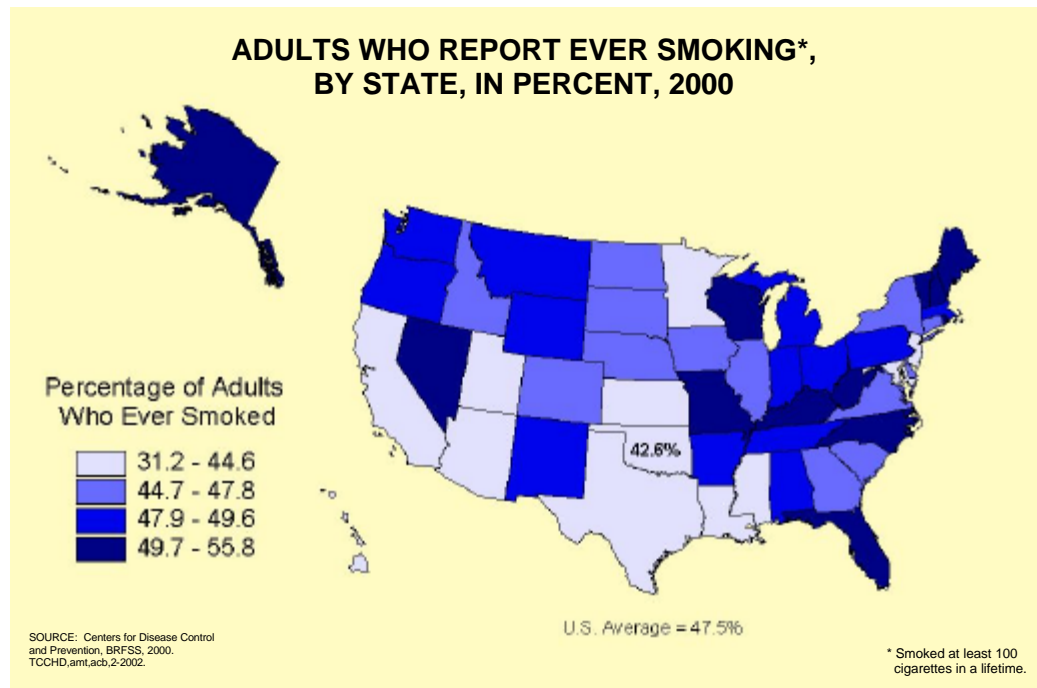
### DID YOU KNOW?

*Each year, smoking kills more people than AIDS, alcohol, drug abuse, car crashes, murders, suicides, and fires combined.*

- Centers for Disease Control and Prevention, 2000.

In 2000, 23.3% of Oklahoma adults reported that they were current smokers, just even with the U.S. average of 23.2%, placing Oklahoma in the second highest percentile among U.S. states (**Figure 8.11**). States reporting the highest percentage of adult smokers included those in the Ohio Valley and Nevada. California and Utah reported the lowest percentages. That same year, the percentage of adults in the U.S. who had ever smoked was 47.5%. States with the highest percentage of adults who ever smoked included Alaska, Kentucky, Maine, Nevada, and New Hampshire. Oklahoma fell in the lowest percentile, with 42.6% of adults reporting ever smoking (**Figure 8.12**).

Figure 8.12



**DID YOU KNOW?**

Approximately 80% of adult smokers started smoking before the age of 18.

Centers for Disease Control and Prevention, 2000.

Although cigarette smoking rates among U.S. high school students increased during most of the 1990s, they have declined significantly since 1997. In 2001, the prevalence of current smoking (those who smoked cigarettes on = 1 of the 30 days preceding the survey) was reported at 28.5%, down from a peak of 36.4% in 1997. Current frequent smoking (those who smoked cigarettes on = 20 of the 30 days preceding the survey) decreased from 16.8% in 1999 to 13.8% in 2001. If this decreasing pattern continues, the United States could achieve the national health objective for 2010 of reducing current smoking rates among high school students to = 16%.<sup>4</sup>

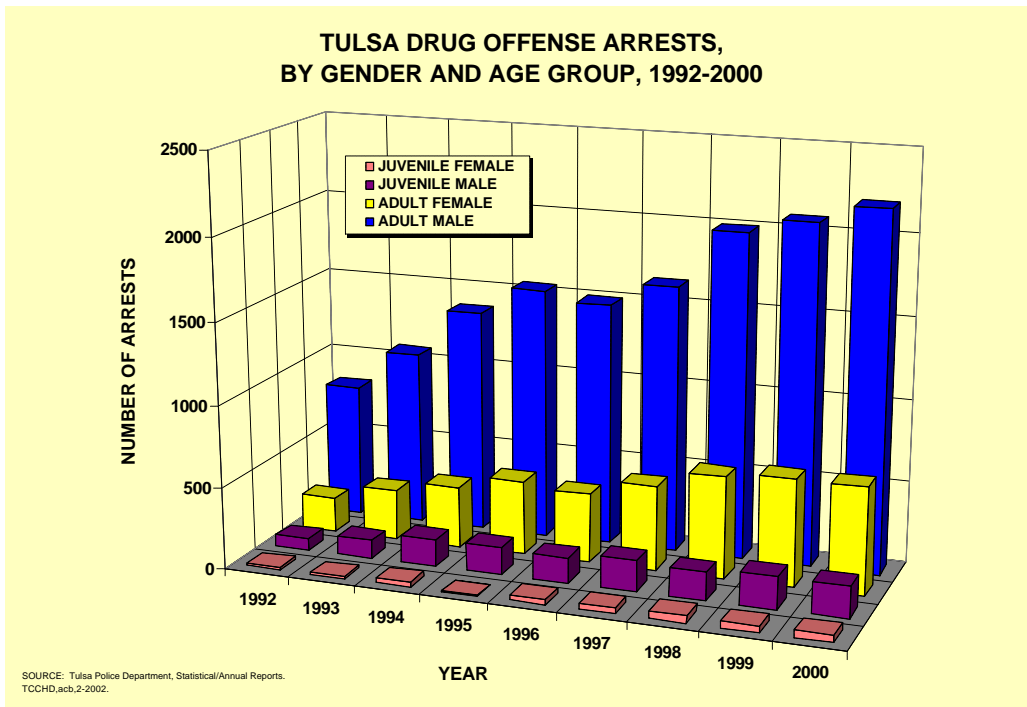
**Drug Use**

Considerable media attention has been given to recent surveys which show that the use of illegal drugs, especially marijuana, is again increasing in the United States after having declined from the mid-1980s into the 1990s. The increase



has been noted especially among youth. An increase in drug offense arrests in Tulsa among both juveniles and adults has occurred since 1992. **Figure 8.13** clearly shows that drug offense arrests in Tulsa have nearly tripled for both juveniles and adults from 1,122 total arrests in 1992 to almost 3,100 total arrests in 2000.

**Figure 8.13**



The Youth Risk Behavior Survey is a national school-based survey conducted biennially to assess the prevalence of health risk behaviors among high school students (grades 9-12). **Figure 8.14** displays the current use (use on = 1 of the 30 days preceding the survey) of illicit drugs, tobacco, and alcohol. Clearly, alcohol consumption is a widely accepted practice with approximately 50% of students having used alcohol within 30 days prior to the survey and over 30% reporting binge drinking (5 or more drinks on at least one occasion). Just over 40% of surveyed youth report current tobacco use, 18% admit smoking cigars, and almost 8% report the use of smokeless tobacco. Approximately 27% of students report current marijuana use, 4.2% report inhalant use, and 4% report cocaine use.

A smaller, but still troubling, percentage of students admit to lifetime use (defined as having ever used) of illicit drugs (**Figure 8.15**). Over 47% of students report experimenting with marijuana at some time in their lives, and 14.6% admit inhalant use. A frightening 9.5% report cocaine use, 9.1% experiment with methamphetamine, 2.4% inject heroin, and close to 4% use anabolic steroids.

**HEALTHY PEOPLE 2010 GOAL**

*Reduce substance abuse to protect the health, safety, and quality of life for all, especially children.*

- U.S. Department of Health and Human Services, 2000

**DID YOU KNOW?**

*In 2000, an estimated 14 million Americans were current users of illicit drugs.*

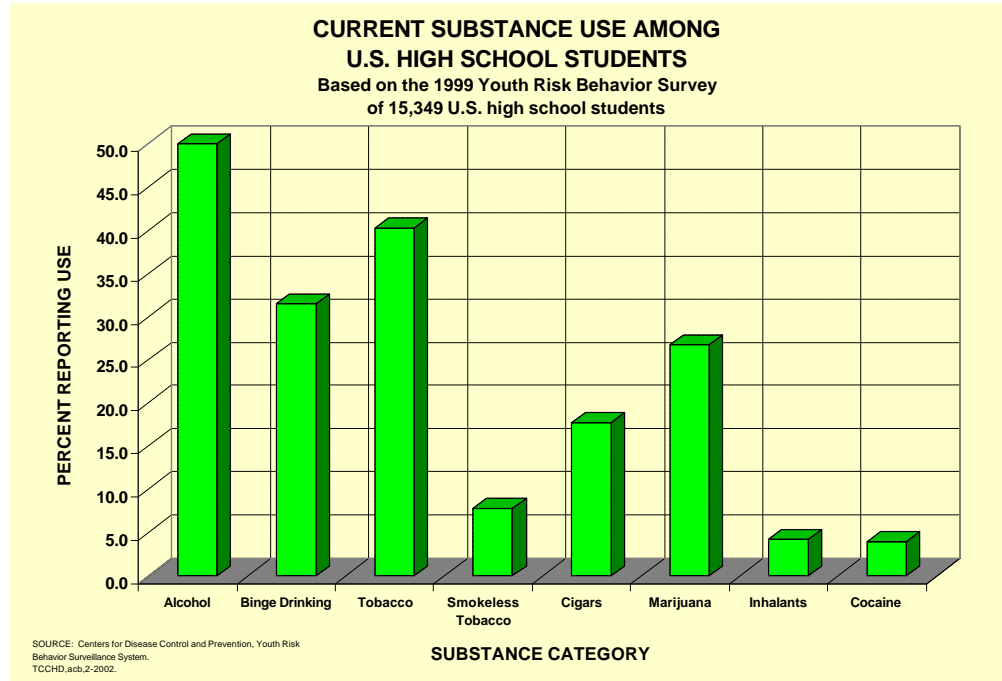
- Drug Enforcement Administration, 2001.

Figure 8.14

**HEALTHY PEOPLE 2010 OBJECTIVE**

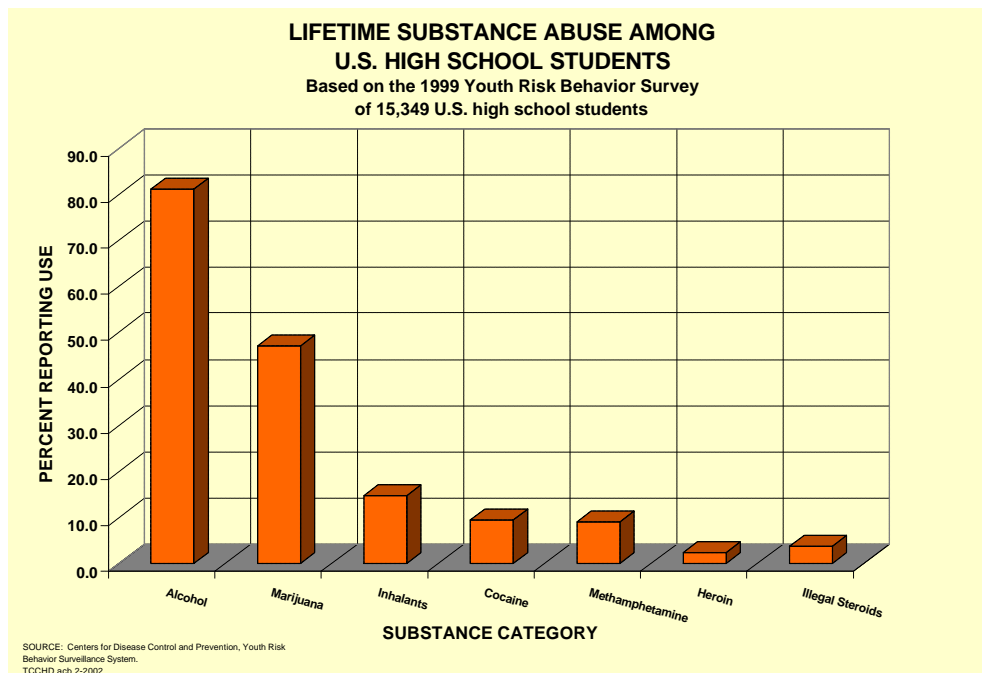
*Increase the proportion of adolescents who disapprove of substance abuse.*

- U.S. Department of Health and Human Services, 2000



A growing public health concern is the quantity of legal controlled substances which are obtained fraudulently from healthcare providers and subsequently distributed to the drug-abusing community. Healthcare providers, drug enforcement agents, and other law enforcement authorities recognize that unknown, yet substantial, quantities of these addictive substances, especially narcotics and benzodiazepines are easily obtained by individuals presenting themselves to healthcare providers with false complaints. These drugs rapidly find their way into the illicit drug market at highly inflated prices.

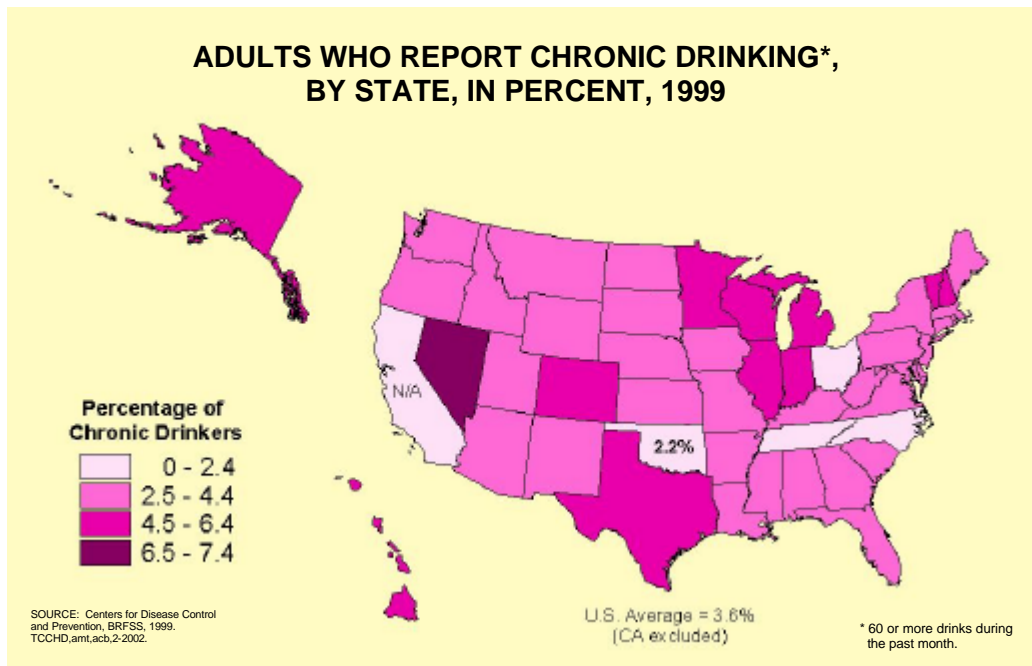
Figure 8.15



There is a widely held public perception that much of the increase in crime in the United States in recent years is related to increased use of drugs. A U.S. Department of Justice report indicated that 70% of inmates had committed a drug offense or used drugs regularly. Approximately 55% of convicted inmates were using drugs in the month before the offense and over 35% were under the influence of drugs at the time of the offense. Nearly 1 in 6 convicted inmates committed their offense to obtain money to purchase drugs.

## Alcohol

Figure 8.16



Alcohol abuse among adults varies considerably by state. Reported chronic alcohol consumption (60 or more drinks per month) in 1999 ranged from 1.7% to 7.4% of adults (**Figure 8.16**). Oklahoma was below the national average of 3.6%, with 2.2% of adults reporting chronic drinking. Binge drinkers (consumption of five or more drinks per occasion) constituted a higher percentage of the population in 1999, ranging from 7.7% of adults in Tennessee to 27.0% of Wisconsin adults. The U.S. average was 14.9%, and Oklahoma ranked in the lowest percentile at 8.1% (**Figure 8.17**).

Excessive alcohol consumption in itself carries health risks including potential chronic liver disease, cancer (especially in association with smoking), adverse effects to the unborn fetus in pregnant females, and others. A more direct and frequent secondary effect of excessive alcohol consumption is the injuries and fatalities associated with motor vehicle crashes related to alcohol-impaired

### DID YOU KNOW?

*In 1999, there were 19,171 alcohol-induced deaths in the U.S., not including motor vehicle fatalities.*

- Centers for Disease Control and Prevention, 2000.

### HEALTHY PEOPLE 2010 OBJECTIVE

*Reduce average annual alcohol consumption.*

- U.S. Department of Health and Human Services, 2000

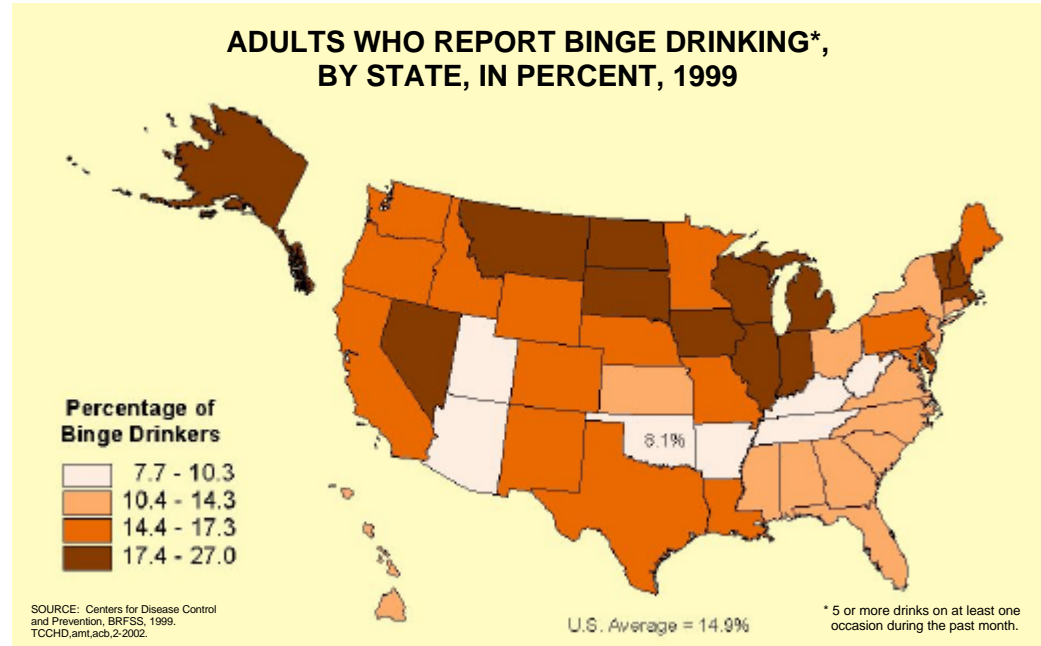


Figure 8.17

HEALTHY PEOPLE 2010 OBJECTIVE

Reduce the proportion of persons engaging in binge drinking of alcoholic beverages.

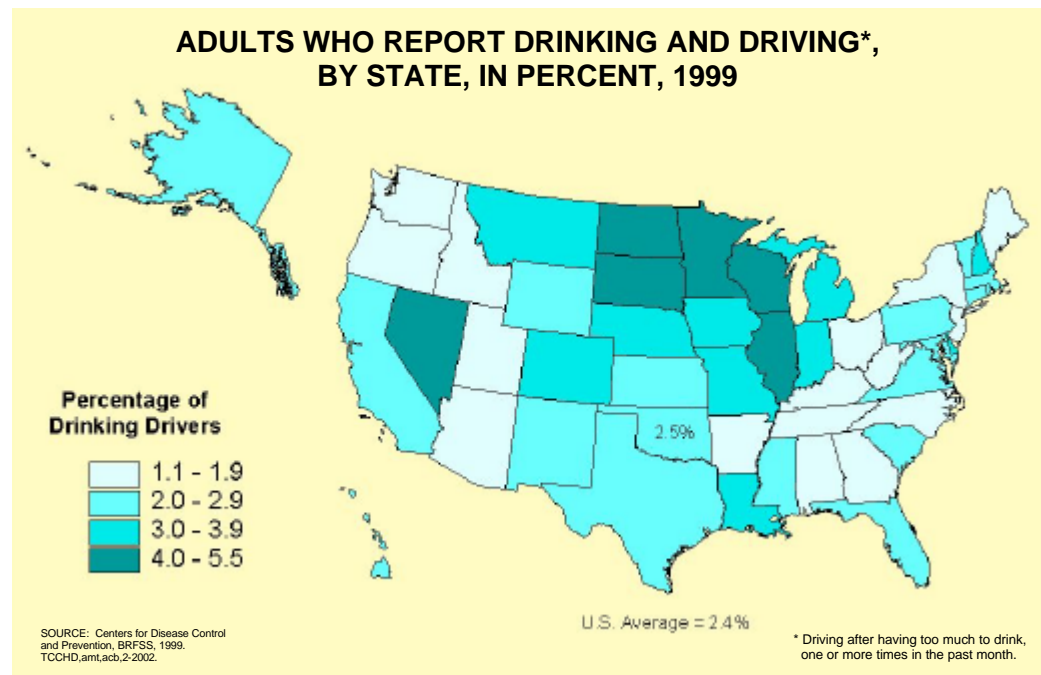
- U.S. Department of Health and Human Services, 2000



drivers. In 1999, the percentage of adults who reported driving after excessive drinking ranged from 1.1% to 5.5% by state with a national average of 2.4% (Figure 8.18). Oklahoma, at 2.5%, was in the second percentile, just slightly above the U.S. average.

