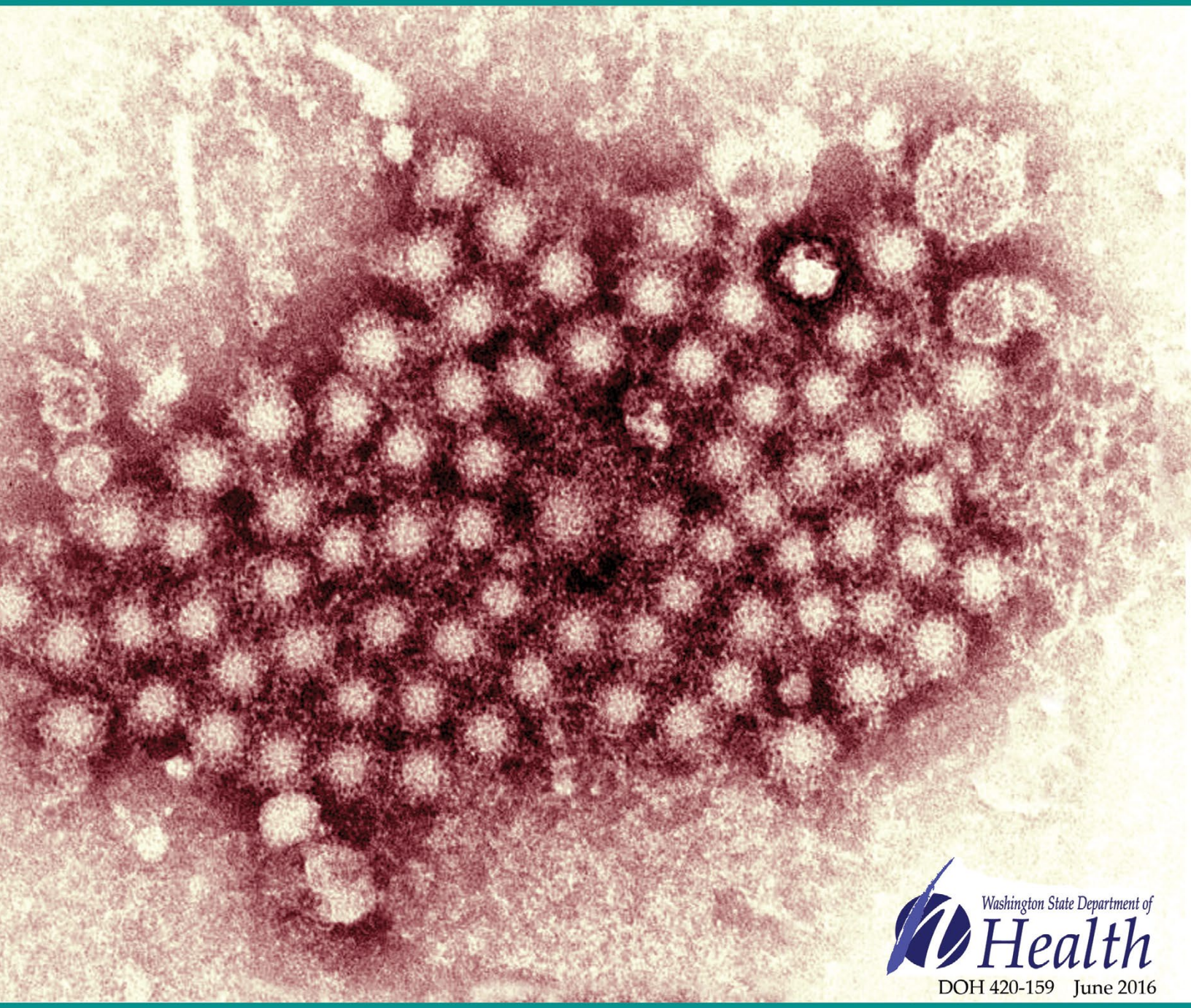
Viral Hepatitis C in Washington State



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Executive summary

This epidemiologic profile of hepatitis C virus (HCV) infections in Washington State provides information about the trends and distribution of HCV infections to assist in prioritization and planning around prevention and treatment efforts.

Over 1% of the United States population is infected with HCV.

- Most acute HCV infections have few symptoms and are not recognized.
- Most untreated acute HCV infections become lifelong chronic infections.
- Many of those with chronic HCV infection are not aware they are infected.
- Treatment for HCV infection requires specialist evaluation, takes months, and is expensive.
- Untreated chronic HCV infections can cause liver damage, cirrhosis, liver failure, or liver cancer.
- Chronic infection leads to increased healthcare costs, decreased productivity, reduced quality of life, and premature death.

Baby boomers (born 1945–1965) and persons who inject drugs are at higher risk of having or acquiring HCV infection.

The yearly impact of HCV in Washington includes:

- Around 60 to 80 acute HCV infections reported.
- An average of 5,115 chronic HCV infections reported.
- Around 550 hospitalizations for HCV infection with charges totaling over $22 million.
- Over 200 HCV-related liver and bile duct cancers.
- About 40 HCV-related liver transplants.
- Over 600 HCV-related deaths, six times the deaths due to HIV, with an ongoing increase.
- An average of 19 years of life lost with each death.
- Health disparities related to HCV by race/ethnicity and other risk factors.

A recent increase in acute HCV reports provides evidence of ongoing transmission. Three-quarters of acute HCV cases in Washington report injection drug use. Additionally, an increase in HCV-related deaths provides evidence of chronic HCV cases developing long-term fatal complications.

Public health interventions for HCV have two components: preventing new infections and meeting the healthcare needs of those chronically infected. In order to accomplish this, public health must:

1. Identify persons with HCV infections, link them to care, and assure they receive treatment to become cured.
   - Increase access to HCV testing through provider systems and community based organizations.
   - Influence providers to adopt national recommendations to screen for HCV infection in persons at high risk for infection including one-time HCV screening for baby boomers.
   - Cultivate partnerships with Medicaid, fee-for-service programs, and managed care programs to reduce HCV treatment funding restrictions.
   - Improve access to healthcare for HCV-infected persons.
   - Use linkage to care models, such as treatment case management services that provide HCV patients with information, referral assistance, and medical and financial navigation.
   - Increase provider capacity to diagnose, care for, treat, and cure those infected with HCV.
   - Support health initiatives that increase access to HCV prevention, care, and treatment services for persons who inject drugs.
2. Prevent new HCV infections.
   - Provide risk reduction counseling and healthcare navigation services for those newly diagnosed.
   - Educate communities about risk factors for HCV, how to reduce risk, and the availability of health insurance options, prevention resources, and treatment services.
3. Strengthen data systems and increase data use around tracking of HCV infections.
   - Increase access to and use of Medicaid and provider healthcare data to improve health outcomes and influence quality of care for those infected with HCV.

