

A vertical strip on the left side of the page features a grayscale microscopic image of tissue. A white grid is overlaid on this image, with some cells filled with a solid blue color. The grid consists of approximately 5 rows and 2 columns of cells.

2013

Communicable Diseases

University of Colorado Hospital

COMMUNITY HEALTH NEEDS ASSESSMENT

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OVERVIEW

People in the United States continue to get diseases that are vaccine preventable. Viral hepatitis, influenza, and tuberculosis (TB) remain among the leading causes of illness and death in the United States and account for substantial spending on the related consequences of infection.¹

Acute respiratory infections, including pneumonia and influenza, are the 8th leading cause of death in the United States, accounting for 56,000 deaths annually.² Pneumonia mortality in children fell by 97 percent in the last century, but respiratory infectious diseases continue to be leading causes of pediatric hospitalization and outpatient visits in the United States. On average, influenza leads to more than 200,000 hospitalizations and 36,000 deaths each year. The 2009 H1N1 influenza pandemic caused an estimated 270,000 hospitalizations and 12,270 deaths (1,270 of which were of people younger than age 18) between April 2009 and March 2010.

Infectious disease kills 300 American children per year, despite the availability of vaccines. Pertussis, a vaccine preventable disease, has resurged in the United States. In 2010, Colorado had 212 reported pertussis cases among children 6 years of age and younger, representing nearly 40 percent of pertussis cases statewide. Diphtheria, Tetanus and Pertussis (DTaP) vaccine is an effective method to control disease spread and helps protect school-aged children against potential classroom exposure.

HEPATITIS

“Hepatitis” means inflammation of the liver and also refers to a group of viral infections that affect the liver.³ The most common types are Hepatitis A, Hepatitis B, and Hepatitis C. Viral hepatitis is the leading cause of liver cancer and the most common reason for liver transplantation. An estimated 4.4million Americans are living with chronic hepatitis; most do not know they are infected. About 80,000 new infections occur each year.

- **Hepatitis A** is an acute liver disease caused by the Hepatitis A virus (HAV), lasting from a few weeks to several months. It does not lead to chronic infection. Transmission occurs by ingestion of fecal matter, even in microscopic amounts, from close person-to-person contact or ingestion of contaminated food or drinks. Hepatitis A vaccination is recommended for all children starting at age 1 year, travelers to certain countries, and others at risk.

¹ <http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=23>

² Ibid.

³ <http://www.cdc.gov/hepatitis/>

- **Hepatitis B** is a liver disease caused by the Hepatitis B virus (HBV). It ranges in severity from a mild illness, lasting a few weeks (acute), to a serious long-term (chronic) illness that can lead to liver disease or liver cancer. Transmission occurs through contact with infectious blood, semen, and other body fluids from having sex with an infected person, sharing contaminated needles to inject drugs, or from an infected mother to her newborn. Hepatitis B vaccination is recommended for all infants, older children and adolescents who were not vaccinated previously, and adults at risk for HBV infection.
- **Hepatitis C** is a liver disease caused by the Hepatitis C virus (HCV). HCV infection sometimes results in an acute illness, but most often becomes a chronic condition that can lead to cirrhosis of the liver and liver cancer. Transmission occurs through contact with the blood of an infected person, primarily through sharing contaminated needles to inject drugs. There is no vaccine for Hepatitis C.

INFLUENZA

The flu is a contagious respiratory illness caused by influenza viruses that infect the nose, throat, and lungs. It can cause mild to severe illness, and at times can lead to death. Most experts believe that flu viruses spread mainly by droplets made when people with flu cough, sneeze or talk. These droplets can land in the mouths or noses of people who are nearby. Less often, a person might also get flu by touching a surface or object that has flu virus on it and then touching their own mouth, eyes or possibly their nose.

On February 24, 2010 vaccine experts voted that everyone 6 months and older should get a flu vaccine each year starting with the 2010-2011 influenza season. CDC's Advisory Committee on Immunization Practices (ACIP) voted for "universal" flu vaccination in the U.S. to expand protection against the flu to more people.

While everyone should get a flu vaccine each flu season, it's especially important that the following groups get vaccinated either because they are at high risk of having serious flu-related complications or because they live with or care for people at high risk for developing flu-related complications:⁴

- Pregnant women
- Children younger than 5, but especially children younger than 2 years old
- People 50 years of age and older
- People of any age with certain chronic medical conditions
- People who live in nursing homes and other long-term care facilities
- People who live with or care for those at high risk for complications from flu, including:
 - Health care workers
 - Household contacts of persons at high risk for complications from the flu

⁴ <http://www.cdc.gov/flu/protect/keyfacts.htm>

- Household contacts and out of home caregivers of children less than 6 months of age (these children are too young to be vaccinated)

CDC recommends that people get their seasonal flu vaccine as soon as vaccine becomes available in their community.⁵ Vaccination before December is best since this timing ensures that protective antibodies are in place before flu activity is typically at its highest. CDC continues to encourage people to get vaccinated throughout the flu season, which can begin as early as October and last as late as May. Over the course of the flu season, many different influenza viruses can circulate at different times and in different places. As long as flu viruses are still spreading in the community, vaccination can provide protective benefit.

PNEUMONIA

Pneumonia is an infection in one or both of the lungs. Many small germs, such as bacteria, viruses, and fungi, can cause pneumonia.⁶ Pneumonia is not a single disease. It can have more than 30 different causes. Understanding the cause of pneumonia is important because pneumonia treatment depends on its cause.

Approximately one-third of the pneumonia cases in the United States each year are caused by respiratory viruses. These viruses are the most common cause of pneumonia in children younger than 5 years.

The flu virus is the most common cause of viral pneumonia in adults. Other viruses that cause pneumonia include respiratory syncytial virus, rhinovirus, herpes simplex virus, severe acute respiratory syndrome (SARS), and more.

TUBERCULOSIS

TB disease is caused by a bacterium called *Mycobacterium tuberculosis*.⁷ The bacteria usually attack the lungs, but TB bacteria can attack any part of the body such as the kidney, spine, and brain. If not treated properly, TB disease can be fatal. TB is spread through the air from one person to another. The TB bacteria are put into the air when a person with active TB disease of the lungs or throat coughs, sneezes, speaks, or sings. People nearby may breathe in these bacteria and become infected.

TB bacteria can live in your body without making you sick.⁸ This is called latent TB infection (LTBI). In most people who breathe in TB bacteria and become infected, the body is able to fight the bacteria to stop them from growing. People with latent TB infection do not feel sick and do not have any symptoms. People with latent TB infection are not infectious and cannot spread TB bacteria to others. However, if TB bacteria become active in the body and multiply, the person will get sick with TB disease.

⁵ <http://www.cdc.gov/flu/protect/keyfacts.htm>

⁶ <http://www.lung.org/lung-disease/pneumonia/understanding-pneumonia.html>

⁷ <http://www.cdc.gov/tb/topic/basics/default.htm>

⁸ Ibid.

There are two tests that can be used to help detect TB infection: a skin test or a special TB blood test.⁹ The skin test is used most often. A small needle is used to put some testing material, called tuberculin, under the skin. In 2-3 days, you return to the health care worker who will check to see if there is a reaction to the test. In some cases, a special TB blood test is given to test for TB infection. This blood test measures how a person's immune system reacts to the germs that cause TB.

DIPHTHERIA, TETANUS, PERTUSSIS

In an effort to reduce infectious disease that can be prevented with vaccination, Colorado will increase the percentage of children who are up to date on their DTaP immunizations when they enter kindergarten.¹⁰

**CDPHE has chosen DTaP immunizations as a
2016 Infectious Disease Winnable Battle.**

For a child to be up to date when entering kindergarten, the child must have received five DTaP shots or four shots if the fourth is administered on or after the child's fourth birthday.

Each year, the Colorado Immunization Program conducts a survey to assess progress toward meeting school immunization requirements. In Colorado, students are asked to receive the required immunizations, claim an exemption or be in the process of getting immunized. For the 2010-11 school year, the state immunization program determined 92.6 percent of Colorado kindergartners were up to date for DTaP. In Colorado, this means that students have either received the required immunizations, claimed an exemption, or are in the process of getting immunized.

**The Colorado 2016 goal for DTaP immunizations is to increase by 2 percent the
number of kindergartners in Colorado who are up to date when they go to school.**

Attaining this goal positions Colorado to achieve the Healthy People 2020 objective that 95 percent of children be vaccinated with four or more doses of DTaP at school entry. Healthy People 2020 includes immunization coverage goals for all ages, but this milestone age group was earmarked with the highest coverage goal, further illustrating the importance of protecting this vulnerable population.

OTHER INFECTIOUS DISEASE COLORADO WINNABLE BATTLES

The Colorado Department of Health has selected the reduction of gonorrhea rates among Colorado's 15- to 29-year old age group as a 2015 Infectious Disease Winnable

⁹ http://www.cdc.gov/tb/publications/factseries/skintest_eng.htm

¹⁰ <http://www.cdphe.state.co.us/hs/winnableBattles/infectiousDiseasePrevention.html>

Battle.¹¹ Gonorrhea rates are discussed in the data report for Sexual Health / HIV. The rate of central line-associated bloodstream infections was also chosen as a 2015 Infectious Disease Winnable Battle. Rates are not included in this report as this is not a community-based health indicator.

¹¹ <http://www.cdphe.state.co.us/hs/winnableBattles/infectiousDiseasePrevention.html>

HEPATITIS A

Colorado Electronic Disease Reporting System: Cases of Hepatitis A

The incidence rate of Hepatitis A is 0.6 per 100,000 population in Colorado.

Denver County has an incidence rate higher than the State.

Arapahoe, Adams and Douglas Counties have hepatitis A incidence rates that are below the State.

Adams and Douglas Counties are currently meeting the HP 2020 goal of 0.3%.