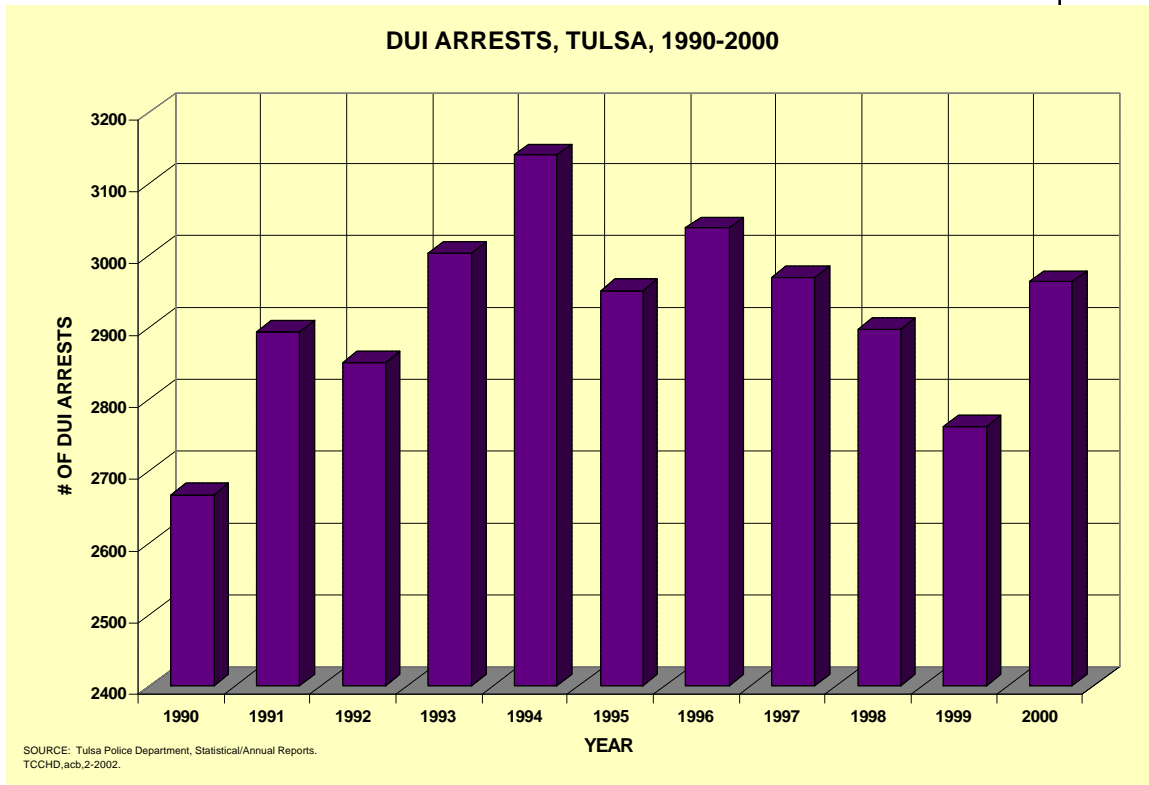
About 3 in 10 high school students reported in 2001 that they had ridden with someone within the past month who had been drinking alcohol, and 13.3% reported driving a car or other vehicle after drinking alcohol. Males were significantly more likely than female students to have driven after drinking.

Figure 8.18



**Figure 8.19** illustrates DUI (driving under the influence) arrests in Tulsa County from 1990 to 2000. DUI arrests in Tulsa ranged significantly over the decade, with a low of 2,667 arrests in 1990 to a high of 3,140 arrests in 1994. The number of arrests declined during the late 1990s, only to increase again in 2000 with 2,963 DUI arrests.

**Figure 8.19**



## Sexual Behavior

Unprotected and unsafe sexual practices cause both unintended pregnancies and the transmission of sexually transmitted diseases. While all sexually active adults are at some risk of unintended pregnancy or STD transmission, depending upon their sexual practices, data clearly substantiate that rates of sexually transmitted diseases are higher among the young and that unintended pregnancies among teens contribute significantly to problems of low birth weight and fetal and infant mortality.

According to the 1999 Youth Risk Behavior Survey, more than half of all high school students had engaged in sexual intercourse at least once during their lifetime (**Figure 8.20**). As one would expect, the percentage grew with increasingly higher grade levels with just over 38% reporting being sexually active in 9<sup>th</sup> grade increasing to 65% in the 12<sup>th</sup> grade. Among those who were

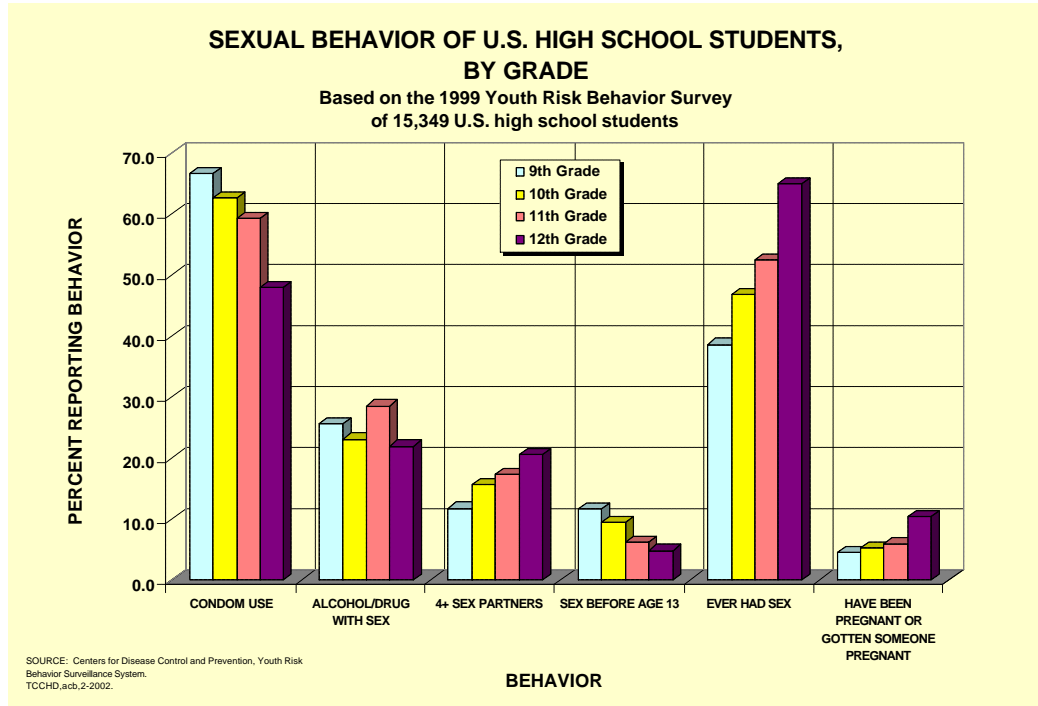


Figure 8.20

HEALTHY PEOPLE 2010 OBJECTIVE

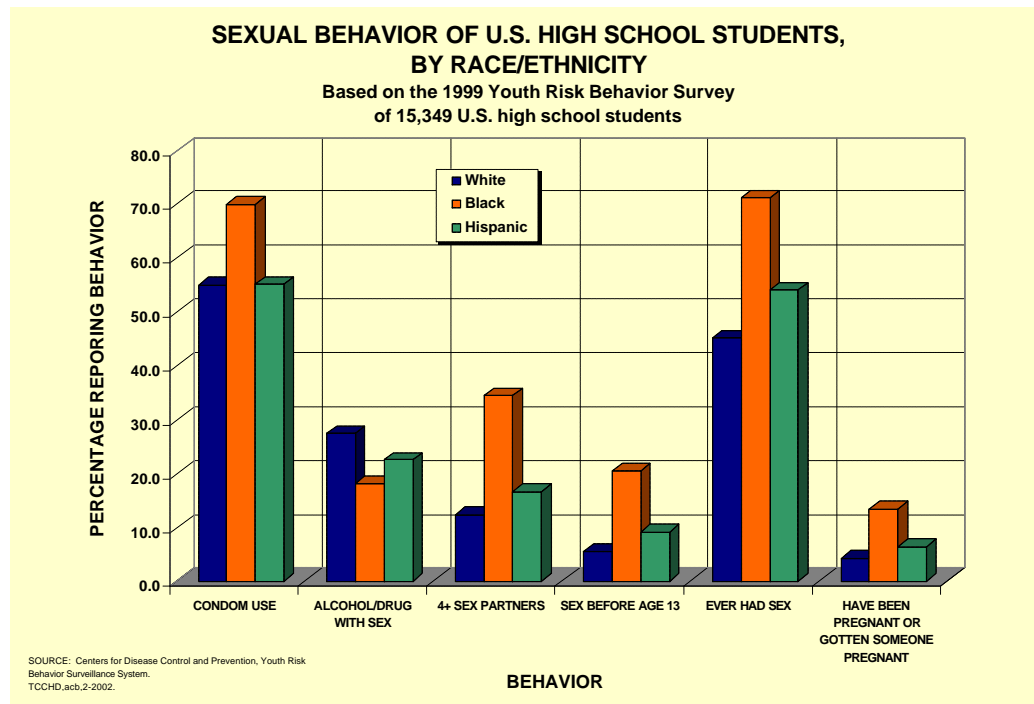
About 1 million teens become pregnant each year; 95% of those pregnancies are unintended.

- U.S. Department of Health and Human Services, 2000



sexually active, almost 60% used a condom during their last sexual intercourse. The percentage of condom use was highest among 9<sup>th</sup> graders (66.6%) and declined steadily with higher grade levels, falling to 47.9% among 12<sup>th</sup> graders. These data clearly show that nearly half of all sexually active high school students are, in essence, playing sexual roulette with unintended pregnancy and sexually transmitted disease.

Figure 8.21



Among the more interesting and disturbing survey results are that 8% of students had engaged in sexual intercourse before 13 years of age, over 16% had engaged in sexual intercourse with four or more partners, and 6.5% had been pregnant or had gotten someone else pregnant. Approximately 25% reported using alcohol or drugs at the time of their last intercourse. Sexual behavior by race/ethnicity is represented in **Figure 8.21**. An alarming 34.4% of black students reported having 4 or more sex partners; however, 70% of blacks reported using a condom, the highest percentage among all races/ethnicities.

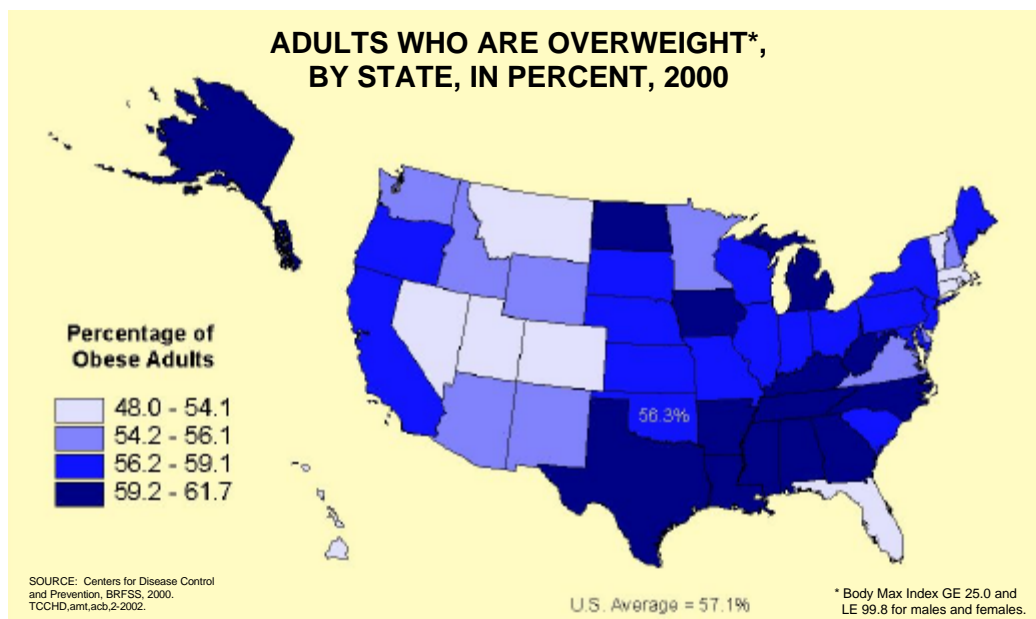
### Healthy Behavior and Self Preservation

Of the major causes of death (heart disease, cancer, cerebrovascular disease, and accidents), preventive action through responsible individual behavior can be effective in significantly reducing death and disability. Heart disease, cancer, and cerebrovascular diseases are directly affected, to a substantial degree, by diet, obesity, level of exercise, smoking, and other behaviors.

### Weight and Exercise

Obesity, with its associated cardiovascular implications, is a significant problem in our society. Based upon 2000 data, over 57% were classified as overweight in the United States, slightly higher than the 56.3% in Oklahoma (**Figure 8.22**). Higher percentages of overweight adults were mainly concentrated in the southern states and Alaska, with lower percentages in the Four Corners region, Nevada, Florida, Hawaii, and the northeastern states.

Figure 8.22



### HEALTHY PEOPLE 2010 GOAL

*Promote health and reduce chronic disease associated with diet and weight.*

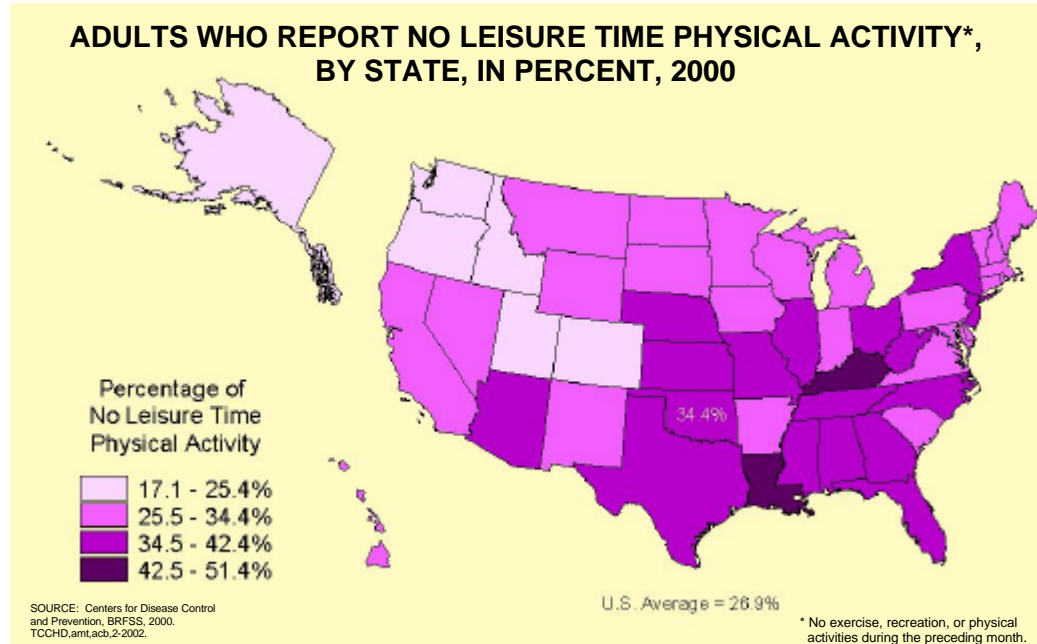
- U.S. Department of Health and Human Services, 2000

### DID YOU KNOW?

*More than 60% of adults do not achieve the recommended amount of regular physical activity.*

- Centers for Disease Control and Prevention, 2000.

Figure 8.23



**HEALTHY  
PEOPLE  
2010  
GOAL**

*Improve health, fitness, and quality of life through daily physical activity.*

- U.S. Department of Health and Human Services, 2000

It is not surprising that over 34% of Oklahomans reported in 2000 that they had no leisure-time physical activity (defined as no exercise, recreation, or physical activities during the preceding month), a behavior which contributes, along with diet, to overweight conditions. The U.S. average for inactive adults was 26.9% (**Figure 8.23**).

According to the 2001 Youth Risk Behavior Survey, over 53% of students had watched television = 3 hours per day during an average school day. An insufficient amount of vigorous physical activity was reported among 31% of students, and 9.5% reported no physical activity at all. Approximately 11% of students were classified as overweight and 14% of students were at risk for becoming overweight.

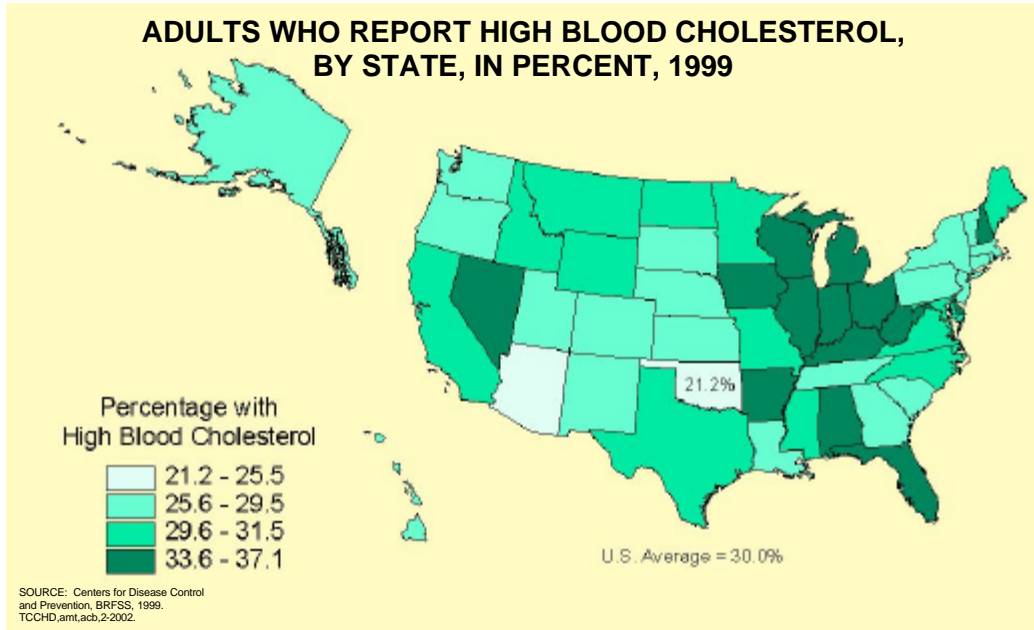
**Screening Tests**

High serum cholesterol levels have negative implications for cerebrovascular and cardiovascular health. Approximately 21% of Oklahomans reported that they had high blood cholesterol levels in 1999, significantly below the U.S. average of 30.0% (**Figure 8.24**). During that same year, 20.9% of Oklahomans reported they had high blood pressure, compared with a U.S. average of 24.0% placing Oklahoma in the lowest percentile in this category (**Figure 8.25**).

In 2000, approximately 5.5% of Oklahomans reported they had been diagnosed with diabetes. This level was slightly lower than the U.S. average of 6.1% (**Figure 8.26**). Generally, states reporting higher percentages of adults with diabetes tended to be in the southern region of the United States, while those with lower percentages of diabetes tended to be northwestern states. Since the

data in these maps are self-reported, the prevalence of these conditions may be underreported.

**Figure 8.24**



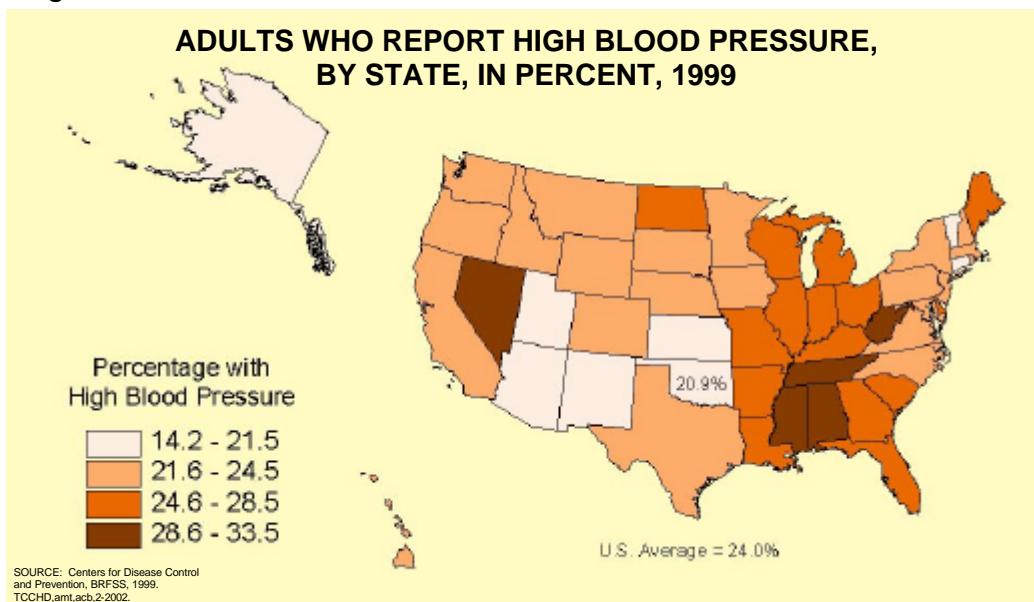
**HEALTHY PEOPLE 2010 OBJECTIVE**

*Reduce the proportion of adults with high total blood cholesterol levels.*

- U.S. Department of Health and Human Services, 2000

Cancer is the second leading cause of death among Americans, Oklahomans, and Tulsans and results from a variety of causes. While behavioral modifications such as limiting exposures to carcinogens at home and in the workplace, having a healthy diet, avoiding tobacco smoke, reducing sun exposure, and other behavioral changes can reduce one’s risk of developing some forms of this disease, it is just as important to receive timely medical

**Figure 8.25**



**DID YOU KNOW?**

*High blood pressure affects about 1 in 4 million American adults.*

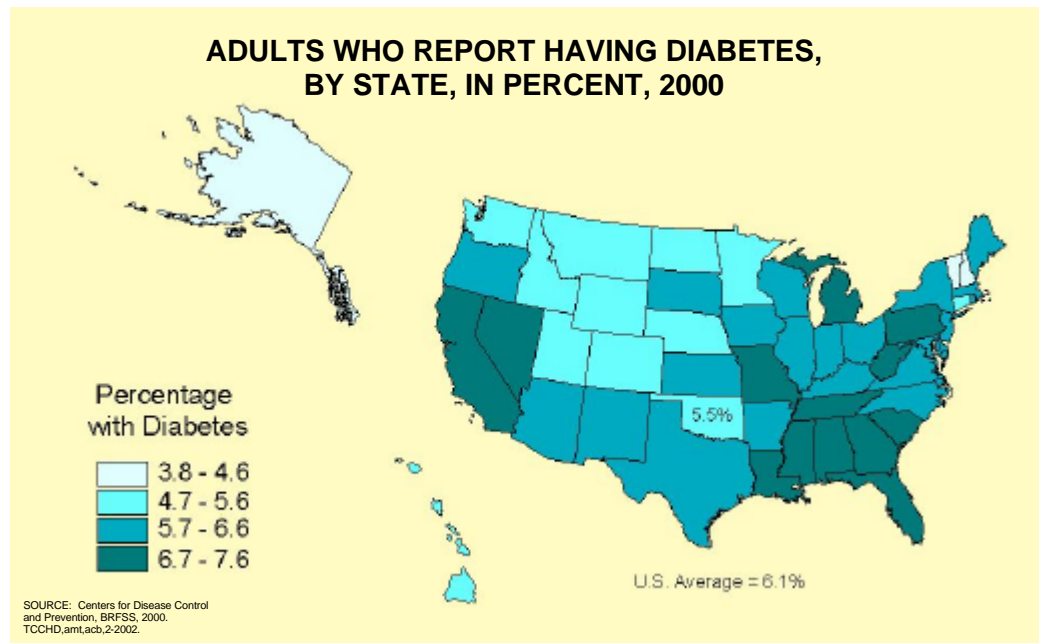
- National Institutes of Health, 2000.

Figure 8.26

HEALTHY  
PEOPLE  
2010  
OBJECTIVE

Prevent  
diabetes.

- U.S. Department  
of Health and  
Human Services,  
2000



screening tests which can detect some cancers in their earliest stages. Routine Pap smears are effective in early detection of cervical cancer in women. In 2000, approximately 3.7% of Oklahoma females reported never having a Pap smear, compared to the U.S. average of 5.1% (**Figure 8.27**). Unfortunately, almost 18% of Oklahoma women (40 years of age and older) reported never having a mammogram, significantly above the national average of almost 12.0% (**Figure 8.28**). States with higher percentages of women reporting never having a mammogram included Oklahoma, Texas, Mississippi, and Idaho.