Abbreviations

ACH	Accountable Community of Health.
ACS	American Community Survey.
AIAN	American Indian/Alaska Native.
AIDS	Acquired immune deficiency syndrome.
ASTHO	Association of State and Territorial Health Officials.
BHT	Better Health Together. The ACH that covers Adams, Ferry, Lincoln, Pend Oreille, Spokane, and Stevens counties.
CDC	Centers for Disease Control and Prevention.
CHARS	Comprehensive Hospital Abstract Reporting System. See Appendix A.
CHSR	Chronic Hepatitis Surveillance Records. See Appendix A.
CI	Confidence interval.
CPAA	Cascade Pacific Action Alliance. The ACH that covers Cowlitz, Grays Harbor, Lewis, Mason, Pacific, Thurston, and Wahkiakum counties.
CSTE	Council of State and Territorial Epidemiologists.
DOC	Department of Corrections.
DOH	Washington State Department of Health.
Project ECHO	Extension for Community Healthcare Outcomes. A program that links primary care clinicians with specialist care teams to manage patients who have chronic conditions requiring complex care.
eHARS	Enhanced HIV/AIDS Reporting System. See Appendix A.
GC ACH	Greater Columbia Accountable Community of Health. The ACH that covers Asotin, Benton, Columbia, Franklin, Kittitas, Garfield, Klickitat, Walla Walla, Whitman, and Yakima counties.
HBV	Hepatitis B virus.
HCA	Health Care Authority.
HCV	Hepatitis C virus.
HIV	Human immunodeficiency virus.
IDPS	Infectious Disease Prevention Section, Washington State Department of Health.
IHBD	Intrahepatic bile duct.
LHJ	Local health jurisdiction.
MMP	Medical Monitoring Project. See Appendix A.
NCACH	North Central Accountable Community of Health. The ACH that covers Chelan, Douglas, Grant, and Okanogan counties.
NHOPI	Native Hawaiian/other Pacific Islander.
NSACH	North Sound Accountable Community of Health. The ACH that covers Island, San Juan, Skagit, and Whatcom counties.
OCDE	Office of Communicable Disease Epidemiology, Washington State Department of Health
OCH	Olympic Community of Health. The ACH that covers Clallam, Jefferson, and Kitsap counties.
OFM	Office of Financial Management.
OID	Office of Infectious Disease, Washington State Department of Health.
PHIMS	Public Health Issues Management System. See Appendix A.
PHSKC	Public Health—Seattle & King County.
PWID	Persons who inject drugs.
SAMHSA	Substance Abuse and Mental Health Services Administration.
SD	Standard deviation.
SSP	Syringe service program.
SWWA RHA	Southwest Washington Regional Health Alliance. The ACH that covers Clark and Skamania counties.
TEDS	Treatment Episode Data Set. See Appendix A.
WDRS	Washington Disease Reporting System.
WSCR	Washington State Cancer Registry. See Appendix A.

Definitions

Age-adjusted rates per 100,000 persons allow comparison of disease rates among populations that may have different age distributions. These rates can also control for age effects when comparing across several years of data, as the age distribution of a population changes over time. Age-adjusted rates in this profile were calculated using the direct method with the US 2000 population as the standard population.

Antibody testing refers to measuring the immune system's reaction to an infection. Finding antibody to hepatitis C means the person was infected by hepatitis C at some time. RNA testing shows if the person has a chronic (ongoing) infection.

Baby boomers include persons born in the United States between the years 1945 and 1965.

Case definition: According to the Centers for Disease Control and Prevention (CDC), a case definition "is a set of uniform criteria used to define a disease for public health surveillance. Case definitions enable public health to classify and count cases consistently across reporting jurisdictions, and should not be used by healthcare providers to determine how to meet an individual patient's health needs." National case definitions for hepatitis C have historically been updated every few years.

Confidence interval: When a number (such as a rate) is calculated, a confidence interval gives a range of two numbers which contains the actual value of the calculated number with 95% certainty. A wide range means the calculated number is less certain.

Confirmed cases: A national case definition will typically include a "confirmed" case classification, which almost always includes a positive laboratory test affirming the presence of an infecting agent. There may or may not be a requirement to have specific symptoms in addition to the laboratory test. Until 2016 the national case definition for acute hepatitis C virus infection had only a confirmed case classification, which required a positive laboratory test and acute symptoms. Chronic hepatitis C (also called Hepatitis C, past or present) has probable and confirmed case classifications.

Incidence represents newly occurring or newly diagnosed cases of a disease in a population, generally reported for a designated time frame (e.g., per year). The burden for an acute, short duration disease is measured by disease incidence.

Percent change is the increase or decrease from one number to another with the change measured as a percent of the initial value. Percent change in cases or disease rates can compare trends over time.

Prevalence represents the number of cases of a disease existing in a population. The one measure of morbidity for a chronic, long-term disease is disease prevalence.

Primary diagnosis refers to the first diagnosis assigned to a hospitalization for a patient. In the Comprehensive Hospital Abstract Reporting System (CHARS), a hospitalization for a patient will be assigned at least one diagnosis (the primary diagnosis) and may also have listed up to 24 additional secondary diagnoses.

Probable cases: A national case definition may include a "probable" case classification, which is typically determined based on a combination of specific symptoms and laboratory tests. Chronic hepatitis C virus infection (also called Hepatitis C, past or present) has probable and confirmed case classifications, which require different positive laboratory tests.

Rates per 100,000 persons, also known as "crude" or "unadjusted" rates, are calculated by dividing the number of events (e.g., case reports, hospitalizations, deaths, etc.) of interest by the population (e.g., county, ACH region, Washington State, United States) for a given time period.

RNA (ribonucleic acid) testing refers to measuring the level of virus in a person. Finding hepatitis C RNA indicates the person is currently infected with hepatitis C and the virus has the potential to damage the liver. The infected person is also able to transmit the virus to others.

Secondary diagnosis refers to any diagnosis other than the first (primary) diagnosis assigned to a hospitalization for a patient.

Statistical significance is a mathematical technique that gives the likelihood a result occurred by random chance. Statistical significance does not necessarily imply importance or practical significance.

Washington State

Washington State is located in the Pacific Northwest region of the United States. It is on the coast of the Pacific Ocean, north of Oregon, west of Idaho, and south of the Canadian province of British Columbia. The state has 39 counties and includes larger urban areas such as Seattle, Tacoma, Everett, and Spokane; many other cities and towns with smaller populations; extensive agricultural regions in central and eastern Washington; smaller farms in western Washington; and timber and coastal resources.

Both acute and chronic hepatitis C virus (HCV) infections are among the notifiable conditions in Washington. Healthcare providers, healthcare facilities, and clinical laboratories are required to report information about new diagnoses of notifiable conditions to the local health jurisdiction (LHJ) of the county where the ill person lives. Public health responsibilities in Washington are under local rule, and local health officers have authority within each of the 35 LHJs. LHJs perform investigations and report cases and results to the Washington State Department of Health (DOH), where statewide data are compiled and added to national disease tracking. LHJs also sometimes collaborate on public health issues with the tribal nations that share borders with the counties they are responsible for.

Investigation of HCV requires significant resources at the local level. Currently, there are limited resources to support these activities, and many LHJs face increasing demands and decreasing funding.

Population characteristics

In 2014, Washington's population was above 7 million—around 2% of the population of the United States. From 2000 to 2014 the state's population grew by almost 17%, primarily in urban areas. The state's population distribution by age and gender resembles that of the country overall with 50% female and 50% male residents (Figure 1). About two-thirds of the population lives in western counties (Figure 2). County populations in 2014 ranged from 2,240 to 2,017,250 (Appendix B, Table 24).