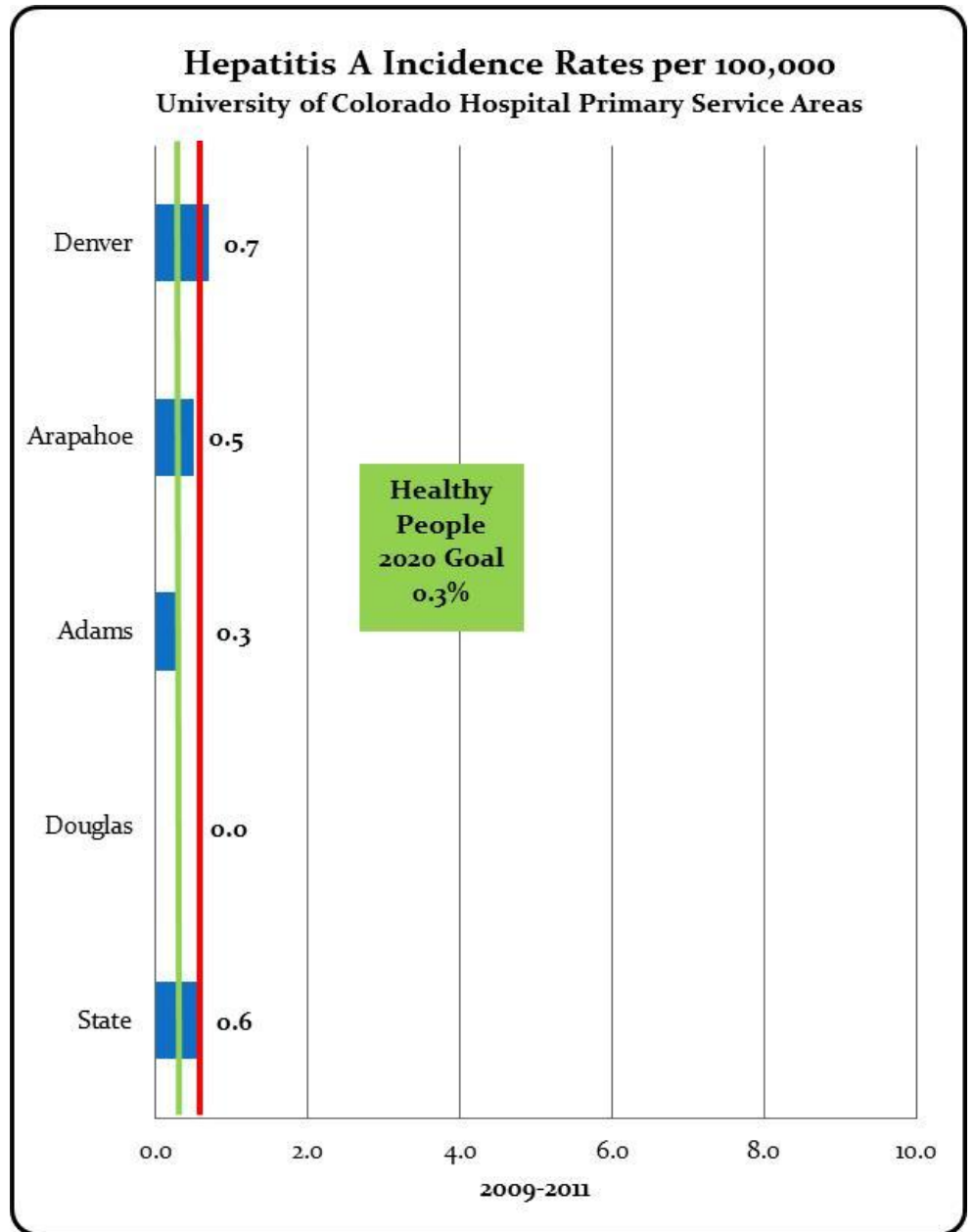


Figure 1: Hepatitis A Incidence¹²

¹² Chart Source: Division of Disease Control and Environmental Epidemiology-Communicable Disease Epidemiology Program (http://www.cdphe.state.co.us/dc/Epidemiology/dc_guide.html) Data is meta-data as calculated by Health Statistics Section of the Colorado Department of Public Health and Education

HEPATITIS A TRENDS AND DEMOGRAPHICS

- The rate of reported hepatitis A cases in Colorado has declined dramatically during 2000-2009. It is likely that increased pediatric use of the hepatitis A vaccine is the reason for this decline.¹³
- In 2000 a total of 212 cases were reported compared with a historic low of 26 cases in 2007.
- During 2005-2009 the average incidence per year was 0.8 cases per 100,000 persons, or an average of 41 reported cases per year in Colorado.
- The largest declines have been among children under 10 years of age, particularly children age 5-9, whose average annual incidence rates declined from 4.1 cases per 100,000 during 2000-2004 to 0.4 cases per 100,000 persons during 2005-2009.
- In recent years (2005-2009), the highest rates of reported illness have been among persons 15-19 years (1.1 per 100,000); persons 20-39 years (1.1 per 100,000) and persons 80 years and older (1.2 per 100,000).
- During 2005-2009 rates of hepatitis A illness were higher among Hispanics than other racial or ethnic groups. The average incidence rate for White non-Hispanic persons was 0.7 per 100,000 and the rate for Hispanic persons was 1.1 per 100,000, approximately 55% higher. While this is a substantial disparity, the difference between the two groups has decreased over time.
- During 2004-2009, international travel was the most frequently reported risk factor for hepatitis A infection, with 46.5% of cases reporting international travel during the 2-6 weeks before onset of symptoms.
- Public health efforts to educate travelers about the importance of hepatitis A vaccine might further decrease incidence.
- While persons who handle food are not at increased risk for hepatitis A, even a single case in a food handler can result in a large and costly public health investigation.
- Food Service employers wishing to decrease their risk of a hepatitis A exposure at their establishment could consider hepatitis A vaccination for workers, in addition to continuing to monitor and enforce regulations that pertain to hand hygiene and bare hand contact with ready to eat foods.
- Rapid reporting and case investigation remain very important to limiting potential spread from reported cases to others in the community.

¹³ <http://www.cdphe.state.co.us/dc/hepatitis/hepa/HepAsummary.pdf>

HEPATITIS B

Colorado Electronic Disease Reporting System: New Acute and Chronic Cases of Hepatitis B

The incidence rate in Colorado of acute Hepatitis B is 0.8 while the rate for chronic Hepatitis B is 10.8.

Denver, Arapahoe, and Adams Counties have combined acute and chronic incidence rates that are higher than the State.

Douglas County has a combined acute and chronic hepatitis B incidence rate that is below the State.

While it is not clear, it is likely that the HP 2020 goal applies to new acute cases of Hepatitis B, in which case all counties are meeting the HP 2020 goal.

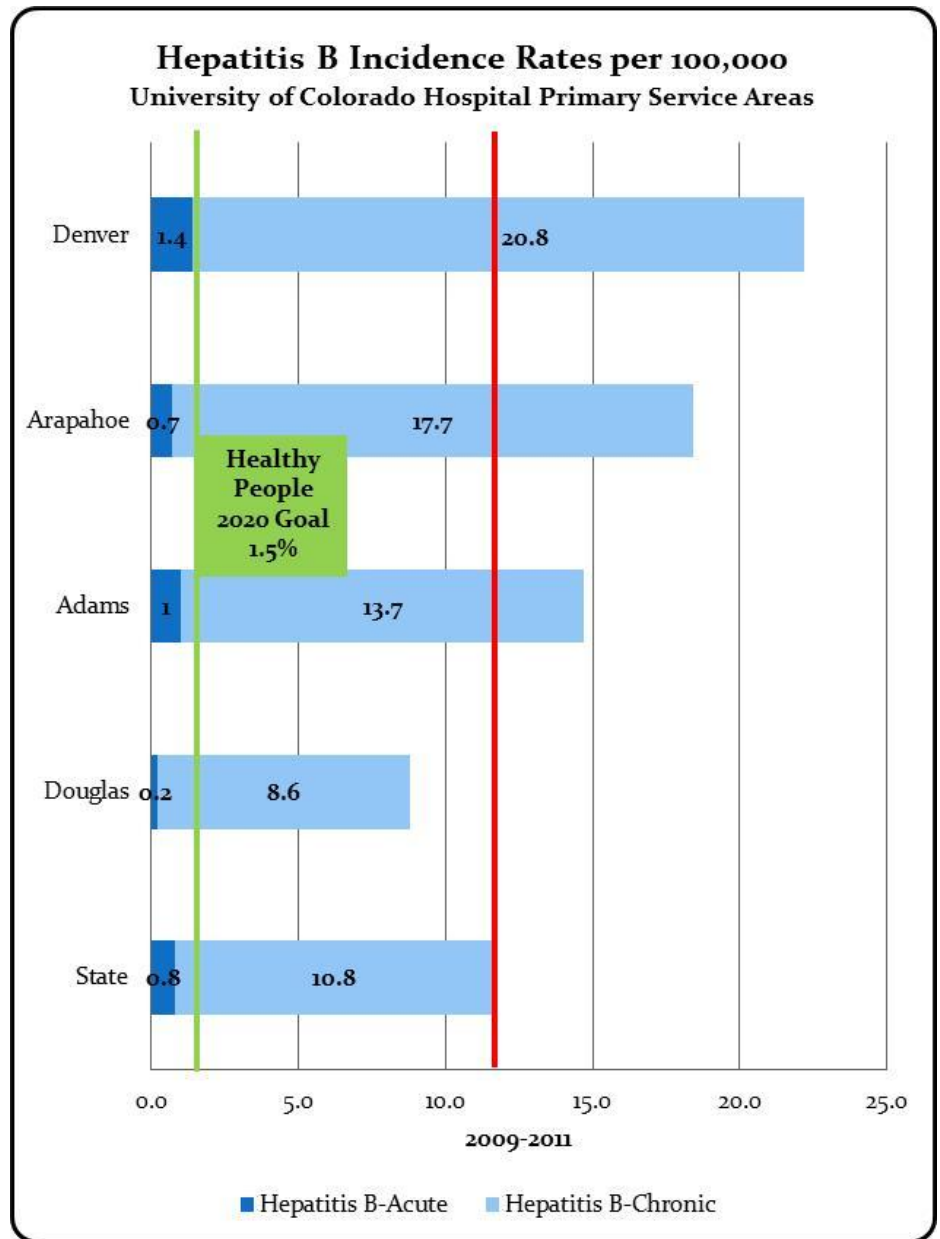


Figure 2: Hepatitis B Incidence¹⁴

¹⁴ Chart Source: Division of Disease Control and Environmental Epidemiology-Communicable Disease Epidemiology Program (http://www.cdphe.state.co.us/dc/Epidemiology/dc_guide.html). Data is meta-data as calculated by Health Statistics Section of the Colorado Department of Public Health and Education

HEPATITIS B DEMOGRAPHICS

- Men had the highest number of reported cases of acute and chronic hepatitis B infection¹⁵.
- For acute cases, persons 30-59 years of age had the highest number of reported cases (40 cases or 75.47%). Person >25 years of age are less likely to be immunized for hepatitis B based on a school-entry requirement that began in 1997. These findings suggest that individuals in these age groups continue to engage in high risk behavior and could benefit from vaccine. For chronic hepatitis B infection persons 20-39 years of age, 287 (51.71%) had the most cases reported. Chronic infections are more likely to be diagnosed among women seeking prenatal care or later in the course of infection when symptoms become more common.
- White non-Hispanic people had the majority of cases reported for acute with 25 (47.10%). The category of Asian/Pacific Islanders had the majority of cases reported for chronic with 208 (37.40%).
- Data in Colorado's Perinatal Hepatitis B Unit indicates that foreign-born pregnant women are significantly more likely to be reported with hepatitis B infection than pregnant women born in the U.S.