Figure 8.27

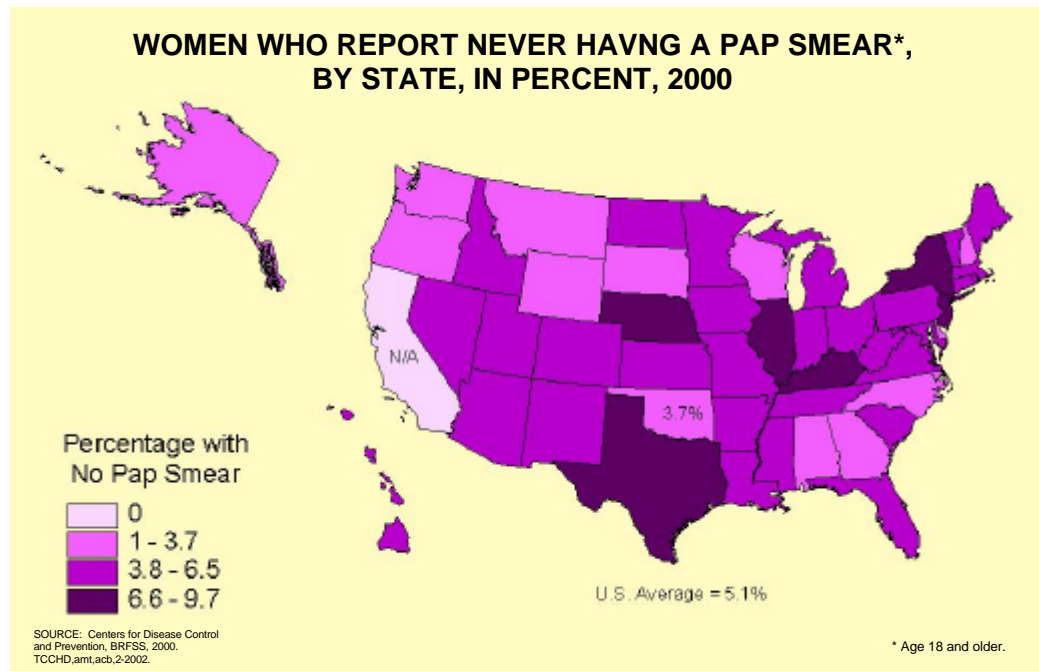
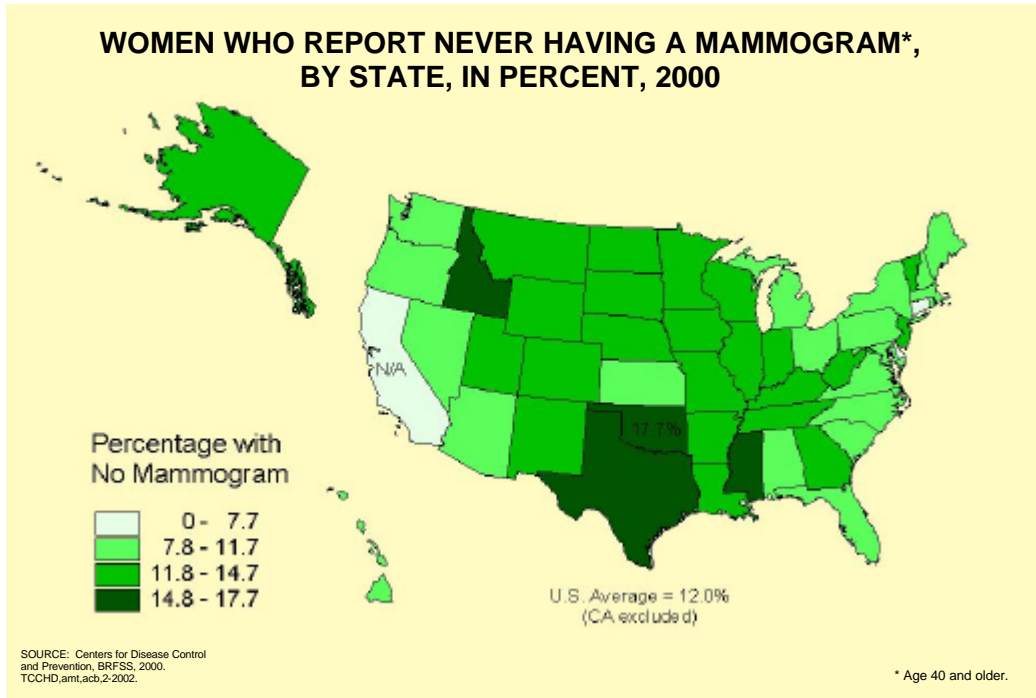


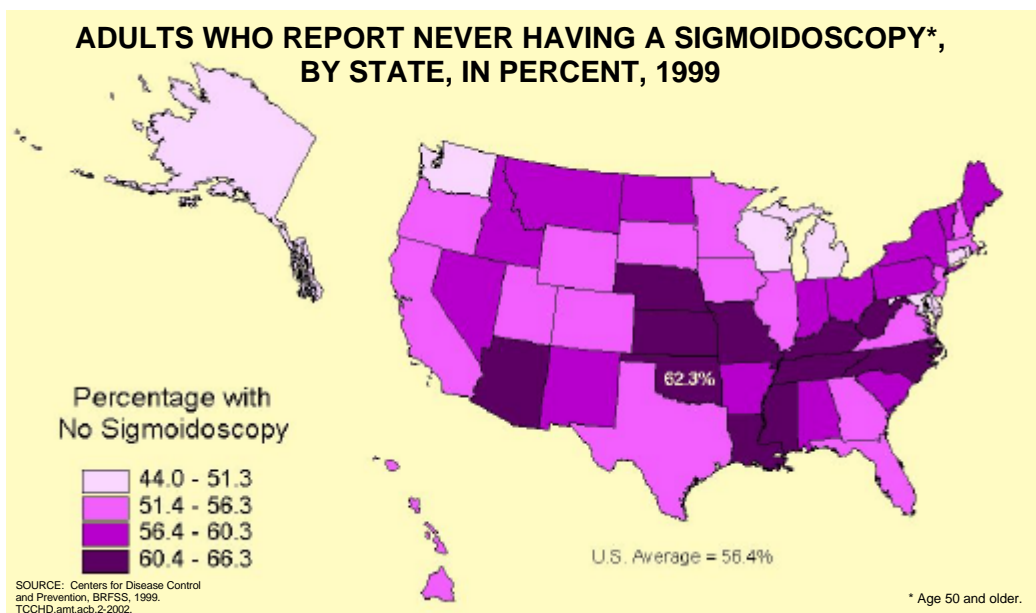


Figure 8.28



Cancers of the lower intestinal tract, colon, and rectum can also be detected in early stages through a sigmoidoscopy screening. The percentage of Oklahoma adults (50 years and older) that reported never having such a procedure was 62.3%, much higher than the national average of 56.4%. This placed Oklahoma in the highest percentile of all states (Figure 8.29).

Figure 8.29



**HEALTHY PEOPLE 2010 OBJECTIVE**

*Increase the proportion of women aged 40 years and older who have received a mammogram within the preceding 2 years.*

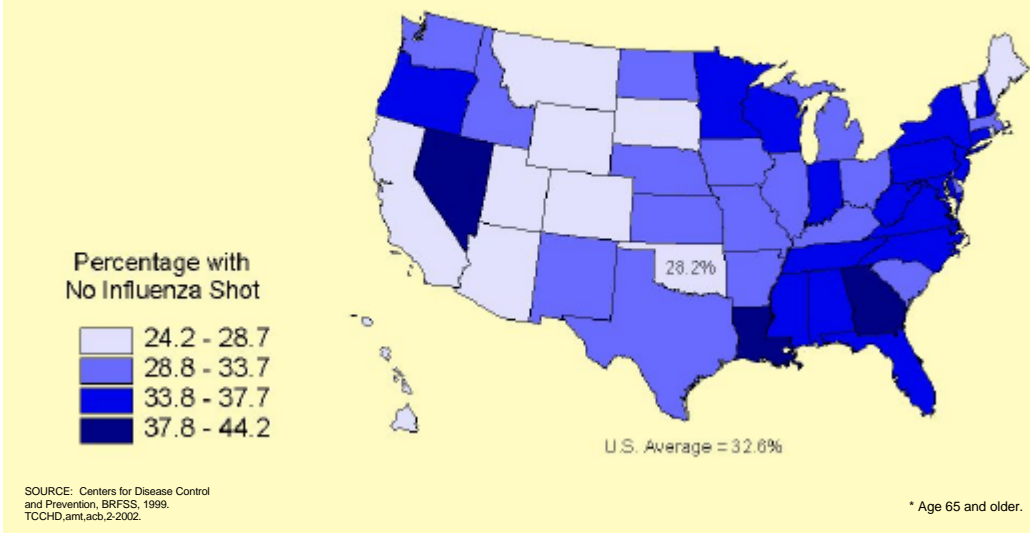
- U.S. Department of Health and Human Services, 2000

## Immunizations

Immunizations against vaccine-preventable diseases in both adults and children are extremely effective tools in decreasing illness and death from a variety of diseases. Immunizations for childhood diseases are required in Oklahoma before entry into school, and every effort is made by the public health system as well as the private medical community to ensure that children are appropriately immunized against the major childhood diseases by two years of age.

Figure 8.30

### ADULTS WHO REPORT NOT HAVING AN INFLUENZA VACCINATION IN THE PREVIOUS YEAR\*, BY STATE, IN PERCENT, 1999



**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Increase the proportion of adults who are vaccinated annually against influenza and ever vaccinated against pneumococcal disease.*

- U.S. Department of Health and Human Services, 2000

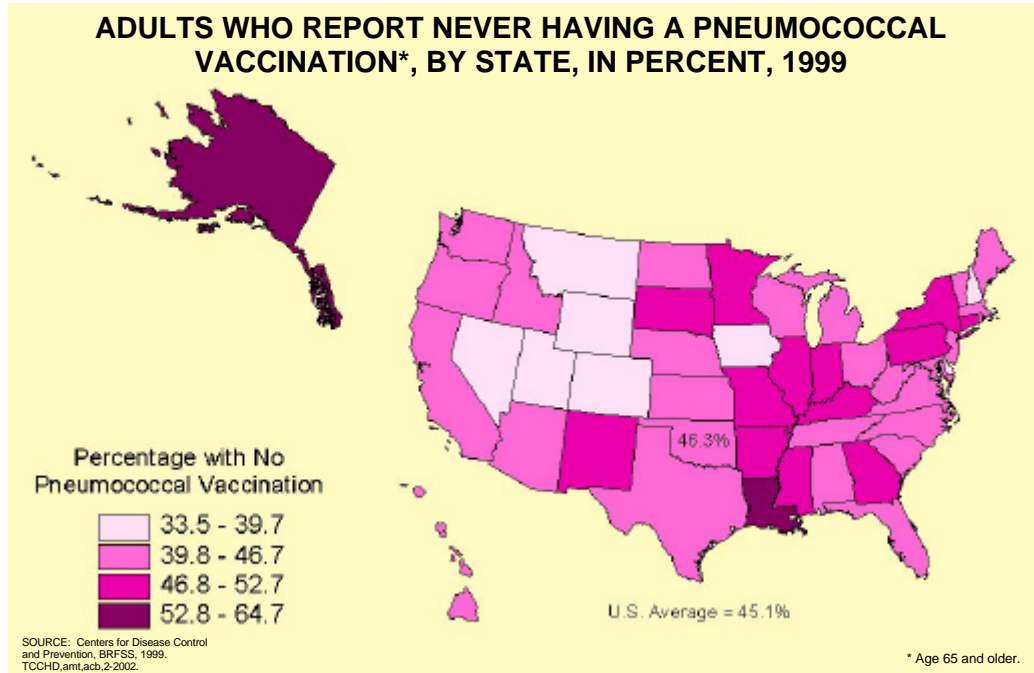
Adequate immunization of adults for a number of infections and communicable diseases is equally important. Annual immunization of older adults against influenza and pneumonia is extremely important. Influenza and pneumonia are major killers of older adults. Unfortunately, the percentage of Oklahoma adults, 65 years of age and over, who did not receive an annual influenza vaccination in 1999 was 28.2% (**Figure 8.30**). This was, however, lower than the U.S. average of 32.6%. States with the lowest immunization levels for influenza included Georgia, Louisiana, and Nevada. States reporting highest levels were the extreme northeastern states, the Four Corners region, Oklahoma, and California. The reason for not receiving an annual flu vaccination often expressed by older adults is that they fear the vaccination will give them the flu, a possibility which is negated by the use of inactivated virus vaccines. Too often, this decision is a deadly mistake.

The percentage of Oklahoma adults (65 years of age and over) who had not received a pneumococcal vaccination by 1999 was 46.3%, slightly higher than



the U.S. average of 45.1%. States with higher percentages of non-vaccinated older adults include Alaska and Louisiana, while lower percentages were mainly in western states (**Figure 8.31**).

**Figure 8.31**



**DID YOU KNOW?**

*Two Tulsa intersections were ranked among the nation's most dangerous intersections.*

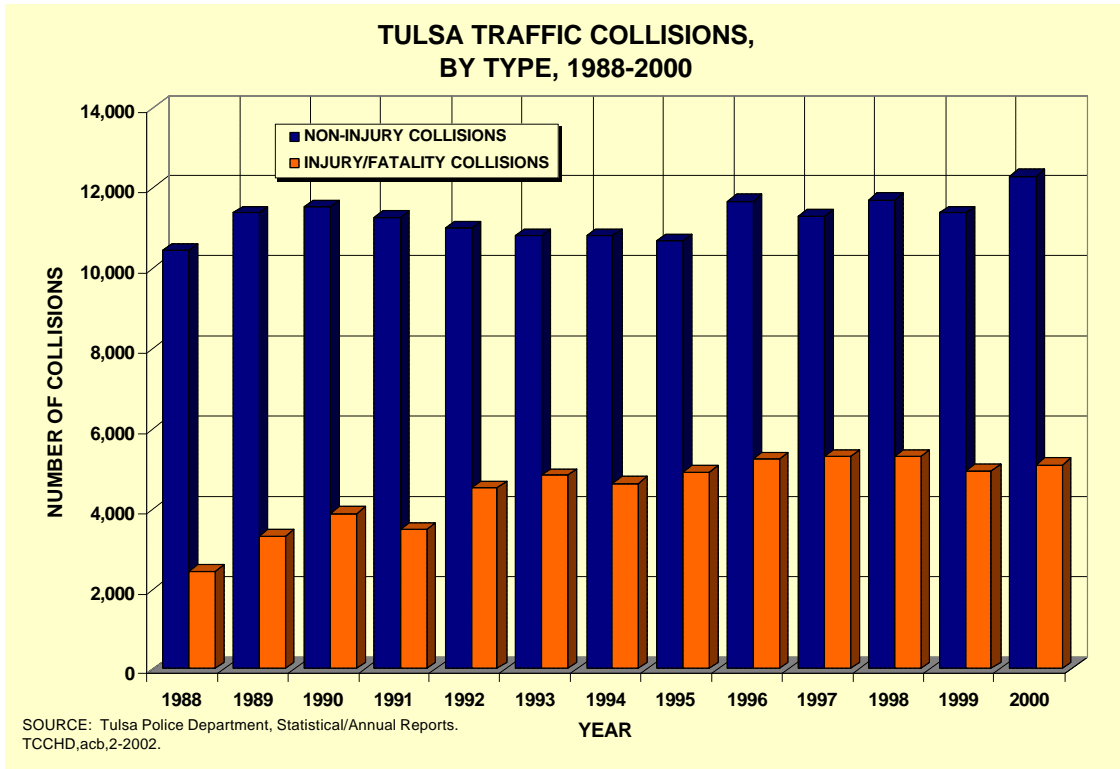
- State Farm Insurance, 2001.

**Seatbelt and Helmet Use**

Accidents, especially motor vehicle accidents among younger adults, are a major cause of death and disability. Accident rates computed from data published by the Tulsa Police Department show that the traffic accidents for the City of Tulsa have risen from a low of 12,868 in 1988 to almost 17,000 in 2000. During this same time period, the number of injury traffic accidents had risen from just under 19% of all accidents to approximately 30% of accidents by 2000. However, the percentage of fatality accidents remained steady at 0.2% of total accidents (**Figure 8.32**).

Seatbelt use is an effective means of reducing both injury and death in car crashes. Use of seatbelts is mandatory in Oklahoma, as well as in most other states. Despite their effectiveness, a significant number of drivers and passengers refuse to wear seatbelts, and a substantial number suffer the consequences of this behavior. In 1997, just less than two-thirds of Oklahomans reported they wore seatbelts (63.1%), which was significantly below the U.S. average of 69.3% (**Figure 8.33**). The Youth Risk Behavior Survey in 2001 found that 14.1% of students had rarely or never worn seatbelts when riding in a car driven by someone else. Male students were much more likely than females students to have rarely or never worn seatbelts.

Figure 8.32



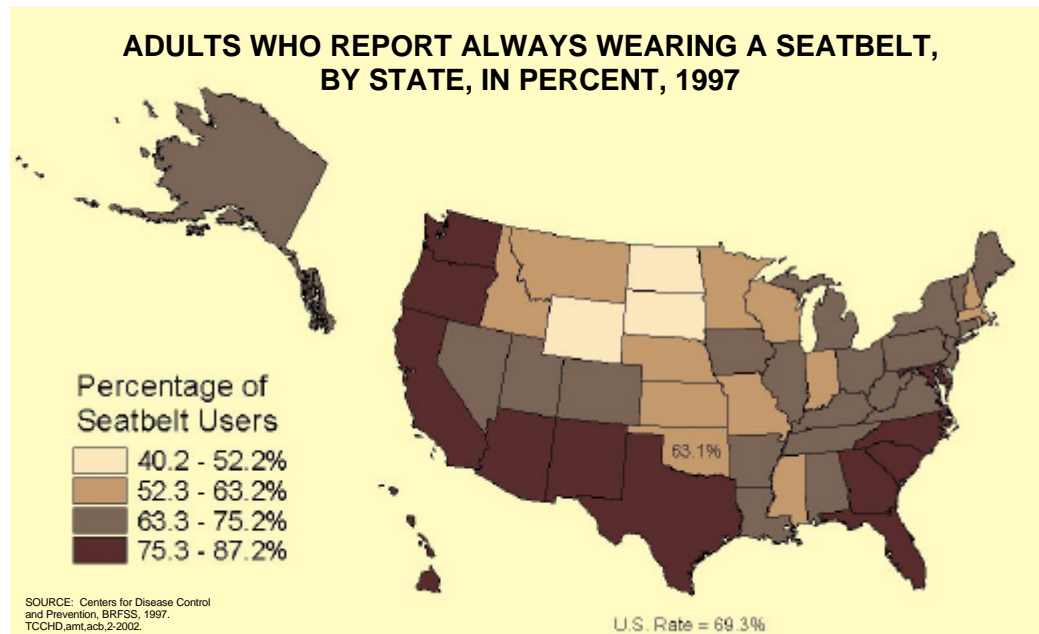
In 1999, nearly 2,500 motorcyclists died and 50,000 were injured in traffic crashes across the country. The same year in Oklahoma, 31 motorcyclists were killed and nearly 700 were injured. Because head injury is a leading cause of death and serious disability in motorcycle crashes, helmet use is important. According to the Youth Risk Behavior Survey, one-fourth of students had ridden a motorcycle during the 12 months preceding the 2001 survey. Of these students, 37.2% said they rarely or never wore a motorcycle helmet.

Figure 8.33

HEALTHY PEOPLE 2010 OBJECTIVE

Increase use of safety belts.

- U.S. Department of Health and Human Services, 2000



## References

- <sup>1</sup> Centers for Disease Control and Prevention. (1996). Trends in rates of homicide - United States, 1985-1994. *Morbidity and Mortality Weekly Report*, 45(22), 460-464.
- <sup>2</sup> Centers for Disease Control and Prevention. (1997). Rates of homicide, suicide, and firearm-related death among children - 26 industrialized countries. *Morbidity and Mortality Weekly Report*, 46(05), 101-105.
- <sup>3</sup> Rennison, C.M. (2001). *Intimate partner violence and age of victim, 1993-1999*. Washington, DC: U.S. Department of Justice, Bureau of Justice Statistics.
- <sup>4</sup> Centers for Disease Control and Prevention. (2002). Trends in cigarette smoking among high school students - United States, 1991-2000. *Morbidity and Mortality Weekly Report*, 51(19), 409-412.





# FAMILY HEALTH

"The problems are complex, but not without promising solutions. Community understanding, combined with action, will improve the well-being of today's children and secure a safe, healthy, and happy future for tomorrow's."

- Oklahoma Institute for Child Advocacy

## Family Health

- Overview
- Maternal Age and Education
- Teen Pregnancy
- Marital Status
- Low Birth Weight
- Prenatal Care
- Alcohol Use During Pregnancy
- Tobacco Use During Pregnancy
- Infant Mortality

# Family Health

## Overview

Over the past decade between 8,000 and 9,400 infants were born annually to Tulsa County residents. An additional 2,000 to 3,200 births occurred in Tulsa County hospitals to residents of surrounding counties. The age range for female childbearing traditionally has been accepted as 15 to 44 years; however, births to females as young as 11 years and as old as 51 years of age have occurred in Tulsa County.

## Maternal Age and Education

The peak childbearing years, in terms of the greatest percentage of births, generally is in the ten year period from 20 to 30 years of age. However, there are significant differences among racial and ethnic groups. For example (Figure 9.1), childbearing among white Tulsa County residents peaks at 26 years of age, while the peak among black women in Tulsa County occurs at 20 years of age.