Median age of Washingtonians in 2014 was 37.4 years. The population is predominantly white (71%), followed by Hispanic (12%), Asian (8%), two

Figure 1. Washington State and United States populations by age group and sex, 2014

Source: American Community Survey (ACS)

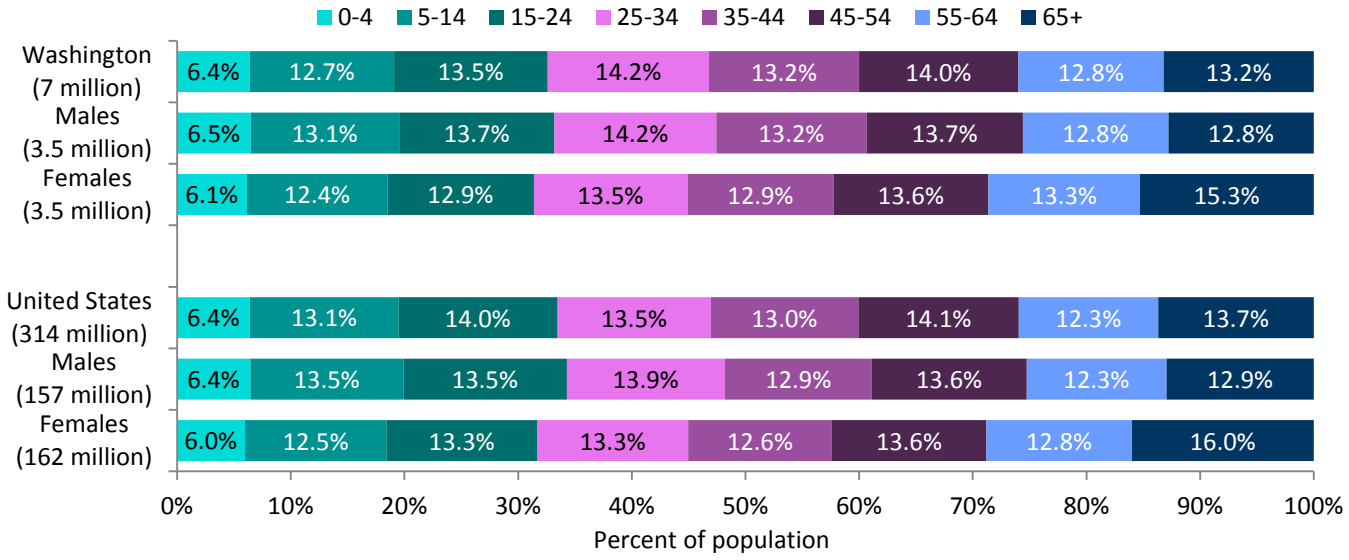
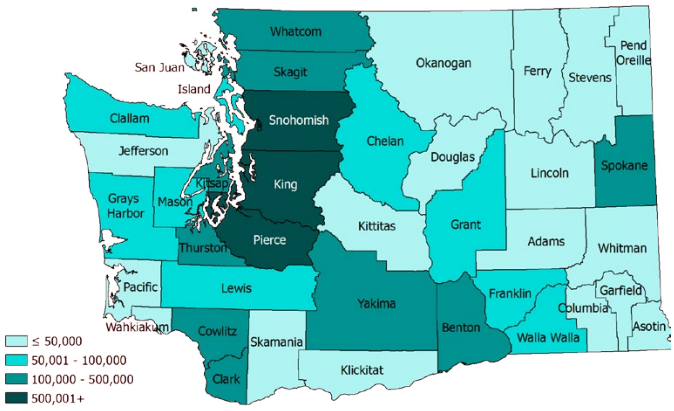


Figure 2. Population size by county—Washington State, 2014

Source: American Commmunity Survey (ACS)



or more races (4%), black (4%), American Indian/Alaska Native (1%), and Native Hawaiian/other Pacific Islander (<1%). Race and ethnicity vary by region (Appendix B, Table 20). For more information on how race and ethnicity numbers presented in this profile were determined, see Appendix A.

In 2014, according to American Community Survey (ACS) five-year estimates,[1] 19% of Washington residents over the age of 5 years spoke a language other than English at home, although 58% of these residents also speak English very well. Over a tenth (13%) were born outside of the United States.

Washington's American Indian population was just over 1% of the 2014 state population. The 29 federally recognized tribes in Washington are mainly in western counties (Figure 3). The tribes are sovereign nations but may interact from a government-to-government standpoint with the LHJs and DOH on matters of public health. This relationship

Figure 3. Map of the 29 sovereign nations in Washington State

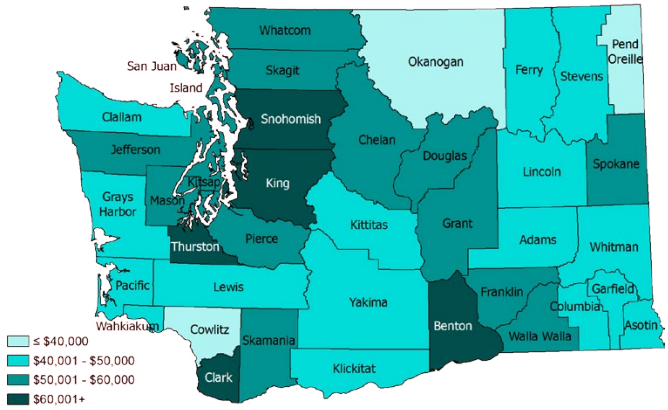
Source: Northwest Portland Area Indian Health Board

is grounded in the US Constitution, numerous treaties, statutes, and executive orders. Washington State recognizes the rights of American Indians to self-governance and self-determination.

The median household income for Washington in 2014 was $60,153 compared to the national median income of $53,657. Among Washington counties, the median income varied considerably, with a nearly two-fold difference between the lowest and highest median incomes (range: $35,146 to $75,045). Counties with higher median incomes tended to be in the western part of the state (Figure 4).

Figure 4. Median income of residents by county—Washington State, 2014

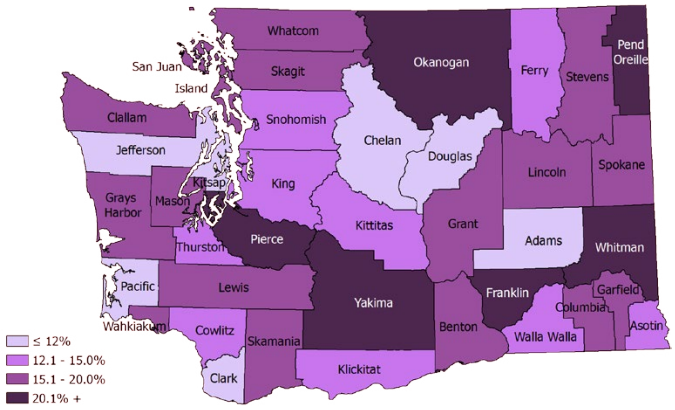
Source: American Commmunity Survey (ACS)



In 2014, 14% of the state population lived in poverty, which was defined as an annual income of less than $11,770 for a single person or $24,250 for a family of four. Counties with the highest rates of poverty (over 20% of the county population) were located in south-central and eastern Washington (Figure

Figure 5. Percentage of residents living in poverty by county—Washington State, 2014

Source: American Commmunity Survey (ACS)

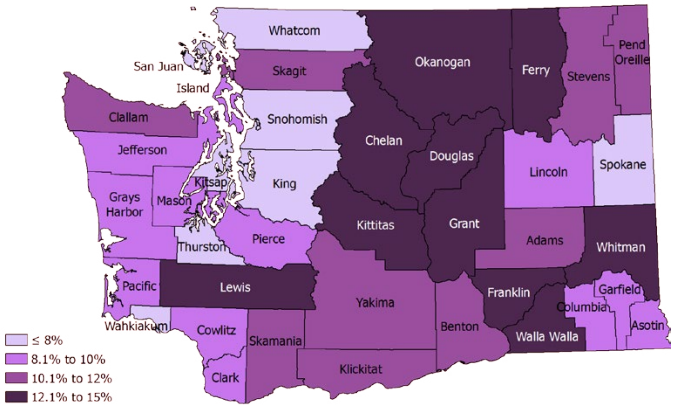


5). Nationally, 15% of the population was living in poverty in 2014.[1]

In the United States, lack of health insurance coverage was 10% in 2014. The percentage of the population lacking health insurance coverage in 2014 varied markedly among the Washington regions. The counties with over 12% of residents lacking health insurance were located primarily in north-central and southeastern Washington while most western counties had less than 10% of residents with no health insurance.[3]

Figure 6. Percentage of residents without health insurance by county—Washington State, 2014

Source: Office of the Insurance Commissioner



Accountable Communities of Health

Washington's Accountable Communities of Health (ACH) are regional coalitions consisting of leaders from a variety of sectors in a given geographic area working together to improve health in their region. The ACHs were developed as part of the Healthier Washington initiative to improve how Washingtonians pay for healthcare services, to ensure healthcare focuses on the whole person, and to build healthier communities through a broad collaborative regional approach.