¹⁵ <http://www.cdphe.state.co.us/dc/hepatitis/Hepatitis%20B%20in%20Colorado%202010%20Final.pdf>

HEPATITIS C

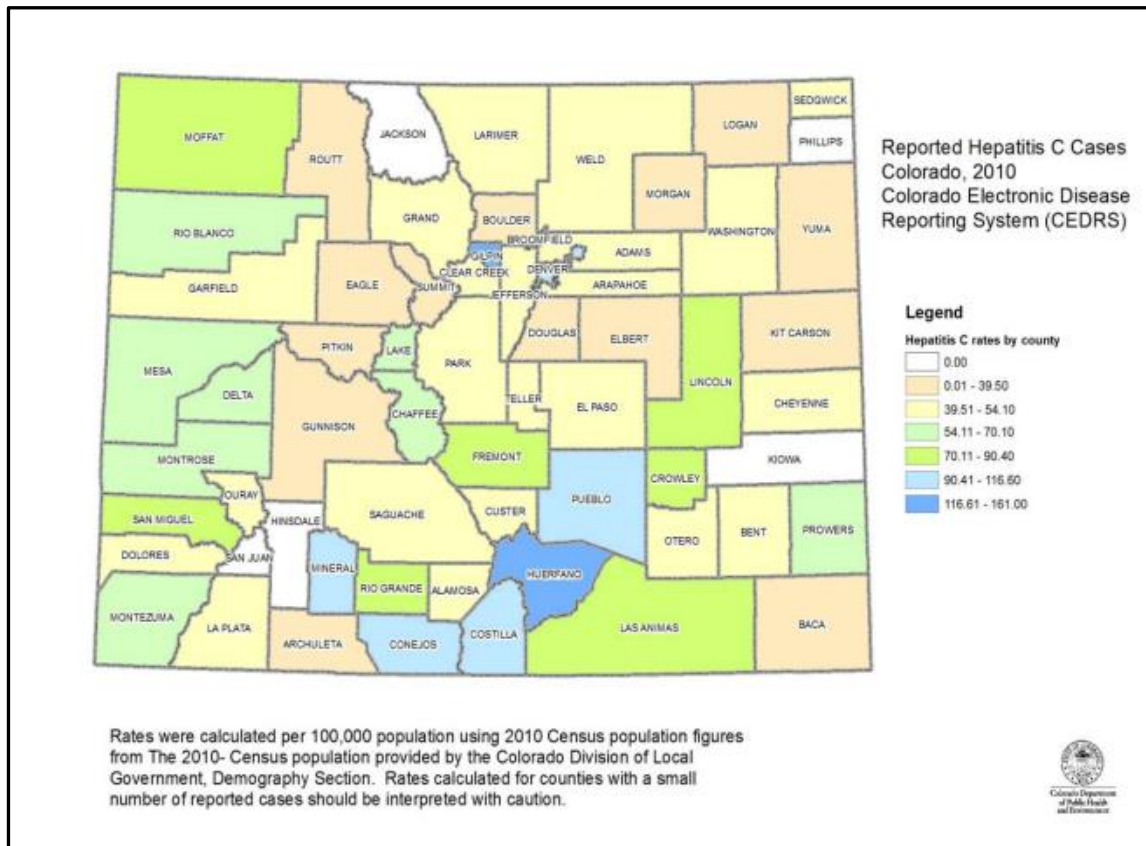


Figure 3: Hepatitis C Incidence Rates per 100,000¹⁶

- Men had the highest number of reported cases of acute and chronic hepatitis C infection.¹⁷ The reasons for this are unclear.
- White non-Hispanic people had the majority of acute cases reported with 18 (66.70%).¹⁸ The category of Other/Multiple/Unknown had the majority of cases reported for chronic 1477 (45.20%).
- Acute hepatitis C was reported in 11 counties.¹⁹ Reported chronic cases resided in 59 of the 64 Colorado counties. Outside of Denver, rural and frontier counties (rural areas sparsely populated that are isolated from population centers and services), had the highest rates of reported chronic cases. However, this is based on small numbers of cases reported, and five rural and frontier counties did not report a case.

¹⁶ <http://www.cdphe.state.co.us/dc/hepatitis/Hepatitis%20C%20in%20Colorado%202010%20Final.pdf>

Note: The Colorado Department of Public Health and Environment did not calculate meta-data for Hepatitis C.

¹⁷ Ibid.

¹⁸ Ibid.

¹⁹ Ibid.

INFLUENZA IMMUNIZATION

BRFSS Survey Question: During the past 12 months, have you had a flu shot?

The prevalence rate of adults who had a flu shot in Colorado is slightly higher than the Nation. Arapahoe, Denver, and Douglas Counties have flu shot prevalence rates in adults that are higher than the State. All counties have rates that are significantly below the Healthy People 2020 goal.

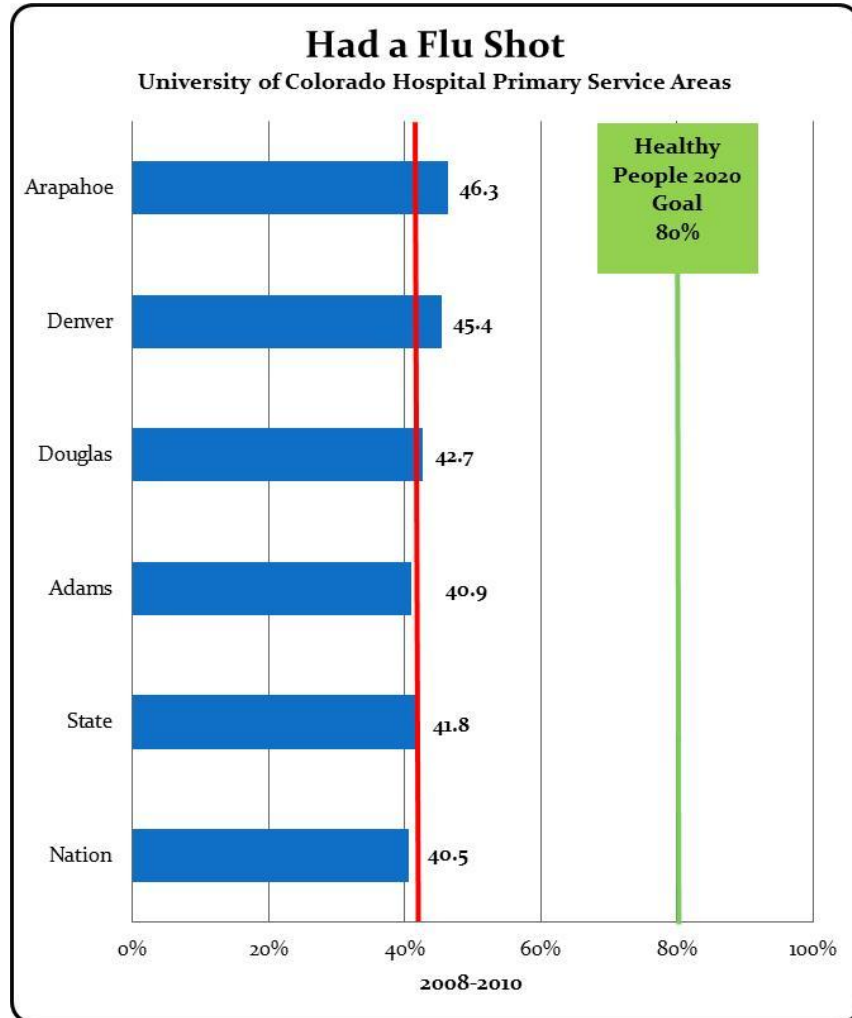


Figure 4: Had a Flu Shot²⁰

²⁰ Chart Source: Behavioral Risk Factor Surveillance System, Colorado Department of Public Health and Environment. For State and County data, two years of data are combined (2003/2004, 2005/2006, 2007/2008, 2009/2010). National data from National BRFSS, 2010/2011 only.

DEMOGRAPHICS OF INFLUENZA IMMUNIZATION

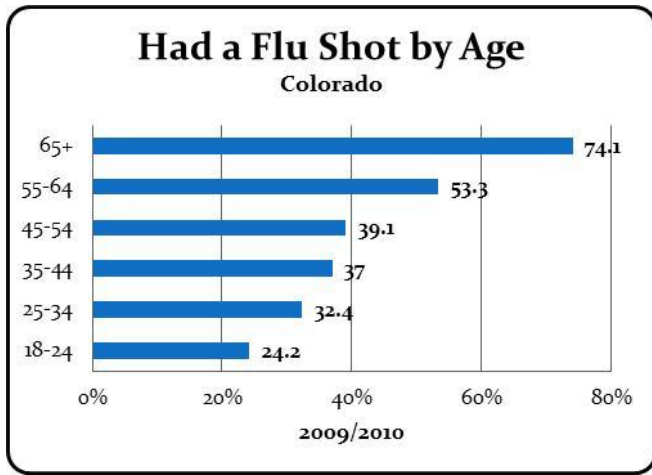


Figure 5: Had a Flu Shot by Age²¹

The prevalence of flu shots in adults increases with age. Rates in the age group 35-44 and 45-54 are statistically the same. All other groups have significantly different rates.

Rates of flu shots in White/Non-Hispanic adults are significantly higher than all other groups.