## DID YOU KNOW?

*During 2000, there were over 4,000,000 babies born in the United States.*

*- National Vital Statistics System, 2002*

Figure 9.1

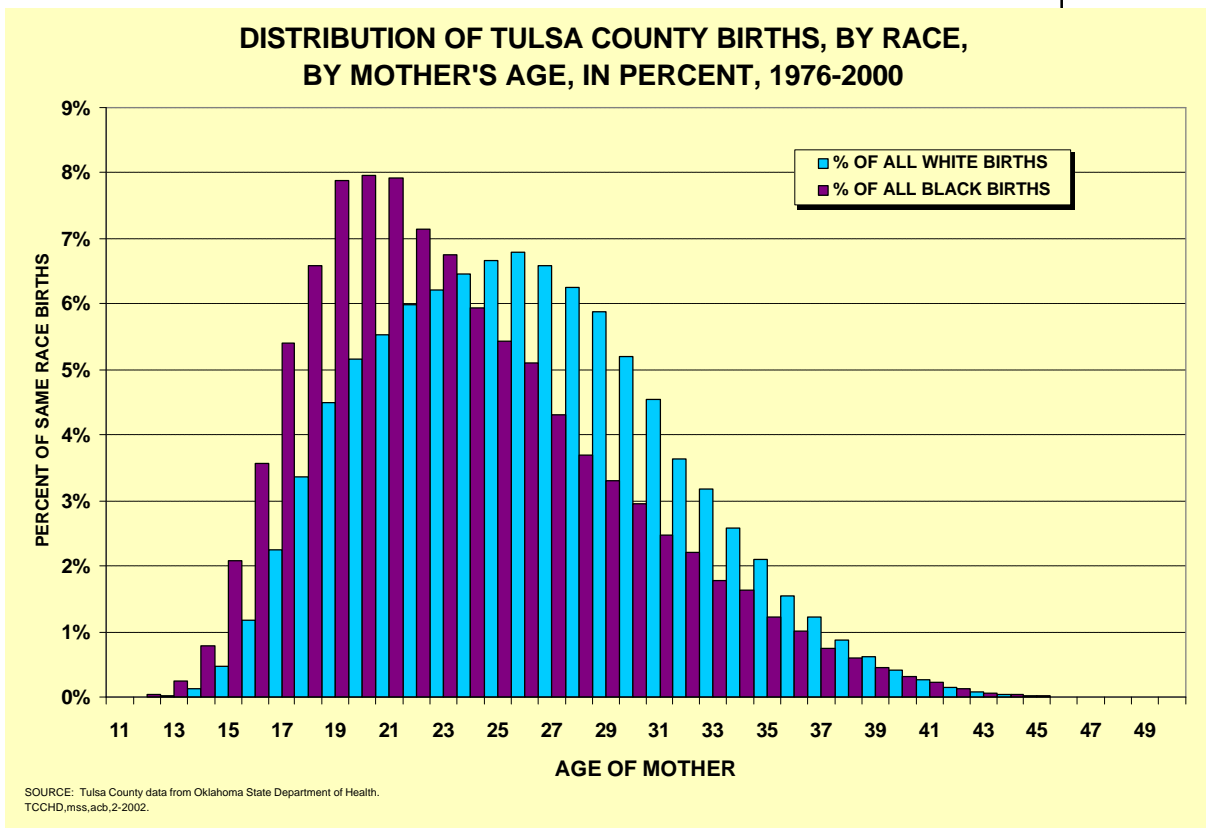
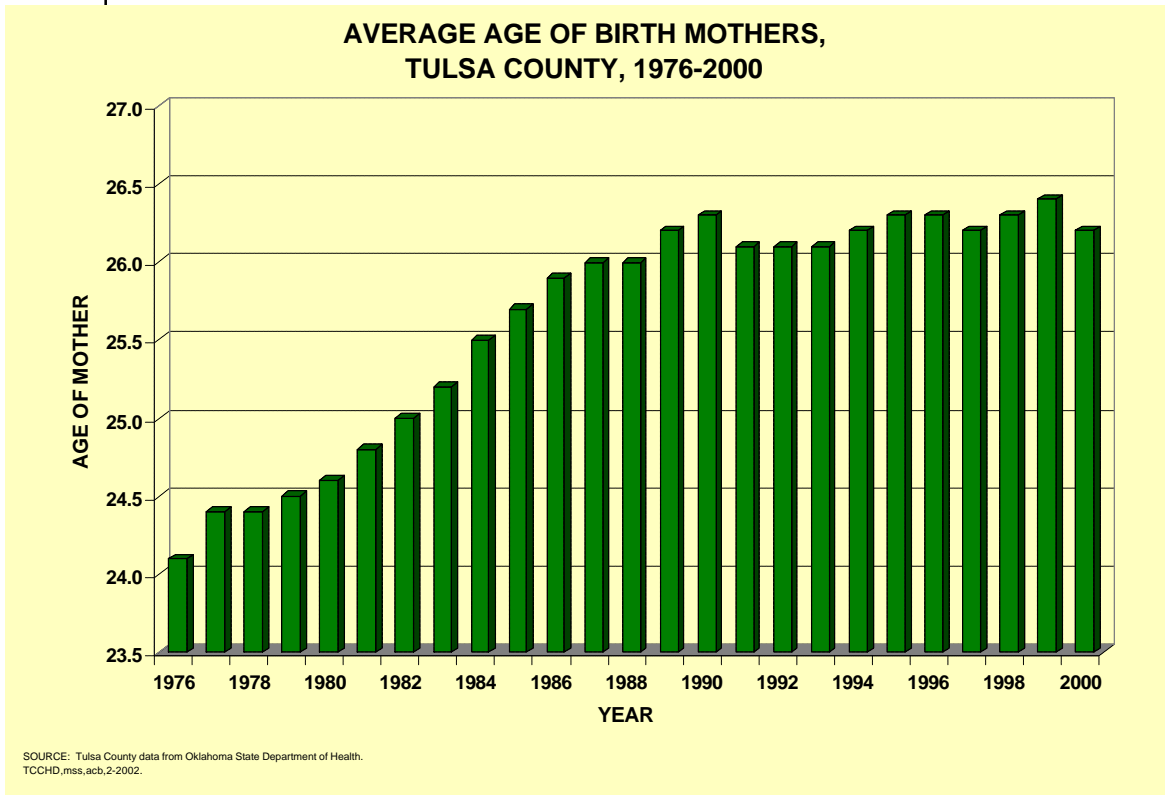


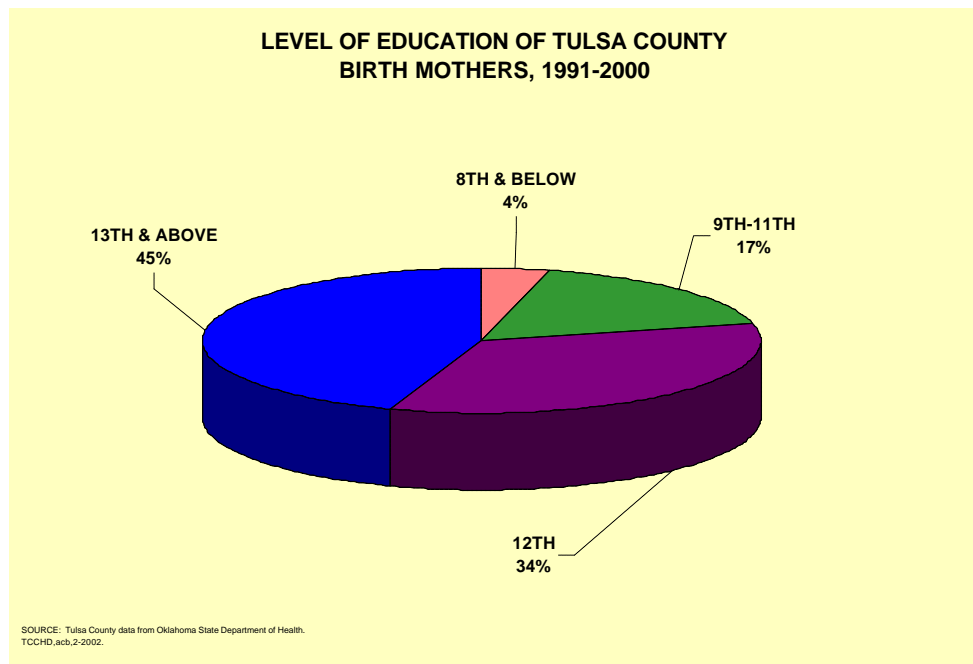


Figure 9.2



There has been a general trend toward childbearing among increasingly older women, with the average age of birth mothers in Tulsa County increasing from 24.1 in 1976 to 26.2 in 2000 (Figure 9.2). The trend toward increasingly older maternal age may be largely responsible for the increase in the highest school

Figure 9.3



HEALTHY  
PEOPLE  
2010  
OBJECTIVE

*Reduce pregnancies among adolescent females.*

- U.S. Department of Health and Human Services, 2000

grade completed by resident mothers (**Figure 9.3**). Maternal educational attainment has increased from just over 30% having at least one year of post-high school education in 1976 to just over 45% in 2000. During the past decade, approximately 79% of Tulsa County birth mothers attained at least a high school education.

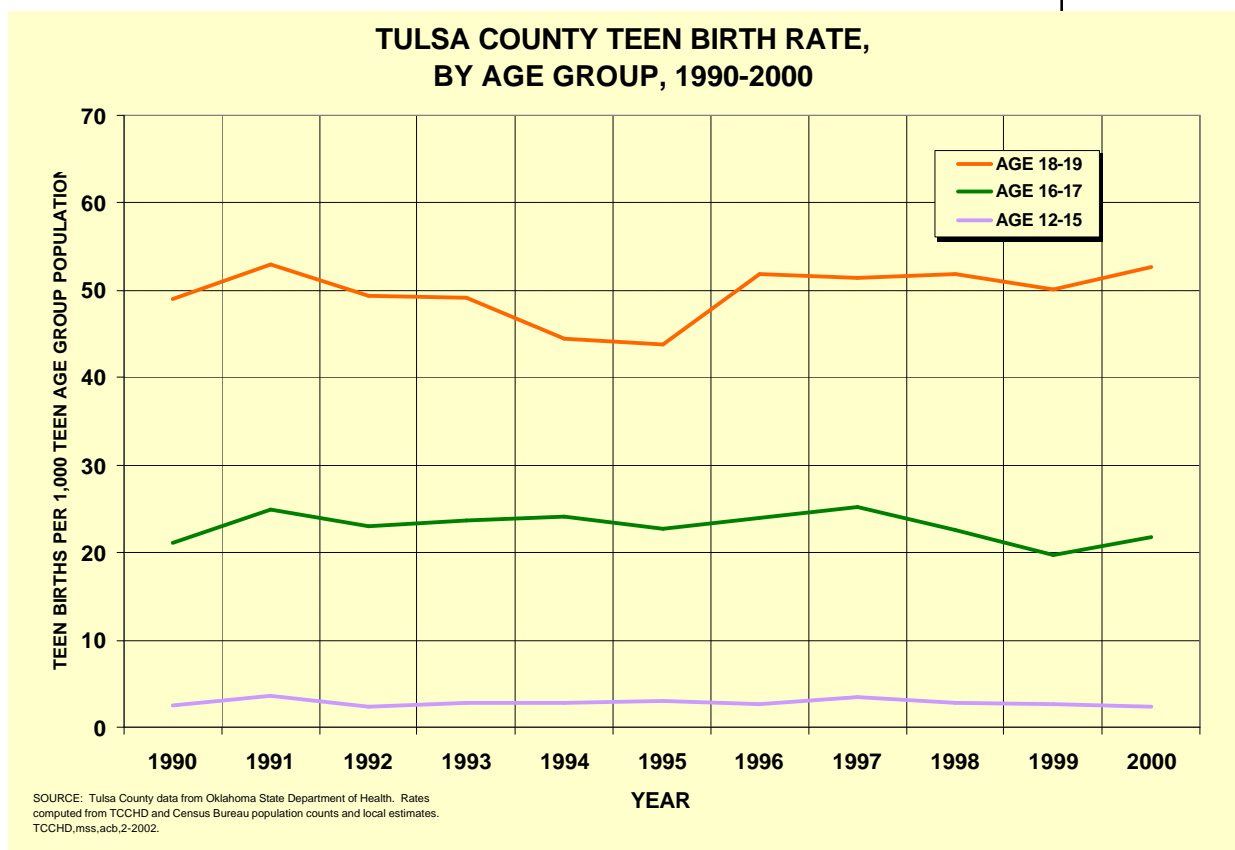
**DEFINING THE TERMS**

*Birth rate=*  
*# of births /*  
*total population*  
*x 1,000*  
*females.*

**Teen Pregnancy**

Births among adolescents continue to be a problem in Tulsa County and in Oklahoma. In 2000, the birth rate for Oklahoma teens (ages 15-19) was 60.1 births per 1,000 teens, compared to a nationwide rate of 48.5. During that same year, only twelve states had higher teen birth rates. In general, states with the highest percentage of teen births were southern states while northern states generally exhibited the lowest percentages of teen births.<sup>1</sup>

**Figure 9.4**



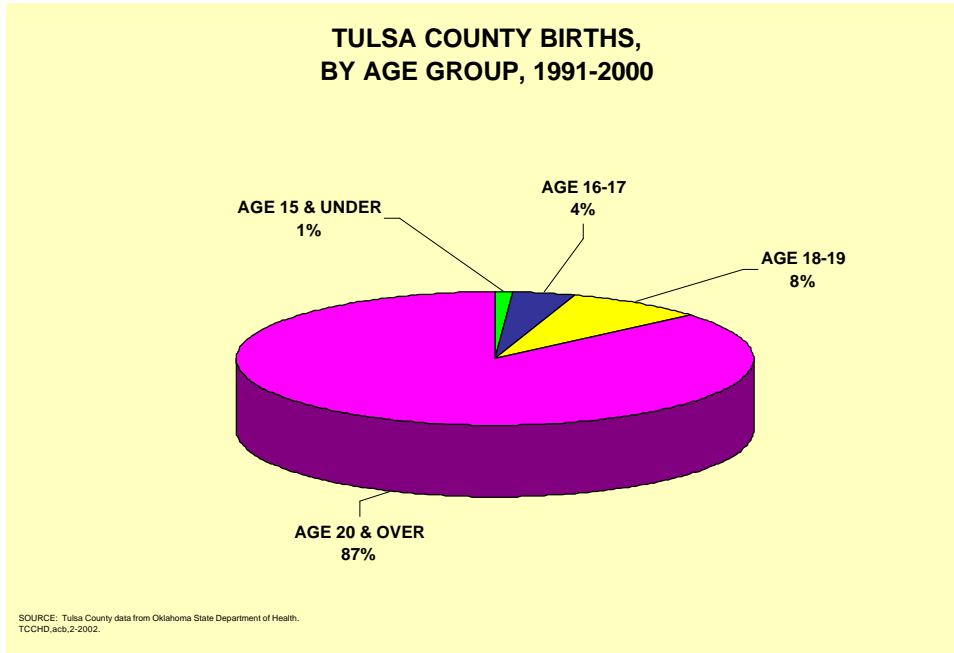
In Tulsa County, the birth rate for the youngest teen age group (15 years and younger) has remained fairly constant during the past decade at approximately 2.8 births per 1,000 population (**Figure 9.4**). The birth rate for teens 16 to 17 years of age has been relatively stable in the past decade at approximately 23

Figure 9.5

**DID YOU KNOW?**

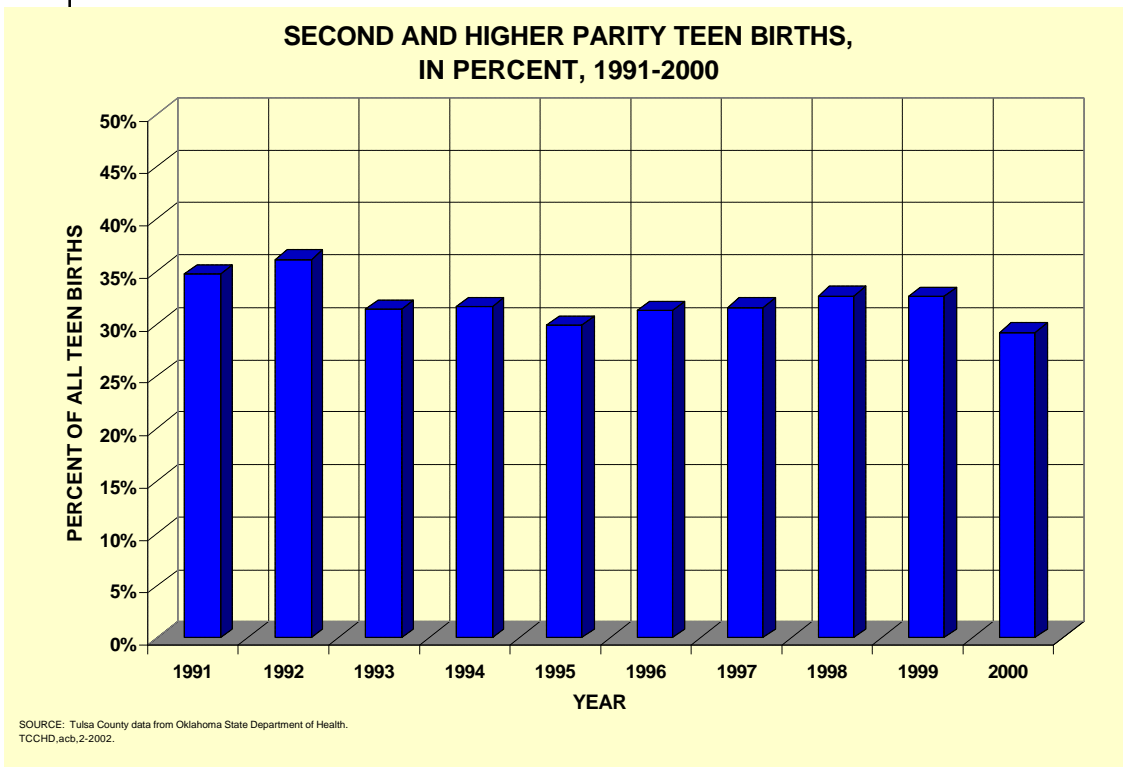
*U.S. birth rates in 2000 were highest among 25-29 year olds. Those in this age group are considered to be in the "principal childbearing years".*

*National Vital Statistics System, 2002*



births per 1,000 population. A slight increase was observed in 1997 (25.2 births per 1,000 population) but was followed by a decrease in 1999 (19.7 births per 1,000 population). Birth rates among teens in the oldest age group (18 and 19 years of age) fluctuated considerably during the 1990s, ranging from a low of 43.8 births per 1,000 population in 1995 to a high of 52.7 births per 1,000 population in 2000. **Figure 9.5** illustrates the percentage of Tulsa County births to teen mothers.

Figure 9.6



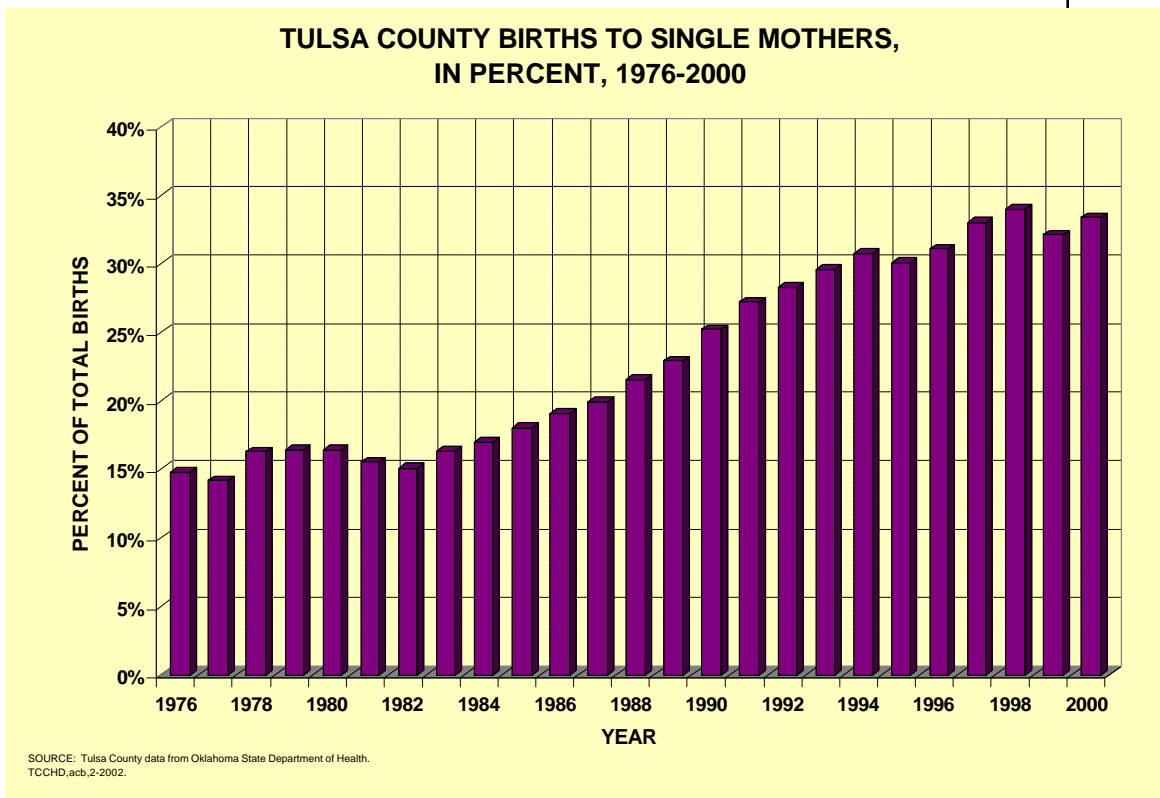
Women who have successive births at intervals closer than two years are at risk of spontaneous abortion or infant death.<sup>2</sup> Tulsa County data have historically shown that teenagers who have a second birth within twenty-four months of their first birth deliver lower birth weight infants than first birth mothers. The percentage of Tulsa County resident teenage mothers experiencing second and higher order births declined during the 1990s from a high of 36.1% (of all Tulsa County resident teen births) in 1992 to a low of 29.2% in 2000 (**Figure 9.6**).

### Marital Status

One of the more significant trends which has occurred during recent years in the characteristics of childbearing has been the dramatic increase in the number of births to mothers who are unmarried. During the 1990s, the percent of births to unmarried women in the United States rose from 28% in 1990 to 33.2% in 2000. Oklahoma exceeded the national average in 2000 with 34.3% of births to single mothers.

From 1976 through 1982, approximately 15% of Tulsa County births were to single mothers. Beginning in 1983 and continuing through 2000, the percentage of unmarried births rose dramatically, exceeding 33% of all births, more than doubling the 1982 percentage (**Figure 9.7**).

**Figure 9.7**



### DID YOU KNOW?

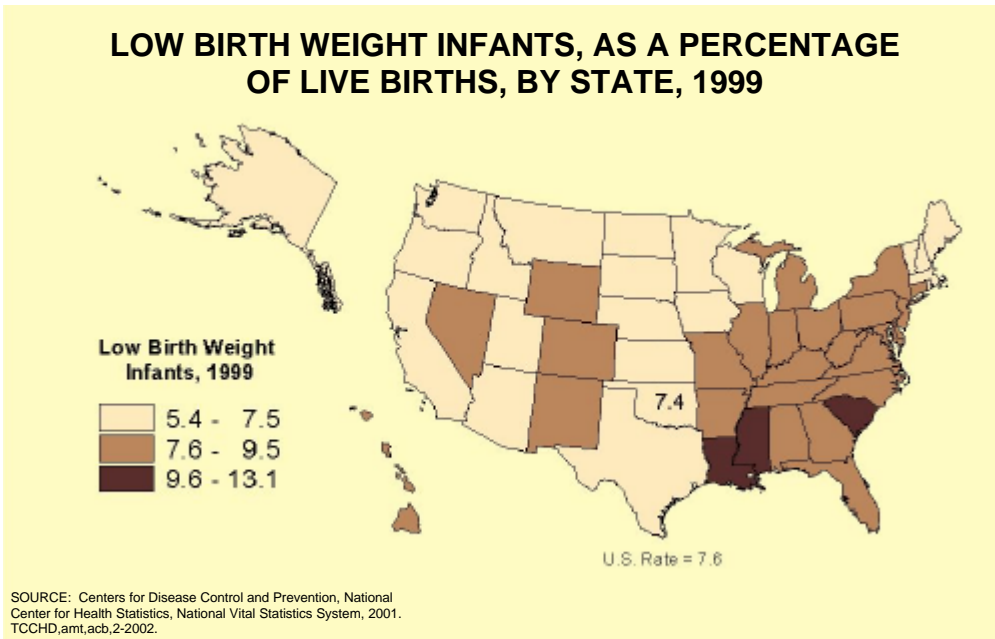
*During 2000, 34.3% of Oklahoma births were to single mothers.*

*- National Vital Statistics System, 2002*

## Low Birth Weight

Reducing the number of low birth weight infants (LBW), defined as those weighing less than 2,500 grams or approximately 5.5 pounds, has been a long standing goal of both public health programs and the private medical community. Low birth weight infants are at higher risk of exhibiting physical and developmental problems and dying before their first birthday. This is particularly true of extreme low birth weight infants.