The ACHs align geographically with Medicaid regional service areas in Washington (Figure 7). Grants and technical assistance for the ACHs come from the Washington State Health Care Authority (HCA), which works with partners to ensure residents have access to better healthcare at lower cost. The ACH regions have differed considerably in their populations and population growth over the past 15 years. King County ACH accounts for 29% of the state's population while North Central Accountable Community of Health accounts for only 3% (Appendix B, Table 19). Population counts rose in all

Figure 7. Accountable Communities of Health regions map, 2014

Source: Washington State Healthcare Authority (HCA)

ACHs from 2000 to 2014, ranging from 11% to 28% increases.

ACHs vary in their governance structures and regional priorities. Member organizations come from the private and public sectors, including healthcare and long-term care providers and facilities, healthcare insurance companies, local public health agencies, school districts, criminal justice agencies, legal service organizations, tribes, local government, nonprofit social service agencies, and philanthropic groups. As they develop, ACHs seek to involve all sectors that contribute to health and healthcare, collaborate on regional decision-making, and integrate healthcare by adjusting financing and delivery systems. Improving access to healthcare is a priority for all ACHs.

The HCA website has more information on Washington's ACHs: http://www.hca.wa.gov/hw/Pages/communities_of_health.aspx

Hepatitis C

Disease transmission

Hepatitis C virus (HCV) infection is the most common bloodborne condition in the United States. It is unrelated to other types of viral hepatitis such as hepatitis A virus and hepatitis B virus infections, and unlike those diseases has no vaccine available to prevent infection.

Humans are the source of exposure for HCV. The most common risk factor in the United States for acquiring HCV infection is current or former use of illicit drugs. Exposure occurs by sharing needles, injection equipment, or less commonly non-injection (nasal) equipment. A person's risk varies by the duration and frequency of drug use. Various groups of persons who inject drugs (PWID) had a 27–93% prevalence of HCV infection compared to an estimated 1.3% prevalence for the US population overall.[4]

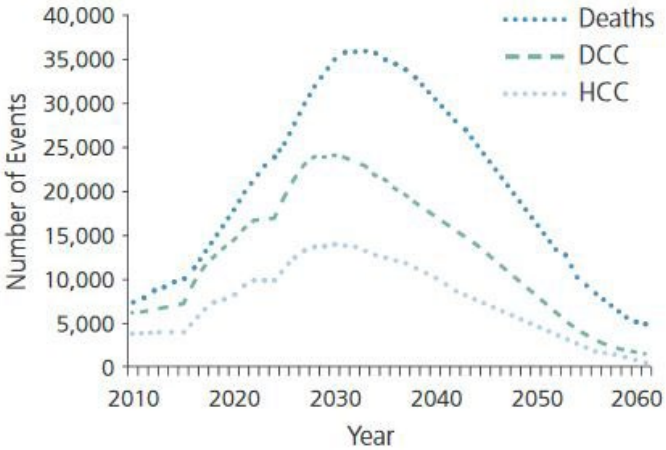
Less commonly, HCV is spread by failures of infection control measures in a healthcare or dental setting (e.g., hemodialysis, reuse of syringes or medication vials); sharing items such as toothbrushes, razors, or blood testing equipment; use of non-sterile equipment for tattooing or piercing; sexual contact without barriers; or an infected birth mother.

Persons born between the years 1945 and 1965 ("baby boomers") are at higher risk for HCV. Baby boomers make up roughly one-quarter of the US population but around three-quarters of chronic HCV cases.[5] They account for at least two-thirds of HCV-associated outpatient, emergency department, and hospital visits.[6] As young adults, baby boomers had higher risks of bloodborne exposures due to unscreened blood products, medical or dental exposures without modern infection control measures, and injection drug use when compared to previous or subsequent generations.[7] HCV testing only became available for clotting factor products in 1987 and for blood and organs in 1992. One-time screening for HCV infection is recommended for baby boomers, who have around a 3% prevalence of HCV infection.[8]

HCV-infected baby boomers accounted for 35% of those added to liver transplant waiting lists and receiving liver transplants in 2012.[41] As the baby boomer generation ages, morbidity and mortality due to HCV infection are expected to increase. Mathematical models suggest that new cases of complications such as liver cancer and death associated with HCV will not peak until after 2030 (Figure 8).[4,18]

Figure 8. Future burden of hepatitis C virus (HCV)-related morbidity and mortality in the United States

Source: Adapted from Rein DB et al.[18]



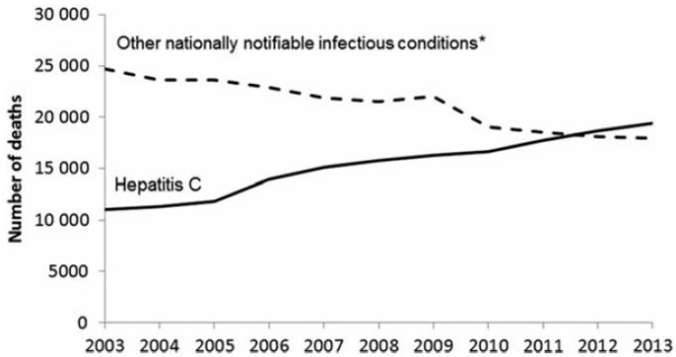
DCC, decompensated cirrhosis
HCC, hepatocellular carcinoma (liver cancer)

Most acute HCV infections cause no or minimal symptoms. When present, acute symptoms include jaundice, abdominal pain, fever, and fatigue. Deaths from acute HCV infections are rare. Between 75% and 85% of acute HCV infections persist to become chronic infections. For those with chronic HCV, 10–20% will develop progressive liver damage over two to three decades with varying degrees of liver scarring (cirrhosis). Cirrhosis can result in end-stage liver disease. Chronic HCV gives a 17-fold risk of a type of liver cancer known as hepatocellular carcinoma,[4] which accounts for over half of those on waiting lists for liver transplant.[9]

Chronic HCV infection is associated with premature death. By 2012, deaths in the United States due to HCV exceeded those due to 60 other nationally notifiable conditions combined, including HIV infection. While deaths due to these other conditions decreased beginning in 2003, deaths due to HCV increased (Figure 9).[10]

Figure 9. Annual number of US deaths associated with hepatitis C virus infection and all other nationally notifiable infectious conditions

Source: Adapted from Ly et al[10]



**Identified in the absence of hepatitis C.*

Based on household surveys and testing, the Centers for Disease Control and Prevention (CDC) estimate that chronic HCV affects at least 2.7 million people in the United States (1.3%).[11] This may be an underestimate because such surveys do not include persons who are incarcerated, homeless, in the military, on reservations, or marginalized—all of whom have an increased risk of HCV infection. Adjusted estimates of the population prevalence of HCV infection are as high as 5.2 million.[12]

About half of those with chronic HCV are diagnosed and aware of their infections.[11] After diagnosis of HCV, linkage to ongoing healthcare is critical so that the infected person can be evaluated by a specialist and referred as appropriate. Nationally, only about one-third of those diagnosed with HCV (32–38%) is referred to care, around one-tenth (7–11%) receives treatment, and about half of those (5–6%) are cured (Figure 10).[13,14]

The first medications available for treating HCV infection were not very effective in achieving sustained viral response (virus undetectable for 24 weeks after treatment completed) and had many side effects. Newer direct-acting agents, approved by the Food and Drug Administration (FDA) beginning in 2011, are highly effective with fewer side effects. However, therapy for HCV takes months, can be complicated, and is expensive.[15] Effective treatment reduces but does not eliminate the risk of developing liver cancer. Liver transplantation is the only treatment option for end-stage liver disease.