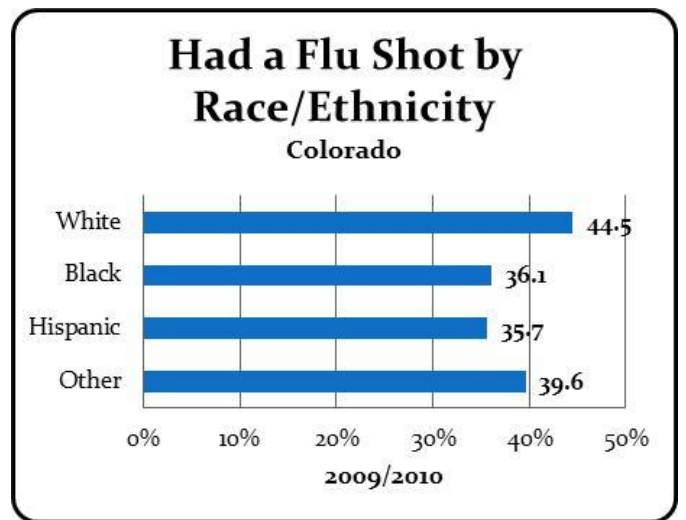


Figure 6: Had a Flu Shot by Race/Ethnicity²²

Adults with income of \$50,000 and above have a significantly higher rate of flu shots than other income groups.

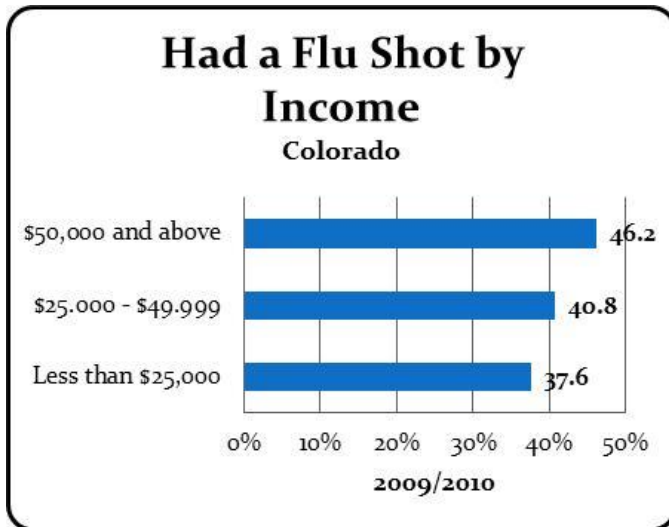


Figure 7: Had a Flu Shot by Income²³

²¹ Chart Source: Behavioral Risk Factor Surveillance System, Colorado Department of Public Health and Environment.

²² Ibid.

²³ Ibid.

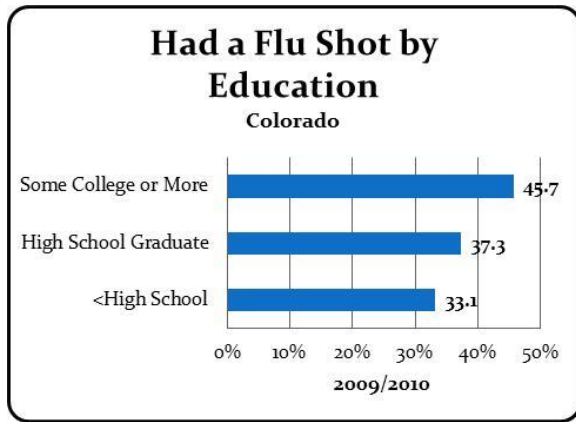


Figure 8 Flu Shot by Education²⁴

Females have a significantly higher rate of flu shots than males.

Adults with some college or more have a significantly higher rate of flu shots than other income groups.

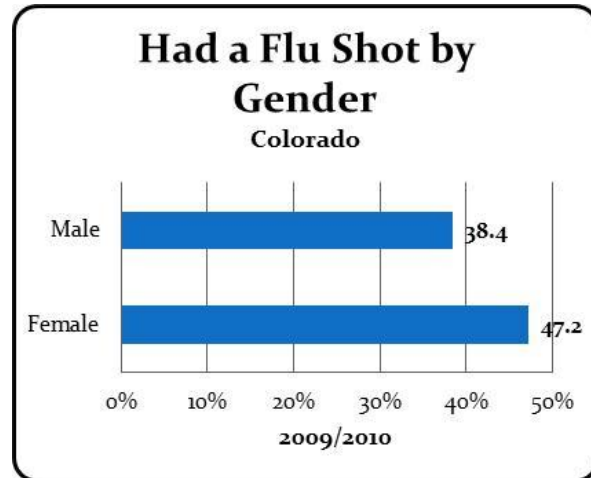


Figure 9: Had a Flu Shot by Gender²⁵

INFLUENZA IMMUNIZATION TRENDS

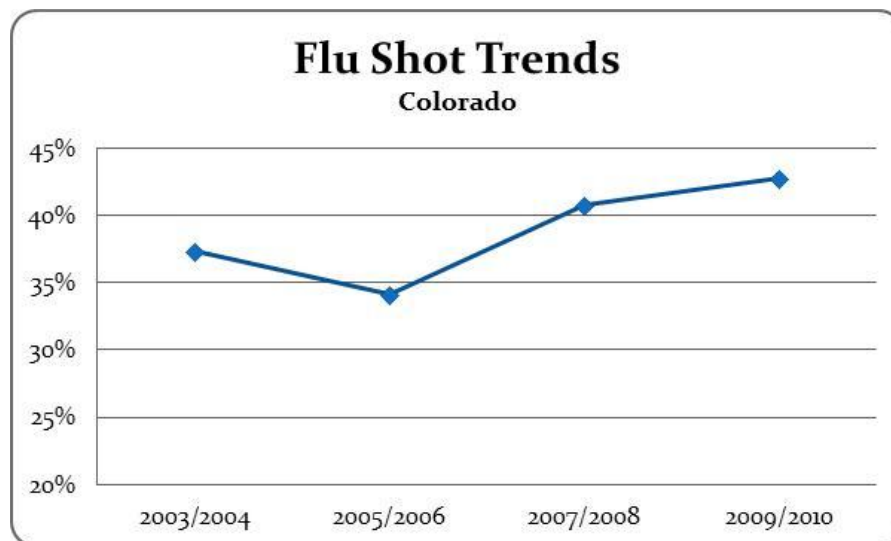


Figure 10: Had a Flu Shot Trends²⁶

The prevalence rate of adults who have received flu shots is increasing in Colorado, but significant gains are needed to meet the Healthy People goal of 80%.

²⁴ Chart Source: Behavioral Risk Factor Surveillance System, Colorado Department of Public Health and Environment.

²⁵ Ibid.

²⁶ Chart Source: Behavioral Risk Factor Surveillance System, Colorado Department of Public Health and Environment.

INFLUENZA HOSPITALIZATIONS

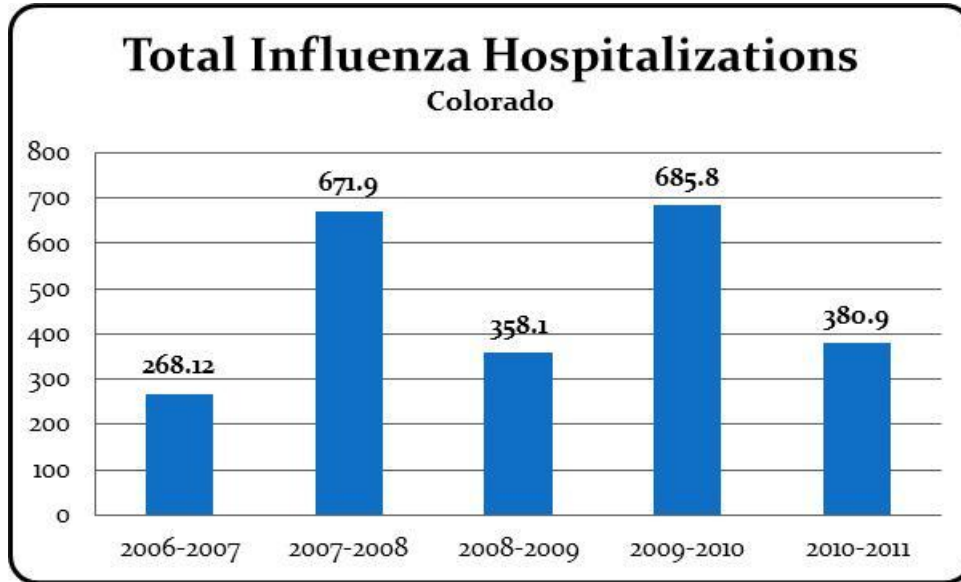


Figure 11: Influenza Hospitalizations²⁷

Hospitalizations due to Influenza vary from year to year. Considerably more infants are hospitalized for influenza than other age groups.

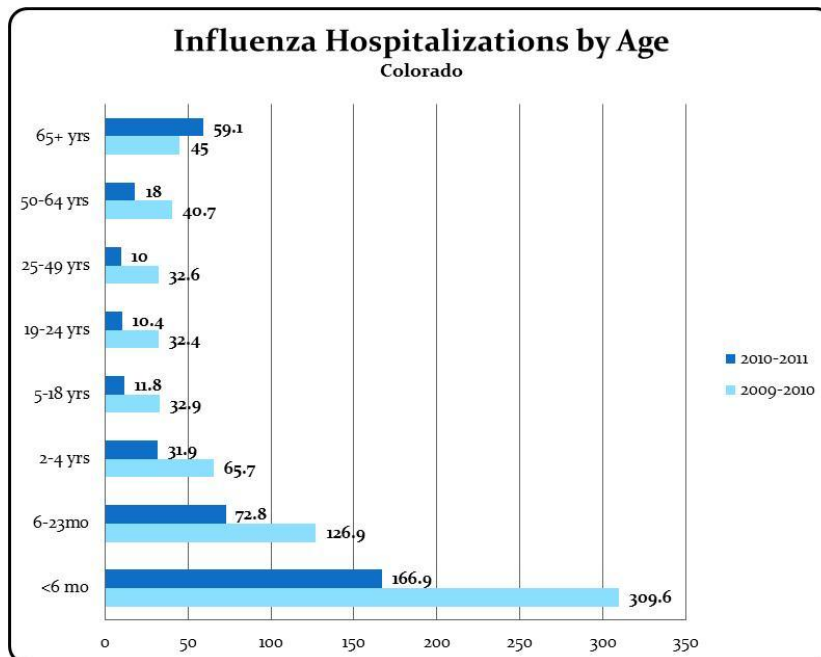


Figure 12: Influenza Hospitalizations by Age²⁸

²⁷ Chart Source: Colorado Department of Public Health, Influenza Surveillance

²⁸ Ibid.