Figure 9.8



**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Reduce low birth weight (LBW) and very low birth weight (VLBW).*

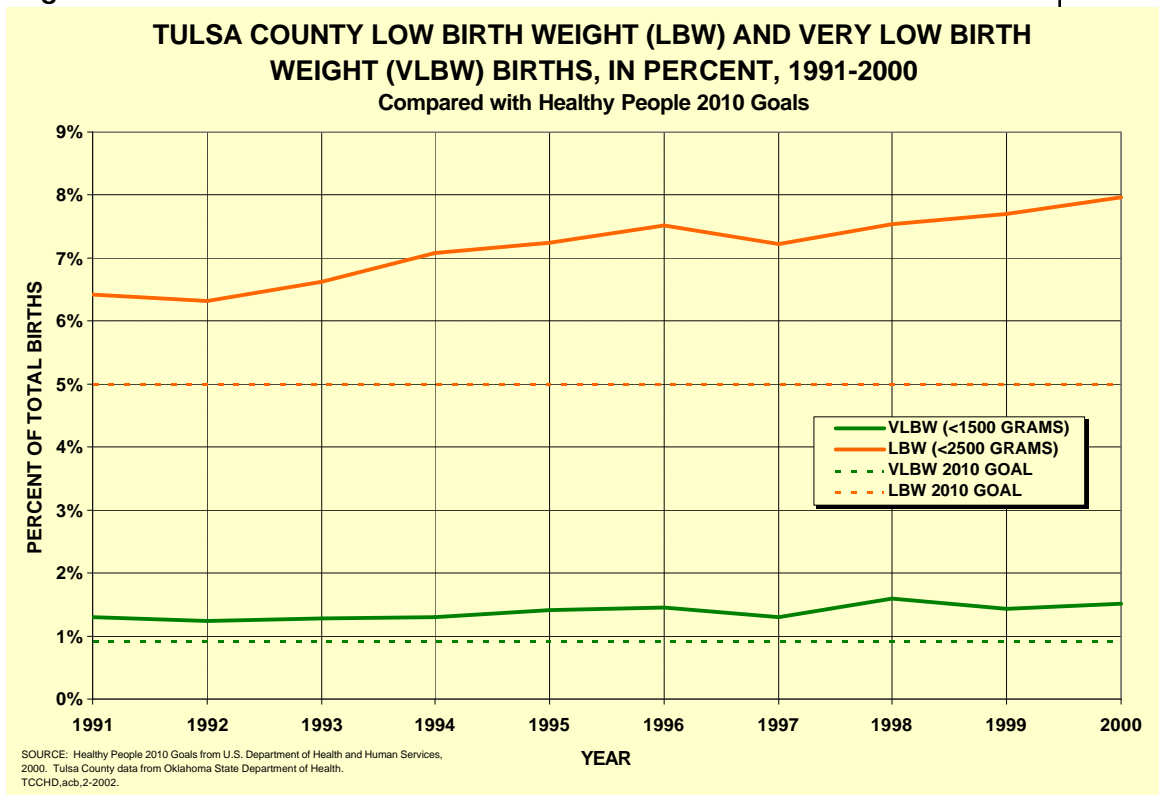
*- U.S. Department of Health and Human Services, 2000*

The prevalence of low birth weight, measured as a percentage of all live births, varied significantly across the United States in 1999 (**Figure 9.8**), ranging from a low of 5.4% to a high of 13.1%. The national rate in 1999 was 7.6%. The Healthy People 2010 goal calls for a reduction in the percentage of low birth weight infants to 5% of all births. Tulsa County, however, is traveling in the opposite direction. In 1991, approximately 6.4% of Tulsa County resident births were categorized as low birth weight. In 2000, that percentage had risen to 8.0% (**Figure 9.9**).

Of greatest concern are those infants who are considered very low birth weight (VLBW), defined as those weighing under 1,500 grams or approximately 3.3 pounds. The percentage of Tulsa County resident births within this category has been relatively constant for the last two decades at approximately 1.4% of all births (**Figure 9.9**). The Healthy People 2010 goal for very low birth weight infants is 0.9% of all births.

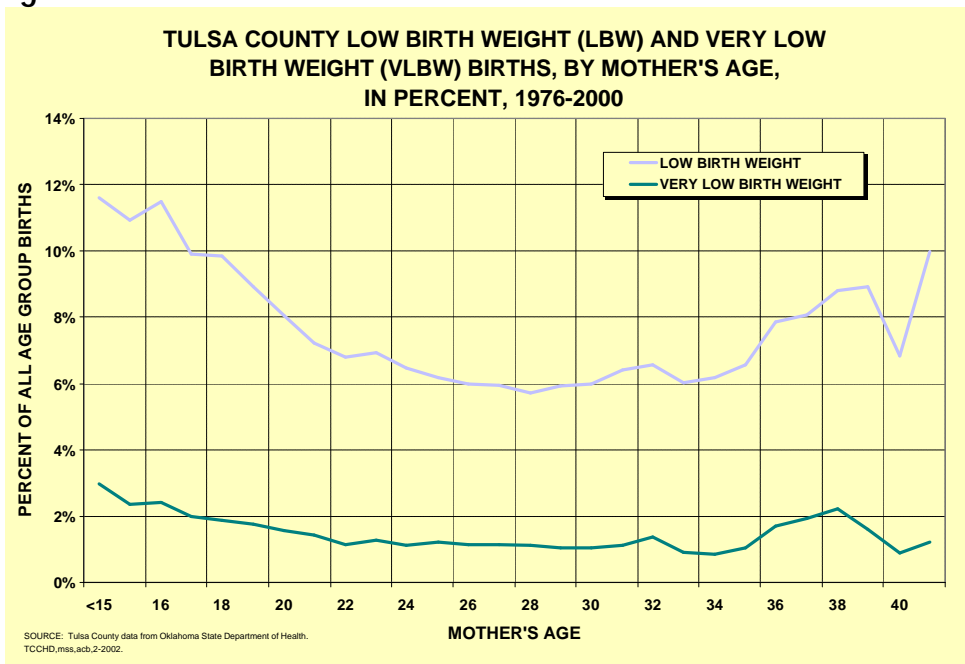
The relationship between low birth weight and maternal age is clear in **Figure 9.10**. The percentage of low weight births among teenagers (under 20 years of

Figure 9.9



age) in Tulsa County generally averages 9% to 12%, while the percentage of low weight births among mothers 20 to 35 years of age is 6% to 7%. The percentage of low birth weight infants begins to increase again at the maternal age of 35.

Figure 9.10



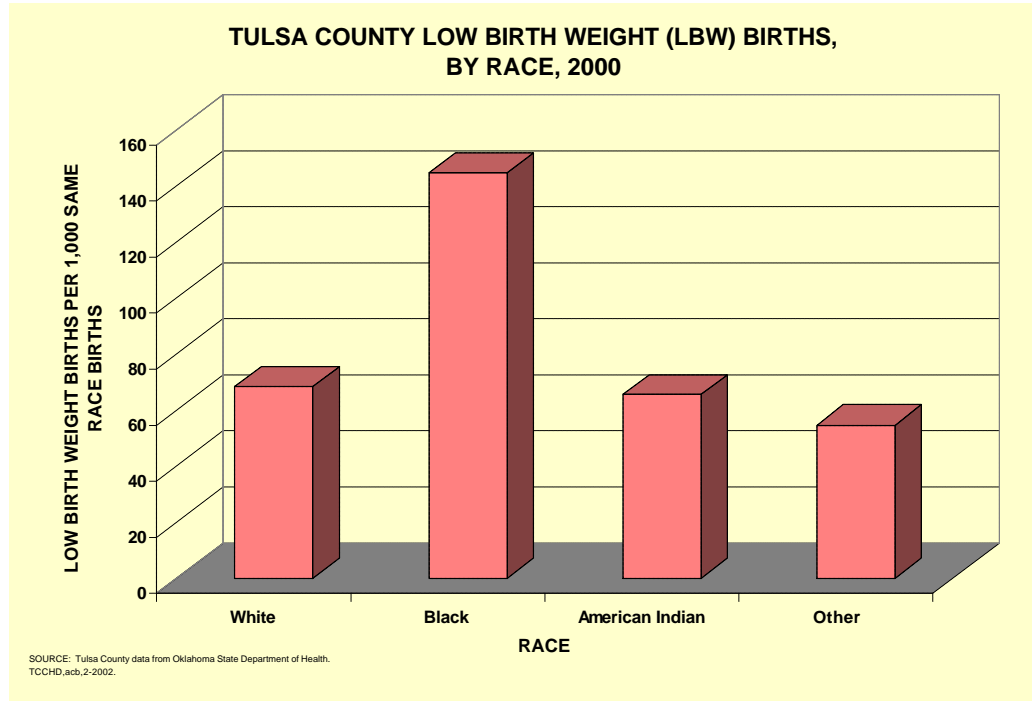
**DID YOU KNOW?**

*Every day in Oklahoma, 9 babies are born too small.*

- Annie E. Casey Foundation, 2001

There are significant racial differences in the prevalence of low birth weight nationally, state-wide, and in Tulsa County. In the United States, black mothers of all ages are more likely than mothers of other racial/ethnic groups to deliver low birth weight or very low birth weight infants. In Tulsa County, the rate of low birth weight infants is more than twice as high among black Tulsa County residents as compared to white residents. Among American Indian residents, the percentage of low weight births is slightly below that of whites (Figure 9.11).

Figure 9.11



**DID YOU KNOW?**

*In Oklahoma, the low birth weight rate for black infants nearly doubles the rate for white infants.*

- Oklahoma Institute for Child Advocacy, 2001

**Prenatal Care**

Prenatal care that begins early in pregnancy, i.e. within the first trimester (first 3 months of pregnancy) and provides for ten or more medical care visits can have significant benefits both for the mother and the fetus. It can considerably improve birth outcomes by reducing prematurity and low birth weight as well as possible subsequent infant mortality. The Healthy People 2010 goal is for 90% of all pregnant females to enter prenatal care within the first trimester of pregnancy.

In 2000 approximately 79% of Oklahoma women reported receiving prenatal care during the first trimester. That same year, less than 75% of pregnant Tulsa County birth mothers reported receiving prenatal care in the first trimester, a significant decline from a high of 78.3% in 1996. During the 1990s, about 19% of Tulsa County women reported entering prenatal care during their second trimester of pregnancy, slightly less than 4% reported entering during



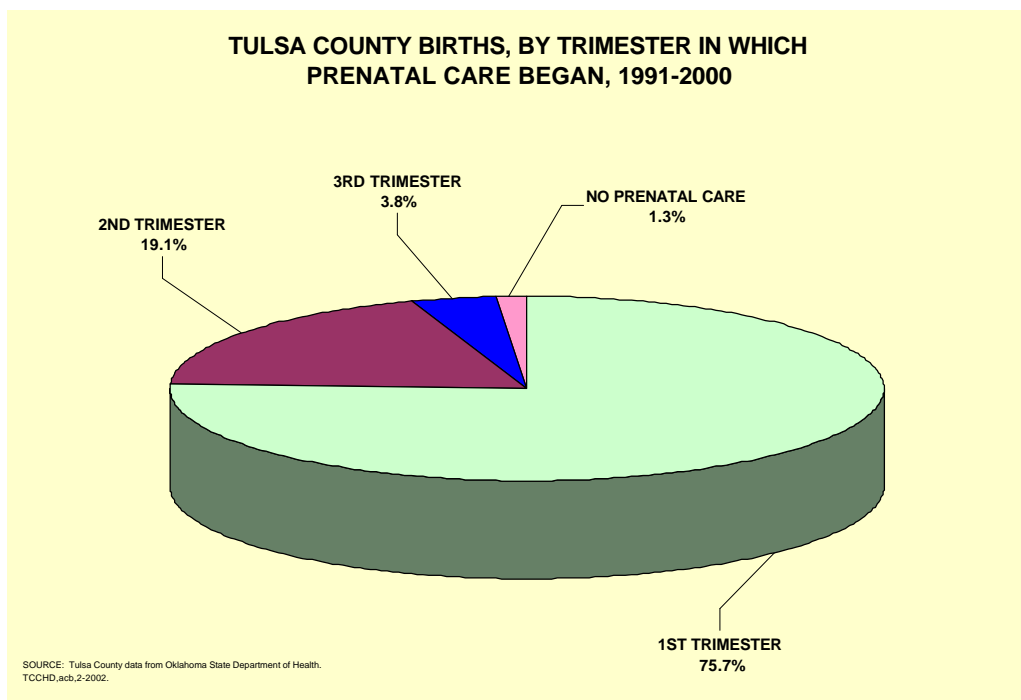


their third trimester, and just over 1% reported having no prenatal care at all (Figure 9.12).

White residents of Tulsa County were more likely to report entering prenatal care during the first trimester in 2000 (78.6%) than were black (62.7%) or American Indian (66.1%) women. Similarly, only 1.0% of whites went entirely without prenatal care during their pregnancies in 2000, while 3.1% of blacks and 1.9% of American Indians did so.

Adult women are also more likely to seek first trimester prenatal care. In 2000, approximately 77.8% of Tulsa County birth mothers age 20 or older reported entering prenatal care during the first trimester, compared with only 46.2% of females 10 to 14 years of age and approximately 60.6% of females 15 to 19 years of age.

Figure 9.12



### Alcohol Use During Pregnancy

Exposure to alcohol during the prenatal period can cause serious medical and developmental problems for infants, including birth defects, premature delivery, neurological and developmental problems, and fetal alcohol syndrome (FAS). Alcohol consumption is reported on birth certificates but is considered to be underreported. Tulsa County birth certificate data, which reflect a high percentage of completion, indicate that, during the 1990s,

### HEALTHY PEOPLE 2010 OBJECTIVE

*Increase the proportion of pregnant women who receive early and adequate prenatal care.*

- U.S. Department of Health and Human Services, 2000

### DID YOU KNOW?

*Approximately 4.6% of Oklahoma mothers reported having late or no prenatal care during 2000.*

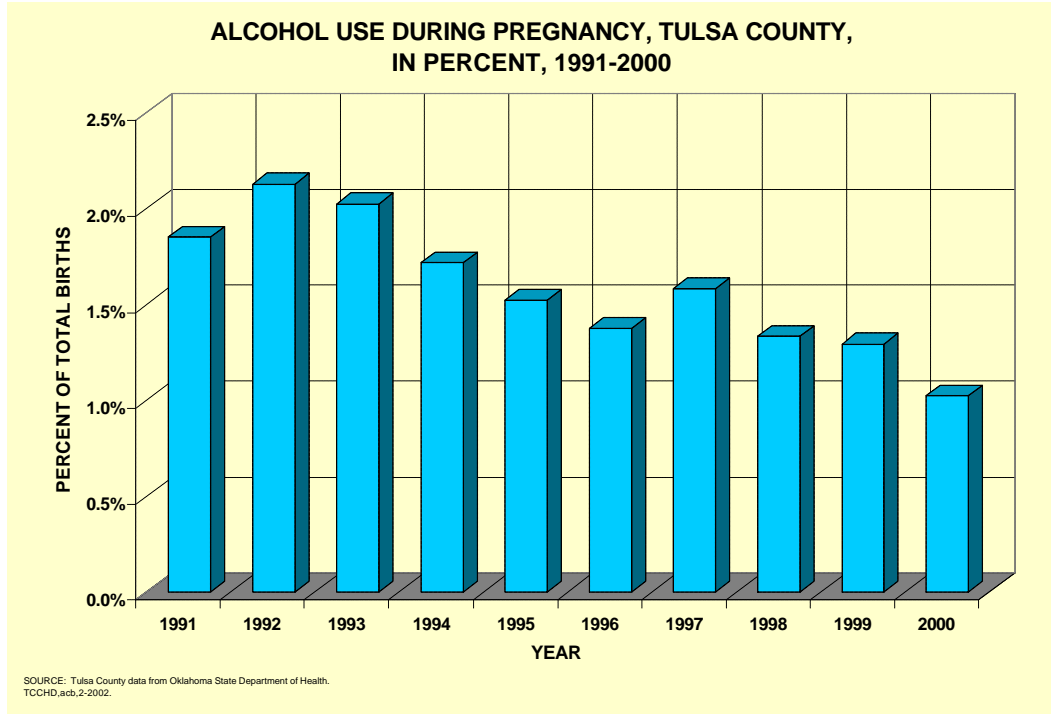
- National Vital Statistics System, 2002

Figure 9.13

**DID YOU KNOW?**

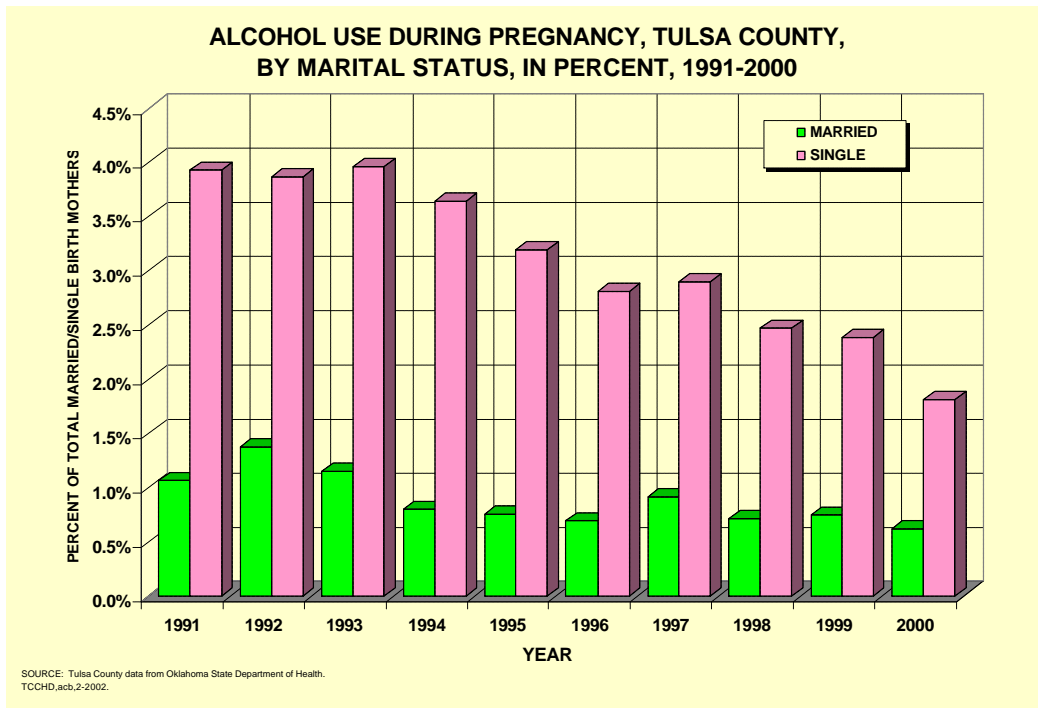
*Alcohol abuse and/or drug abuse occurs in 5-10% of women in the childbearing years.*

- National Center for Education in Maternal and Child Health, 1997



between 1% and 2% of birth mothers reported drinking alcohol during pregnancy (**Figure 9.13**). There was a significant difference in alcohol consumption by marital status. Between 1991 and 2000, the percentage of unwed mothers reporting alcohol consumption was 3 to 4 times greater than that reported by married birth mothers (**Figure 9.14**).

Figure 9.14



Educational level also reflects significant differences in alcohol consumption among birth mothers in the lower educational grade levels. Those with an 11<sup>th</sup> grade education or less showed the highest percentage of alcohol consumption while the lowest reported consumption was among birth mothers with one year of post high school education or more (Figure 9.15). It is important to note that there is a significant relationship between higher educational attainment and higher maternal age. In addition, lower educational attainment tends to be related to higher percentages of out-of-marriage births.

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Reduce the occurrence of fetal alcohol syndrome (FAS).*

- U.S. Department of Health and Human Services, 2000

**Tobacco Use During Pregnancy**

Tobacco use during pregnancy has been associated with poor birth outcomes, including low birth weight, pre-term births, and possibly increased risk of perinatal death.

Reported tobacco use among Tulsa County birth mothers decreased during the 1990s, from 17.2% in 1991 to 14.5% in 2000. Of particular interest, however, are the differences in percentages of birth mothers smoking by age, marital status, and education.