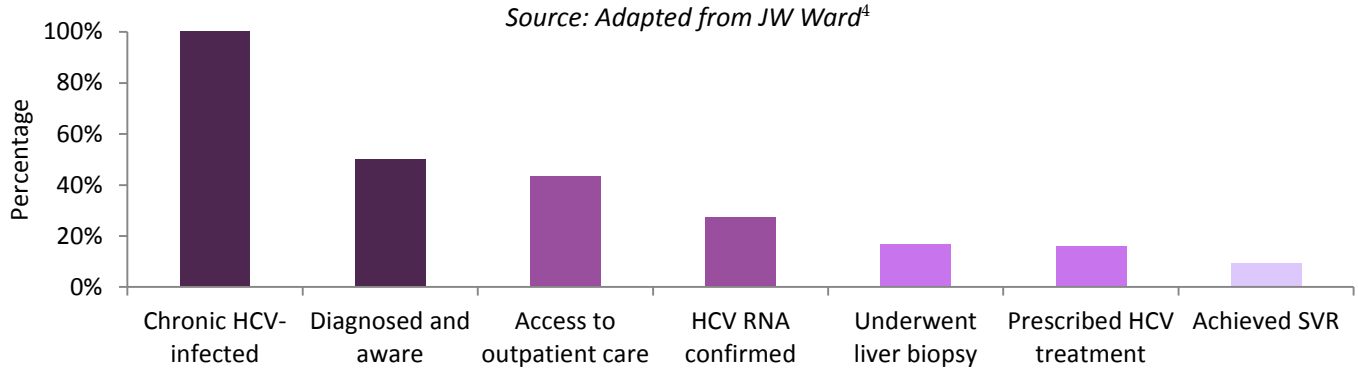
Low treatment rates for HCV-infected persons mean little reduction in the mortality from cirrhosis, liver cancer, and liver failure—or reduction of risk of transmission to others. Cost remains a major barrier to treatment,[16] which is currently prioritized for those with evidence of liver damage but have not reached end-stage liver disease. The number of persons without health insurance in Washington State has decreased from 15% in 2012 to 9% in 2014[3] and an estimated 7% or 522,000 persons in 2015, but cost of care remains a challenge for many. Only wider access to treatment will reduce morbidity and mortality associated with HCV infection.

The total burden of disease associated with chronic HCV infection encompasses both treated and untreated cases. Costs associated with chronic infection encompass healthcare costs (clinical, pharmaceutical, emergency department, and hospital stays), decreased work productivity, activity impairment, reduced quality of life, and premature death.

In a managed care population, patients with HCV infection had higher use of all services, were three times more likely to be hospitalized, and had total healthcare costs over three times higher than other patients.[17] Medicare costs were particularly high for persons with end-stage cirrhosis due to chronic

Figure 10. Treatment cascade for people with chronic hepatitis C virus (HCV) infection

Source: Adapted from JW Ward[4]



HCV infection.[18] While some of the disease burden can be expressed numerically, other factors have significant impacts on affected persons but are less easily measured.

Discussion of the expanding treatment options for HCV infection is beyond the scope of this document. National treatment guidelines are available from the American Association for the Study of Liver Disease and the Infectious Diseases Society of America (http://www.hcvguidelines.org/). Collaboration through telemedicine can help providers in more remote areas manage patients with complex treatment plans. HCV is included in one such telemedicine program in Washington—the University of Washington's Project ECHO (Extension for Community Healthcare Outcomes).

Public health role

In 2014, DOH issued a Hepatitis C Strategic Plan with three primary areas for public health action:

1. Identify people with HCV infections, link them to care, and treat them to achieve cures.
2. Prevent new HCV infections.
3. Strengthen data systems and increase data use around HCV infections.

The goal was to achieve specific outcomes:

- Increased percentage of people with HCV virus infections who know their status.
- Increased percentage of people with HCV who receive treatment.
- Increased percentage of people who are cured.
- Decreased number of new HCV infections.
- Decreased HCV-related morbidity.
- Decreased number of HCV-related deaths.

Due to the number of cases and the spectrum of illness over extended time periods, HCV presents a challenge to public health surveillance. It has been estimated that one case of HCV infection is identified for every four positive laboratory reports.[19] Deduplication of cases and inter-jurisdictional collaboration are often needed.

A comprehensive approach to address HCV infections is essential. Coordinated efforts are needed across regions to:

- Increase diagnoses of HCV, targeting groups likely to have higher risk of infection.
- Educate newly diagnosed chronic HCV cases about measures to reduce further damage to the liver.
- Identify healthcare options for persons newly diagnosed with chronic HCV infections.
- Support ways to reduce transmission of HCV.
- Improve disease surveillance for HCV infections.

Who should be tested for hepatitis C?

In the United States, around half of people with chronic HCV are unaware of their infection. Baby boomers make up about one-quarter of the country's population but around three-quarters of chronic HCV cases.[5] This group accounts for at least two-thirds of HCV-associated outpatient, emergency department, and hospital visits,[6] and was designated for screening in 2012.[20] Other groups are also at risk, particularly persons who currently inject drugs. To improve detection of chronic cases, Washington's Hepatitis C Strategic Plan recommended instituting

Table 1. Recommendations for testing for hepatitis C virus (HCV) infection

Source: Adapted from CDC guidelines

Who should be tested for hepatitis C virus (HCV) infection?
Anyone born from 1945–1965
Current or former injection drug users
Recipients of clotting factor concentrates before 1987
Recipients of blood transfusions or organ transplants before 1992
Recipients of blood or organs from HCV-positive donors
Children born to HCV-positive mothers
Persons with HIV infection
Persons with abnormal liver function tests
Long-term hemodialysis patients
Healthcare workers after needlesticks involving HCV-positive blood

HCV rapid testing programs in jails and syringe service programs. To detect previously unrecognized HCV cases, screening is recommended for a person with unknown HCV status and any of the risks listed in Table 1. Screening should be done once for a person in any of the listed groups for whom the risk is not ongoing. Repeat screening may be appropriate for a person with continued risk for exposure to HCV.

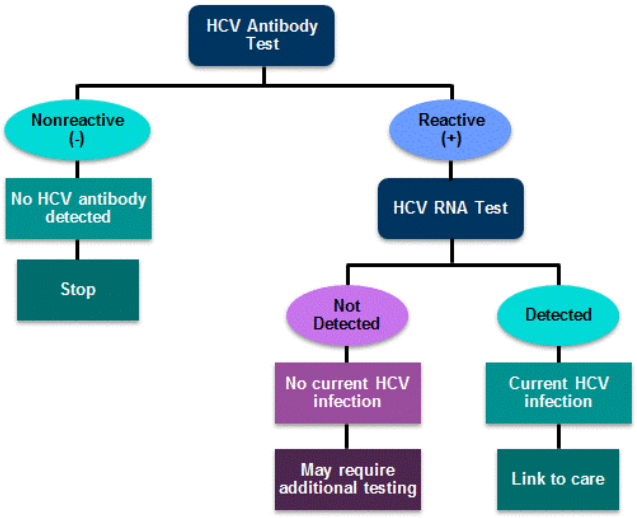
A free online tool is available from CDC for individuals to assess their risk of hepatitis infection (all types) as well as their need for vaccinations for hepatitis A and hepatitis B (https://www.cdc.gov/hepatitis/RiskAssessment/start.html). Primary care healthcare providers and LHJs can promote this link through blogs, emails, Twitter, newsletters, and websites.