PNEUMONIA VACCINATION

BRFSS Survey Question: Have you ever had a pneumonia vaccination?

The prevalence rate of adults who had a pneumonia vaccination in Colorado is 25.3%. Denver and Arapahoe Counties have pneumonia vaccination prevalence rates in adults that are higher than the State. Adams and Douglas Counties have a pneumonia vaccination prevalence rate in adults that is below the State.

The HP 2020 Goal of 60% vaccination applies to high risk adults between the ages of 18-64, and is not directly comparable to this data.

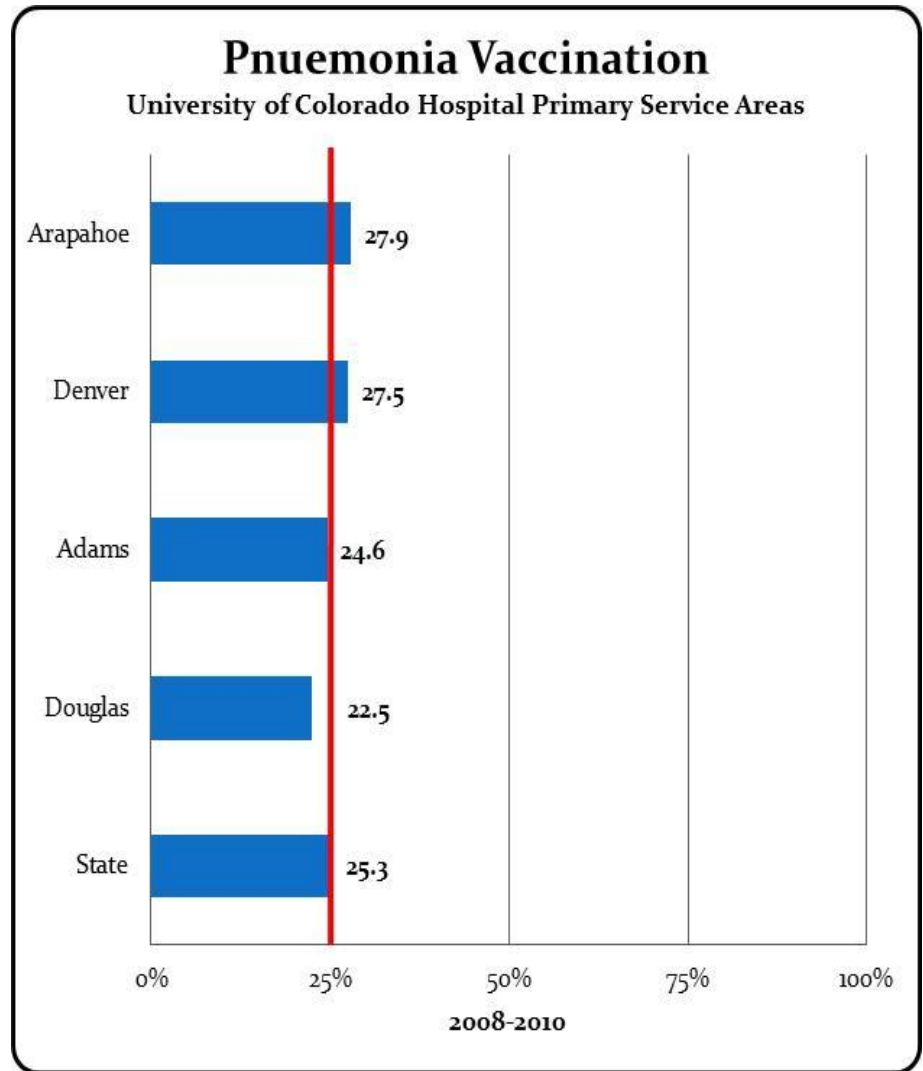


Figure 13: Pneumonia Vaccination²⁹

²⁹ Chart Source: Behavioral Risk Factor Surveillance System, Colorado Department of Public Health and Environment. For State and County data, two years of data are combined (2003/2004, 2005/2006, 2007/2008, 2009/2010).

DEMOGRAPHICS OF PNEUMONIA VACCINATION

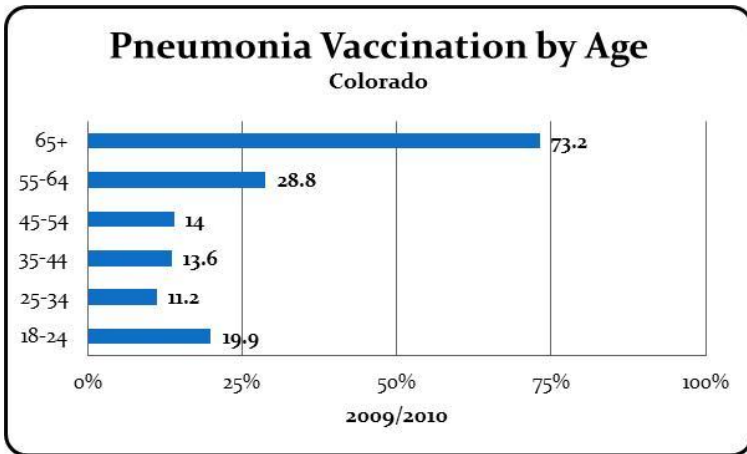


Figure 14: Pneumonia Vaccination by Age³⁰

The prevalence of pneumonia vaccination in adults is significantly higher in the youngest and two oldest age groups, than for adults aged 25 to 54

Hispanic adults have a significantly lower prevalence rate of pneumonia category than all other adults.

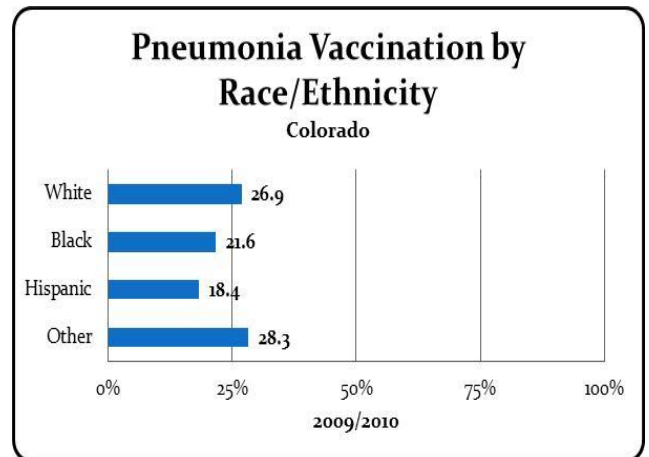


Figure 15: Pneumonia Vaccination by Race/Ethnicity³¹

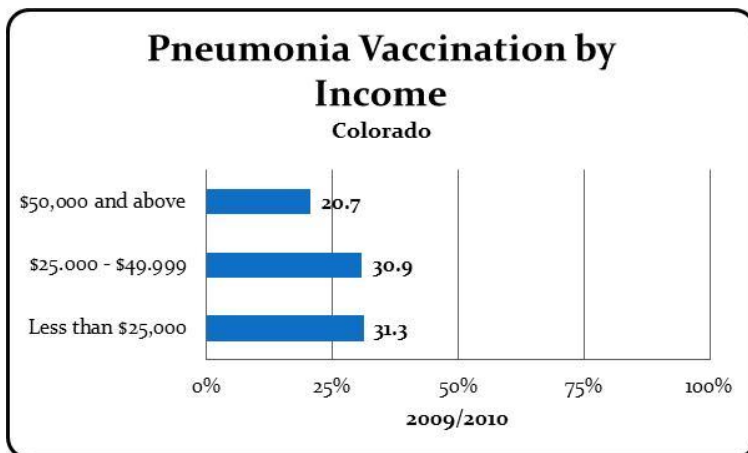


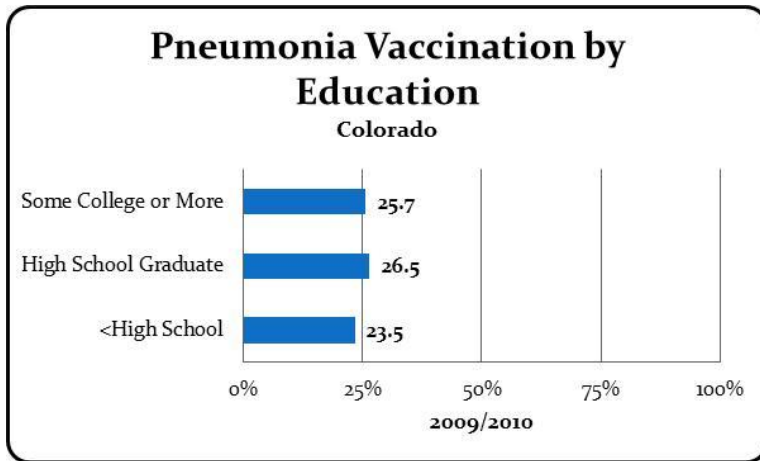
Figure 16: Pneumonia Vaccination by Income³²

Adults with income of \$50,000 and above have a significantly lower rate of pneumonia vaccination than other income groups.

³⁰ Chart Source: Behavioral Risk Factor Surveillance System, Colorado Department of Public Health and Environment.

³¹ Ibid.

³² Ibid.