**Figure 9.15**

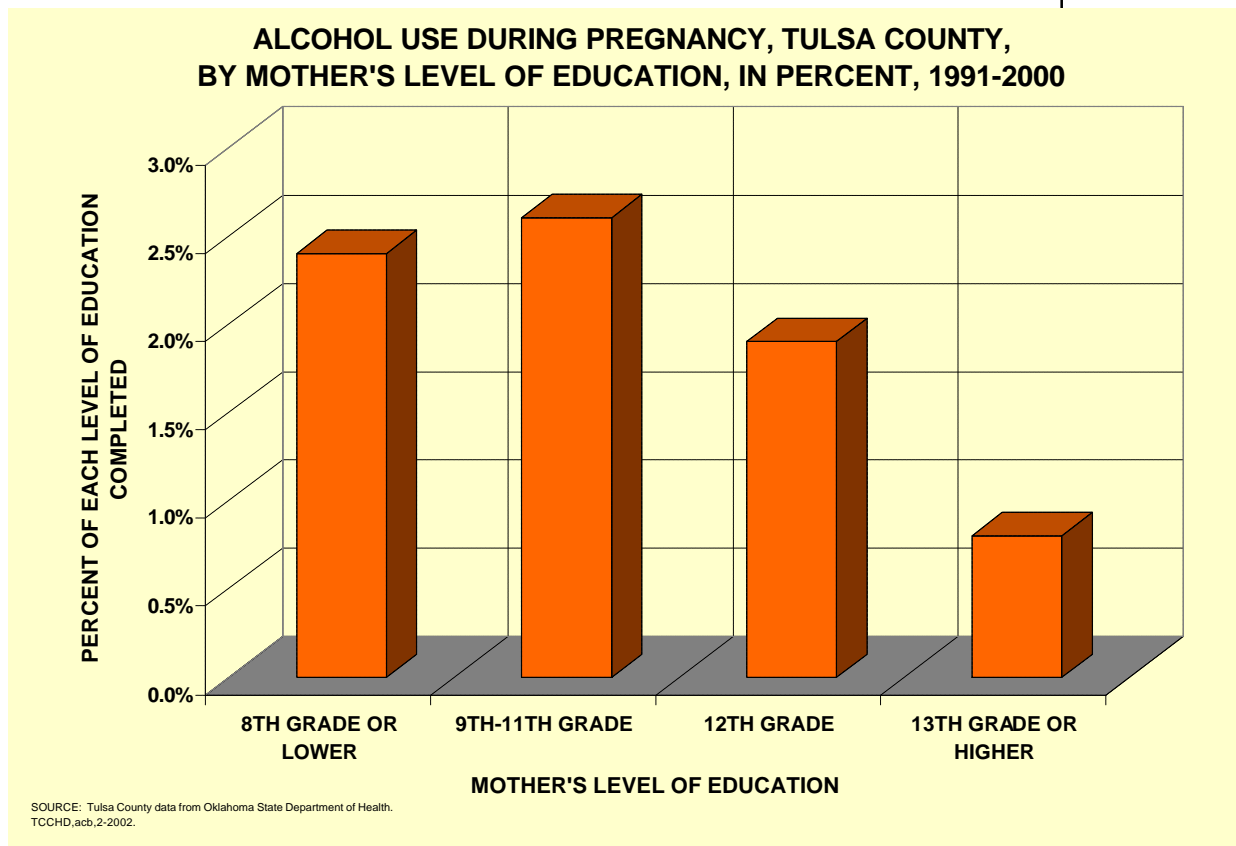


Figure 9.16

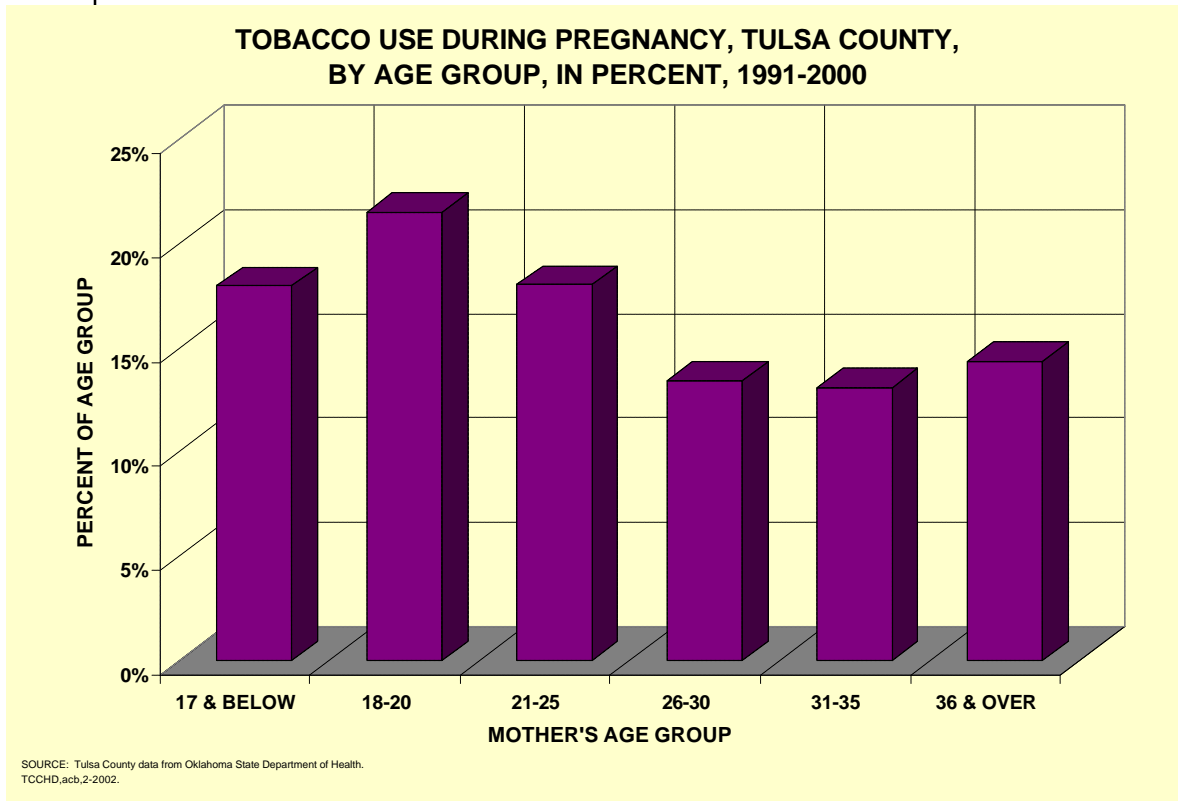


Figure 9.16, which depicts tobacco during pregnancy by age group, clearly shows a greater likelihood of tobacco use among teenagers than among older birth mothers, with 18 to 20 year olds showing the highest prevalence of

Figure 9.17

**HEALTHY PEOPLE 2010 OBJECTIVE**

*Increase abstinence from alcohol, cigarettes, and illicit drugs among pregnant women.*

- U.S. Department of Health and Human Services, 2000

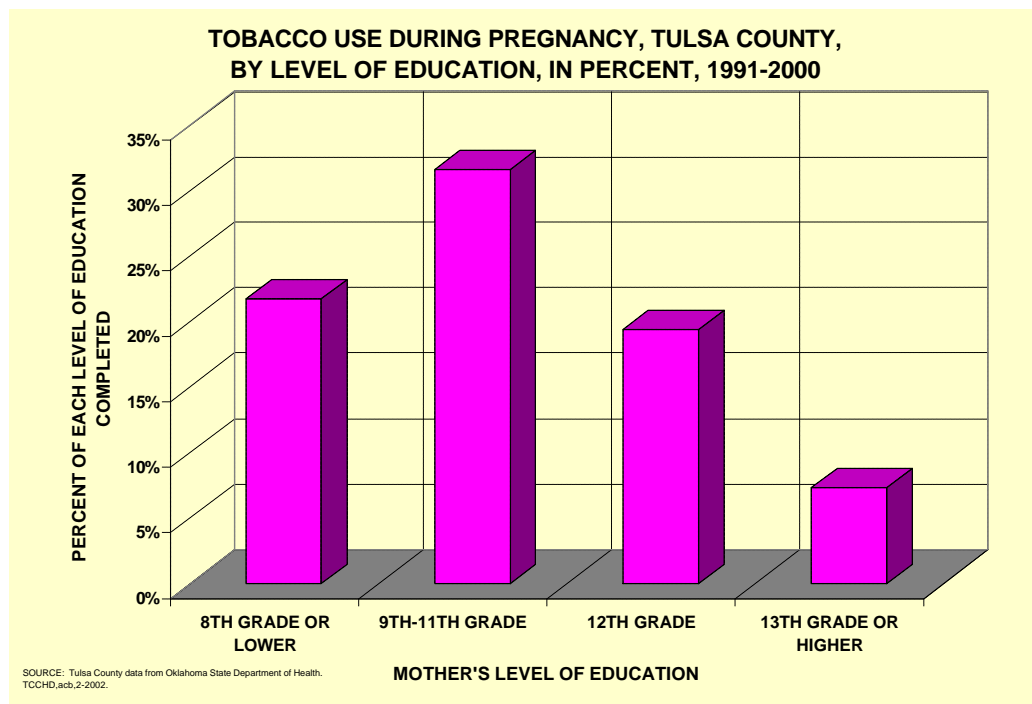
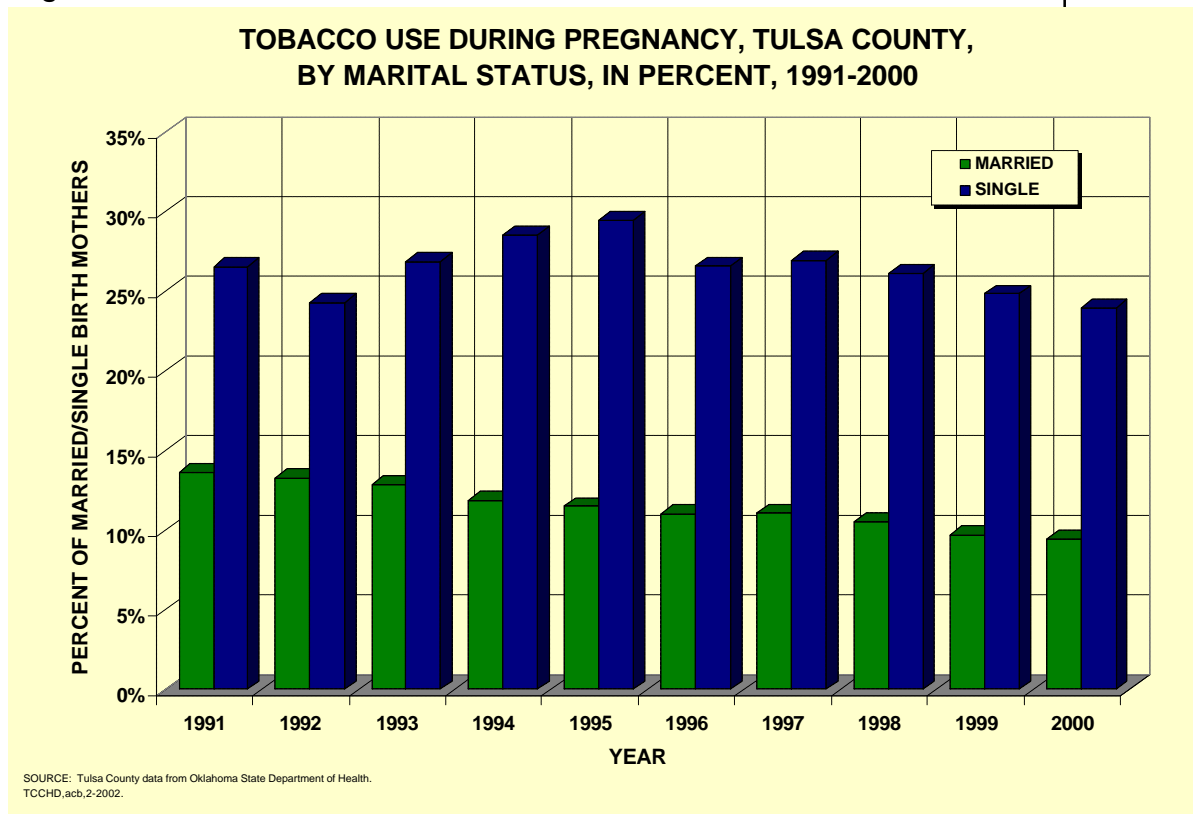


Figure 9.18



tobacco use followed by steady declines among subsequent five year age groups (except the oldest group of 36 and older). Similarly, differences were apparent among those reporting tobacco use by maternal educational level (which is closely related to age group): 21.7% of individuals completing 8<sup>th</sup> grade or below reported using tobacco during pregnancy, 31.6% of individuals completing grades 9 through 11, and 19.4% of those completing 12<sup>th</sup> grade. Only 7.3% of mothers with post high school education reported tobacco use during pregnancy (**Figure 9.17**). Tulsa County birth data also clearly indicate tobacco use by single birth mothers is more than twice as high as tobacco use by married mothers (**Figure 9.18**).

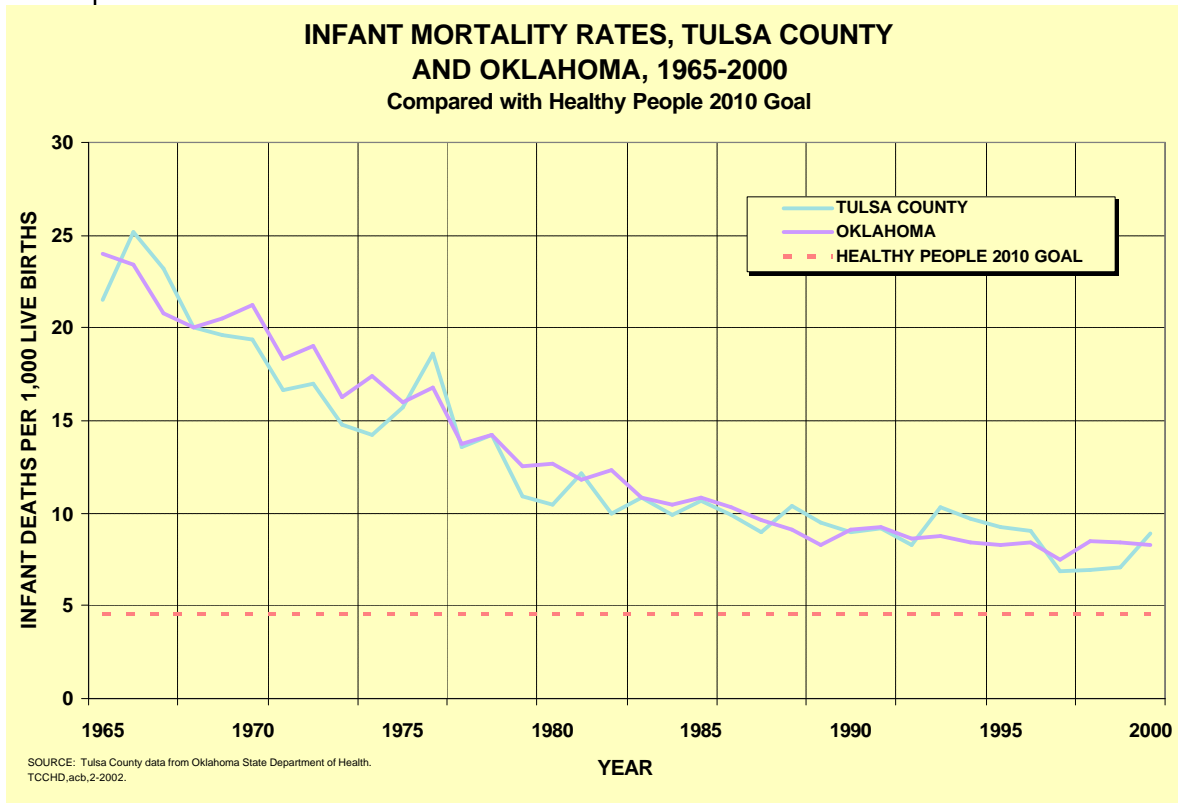
## Infant Mortality

The infant mortality rates (death before 1 year of age) for Tulsa County, Oklahoma, and the United States have declined for many decades although that decline has become less apparent within the last 15-20 years. Tulsa County was experiencing a slight decline in infant mortality during the late 1990s, but in 2000 the infant death rate for Tulsa County increased to 8.9 (**Figure 9.19**). The Healthy People 2010 goal is 4.5 infant deaths per 1,000 live births, well below the current rate for Tulsa County.

## DEFINING THE TERMS

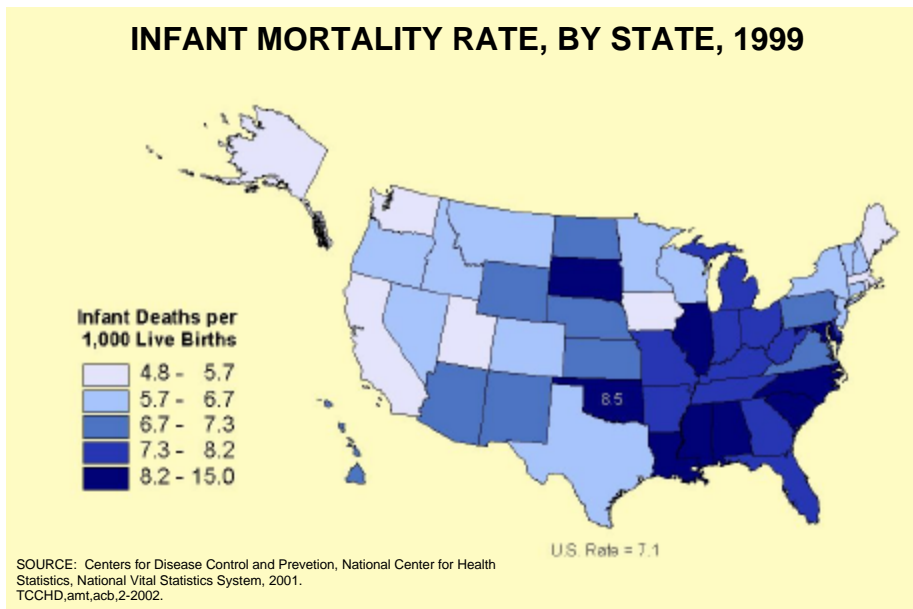
*Infant mortality  
rate=*  
*# deaths under*  
*1 year of age /*  
*# of live births x*  
*1,000.*

Figure 9.19



Infant deaths are not uniformly distributed in the United States (**Figure 9.20**). In 1999, Oklahoma’s infant death rate was 8.5 per 1,000 live births, exceeding the national rate of 7.1 deaths per 1,000 live births. Other states ranged from 4.8 to 15.0. States with highest infant death rates were concentrated in the southeastern United States while lower infant death rate states were predominantly in the western states.

Figure 9.20



**DID YOU KNOW?**

*Every day in Oklahoma, 1 baby will die.*

- Annie E. Casey Foundation, 2001



## References

- <sup>1</sup> Martin, J.A., Hamilton, B.E., Ventura, S.J., Menacker, F., & Park, M.M. (2002). Births: Final data for 2000. *National Vital Statistics Reports*, 50(5), 1-104.
- <sup>2</sup> Oklahoma State Department of Health. (1996). *Tulsa County regional perinatal health - County profiles 1995 update*. Oklahoma City: Author.







# AN OUNCE OF PREVENTION

"An ounce of prevention is worth a pound of cure."

- Ancient Proverb

## An Ounce of Prevention

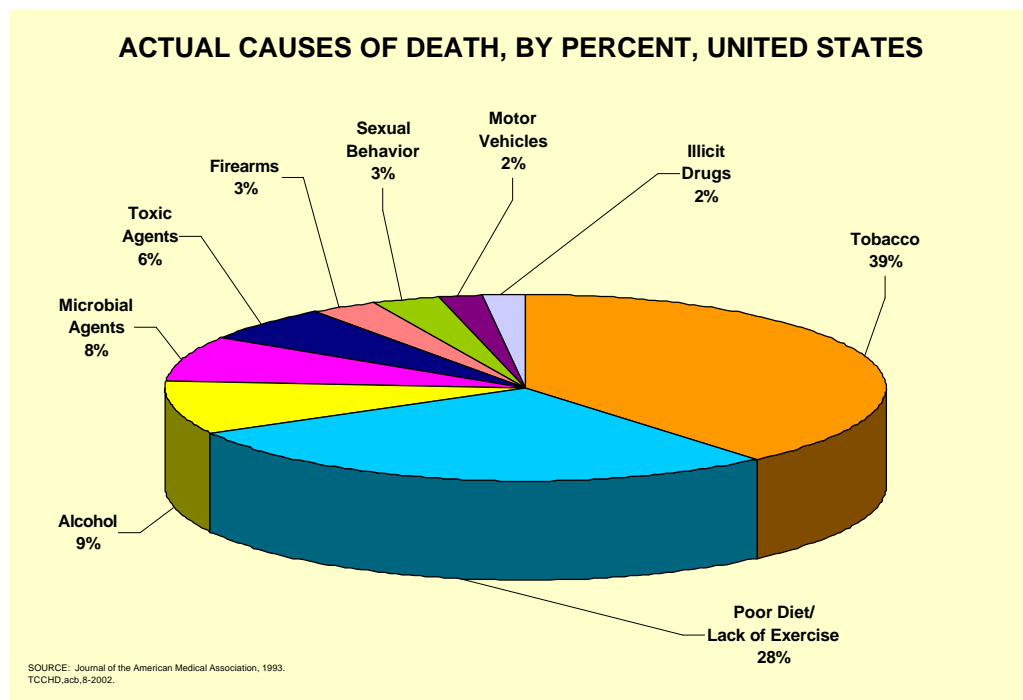
- Introduction
- Physical Activity and Nutrition
- Tobacco Use
- Prenatal Care
- Immunizations
- Cancer Screening

# An Ounce of Prevention

## Introduction

Many of the leading causes of death in the United States, Oklahoma, and Tulsa County are chronic diseases, such as heart disease, cancer, and diabetes, as well as preventable injuries. The *actual* causes of death, defined as those factors that significantly contribute to the leading causes of death, are graphically displayed in **Figure 10.1**. Although chronic diseases are among the most prevalent and costly health problems, they are also among the most preventable.

Figure 10.1



Disease prevention is the key to public health. Preventive intervention strategies are considered primary, secondary, and tertiary. Primary prevention is designed to stop disease from ever occurring, generally by reducing exposure or risk factors, and includes activities such as immunizations, good nutrition, and physical activity. Secondary prevention attempts to identify and control disease processes in their early stages, often before signs and symptoms become apparent. Examples of secondary prevention might include breast cancer screening and HIV testing. Medical care, or tertiary intervention, seeks to prevent disability by restoring individuals to their optimal level of

## DID YOU KNOW?

*Chronic diseases account for 75% of the \$1 trillion spent on healthcare each year in the U.S.*

- Centers for Disease Control and Prevention, 2002

## HEALTHY PEOPLE 2010 OBJECTIVE

*Increase the proportion of physicians and dentists who counsel their at-risk patients about tobacco use cessation, physical activity, and cancer screening.*

- U.S. Department of Health and Human Services, 2000

**HEALTHY  
PEOPLE  
2010  
OBJECTIVE**

*Increase the proportion of adults who are at a healthy weight.*

- U.S. Department of Health and Human Services, 2000

functioning after damage is done. Public health generally focuses on primary and secondary prevention intervention strategies. This chapter explores several strategies of public health prevention.

**Physical Activity and Nutrition**

Health-damaging behaviors – in particular lack of physical activity and poor eating habits – are major contributors to obesity, cancer, cardiovascular disease, and diabetes. Promoting health behavior choices through education, community policies, and community practices is essential to reducing the burden of chronic diseases.

Following dramatic increases in weight gain and obesity among U.S. adults between 1987 and 2000, obesity has reached epidemic proportions; over 45 million adults are obese. Moreover, the epidemic is not limited to adults: the percentage of young people who are overweight has more than doubled in the last 20 years. From 10% to 15% of Americans between the ages of 6 and 17 – about 8 million young people – are considered overweight. Promoting regular physical activity and healthy eating and creating an environment that supports these behaviors are essential to reducing the epidemic of obesity.

**Figure 10.2**



Table 10.1

### The Dietary Guidelines for Americans

1. Eat a variety of foods to get the energy, protein, vitamins, minerals, and fiber you need for good health.
2. Balance the food you eat with physical activity – maintain or improve your weight to reduce your chances of having high blood pressure, heart disease, stroke, certain cancers, and diabetes.
3. Choose a diet with plenty of grain products, vegetables, and fruits which provide needed vitamins, minerals, fiber, and complex carbohydrates, and can help lower your intake of fat.
4. Choose a diet low in fat, saturated fat, and cholesterol to reduce your risk of heart attack and certain types of cancer and to help you maintain a healthy weight.
5. Choose a diet moderate in sugars. A diet with lots of sugars has too many calories and too few nutrients for most people and can contribute to tooth decay.
6. Choose a diet moderate in salt and sodium to help reduce your risk of high blood pressure.
7. If you drink alcoholic beverages, do so in moderation. Alcoholic beverages supply calories, but little or no nutrients. Drinking alcohol is also the cause of many health problems and accidents and can lead to addiction.

SOURCE: U.S. Department of Agriculture, 2002.