Rapid testing programs for HCV are recommended for target populations at increased risk for infection who do not have access to screening services through traditional means such as primary care settings. The rapid test involves screening for HCV antibody. Positive antibody results require a follow-up confirmatory test, such as an HCV ribonucleic acid (RNA) test. The antibody test is based on a finger stick rather than drawing blood from a vein, so it can be provided at a wider range of sites. Public health has adopted the use of rapid testing in venues that have access to at-risk populations such as syringe services programs in an effort to increase access of services for injection drug users. Rapid testing is available at various existing and planned HCV testing programs within Washington.

If confirmatory testing for HCV RNA is positive, the infected person should be linked to care (Figure 11). In addition, newly identified persons with of HCV infection should be: educated about means to prevent complications such as avoiding alcohol and certain medications; referred to syringe exchange and substance treatment programs as appropriate; vaccinated for hepatitis A and hepatitis B if susceptible; and counseled on ways to prevent HCV transmission, including not sharing syringes, drug injection works, blood testing equipment, or personal care items potentially contaminated with blood such as toothbrushes, nail clippers, and razors.

Figure 11. Process for hepatitis C testing and linkage of patients to care

Source: Adapted from Centers for Disease Control and Prevention (CDC) guidance[23]



Goal of the epidemiologic profile

The main goal of this epidemiologic profile is to describe the morbidity and mortality associated with HCV for Washington overall and for each of the nine ACHs within the state for use in program planning, evaluation, and grant-writing. Sources include notifiable conditions surveillance data for acute and chronic HCV, hospitalizations, cancer registry data, death records, and more. Analyses included in the epidemiologic profile generally incorporate the years 2000–2014, with most descriptive data presented for the years 2010–2014. Datasets used in this profile are described in detail in Appendix A.

Hepatitis C prevention in Washington State

The Washington State Department of Health (DOH) Office of Infectious Disease, Infectious Disease Prevention Section (IDPS) developed an operational plan to address morbidity and mortality from HCV infections. The plan outlines activities that support the goals of the state Hepatitis C Strategic Plan to ensure that new HCV infections are prevented and that persons are screened, tested, and appropriately linked to healthcare services.

Current prevention practices in Washington use an existing network of local health jurisdictions and community-based providers to increase and strengthen capacity to improve the health of populations disproportionately impacted by viral hepatitis (hepatitis B and hepatitis C). The principles of Program Collaboration and Service Integration are used as the framework to increase efficiencies by reducing missed opportunities to reach those who share common risk factors or modes of transmission for HCV.

With the implementation of the Patient Protection and Affordable Care Act (ACA), IDPS expanded its reach to also work with healthcare providers and payer systems. By maximizing opportunities to integrate services at the community level and simultaneously cultivating broader partnerships with health delivery systems, Washington not only improved its ability to reach populations affected by health disparities, but maximized opportunities for improved care and treatment services for those infected with HCV.

Groups at higher risk for HCV infection are often also at increased risk for infection with human immunodeficiency virus (HIV) or sexually transmitted diseases (STDs). IDPS' current prevention strategy includes increasing the scale and scope of HIV and STD community-based providers' ability to provide HCV screening and linkage to care activities. The intent was to use established networks of community-based entities that are trusted and experienced as access points to increase viral hepatitis prevention services. By cultivating the currently funded infectious disease prevention network, IDPS is working to increase its ability to reach those who would otherwise likely be missed for HCV screening.

Persons who inject drugs (PWID) are disproportionately impacted by HCV and need improved access to HCV screening, vaccination for other conditions, and linkage to care. Integrating HCV services into an existing HIV prevention service network, such as syringe service programs, expands outreach to PWID, affording the opportunity to reach a population in an existing and trusted service setting.

One of the primary goals in the state's cooperative agreement with the Centers for Disease Control and Prevention (CDC) is to increase the proportion of persons living with HCV infection in Washington who are made aware of their infections through testing and linkage to care. In order to achieve this goal, IDPS became an early supporter and adopter of the HCV rapid testing platform and developed a statewide *HCV Adopter Manual* to assist participating syringe service programs in implementing a comprehensive HCV screening program.

In early 2013 and in 2014, IDPS assessed the capacity of providers to integrate HCV rapid testing and linkage to care into existing programs. Surveys were submitted to syringe service programs throughout the state to identify programs that had access to at-risk populations and that expressed interest in establishing a HCV rapid testing program within their existing services. In response to the survey, IDPS conducted two waves of trainings for community-based organizations in 2013 and 2014.

Table 2 depicts over two years of data collected through community based organizations conducting HCV rapid testing for PWID. The one agency exception to exclusively targeting PWID is the Gay City Health Project which provides testing services to: men who have sex with men (MSM), men who have sex with both men and women (MSMW), and MSM who also inject drugs.

A critical component of Washington's rapid testing

program is ensuring that mechanisms are in place for referral to care and supportive service. In an effort to strengthen access to care, IDPS has invested in telehealth models as a key strategy to build provider capacity. For example, the Extension for Community Healthcare Outcomes Project (Project ECHO) utilizes telehealth technology to deliver case consultations between healthcare clinicians and specialty providers. Project ECHO has been recognized by the CDC as an effective model in building primary care capacity to treat HCV and improving pathways to care.

The prevention methods used in Washington have been successful in cultivating capacity for HCV medical management, especially in community health centers. This collaborative partnership between public health agencies and the larger healthcare community is essential as IDPS continues to work on increasing the scale and accessibility of HCV rapid testing in the community.

Table 2. Summary of hepatitis C screening performed at test sites funded by the Washington State Deparment of Health from November 1, 2013 to December 31, 2015

Source: Office of Infectious Disease

Agency	HCV antibody tests N	Received results N (%)	HCV antibody positive N (%)
Clark County Public Health	92	92 (100)	18 (19.5)
Evergreen Treatment Services[1]	213	201 (93.7)	133 (62.4)
Gay City Health Project	88	88 (100)	0 (0.0)
Hepatitis Education Project (HEP)	2,498	2,317 (92.7)	387 (15.4)
Kitsap County Public Health[7]	10	10 (100)	0 (0.0)
Kittitas Health Department[2]	23	21 (92.1)	1 (4.3)
Public Health–Seattle & King County National HIV Behavioral Surveillance (PHSKC NHBS)[8]	493	454 (92.0)	324 (65.7)
People's Harm Reduction Alliance (PHRA)[3]	113	108 (95.5)	46 (40.7)
Point Defiance AIDS Project (PDAP)[4]	291	288 (98.9)	73 (25.0)
Robert Clewis Center	386	383 (99.2)	146 (37.8)
Snohomish Health District[5]	469	447 (95.3)	129 (27.7)
Spokane Regional Health District	130	130 (100)	52 (40.0)
Whatcom Health Department[6]	70	56 (80.0)	17 (24.2)
Overall	**4,876**	**4,595 (94.2)**	**1,326 (28.8)**

[1] *HEP began providing testing services for Evergreen Treatment Services in 2015.*

[2] *Kittitas Health Department began testing in January 2014.*

[3] *PHRA began testing in May 2014. HEP began providing testing services for PHRA in 2015.*

[4] *Point Defiance AIDS Project began testing in August 2014.*

[5] *Snohomish Health District began testing in January 2014.*

[6] *Whatcom Health Department began testing in September 2014.*

[7] *Kitsap County Public Health began testing in November 2015*

[8] *PHSKC NHBS began testing in July 2015 and ended testing in November 2015*

Acute infections

Acute hepatitis C virus (HCV) infections have been notifiable in Washington since 1981. Healthcare providers and clinical laboratories are required to report all new diagnoses of HCV infection. However, most of these acute infections are not recognized or clinically diagnosed. Persons with recognized acute HCV infection should receive follow-up testing to determine whether they have developed chronic hepatitis, as occurs in a majority of infections.