There are no significant differences between pneumonia vaccination rates based on education groups

Figure 17: Pneumonia Vaccination by Education³³

PNEUMONIA IMMUNIZATION TRENDS

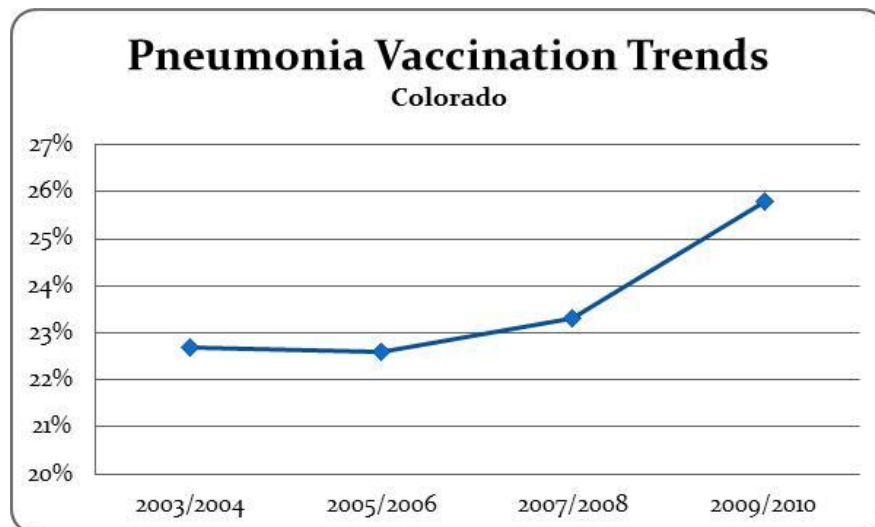


Figure 18: Had a Flu Shot Trends³⁴

A significant increase in the adult prevalence rate of pneumonia vaccination was seen from 2007/2008 to 2009/2010.

³³ Chart Source: Behavioral Risk Factor Surveillance System, Colorado Department of Public Health and Environment.

³⁴ Chart Source: Behavioral Risk Factor Surveillance System, Colorado Department of Public Health and Environment.

TUBERCULOSIS INCIDENCE RATES

Survey: Tuberculosis in Colorado: 2006-2010 Mean Case Rate by County (Reporting at least one case case)

Overall, tuberculosis incidence rates in Colorado are lower than the nation.

Denver and Arapahoe Counties have TB incidence rates that are higher than the State while the Adams County rate is the same as the State. Douglas County has a TB rate that is lower than the State. Douglas County is already meeting the HP 2020 target.

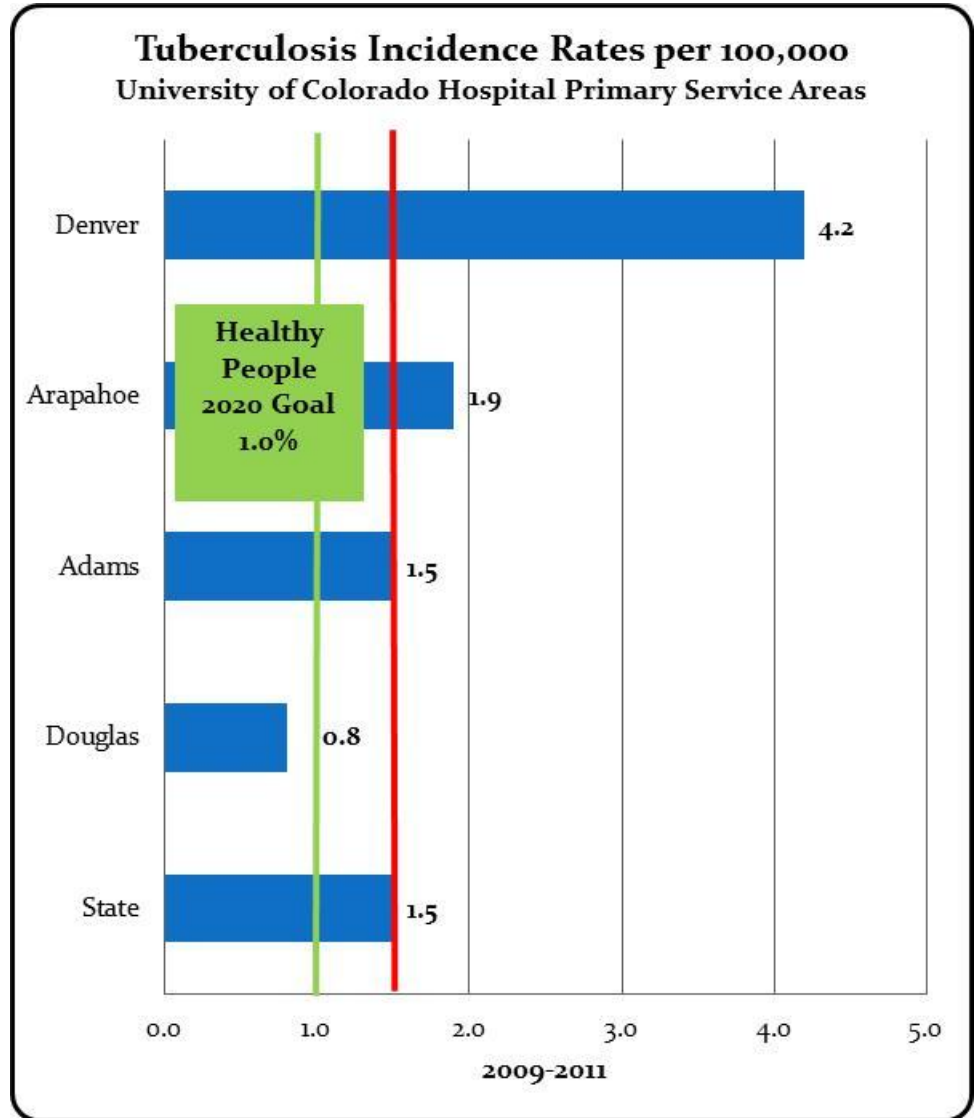


Figure 19: Tuberculosis Incidence Rates³⁵

³⁵ Chart Source: Colorado Department of Public Health and Environment. Denominators for computing the rate of tuberculosis in Colorado are from the Colorado Division of Local Government, State Demography Office. National data is from 2010 only as reported by the CDC
<http://www.cdc.gov/tb/publications/factsheets/statistics/TBTrends.htm>

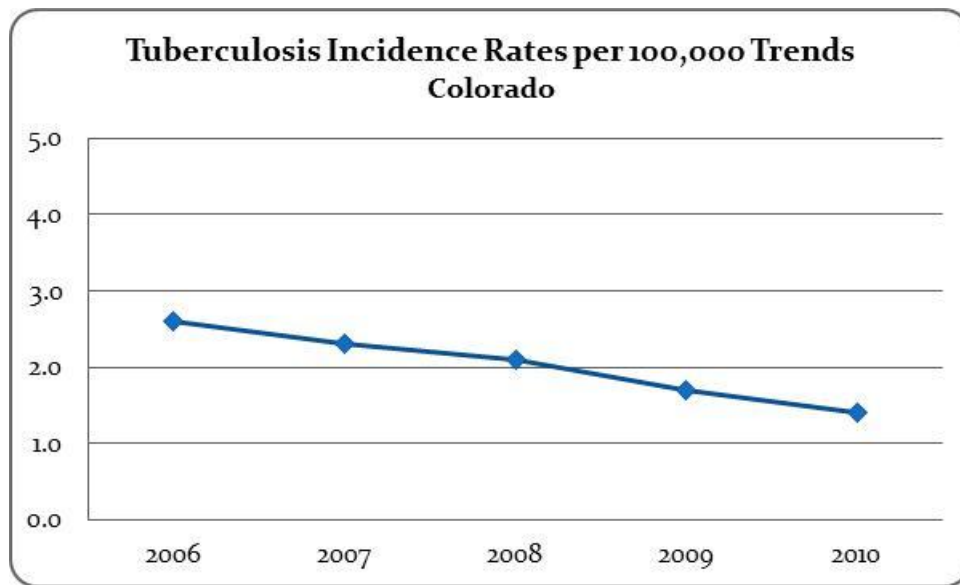


Figure 20: Tuberculosis Incidence Trends³⁶

In Colorado, incidence rates of TB are trending downward. In 2010, a total of 11,181 tuberculosis (TB) cases were reported in the United States, for a rate of 3.6 cases per 100,000 population, which was a decline of 3.9% from 2009 and the lowest rate recorded since national reporting began in 1953.³⁷ Despite an average decline in TB rates of 3.8% per year during 2000--2008, a record decline of 11.4% in 2009, and the 2010 decline of 3.9%, the national goal of TB elimination (defined as <0.1 case per 100,000 population) by 2010 was not met.

Although TB cases and rates decreased among foreign-born and U.S.-born persons, foreign-born persons and racial/ethnic minorities were affected disproportionately by TB in the United States. In 2010, the TB rate among foreign-born persons in the United States was 11 times greater than among U.S.-born persons. TB rates among Hispanics, non-Hispanic blacks, and Asians were seven, eight, and 25 times greater, respectively, than among non-Hispanic whites. Among U.S.-born racial and ethnic groups, the greatest racial disparity in TB rates was for non-Hispanic blacks, whose rate was seven times greater than the rate for non-Hispanic whites. Progress toward TB elimination in the United States will require ongoing surveillance and improved TB control and prevention activities to address persistent disparities between U.S.-born and foreign-born persons and between whites and minorities.

³⁶ Chart Source: Colorado Department of Public Health and Environment. Denominators for computing the rate of tuberculosis in Colorado are from the Colorado Division of Local Government, State Demography Office. No TB cases were reported in Archuleta or La Plata.

³⁷ <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm60u02.htm>

Colorado Electronic Disease Reporting System: Confirmed or probable case classifications of Pertussis.

Pertussis is commonly known as whooping cough. The number of new cases per 100,000 people is slightly higher in Colorado than the nation.

Arapahoe and Adams County rates of new pertussis cases are higher than the State.

Douglas and Denver County rates of new pertussis cases are below the State.

HP 2020 goals for pertussis are not comparable to this data.