Regular physical activity substantially reduces the risk of dying from coronary heart disease, the nation's leading killer, and decreases the risk for colon cancer, diabetes, and high blood pressure. It also helps control weight; contributes to healthy bones, muscles, and joints; reduces falls among the elderly; helps to relieve the pain of arthritis; reduces symptoms of anxiety and depression; and is associated with fewer hospitalizations and physician visits. Moreover, physical activity need not be strenuous to be beneficial. People of all ages benefit from moderate physical activity, such as brisk walking, swimming, and cycling.

We now know that good nutrition lowers the risk for many chronic diseases, including heart disease, stroke, certain types of cancer, diabetes, and osteoporosis. Although Americans are slowly adopting healthier diets, a large gap remains between recommended dietary patterns and what Americans actually eat. The Food Guide Pyramid (**Figure 10.2**) was developed to help healthy Americans follow the Dietary Guidelines for Americans (**Table 10.1**). The Food Guide Pyramid emphasizes foods from the five major food groups shown in the three lower sections of the pyramid. Each of these food groups provides some, but not all, of the nutrients that you need. Foods in one group

### DID YOU KNOW?

*The estimated annual cost of obesity in the United States is about \$117 billion.*

*Centers for Disease Control and Prevention, 2002*

**DID YOU KNOW?**

*Researchers have identified more than 250 chemicals in tobacco smoke that are toxic or cause cancer.*

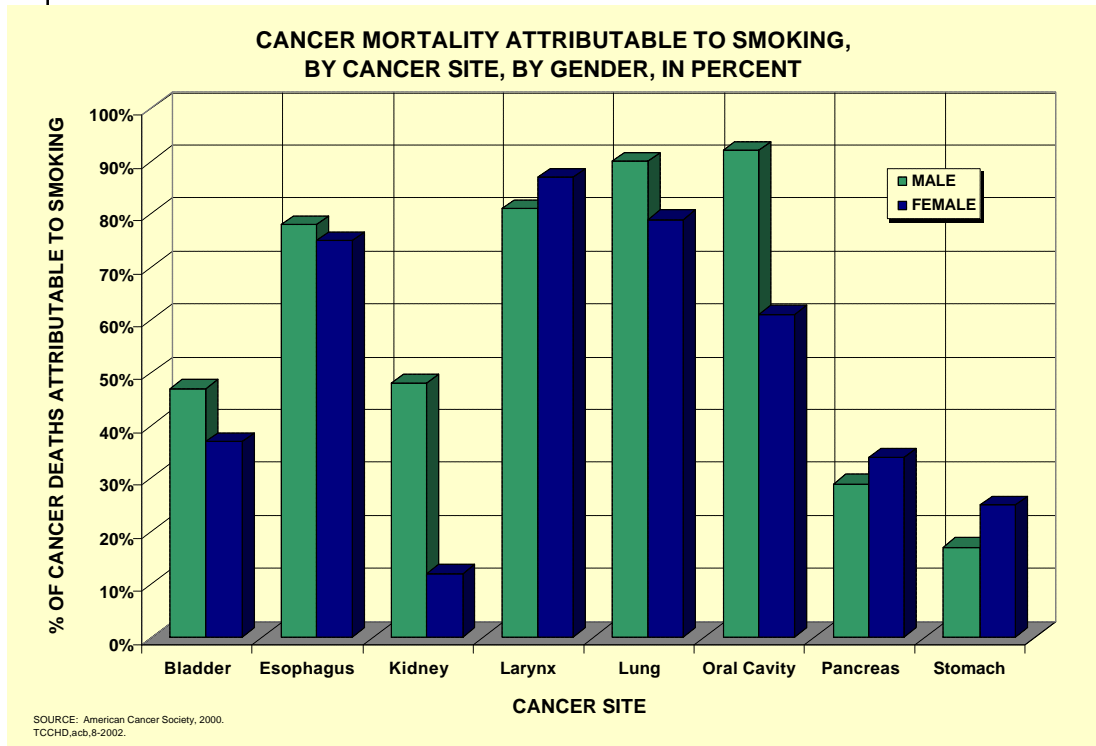
*Centers for Disease Control and Prevention, 2002*

cannot replace those in another. No one food group is more important than another – for good health, you need them all. The small tip of the pyramid shows fats, oils, and sweets. These foods provide calories and little else nutritionally. Most people should use them sparingly. The Food Guide Pyramid was developed for those who regularly eat foods from all five major food groups. Thus, some people, such as vegetarians, may need special help from a dietitian in planning food choices to assure that they get needed nutrients.

**Tobacco Use**

Since the 1964 release of the first Surgeon General’s report on smoking and health, scientific knowledge about the health consequences of tobacco use has greatly increased. Smoking is known to cause chronic lung disease, heart disease, and stroke, as well as cancer of the lungs, larynx, esophagus, mouth, and bladder. In addition, smoking contributes to cancer of the cervix, pancreas, and kidneys. **Figure 10.3** graphically displays cancer mortality attributed to smoking, by site and gender.

**Figure 10.3**



The harmful effects of smoking do not end with the smoker. Women who smoke during pregnancy are more likely to have babies with low birth weight, which is linked with an increased risk of infant death and with a variety of infant health disorders. In addition, secondhand smoke has harmful effects on



nonsmokers. Each year, an estimated 3,000 nonsmoking Americans die of lung cancer and up to 300,000 children suffer from respiratory tract infections due to exposure to secondhand smoke.

Approximately 80% of the 46.5 billion adult smokers in the United States started smoking before the age of 18. More than 4 million adolescents are current smokers. Each day, more than 6,000 young people try their first cigarette and nearly 3,000 become regular smokers, adding up to more than one million new smokers each year. It is estimated that more than 6.4 million children living today will die prematurely because of a decision they will make as adolescents – the decision to smoke cigarettes.

Tobacco-free policies involving a school's faculty, staff, and students have a critical role in reducing tobacco use among young people, especially when these policies apply to all school facilities, property, vehicles, and school-sponsored events. Adopting strong tobacco-free policies is only the first step. Schools should rigorously enforce these policies to protect children from the hazards of tobacco smoke at school and to model a tobacco-free environment. According to the Centers for Disease Control and Prevention, the implementation of effective educational programs for preventing tobacco use could postpone or prevent smoking onset in 20% to 40% of U.S. adolescents.<sup>1</sup>

## Prenatal Care

Babies have a better chance of being born healthy when their mothers are also healthy. Because of the special risks and needs of pregnancy, women require prenatal care. Appropriate prenatal care is a combination of beginning care within the first trimester and following a schedule of care throughout the pregnancy. Prenatal care may reduce the risk of infant death and low birth weight.

A woman's decision to start prenatal care depends on many things. The availability and accessibility of care, as well as her knowledge, attitudes, and beliefs about pregnancy and the need for prenatal care are just a few factors. Prenatal care is more than just a clinic visit. It is practicing healthy behaviors during pregnancy, such as eating properly, getting enough rest, and exercising moderately. It is also important to abstain from drinking alcohol or using tobacco or illicit drugs.

## Immunizations

At the beginning of the 20<sup>th</sup> century, infectious diseases were widely prevalent in the United States and exacted an enormous toll on the population. Few

### HEALTHY PEOPLE 2010 OBJECTIVE

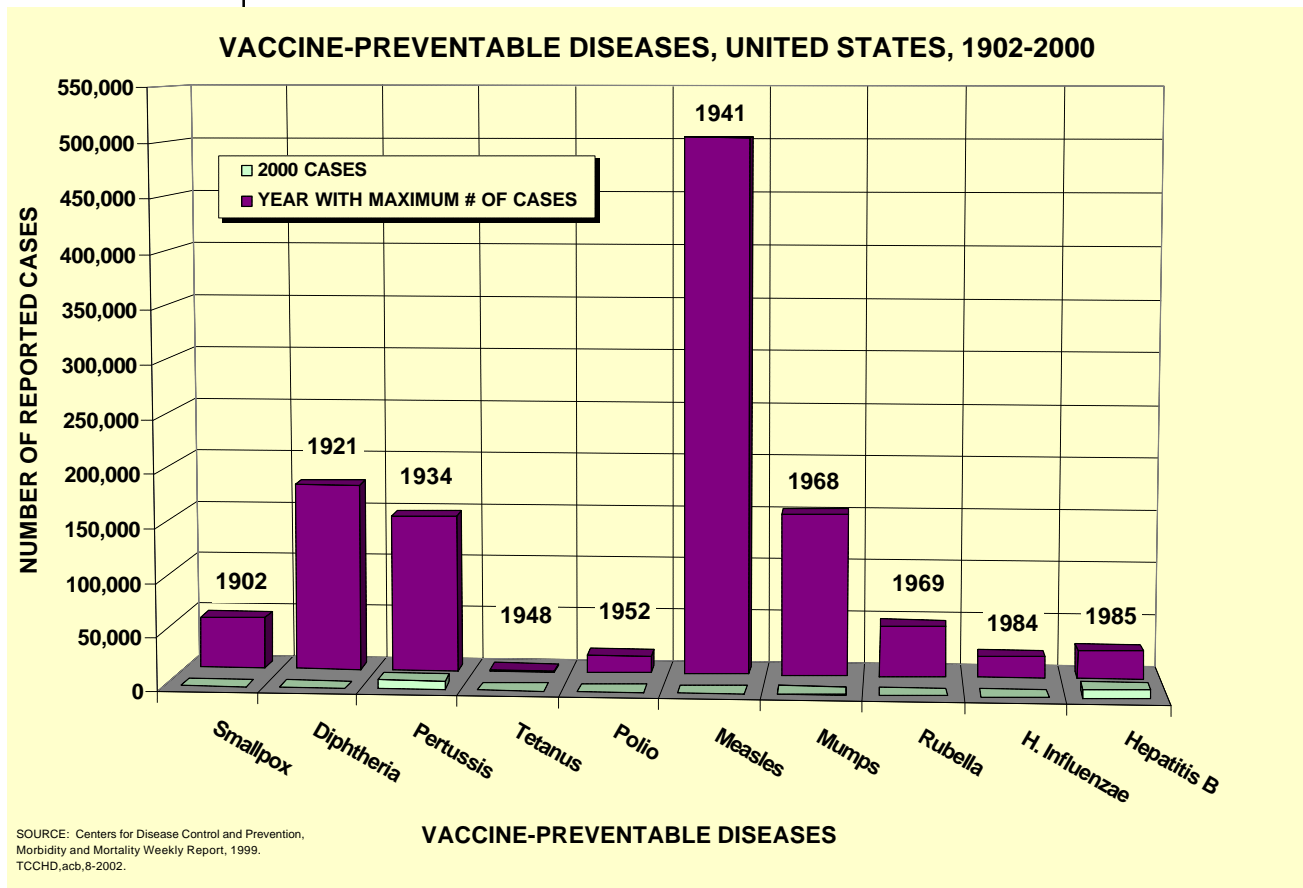
*Achieve and maintain effective vaccination coverage levels for universally recommended vaccines among young children.*

- U.S. Department of Health and Human Services, 2000

effective treatment and precautionary measures existed to prevent infectious diseases. Since that time, however, substantial achievements have been made in the control of many vaccine-preventable diseases (**Figure 10.4**).

In a 1999 MMWR report, vaccination was listed as one of the ten greatest public health achievements of the 20<sup>th</sup> century (**Table 10.2**).<sup>2</sup> Vaccination coverage in the United States is now at record high levels. In 1997 coverage among children aged 19-35 months exceeded 90% for three or more doses of diphtheria and tetanus toxoids and pertussis vaccine (DTP), three or more doses of poliovirus vaccine, three or more doses of Hib (*Haemophilus influenzae* type b) vaccine, and one or more doses of measles-containing vaccine. Coverage among children aged 5-6 years has exceeded 95% each school year since 1980 for DTP, polio, and MMR (measles, mumps, and rubella) vaccines.<sup>3</sup>

Figure 10.4



While the United States has a very low incidence of vaccine-preventable diseases, the viruses and bacteria that cause them still exist. To achieve the full potential of vaccines, parents must recognize vaccines as a means of mobilizing the body's natural defenses and be better prepared to seek vaccinations for their children. Researchers must address increasingly complex

questions about safety, efficacy, and vaccine delivery and must pursue new approaches to vaccine administration more aggressively. In addition, the vaccine-delivery system must be extended to new populations of adolescents and adults.

**Table 10.2**

**The 10 Greatest Public Health Achievements  
in the United States, 1900-1999**

- |   |   |
|---|---|
| 1. Vaccination  | 6. Safer and healthier foods                      |
| 2. Motor-vehicle safety                                     | 7. Healthier mothers and babies                   |
| 3. Safer workplaces   | 8. Family planning                                |
| 4. Control of infectious diseases                           | 9. Fluoridation of drinking water                 |
| 5. Decline in deaths from coronary heart disease and stroke | 10. Recognition of tobacco use as a health hazard |

SOURCE: Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Report, 1999. TCCHD, acb, 8-2002.

## Cancer Screening

In 2002 an estimated 1,284,900 people in the United States will be diagnosed with cancer, and 555,500 will die of cancer. It is estimated that up to 35% of the cancer deaths could be avoided through cancer screening. Beyond the potential for avoiding death, screening may reduce cancer morbidity, since treatment for earlier stage cancers is often less aggressive than that for more advanced cancers.<sup>4</sup>

There are different levels of cancer screening. Direct or assisted visual observation is the most widely available examination for the detection of cancer. It is useful in identifying suspicious lesions in the skin, retina, lip, mouth, larynx, external genitalia, and cervix. The second most available detection procedure is palpation. It is particularly valuable in detecting lumps, nodules, or tumors in the breast, mouth, salivary glands, thyroid, subcutaneous tissues, anus, rectum, prostate, testes, ovaries, uterus, and enlarged lymph nodes in the neck, axilla, or groin. Internal cancers require procedures and tests such as endoscopy, x-rays, magnetic resonance imaging (MRI), or ultrasound. Laboratory tests, such as the Pap smear or the fecal occult blood test have been employed for detection of specific cancers.

## DID YOU KNOW?

*The overall annual costs for cancer are estimated at \$107 billion.*

- U.S. Department of Health and Human Services, 2000

## HEALTHY PEOPLE 2010 OBJECTIVE

*Increase the proportion of women who receive a Pap test.*

- U.S. Department of Health and Human Services, 2000

A cancer-related checkup is recommended every three years for people between the ages of 20 and 40. For those over the age of 40, a checkup is recommended annually. Depending on the age of the patient, the examination might include an assessment for cancer of the thyroid, oral cavity, skin, lymph nodes, testes, and ovaries. Every exam should include health counseling, regardless of the person's age.

## References

- <sup>1</sup> Centers for Disease Control and Prevention. (2000). *Reducing tobacco use: A report of the Surgeon General*. Atlanta: Author.
- <sup>2</sup> Centers for Disease Control and Prevention. (1999). Ten great public health achievements - United States, 1900-1999. *Morbidity and Mortality Weekly Report*, 48(12), 241-243.
- <sup>3</sup> Centers for Disease Control and Prevention. (1999). Achievements in public health, 1900-1999 impact of vaccines universally recommended for children - United States, 1900-1998. *Morbidity and Mortality Weekly Report*, 48(12), 243-248.
- <sup>4</sup> American Cancer Society. (2002). *Cancer facts and figures - 2002*. Atlanta: Author.



# HEALTH DEPARTMENT SERVICES AND PROGRAMS

*"Health care is vital to all of us some of the time but public health is vital to all of us all of the time."*

- C. E verett Koop, U.S. Surgeon General 1981-1989

## Health Department Services and Programs

- Introduction
- Personal Health Services
  - Adult Health
  - Child Guidance
  - Child Health
  - Children First
  - Communicable Disease Control
  - Community Dentistry
  - Family Planning
  - Healthy Start Initiative/Health Education
  - Maternal Health
  - Social Work/Outreach
  - Women, Infants, and Children (WIC)
- Environmental Health Services
- Consumer Protection
- Planning and Epidemiology
- The MATCH Project
- Community Health Foundation

## Health Department Services and Programs

### Introduction

Effective public health systems have been a vital necessity as the world has grown and developed. Effective public health services include monitoring the health and well-being of citizens, identifying problems in the environment and among community members, and establishing public health practices to address community problems such as healthcare accessibility and disease prevention.

Today the Tulsa Health Department continues to strive for organizational excellence by providing public health services to every person in Tulsa County. The Tulsa Health Department believes that a healthy community begins with people making healthy choices. Our vision is a community free from hazards, diseases, injuries, and barriers to vital health services that impede any of our citizens from reaching their full potential.

Every day each person in Tulsa County comes in contact with the Tulsa Health Department as we continue to prevent the spread of disease by protecting the food we eat, the water we drink, and the air we breathe. Education and awareness of the services of the Tulsa Health Department are accomplished through effective collaborative efforts, utilizing all available community resources.

Today, the face of public health is you. It is the face you, your family member, your neighbor, your co-worker, and your friend. This chapter outlines the many programs and services offered by the Tulsa Health Department.

### Personal Health Services

Personal Health Services is primarily comprised of direct health services to individuals. These services include medical, dental, nursing, nutrition, child guidance, speech/language, health education, case management, outreach, and social work. Personal Health Services provides for all ages – newborns through seniors – in our clinic sites, clients' homes, and many community-based sites throughout the county. Personal Health Services personnel account for two-thirds of all Tulsa Health Department staff.

### Adult Health

The Adult Health program maintains and promotes adult health by providing cancer and chronic disease screening. Services include screenings for

### FAQ'S

*How can I contact the Tulsa City-County Health Department?*

*(918) 582-  
WELL*



hypertension, diabetes, high cholesterol, breast cancer, and cervical cancer. Pap smears, mammograms, and health education are also offered.

## Child Guidance

Child Guidance provides four areas of service with graduate-level trained staff who work as a multidisciplinary team to bring together expertise and assure a comprehensive assessment of the family's needs. The service areas are behavioral health, child development, parent education, and speech, language, and audiology.

## Child Health

The Child Health program provides healthcare for primarily underserved infants and children in Tulsa County. Services include physical examinations, treatment for common childhood illnesses, immunizations, counseling, health education, and evaluation of growth, development, nutrition, vision, hearing, and emotional health, along with referrals to other Health Department programs and community resources.

## Children First

The Children First program promotes health and parenting issues by following first-time mothers during pregnancy through the child's second birthday. These clients have a high prenatal care rate, and most mothers are successfully breastfeeding. There is a heavy focus on prenatal smoking cessation with many clients successfully decreasing or eliminating their habit completely. Fathers are an integral part of the program.

## Communicable Disease Control

Communicable Disease Control (CDC) focuses on the prevention aspect of infectious diseases. CDC offers services in the areas of sexually transmitted diseases, immunizations, and tuberculosis. The Sexually Transmitted Disease (STD) clinic provides full-time access to testing and treatment for people needing evaluation of their STD status. The clinic also offers preventive treatment to those who have been exposed to STDs. Testing for the Human Immunodeficiency Virus (HIV) is offered through the clinic and by appointment for clients who do not wish to go through the STD clinic. The Immunization program provides immunizations at all clinic sites in addition to community-based sites throughout Tulsa County. The Tuberculosis (TB)

### FAQ'S

*Who is eligible to receive health department clinic services?*

*Tulsa City-County Health Department clinic services are available to all persons on a sliding scale fee basis, according to income.*



Control program is a community-wide program focusing on education, primary prevention, screening, and treatment of TB.

## Community Dentistry

The goal of this program is to improve the oral health of Tulsa County residents with emphasis on low-income children and pregnant women. Priorities of the program include the prevention and treatment of dental-related pain and infection; the prevention of primary dental disease through examinations (including radiography), prophylaxis, fluoride treatments and sealants; the prevention of secondary dental disease through the placement of amalgams, stainless steel crowns and composites, and the prevention of tertiary disease utilizing pulpotomies, endodontics, and when necessary, extractions.

## Family Planning

The Family Planning program offers comprehensive family planning services to women and men on a sliding scale fee-for-service. Services include physical examinations, laboratory, pregnancy testing, all contraceptives, counseling, and referrals for other services. Free preconceptional counseling and pregnancy testing are also available.

## Healthy Start Initiative/Health Education

Tulsa Healthy Start is a federally funded program designed to help reduce infant mortality in Tulsa County. Outreach workers, case managers, and health educators work closely with clients to provide support for the entire family. Services that are offered include assistance with prenatal care, access to well-baby visits, childhood immunizations, referrals to WIC services, family planning assistance, and links to social services for jobs, child care, housing, and education.

The Health Education program focuses on Tulsa County school systems and juvenile agencies. The primary goal is to change poor health behaviors and attitudes. The most requested topics include dental health, hygiene, human growth and development, sexually transmitted diseases, communicable diseases, and food handling.

## Maternal Health

The Maternal Health program serves to reduce the risk of infant mortality through the provision of comprehensive early prenatal care. Prenatal care

### FAQ's

*When can I  
bring my child  
in for  
immunizations?*

*All  
immunizations  
are given  
Monday  
through  
Thursday  
8:00am to  
4:00pm and  
Friday 8:00am  
to 11:00am.*

includes medical check-ups, laboratory screenings, social work services, case management, referral to prenatal classes, and individual counseling and health education.

### **Social Work/Outreach**

Public health social work services are available upon referral from staff or self-referral for clients receiving clinic services at the Tulsa Health Department. The social worker provides psycho-social assessments, referral, and assistance with basic needs (food, housing, transportation), relationship and abuse concerns, compliance with healthcare recommendations, financial assistance, and connection to mental health services.

The REACH (Raising Educational Awareness for Community Health) team consists of three outreach workers. They provide visits on internal and external community referrals to follow-up on clients who miss appointments and are behind on immunizations. Outreach staff canvas low-income neighborhoods by walking door-to-door distributing information about Health Department services and the importance of preventive health care.

### **Women, Infants, and Children (WIC)**

The Women, Infants, and Children (WIC) program helps to improve the health of low-income pregnant and breastfeeding women, as well as of infants and children up to five years of age who are at nutritional risk. WIC helps improve nutrition by providing nutrition education, referrals for additional health care, and vouchers for nutritious foods. Breast pumps are also available to promote breastfeeding.

### **Environmental Health Services**

Environmental Health Services enforces state policies laws, county regulations, and city and county public health nuisance abatement affecting commercial and private premises. These codes regulate unsanitary animal pens, dead animals, improper garbage storage, accumulations of trash and weeds, sub-standard housing, Certificates of Occupancy, local air quality, and rat and mosquito control. The Environmental Laboratory provides eastern Oklahoma with testing capabilities for bacterial and inorganic contaminants in public and private water supplies. The laboratory also provides other inorganic and lead-based paint testing.

#### **FAQ'S**

*Does the Health Department do blood tests for marriage licenses?*

*Premarital testing is done Monday and Wednesday 8:00am to 11:00am and 1:00pm to 3:00pm and Friday 8:00am to 11:00am.*



## Consumer Protection

The Consumer Protection division mission is to protect public health, to prevent the transmission of disease, and to meet the public expectations for a cleaner, safer environment through the use of effective education and all available community resources. This is accomplished through education, technical assistance, and inspections of food service establishments, swimming pools, lodging facilities, barbershops, and body piercing facilities. Food safety and swimming pool operation classes are provided to assist in providing a safe environment.