Washington State follows national case definitions to identify new infections. Case definitions may change from year to year. Between 2000 and 2014 there were five acute HCV case definitions, each slightly different as better information and technology became available to determine true infections (cases). A Washington case is counted for acute HCV surveillance only if it is laboratory confirmed with an HCV virus detection test. Just one-quarter of acute cases have symptoms, and not all ill persons seek healthcare evaluation and get tested. According to the Centers for Disease Control and Prevention (CDC), the reported number of acute HCV infections represent only an estimated 7% of the true number.[23]

National reports of acute HCV peaked in 1992 at 6,010 cases (2.4 cases per 100,000 persons) and dropped to a low of 694 cases in 2005. Blood screening, safer injection drug use, medical and dental infection control, and improved workplace safety contributed to the decrease in acute HCV cases. However, there have been recent increases in reports of acute HCV infection. According to the CDC, there was a 2.5-fold increase in acute HCV cases from 2010 to 2014, reaching 2,194 cases nationally. A true increase in incidence of acute HCV overall as well as some increase in case identification are likely responsible.[23]

Recent case reporting of acute HCV in Washington State mostly followed the national pattern. Annual case reports peaked at 232 cases (5.0/100,000 persons) in 1988 and have ranged from 18 to 83 (0.3–1.2/100,000 persons) since 2005 with a steady annual increase since 2007 (Figure 12). Based on the CDC estimate of reporting for only 7% of the estimated true number of HCV cases, the 83 acute HCV cases reported in 2014 may represent a true total of 1,154 new cases in Washington.

National rates increased from 0.3/100,000 in 2010 to 0.7 in 2014. Similarly, Washington's rates increased

Figure 12. Number and rate of reports of acute hepatitis C virus infection—Washington State, 2000–2014

Source: Public Health Issues Management System (PHIMS)

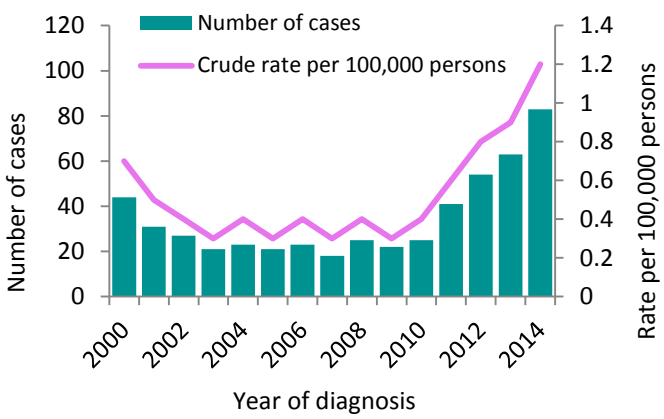


Figure 13. Incidence rate of reports of acute hepatitis C virus infection—United States and Washington State, 1984–2014

Source: Public Health Issues Management System (PHIMS) and the Centers for Disease Control and Prevention (CDC)

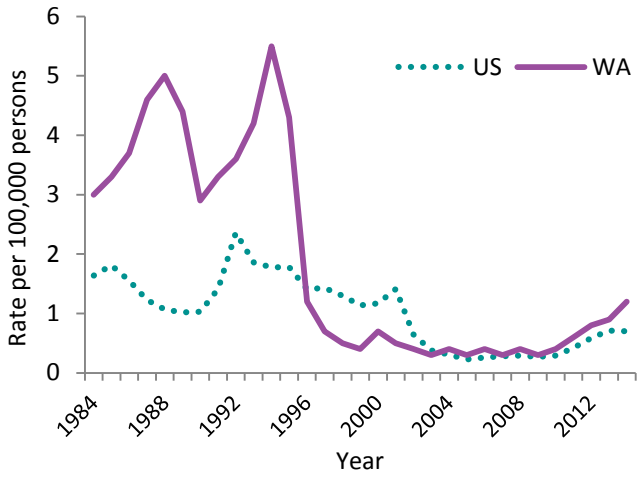


Table 3. Demographic and risk-factor associated characteristics of 262 residents with acute hepatitis C infection (excludes 4 perinatal cases)—Washington State, 2010–2014

Source: Public Health Issues Management System (PHIMS)

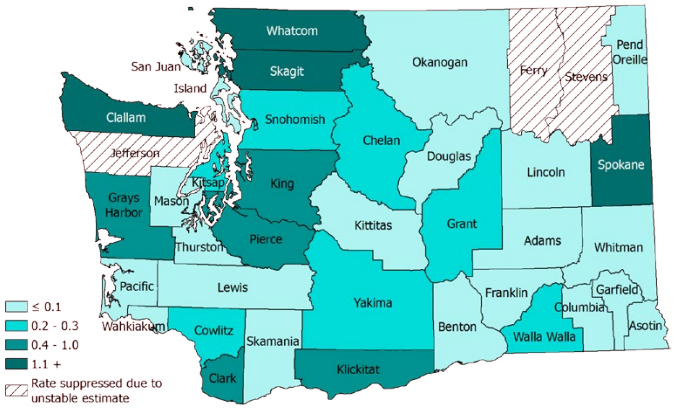
Characteristic	Number (%)
Average age (SD, range)	32.4 (11.4, 15-91)
Birth year	
Born before 1945	2 (0.8)
Born 1945–1965	31 (11.8)
Born after 1965	229 (87.4)
Sex at birth	
Male	126 (48.1)
Female	136 (51.9)
Race/ethnicity	
White, non-Hispanic	167 (63.7)
Black, non-Hispanic	8 (3.1)
American Indian/Alaska Native, non-Hispanic	16 (6.1)
Asian, non-Hispanic	3 (1.1)
Native Hawaiian/other Pacific Islander, non-Hispanic	1 (0.4)
Multi-race/race unknown, non-Hispanic	5 (1.9)
Hispanic, any race	9 (3.4)
Race and ethnicity unknown	53 (20.2)
Current injection drug use	
Yes	196 (74.8)
No	38 (14.5)
Missing	28 (10.7)

from 0.4 to 1.2 per 100,000 persons from 2010 to 2014. Part of this increase may be due to a change in the case definition (Figure 13). Starting in 2012, a negative HCV antibody test within 6 months prior to a positive HCV virus detection test would qualify a case to be counted even in the absence of the acute symptoms. In 2016, this changed to a 12-month period.