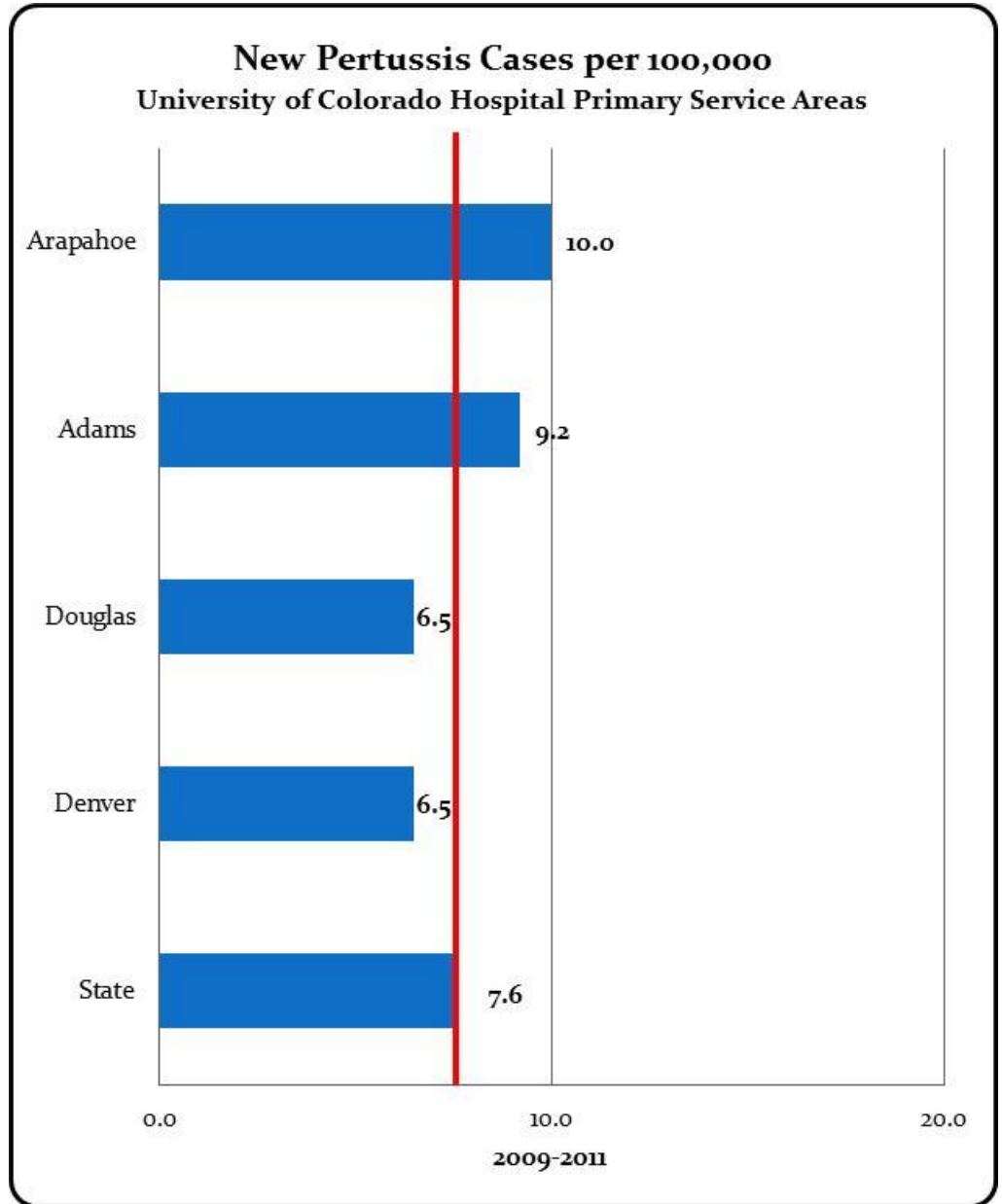


Figure 21: New Pertussis Cases³⁸

³⁸Chart Source: Colorado Electronic Disease Reporting System (CEDRS). National data source: Office of Surveillance, Epidemiology, and Laboratory Services, Public Health Surveillance Program Office, Centers for Disease Control <http://www.cdc.gov/mmwr/PDF/wk/mm5754.pdf>

PERTUSSIS DEMOGRAPHICS

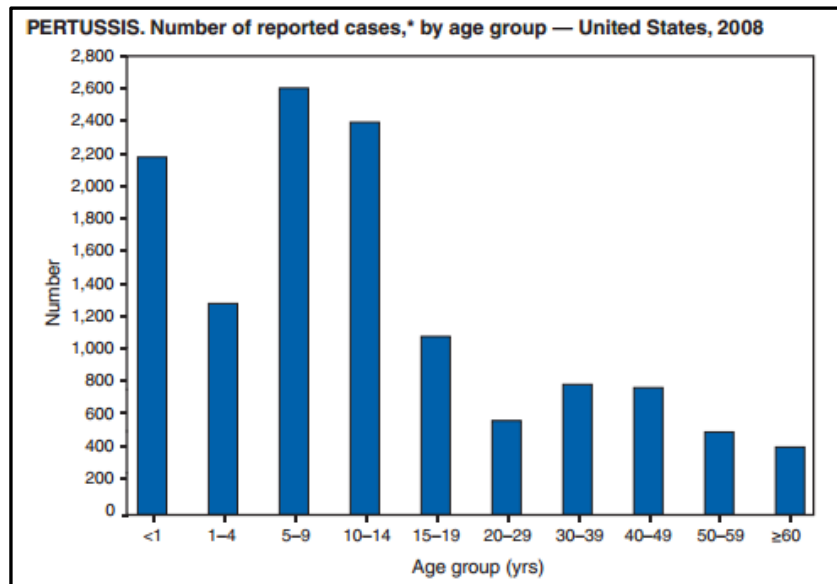


Figure 22: National Pertussis Cases by Age³⁹

Infants, especially those who are under-vaccinated, are at increased risk for complicated infections and death from pertussis.⁴⁰ Immunity to pertussis is thought to wane approximately 5-10 years after completion of childhood vaccination. A second peak in the number of reported cases is observed among school aged children and adolescents. The contribution of cases in children aged 5-9 years appears to be increasing compared with previous years.

³⁹Chart Source: Office of Surveillance, Epidemiology, and Laboratory Services, Public Health Surveillance Program Office, Centers for Disease Control <http://www.cdc.gov/mmwr/PDF/wk/mm5754.pdf> *Of 13,278 cases, age was reported unknown for 671 persons.

⁴⁰ Ibid.

PERTUSSIS TRENDS

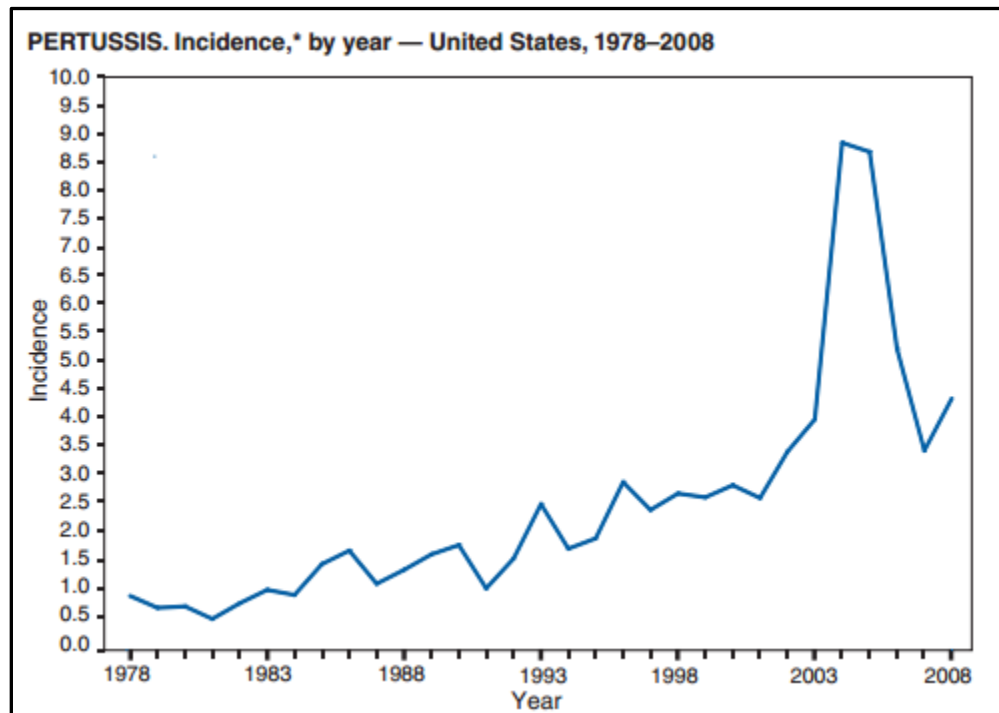


Figure 23: Pertussis Incidence by Year⁴¹

Although the incidence of reported pertussis is substantially lower than the peak in 2004, incidence increased slightly during 2007-2008, and continues to remain higher than in the 1990s.

PERTUSSIS IMMUNIZATION

Each year, the Colorado Immunization Program conducts a survey to assess progress toward meeting school immunization requirements.⁴² In Colorado, students are asked to receive the required immunizations, claim an exemption or be in the process of getting immunized. According to Colorado data from 2003, of children 7 months to 9 years of age, 60% of pertussis cases occurred in children who were not appropriately immunized for their age.⁴³

For the 2010-11 school-year, the state immunization program determined 92.6 percent of Colorado kindergartners were up to date for DTaP.

⁴¹ Office of Surveillance, Epidemiology, and Laboratory Services, Public Health Surveillance Program Office, Centers for Disease Control. Data is per 100,000 population.

⁴² <http://www.cdphe.state.co.us/hs/winnableBattles/infectiousDiseasePrevention.html>

⁴³ <http://www.cdphe.state.co.us/dc/Epidemiology/vaccinepreventable2003.pdf>

In Colorado, this means that students have either received the required immunizations, claimed an exemption, or are in the process of getting immunized.

The Colorado 2016 goal is to increase by 2 percent the number of kindergartners in Colorado who are up to date with DTaP immunizations when they go to school.

Child poverty is the single most significant risk factor for under-immunization.⁴⁴ Income influences immunization rates in a variety of ways, including parental knowledge and attitudes; reliance on publicly-financed health care services; inadequate insurance coverage; lack of childcare; and other health care access barriers. In addition, although national immunization rates for all racial and ethnic groups have improved, racial and ethnic disparities remain. In Colorado, these disparities are most visible among Hispanic children because they are the largest ethnic minority group in the state, and the only group for whom data exist. Because under-immunized children tend to reside in geographic, cultural, or economic pockets of need, the risk associated with a disease outbreak in these communities increases.

⁴⁴ Colorado Childhood Immunization Rates: Policy and Practice; Colorado Health Institute Policy Brief.

INTERVENTIONS

CLINICAL RECOMMENDATIONS

The following clinical recommendations come from the [US Preventive Services Task Force \(USPSTF\)](#) .

SCREENING FOR HEPATITIS B VIRUS INFECTION IN PREGNANCY

The U.S. Preventive Services Task Force (USPSTF) recommends screening for hepatitis B virus (HBV) infection in pregnant women at their first prenatal visit.

COMMUNITY INTERVENTIONS

The following evidence-based community interventions come from the [Guide to Community Preventive Services](#) , Centers for Disease Control and Prevention (CDC).