## Planning and Epidemiology

The Planning & Epidemiology (P&E) program mission is to improve the health of the citizens of Tulsa County through effective information management. The P&E program serves a myriad of functions: developing socioeconomic and demographic profiles for assessing the health of Tulsa County, securing grant applications, mapping health data, conducting epidemiologic disease investigations, responding to illness-related complaints about food establishments, following animal bite complaints to ensure compliance with city guidelines and rabies protocol, and performing in-service educational programs to educate the public about food safety. P&E staff play a daily role in bioterrorism preparedness through the Tulsa Area Syndromic Surveillance System (TASSS). Also under the P&E program is the Fetal and Infant Mortality Review (FIMR) program. FIMR examines medical, social, environmental, and economic indicators of infant death in the community; plans interventions and policies; and participates in intervention and policy implementation.

## The MATCH Project

The MATCH Project is a program that works in conjunction with the Oklahoma State Department of Health to implement a comprehensive tobacco use reduction and cessation demonstration program. The program is organized into program areas consistent with the CDC's four cornerstones for comprehensive programs: cessation, community, classroom, and counter-marketing. The primary goals of the MATCH Project are to prevent tobacco use initiation by youth; to protect children, workers, and the public from second hand smoke; to promote quitting among youth and adults; and to eliminate disparities of tobacco use among population groups. The MATCH Project sponsors a tobacco cessation quit line, 1-866-PITCH-EM and is a key player in the Breath Easy campaign.

### FAQ's

*How can I get help to quit smoking?*

*Call 1-866-PITCH-EM for free help with tobacco cessation.*

## **The Community Health Foundation**

Established in 1996, the Community Health Foundation is a 501(c)(3) organization whose primary purpose is to function as an advocate of healthy lifestyle choices by raising community awareness of current health issues through partnerships, planning, fund development, and programs. Improving the health of a community begins with individuals as well as with organizations working together. The Community Health Foundation is a vehicle in which these partnerships are formed and organized into positive action to not only further the mission of the Tulsa Health Department but also to improve the health and wellness of the citizens of Tulsa County.

# Health Data Resources

Appendix A



## Health Data Resources

### Public Health Defined

#### LOCAL

Tulsa City-County Health Department  
<http://www.tulsa-health.org>

#### STATE

Oklahoma State Department of Health  
<http://www.health.state.ok.us>

#### NATIONAL

American Public Health Association  
<http://www.apha.org>  
 Indian Health Service  
<http://www.ihs.gov>  
 National Association of City and County Health Officials  
<http://www.naccho.org>  
 National Institutes of Health  
<http://www.nih.gov>  
 National Public Health Information Coalition  
<http://www.nphic.org>  
 National Public Health Performance Standards Program  
<http://www.phppo.cdc.gov/nphpsp>  
 Public Health Emergency Preparedness and Response  
<http://www.bt.cdc.gov>  
 Public Health Foundation  
<http://www.phf.org>  
 Public Health Practice Program Office  
<http://www.phppo.cdc.gov>  
 U.S. Department of Health and Human Services  
<http://www.os.dhhs.gov>  
 World Health Organization  
<http://www.who.int/en>

### Healthy People 2010

#### NATIONAL

Healthy People 2010  
<http://web.health.gov/healthypeople>

### Demographic Overview of Tulsa County

#### LOCAL

Indian Nations Council of Governments  
<http://www.incog.org>  
 Tulsa Metropolitan Chamber of Commerce  
<http://www.tulsachamber.com>

#### STATE

Oklahoma Department of Commerce  
<http://www.odoc.state.ok.us>  
 State of Oklahoma  
<http://www.state.ok.us>

#### NATIONAL

Administration on Aging  
<http://www.aoa.dhhs.gov>  
 Health Resources and Services Administration, Community Health Status Indicators Project  
<http://www.communityhealth.hrsa.gov>  
 U.S. Census Bureau  
<http://www.census.gov>  
 U.S. Census Bureau, Statistical Abstract of the United States  
<http://www.census.gov/prod/2002pubs/01statab/stat-ab01.html>

### Life Expectancy and Mortality

#### LOCAL

Tulsa City-County Health Department  
<http://www.tulsa-health.org>

#### STATE

Oklahoma State Department of Health  
<http://www.health.state.ok.us>

#### NATIONAL

Administration on Aging  
<http://www.aoa.dhhs.gov>  
 Alzheimer's Association  
<http://www.alz.org>  
 Alzheimer's Disease Education and Referral  
<http://www.alzheimers.org>





American Cancer Society  
<http://www.cancer.org>  
 American Diabetes Association  
<http://www.diabetes.org>  
 American Dietetic Association  
<http://www.eatright.org>  
 American Heart Association  
<http://www.americanheart.org>  
 American Lung Association  
<http://www.lungusa.org>  
 American Stroke Association  
<http://www.strokeassociation.org>  
 American Trauma Society  
<http://www.amtrauma.org>  
 Centers for Disease Control and Prevention  
<http://www.cdc.gov>  
 Morbidity and Mortality Weekly Report  
<http://www.cdc.gov/mmwr>  
 National Cancer Institute  
<http://www.nci.nih.gov>  
 1-800-4-CANCER  
 National Center for Chronic Disease Prevention  
 and Health Promotion  
<http://www.cdc.gov/nccdphp>  
 National Center for Health Statistics  
<http://www.cdc.gov/nchs>  
 National Center for HIV, STD, and TB Prevention  
<http://www.cdc.gov/nchstp/od/nchstp.html>  
 National Center for Infectious Diseases  
<http://www.cdc.gov/ncidod>  
 National Center for Injury Prevention and Control  
<http://www.cdc.gov/ncipc>  
 National Heart, Lung, and Blood Institute  
<http://www.nhlbi.nih.gov>  
 National Institute of Diabetes and Digestive and  
 Kidney Diseases  
<http://www.niddk.nih.gov>  
 National Institutes of Health  
<http://www.nih.gov>  
 National Stroke Association  
<http://www.stroke.org>  
 National Vital Statistics System  
<http://www.cdc.gov/nchs/nvss.htm>

## Infectious and Communicable Diseases

### LOCAL

Tulsa City-County Health Department  
<http://www.tulsa-health.org>

### STATE

Oklahoma State Department of Health  
<http://www.health.state.ok.us>

### NATIONAL

Morbidity and Mortality Weekly Report  
<http://www.cdc.gov/mmwr>  
 National Center for Health Statistics  
<http://www.cdc.gov/nchs>  
 National Center for HIV, STD, and TB Prevention  
<http://www.cdc.gov/nchstp/od/nchstp.html>  
 National Center for Infectious Diseases  
<http://www.cdc.gov/ncidod>  
 National Immunization Program  
<http://www.cdc.gov/nip>  
 National STD Hotline  
<http://www.ashastd.org/NSTD>  
 1-800-227-8922 or 1-800-342-2437

## Environmental Health

### LOCAL

Ozone Alert  
<http://www.ozonealert.com>  
 Tulsa Area Clean Cities  
<http://www.tulsacleancities.com>  
 Tulsa City-County Health Department  
<http://www.tulsa-health.org>  
 Tulsa Commuter Choice Program  
<http://www.e-tulsa.org>  
 Tulsa's Environmental Network  
<http://www.e-tulsa.org>

### STATE

Oklahoma Department of Environmental Quality  
<http://www.deq.state.ok.us>

### NATIONAL

Agency for Toxic Substances and Disease  
 Registry  
<http://www.atsdr.cdc.gov>  
 National Center for Environmental Health  
<http://www.cdc.gov/nceh>  
 National Center for Health Statistics  
<http://www.cdc.gov/nchs>  
 National Institute of Environmental Health  
 Sciences  
<http://www.niehs.nih.gov>  
 U.S. Department of Agriculture  
<http://www.usda.gov>

U.S. Environmental Protection Agency  
<http://www.epa.gov>  
 U.S. Food and Drug Administration  
<http://www.fda.gov>

## Health Risks and Health Behaviors

### LOCAL

#### HELPLINE

<http://www.helplinetulsa.net>  
 (918) 836-HELP  
 Tulsa City-County Health Department  
<http://www.tulsa-health.org>  
 Tulsa Police Department  
<http://www.tulsapolice.org>

### STATE

Oklahoma Department of Human Services  
<http://www.okdhs.org>  
 Oklahoma State Department of Health  
<http://www.health.state.ok.us>

### NATIONAL

Administration for Children and Families  
<http://www.acf.dhhs.gov>  
 Alcoholics Anonymous  
<http://www.alcoholics-anonymous.org>  
 American Cancer Society  
<http://www.cancer.org>  
 American Council for Drug Education  
<http://www.acde.org>  
 American Diabetes Association  
<http://www.diabetes.org>  
 American Dietetic Association  
<http://www.eatright.org>  
 American Heart Association  
<http://www.americanheart.org>  
 American Lung Association  
<http://www.lungusa.org>  
 American Stroke Association  
<http://www.strokeassociation.org>  
 American Trauma Society  
<http://www.amtrauma.org>  
 Morbidity and Mortality Weekly Report  
<http://www.cdc.gov/mmwr>  
 National Cancer Institute  
<http://www.nci.nih.gov>  
 1-800-4-CANCER  
 National Center for Chronic Disease Prevention  
 and Health Promotion  
<http://www.cdc.gov/nccdphp>

National Center for Health Statistics  
<http://www.cdc.gov/nchs>  
 National Center for HIV, STD, and TB Prevention  
<http://www.cdc.gov/nchstp/od/nchstp.html>  
 National Center for Infectious Diseases  
<http://www.cdc.gov/ncidod>  
 National Center for Injury Prevention and Control  
<http://www.cdc.gov/ncipc>  
 National Child Abuse Hotline  
<http://www.childhelpusa.org>  
 1-800-4-A-CHILD  
 National Clearinghouse for Alcohol and Drug  
 Information  
<http://www.health.org>  
 National Clearinghouse on Child Abuse and  
 Neglect Information  
<http://www.calib.com/nccanch>  
 National Domestic Violence Hotline  
<http://www.ndvh.org>  
 1-800-799-SAFE  
 National Heart, Lung, and Blood Institute  
<http://www.nhlbi.nih.gov>  
 National Immunization Program  
<http://www.cdc.gov/nip>  
 National Institute for Occupational Safety and  
 Health  
<http://www.cdc.gov/niosh>  
 National Institute of Diabetes and Digestive and  
 Kidney Diseases  
<http://www.niddk.nih.gov>  
 National Institute on Drug Abuse  
<http://www.nida.nih.gov>  
 National Institutes of Health  
<http://www.nih.gov>  
 National STD Hotline  
<http://www.ashastd.org/NSTD>  
 1-800-227-8922 or 1-800-342-2437  
 National Stroke Association  
<http://www.stroke.org>  
 SafeUSA  
<http://www.cdc.gov/safeusa>  
 Substance Abuse and Mental Health Services  
 Administration  
<http://www.samhsa.gov>  
 U.S. Department of Justice  
<http://www.usdoj.gov>

## Family Health

### LOCAL

Community Service Council  
<http://www.csctulsa.org>



Tulsa City-County Health Department  
<http://www.tulsa-health.org>

**STATE**

Oklahoma Department of Human Services  
<http://www.okdhs.org>  
Oklahoma Institute for Child Advocacy  
<http://www.oica.org>  
Oklahoma State Department of Health  
<http://www.health.state.ok.us>

**NATIONAL**

Administration for Children and Families  
<http://www.acf.dhhs.gov>  
American College of Obstetricians and Gynecologists  
<http://www.acog.org>  
American SIDS Institute  
<http://www.sids.org>  
Annie E. Casey Foundation  
<http://www.aecf.org>  
Forum on Child and Family Statistics  
<http://www.childstats.gov>  
Health Resources and Services Administration, Maternal and Child Health Bureau  
<http://mchb.hrsa.gov>  
National Center for Health Statistics  
<http://www.cdc.gov/nchs>  
National Center on Birth Defects and Developmental Disabilities  
<http://www.cdc.gov/ncbddd>  
National Immunization Program  
<http://www.cdc.gov/nip>  
National Vital Statistics System  
<http://www.cdc.gov/nchs/nvss.htm>  
Planned Parenthood Federation of America  
<http://www.ppfa.org>

**An Ounce of Prevention**

**LOCAL**

Tulsa City-County Health Department  
<http://www.tulsa-health.org>

**STATE**

Oklahoma State Department of Health  
<http://www.health.state.ok.us>

**NATIONAL**

Agency for Toxic Substances and Disease Registry  
<http://www.atsdr.cdc.gov>  
American Cancer Society  
<http://www.cancer.org>  
American Council for Drug Education  
<http://www.acde.org>  
American Dental Association  
<http://www.ada.org>  
American Diabetes Association  
<http://www.diabetes.org>  
American Dietetic Association  
<http://www.eatright.org>  
American Heart Association  
<http://www.americanheart.org>  
American Lung Association  
<http://www.lungusa.org>  
American Stroke Association  
<http://www.strokeassociation.org>  
American Trauma Society  
<http://www.amtrauma.org>  
Health Resources and Services Administration Information Center  
<http://www.ask.hrsa.gov>  
1-888-ASK-HRSA  
Healthfinder  
<http://healthfinder.gov>  
Morbidity and Mortality Weekly Report  
<http://www.cdc.gov/mmwr>  
National Cancer Institute  
<http://www.nci.nih.gov>  
1-800-4-CANCER  
National Center for Chronic Disease Prevention and Health Promotion  
<http://www.cdc.gov/nccdphp>  
National Center for Environmental Health  
<http://www.cdc.gov/nceh>  
National Center for Health Statistics  
<http://www.cdc.gov/nchs>  
National Center for HIV, STD, and TB Prevention  
<http://www.cdc.gov/nchstp/od/nchstp.html>  
National Center for Infectious Diseases  
<http://www.cdc.gov/ncidod>  
National Center for Injury Prevention and Control  
<http://www.cdc.gov/ncipc>  
National Center on Birth Defects and Developmental Disabilities  
<http://www.cdc.gov/ncbddd>  
National Heart, Lung, and Blood Institute  
<http://www.nhlbi.nih.gov>



National Immunization Program

<http://www.cdc.gov/nip>

National Institute of Diabetes and Digestive and  
Kidney Diseases

<http://www.niddk.nih.gov>

National Institute on Drug Abuse

<http://www.nida.nih.gov>

National STD Hotline

<http://www.ashastd.org/NSTD>

1-800-227-8922 or 1-800-342-2437

National Stroke Association

<http://www.stroke.org>

Planned Parenthood Federation of America

<http://www.ppfa.org>

SafeUSA

<http://www.cdc.gov/safeusa>

Substance Abuse & Mental Health Services  
Administration

<http://www.samhsa.gov>

## Health Department Services and Programs

### LOCAL

Breathe Easy

<http://www.breatheeasyok.com>

Tobacco Use Cessation Quitline

<http://www.1866pitchem.com>

1-866-PITCH-EM

Tulsa Area Syndromic Surveillance System

<http://www.tulsabiowatch.com>

Tulsa City-County Health Department

<http://www.tulsa-health.org>



# Glossary

Appendix B



**ACTUAL CAUSE OF DEATH:** A primary determinant or risk factor associated with a pathologic or diagnosed cause of death. For example, tobacco use would be the actual cause of death for many lung cancers.

**AGE-ADJUSTED MORTALITY:** The expected number of deaths that would occur if a population had the same age distribution as a standard population.

**AGENT:** The cause of a disease. Bacteria, virus, parasite, fungus, or mold are various agents found in the cause of infectious diseases.

**AGGRAVATED ASSAULT:** An unlawful attack by one person upon another for the purpose of inflicting severe or aggravated bodily injury. This type of assault is usually accompanied by the use of a weapon or by means likely to produce death or great bodily harm.

**ASSESSMENT:** One of public health's three core functions. Assessment calls for regularly and systematically collecting, analyzing, and making available information on the health of a community, including statistics on health status, community health needs, and epidemiologic and other studies of health problems.

**ASSURANCE:** One of public health's core functions. It involves assuring constituents that services necessary to achieve agreed-upon goals are provided by encouraging actions on the part of others, by requiring action through regulation, or by providing services directly.

**BIRTH RATE:** The total number of births per unit of population reported during a given time interval, often expressed as the number of births per 1,000 persons.

**CRUDE MORTALITY RATE:** The total number of deaths per unit of population reported during a given time interval, often expressed as the number of deaths per 1,000 or 100,000 persons.

**DOMESTIC VIOLENCE:** Threatening, causing, or attempting to cause serious physical harm between family or household members. Family or household members are defined as spouses, former spouses, present spouses of former spouses, parents, foster parents, children, persons otherwise related by blood or marriage, or persons living in the same household or who formerly lived in the same household. Also included in this category are persons in dating relationships or someone with whom they had a child.

**ENDEMIC RATE:** The ongoing, usual level of, or constant presence of a disease within a given population or geographic area.

**ENVIRONMENT:** The favorable surroundings and conditions external to the human or animal that cause or allow disease transmission. Environmental factors can include the biological aspects as well as the social, cultural, and physical aspects of the environment.

**EPIDEMIC:** An outbreak or occurrence of one specific disease from a single source, in a group, population, community, or geographical area, in excess of the usual level of expectancy.



**EPIZOOTIC:** Epidemic rates of disease among animals.

**FAMILY HOUSEHOLD:** At least two family members related by birth, marriage, or adoption, one of whom is related to the householder.

**FEDERAL, STATE, OR LOCAL PUBLIC HEALTH AGENCY:** A government or non-government entity authorized to provide one or more essential public health services. Included are health, mental health, substance abuse, environmental health, occupational health, educational, and public health agencies.

**FOODBORNE ILLNESS:** Illness caused by the transfer of disease organisms or toxins from food to humans.

**FORCIBLE RAPE:** The carnal knowledge of a female forcibly and against her will.

**HEALTH EDUCATION:** Any planned combination of learned experiences designed to predispose, enable, and reinforce voluntary behavior conducive to health in individuals, groups, and communities.

**HEALTH PROMOTION:** Efforts to create healthy lifestyles and a healthy environment to prevent medical and other secondary conditions, such as teaching people how to address their healthcare needs and increasing opportunities to participate in usual work activities.

**HERD IMMUNITY:** The level of disease resistance of a community or population. Herd immunity is achieved when a sufficient proportion of a population is protected by vaccine to prevent the circulation of disease agents within the population.

**HISPANIC ORIGIN:** Based on self-identification by respondents. People of Hispanic origin are those who indicated that their origin was Mexican, Puerto Rican, Cuban, Central or South American, or some other Hispanic origin. People of Hispanic origin may be of any race.

**HOST:** An organism, usually a human or an animal, that harbors a disease.

**HOUSEHOLDER:** The person (or one of the people) in whose name a housing unit is owned, rented, or maintained. If the house is owned or rented jointly by a married couple, the household may be either the husband or the wife.

**INCIDENCE RATE:** A measure of the number of new cases of disease occurring in a specific population over a specific period of time, usually 1 year.

**INCUBATION PERIOD:** The time between exposure to a pathogenic organism and the onset of symptoms of a disease.

**INDICATOR:** A measure of health status or a health outcome.

**INFANT DEATH:** Death of an infant less than 1 year old.

**INFANT MORTALITY RATE:** The number of deaths of infants less than 1 year old per 1,000 live births in a population.

**INFECTIOUS DISEASE:** A disease caused by the entrance into the body of organisms (such as bacteria, protozoans, fungi, or viruses) that then grow and multiply there; often used synonymously with communicable disease.

**LEADING CAUSES OF DEATH:** Those diagnostic classifications of disease that are most frequently responsible for deaths.

**LIFE EXPECTANCY:** The number of additional years of life expected at a specified point in time.

**LOW BIRTH WEIGHT (LBW):** Weight at birth of less than 2,500 grams (about 5.5 pounds).

**MORBIDITY:** A measure of disease incidence or prevalence in a given population, location, or other grouping of interest.

**MORTALITY:** The event or rate of death.

**MURDER AND NONNEGLIGENT MANSLAUGHTER:** The willful (nonnegligent) killing of one human being by another.

**NATIONALLY NOTIFIABLE & STATE REPORTABLE DISEASES:** Diseases for which there are legal requirements for reporting and notification to public health authorities.

**NON-FAMILY HOUSEHOLD:** A person living alone or a householder who shares a home with non-relatives only, such as boarders or roommates.

**NON-HISPANIC:** All people whose ethnicity is not Hispanic. Race and ethnicity are separate concepts, so the racial categories of White, Black, American Indian and Alaska Native, and Asian and Pacific Islander all contain some people of Hispanic origin.

**PANDEMIC:** An epidemic that is widespread across a country, continent, or a large populace, possibly worldwide.

**PARITY:** The number of live births a woman has had.

**POLICY DEVELOPMENT:** One of public health's three core functions. Policy development involves serving the public interest in the development of comprehensive public health policies by promoting the use of the scientific knowledge base in decision making and by leading in developing public health policy.

**PREVALENCE RATE:** A measure of the total number of cases of disease existing in a specific population at a certain point in time or over a certain period of time.

**PRIMARY PREVENTION:** Healthcare services, medical tests, counseling, and health education and other actions designed to prevent the onset of a targeted condition. Routine immunization of healthy individuals is an example of primary prevention.

**PROPHYLAXIS:** Prevention of or protection against disease, often involving the use of a biologic, chemical, or mechanical agent to destroy or prevent the entry of infectious diseases.

**PUBLIC HEALTH INFRASTRUCTURE:** The resources needed to deliver the essential public health services to every community – people who work in the field of public health, information and communication systems used to collect and disseminate accurate data, and public health organizations at the state and local levels in the front lines of public health.

**RACE:** Based on self-identification by respondents. There are four groups: White, Black, American Indian and Alaska Native, and Asian and Pacific Islander.

**RESERVOIR:** Humans, animals, plants, soil, or inanimate organic matter (feces or food) in which infectious organisms live and multiply.

**RISK FACTOR:** Something that increases a person's chance of developing a disease, condition, or injury.

**SECONDARY PREVENTION:** Measures such as healthcare services designed to identify or treat individuals who have a disease or risk factors for a disease but who are not yet experiencing symptoms of the disease. Pap tests and high blood pressure screening are examples of secondary prevention.

**TERTIARY PREVENTION:** Preventive healthcare measures or services that are part of the treatment and management of persons with clinical illnesses. Examples of tertiary prevention include cholesterol reduction in patients with coronary heart disease and insulin therapy to prevent complications of diabetes.

**VECTOR:** Any living nonhuman (usually an insect or small animal) carrier of disease that transports and serves the process of disease transmission.

**VERY LOW BIRTH WEIGHT (VLBW):** Weight at birth of less than 1,500 grams (about 3.3 pounds).

**VIOLENT CRIME:** Composed of four offenses: murder and nonnegligent manslaughter, forcible rape, robbery, and aggravated assault. All violent crimes involve force or threat of force.

**YEARS OF POTENTIAL LIFE LOST (YPLL):** A statistical measure used to determine premature death. YPLL is calculated by subtracting an individual's age at death from a predetermined life expectancy, usually 75 years of age.

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Appendix C



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Tulsa City-County Health Department  
5051 S. 129th E. Avenue  
Tulsa, OK 74134-7004

For more information, please call (918) 582-WELL or visit [www.tulsa-health.org](http://www.tulsa-health.org)