TARGETED VACCINATIONS: MULTIPLE INTERVENTIONS IMPLEMENTED IN COMBINATION

Combinations of specific interventions have proven effective at increasing targeted vaccine coverage,

TARGETED VACCINATIONS: PROVIDER REMINDERS

Provider reminders let providers or other appropriate staff know when individual clients are due for vaccinations, through notations, stickers, or other prompts in clients' charts, or through computer databases or registries.

UNIVERSALLY RECOMMENDED VACCINATIONS: CLIENT OR FAMILY INCENTIVE REWARDS

Client or family incentive rewards, which may be monetary (e.g., gift cards) or non-monetary (e.g., baby products) are used to motivate people to obtain recommended vaccinations.

UNIVERSALLY RECOMMENDED VACCINATIONS: CLIENT REMINDER AND RECALL SYSTEMS

Client reminder and recall interventions involve reminding members of a target population that vaccinations are due (reminders) or late (recall).

UNIVERSALLY RECOMMENDED VACCINATIONS: HEALTH CARE SYSTEM-BASED INTERVENTIONS IMPLEMENTED IN COMBINATION

Interventions to increase client demand for vaccinations, when combined with interventions that improve access (e.g., home visits) and/or with interventions that target providers or systems (e.g., provider reminders), are recommended for improving vaccination rates.

UNIVERSALLY RECOMMENDED VACCINATIONS: HOME VISITS TO INCREASE VACCINATION RATES

Home visits intended to increase vaccination rates:

- Provide vaccinations to clients in their homes, or
 - Promote recommended vaccinations with referral to available immunization services.
- Home visits may be conducted by either vaccination providers, such as nurses, or other providers, such as social workers. Visits generally include an assessment of client vaccination status and a brief discussion of the importance of the indicated immunizations.

UNIVERSALLY RECOMMENDED VACCINATIONS: PROVIDER ASSESSMENT AND FEEDBACK

Provider assessment and feedback involves retrospectively evaluating the performance of providers in delivering one or more vaccinations to a client population and giving them feedback on their performance.

UNIVERSALLY RECOMMENDED VACCINATIONS: REDUCING CLIENT OUT-OF-POCKET COSTS

Reducing out-of-pocket costs to families for vaccinations or administration of vaccinations can be implemented by paying for vaccinations or administration, providing insurance coverage, or reducing copayments for vaccinations at the point-of-service.

UNIVERSALLY RECOMMENDED VACCINATIONS: STANDING ORDERS WHEN USED ALONE

Standing orders authorize nurses, pharmacists, and other healthcare personnel to administer vaccinations without the need for examination or direct order from the attending provider.

UNIVERSALLY RECOMMENDED VACCINATIONS: VACCINATION PROGRAMS IN WIC SETTINGS

Coordinated vaccination interventions in WIC settings are recommended based on strong evidence of effectiveness in increasing vaccination coverage in children.

UNIVERSALLY RECOMMENDED VACCINATIONS: VACCINATION REQUIREMENTS FOR CHILD CARE, SCHOOL AND COLLEGE ATTENDANCE

Vaccination requirements are laws or policies requiring vaccinations or other documentation of immunity as a condition of child care, school, and college attendance. Their purpose is to reduce the incidence of vaccine-preventable disease and associated morbidity and mortality by increasing vaccination rates.

UNIVERSALLY RECOMMENDED VACCINES: PROVIDER REMINDERS

Provider reminder interventions inform those who administer vaccinations that individual clients are due for specific vaccinations.

WORKSITE HEALTH PROMOTION: INTERVENTIONS TO PROMOTE SEASONAL INFLUENZA VACCINATIONS AMONG HEALTHCARE WORKERS

Interventions to increase uptake of flu vaccines in healthcare workers (HCW) involve making vaccines available to workers and announcing this availability using things such as newsletters, e-mails, or paycheck inserts.

WORKSITE HEALTH PROMOTION: INTERVENTIONS TO PROMOTE SEASONAL INFLUENZA VACCINATIONS AMONG NON-HEALTHCARE WORKERS

Interventions to promote influenza vaccination among workers can include making vaccines available to workers and announcing this availability in work settings, using things such as newsletters, e-mails, or paycheck inserts.

CONSUMER INFORMATION

The following consumer resources are from the Quick Guide to Healthy Living at healthfinder.gov.

PROTECT YOURSELF FROM SEASONAL FLU

Get a seasonal flu shot every year.

GET A PNEUMONIA SHOT

Get the pneumonia shot at age 65 to protect yourself from the most common type of bacterial pneumonia.

GET ADULT BOOSTER SHOTS

The shots we get as children can weaken over time. That's why it's important to get your adult shots.

GET YOUR CHILD'S SHOTS ON SCHEDULE

Shots (also called vaccinations or immunizations) work best when they are given at certain ages.

GET YOUR PRE-TEEN'S SHOTS ON SCHEDULE

All kids need the Tdap and MCV4 shots at age 11 or 12. Doctors recommend girls also get the HPV vaccine.

CHILDHOOD IMMUNIZATIONS

A two-pronged approach will be used to drive the 2 percent increase in DTaP coverage rates among Colorado kindergartners⁴⁵. The first step is to better educate parents and providers on the importance of immunizations. Colorado recently developed www.ImmunizeForGood.com, a parent-focused website that has received national recognition. To ensure health care providers are equally educated on the benefits of immunization, the Colorado Immunization Program also has launched a new provider education series in 2011. The educational webinars will continue in 2012. In the second approach, the immunization program will expand access and utilization of the Colorado

Immunization Information System (CIIS) in child care facilities, head start programs, WIC programs and elementary schools. This will allow staff at these facilities to review immunization records online and quickly identify any children who need additional vaccinations to be fully vaccinated.

⁴⁵ <http://www.cdphe.state.co.us/hs/winnableBattles/infectiousDiseasePrevention.html>

LOCAL RESOURCES

County	City	Provider	Contact Person	Email	Website	Address	Phone Number	Programs
Colorado		CDPHE: Communicable Disease Program	Lisa Miller	*	http://www.cdphe.state.co.us/dc/epidemiology/dc_guide.html	4300 Cherry Creek Drive South A5 Denver, CO 80246	(303)-692-2628	Walk in clinic every Wednesday from 1-6:45 PM, serves low income families
Colorado		Colorado Children's Immunization Coalition	Erin Suelman- Noonan	erin.suelmann@childrenscolorado.org	http://www.childrensimmunization.org/	13123 East 16th Avenue, Box 281 Aurora, CO 80045	(720)-777-5340	An immunization information system is an important tool to increase and sustain high immunization coverage by consolidating immunization records of children from multiple providers, allowing providers to generate reminder and recall notices, and providing official school forms. The Centers for Disease Control and Prevention has guidelines for immunization information system functionality. These guidelines were used to develop the Colorado Immunization
Colorado		Colorado Influenza and Pneumococcal Alert Coalition	Erica Bloom	erica.bloom@state.co.us	http://immunizecolorado.com/		303-692-2789	A statewide partnership that promotes vaccination of adults against life-threatening diseases such as influenza, pneumonia, and many others

County	City	Provider	Contact Person	Email	Website	Address	Phone Number	Programs
Colorado		Colorado Immunization Program	Margaret Huffman	cdphedcdimmunization@cdphe.state.co.us	http://www.cdphe.state.co.us/dc/immunization/index.html	4300 Cherry Creek Drive South Denver, CO 80246	(303)-692-2650	The Immunization Program works to decrease preventable illness through the use of vaccines.
Colorado		Children's Hospital of Colorado Infectious Disease Program	*	*	http://www.childrenscolorado.org/conditions/immune/index.aspx	13123 East 16th Ave. Aurora, CO 80045	(720) 777-6981	Infectious Disease Program for Children across Colorado
Colorado		Colorado Department of Public Health Immunizations	*	cdphedcdimmunization@cdphe.state.co.us	http://www.cdphe.state.co.us/dc/immunization/	4300 Cherry Creek Drive South Denver, CO 80246	(303)-692-2650	The Immunization Program works to decrease preventable illness through the use of vaccines.
Adams	Commerce City	Community Health Services Adolescent Health	Deb Havilan		http://www.chskidshealth.org/phsicians.html	4675 E 69th Avenue Commerce City, CO 80022	303.567.3147	Immunizations offered by appointment, welcomes low income and uninsured populations
Adams, Arapahoe, Douglas		TCHD: Immunization Clinic	Bruce Wilson	webmaster@tchd.org	http://www.tchd.org/immunizations.html	6162 South Willow Drive, Suite 100 Greenwood Village, CO 80111	303-220-9200	Immunization by appointment only

County	City	Provider	Contact Person	Email	Website	Address	Phone Number	Programs
Arapahoe, Jefferson, Douglass, Adams		Metro Community Provider Network	John Kuennig	jkuennig.mcpn@hensmann.com	http://www.mcpn.org/en/index.html	3701 S Broadway Street Englewood, CO 80110	(303) 458-5302	Immunizations for the underserved in Arapahoe, Jefferson, Douglass, and Adams counties.
Denver		Clinica Tepeyac	Jim Garcia	*	http://www.clinicatepeyac.org/	5075 Lincoln Street Denver, CO 80216	(303)-458-5302	Immunizations offered by appointment, welcomes low income and uninsured populations
Denver		Inner City Health Center	Kraig Burleson	rachelw@innercityhealth.com	http://www.innercityhealth.com/	3800 York St Denver, CO 80205	(303) 296-1767	Immunizations offered by appointment, welcomes low income and uninsured populations
Denver, Jefferson, Adams, Arapahoe,		Denver Health Public Health Immunization Center	*	*	http://denverhealth.org/Services/PublicHealth/ImmunizationClinic.aspx	777 Bannock St, Denver, CO 80204	303-436-6000	Immunizations offered for low income and uninsured populations at low costs or in conjunction with Medicaid, CICIP or CHIP

County	City	Provider	Contact Person	Email	Website	Address	Phone Number	Programs
Denver, Jefferson, Adams, Arapahoe,		Visiting Nurse Association: Flu shot Clinic	Michael Chapman	chapmanm@vnacolorado.org	http://www.vnacolorado.org/Services/Flu.aspx	90 Grant Street Denver, CO 80203	303-698-6517	Immunization and Flu Shot Clinic for Children and Adults for residents of the Denver metro area