The state's five-year rate for the period 2010 to 2014 was 0.8/100,000 persons. Among Washington's 39 counties, 18 had no cases of acute HCV infection diagnosed during this five-year period. For counties with cases, five-year rates ranged from 0.1 to 4.8, but several elevated rates were based on five or fewer cases and so are unreliable (Figure 14). A number of counties had marked increases in their cases between 2010 and 2014, including King, Pierce, Spokane, and Whatcom counties. Among the Accountable Communities of Health, Better Health Together

Figure 14. Number and rate of reports of acute hepatitis C virus infection—Washington State, 2000–2014

Source: Public Health Issues Management System (PHIMS)

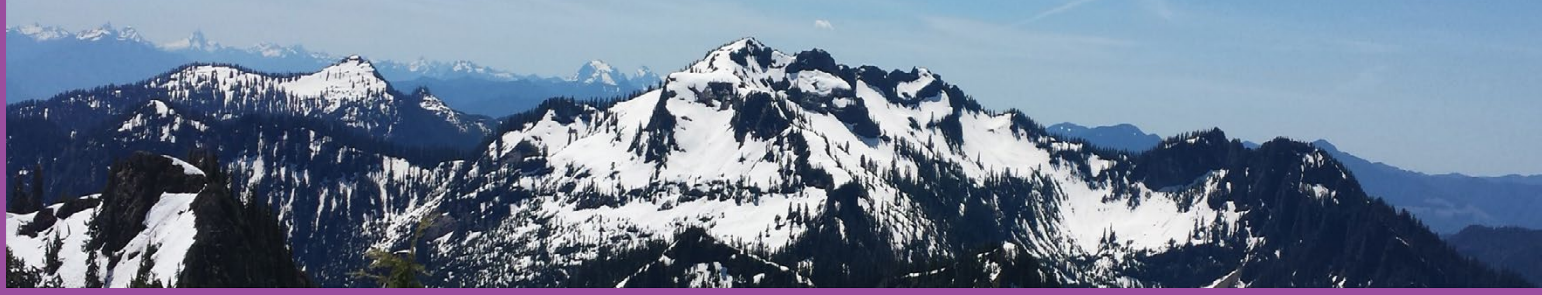


had the highest five-year rate due to the high rate in Spokane County. The North Central Accountable Community of Health had the lowest five-year rate.

For non-perinatal acute HCV cases reported between 2010 and 2014 the average age was 32.4 years, ranging from 15–91 years. Most cases (87%) were born after 1965 and only 12% were born in the baby boomer range of 1945–1965. A roughly equal number of males and females were reported with acute HCV infections. Information on race was missing for 20% of reported cases. Information on ethnicity was missing for 37% of reported cases.

Cases with race and ethnicity information available were more likely to be white (64%) or American Indian/Alaska Native (6%) and were less likely to be Hispanic (9%) compared to the state population. The predominant risk factor reported was injection drug use, occurring for 75% of all cases and 84% of cases with any risk information reported (Table 3). Between 2010 and 2014 there were seven cases ages 60 years and older. Of these, five had medical exposures in Washington as their most likely exposure, one had medical exposures outside the United States, and one had no identified exposures.

Information about morbidity associated with acute HCV infection is limited due to so few cases having symptoms and receiving healthcare services. Of the 262 non-perinatal cases, 107 (41%) were hospitalized although such admissions tend to be of limited duration. Only one death occurred in Washington between 2000 and 2014 due to acute HCV infection.



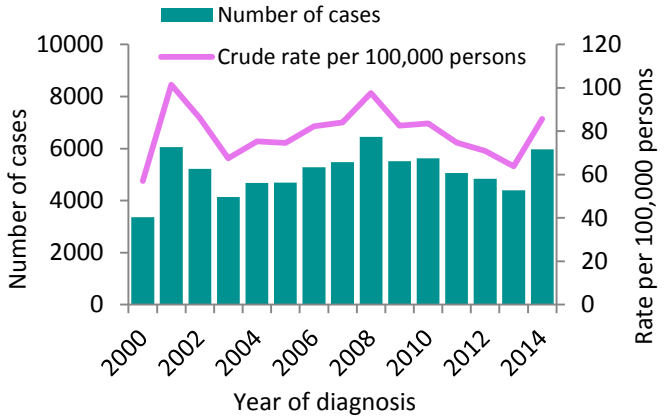
Chronic infections

Chronic hepatitis C virus (HCV) infection has been a notifiable condition in Washington since 2000. However, many persons with chronic HCV infection did not recognize their initial infections and receive appropriate testing, so they remain undiagnosed and unreported. In addition, HCV screening may not be done even when complications develop years later. Consequently, reports of persons with chronic HCV infection underestimate the true number of HCV-related illnesses, treatments, or premature deaths.

National case definitions have been used each year to classify infections reported in Washington as probable or confirmed. In this epidemiologic profile, numbers presented for chronic infections include both confirmed and probable cases. Chronic HCV cases are reported by year of diagnosis, not year of infection, regardless of whether the acute infection was reported or even recognized. A probable or confirmed Washington case is counted for chronic HCV surveillance only if it is laboratory confirmed with an HCV antibody or viral detection test in line with national case definitions. Reports of chronic HCV cases were relatively stable in Washington between 2001 and 2014, ranging from 4,135 to 6,447 newly diagnosed cases identified each year (Figure 15).

Figure 15. Number and rate of reports of chronic hepatitis C infections per 100,000 persons—Washington State, 2000–2014

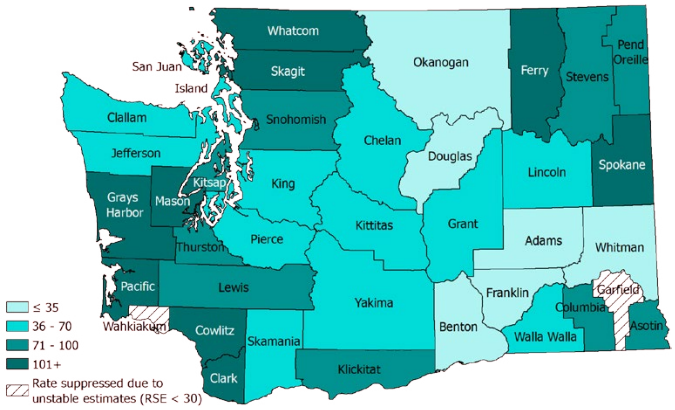
Source: Chronic Hepatitis Surveillance Records (CHSR)



National estimates of HCV prevalence are based on household surveys and exclude certain populations including homeless, institutionalized, military, and marginalized populations, which may have higher risk of HCV infection than the surveyed population. One study that accounted for these additional populations determined that 3.5 million people in the United States (range: 2.5 million to 4.7 million) may be chronically infected with HCV.[24] Higher estimates also exist. Over 1% of the US population is chronically infected.[11]

Figure 16. Five-year rate of chronic hepatitis C infections per 100,000 persons among non-incarcerated residents—Washington State, 2010–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)



**Rates do not include cases from the Department of Corrections.*

Chronic HCV infection can result in cirrhosis and may eventually reach end-stage liver disease. Severe symptoms of end-stage liver disease from any cause may involve fluid collection in the abdomen (ascites), enlarged blood vessels in the esophagus resulting in bleeding (esophageal varices), or a metabolic disorder resulting in altered mental function (hepatic encephalopathy). Another complication of cirrhosis is liver cancer, which occurs in 1% to 5% of persons with chronic HCV infection. Disease progression to complications tends to be more rapid when HCV

Table 4. Demographic and risk-factor associated characteristics of 25,874 residents with chronic hepatitis C infection—Washington State, 2010–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)

Characteristic	Number (%)****
Average age (SD, range)	47.2 (13.9, <1 to 101)
Birth year*	
Born before 1945	1,224 (4.7)
Born 1945–1965	14,507 (56.2)
Born after 1965	10,085 (39.1)
Sex at birth*	
Male	14,874 (59.1)
Female	10,298 (40.9)
Race/ethnicity	
White, non-Hispanic	3,179 (12.3)
Black, non-Hispanic	146 (0.6)
American Indian/Alaska Native, non-Hispanic	330 (1.3)
Asian, non-Hispanic	76 (0.3)
Native Hawaiian/other Pacific Islander, non-Hispanic	16 (0.1)
Multi-race/race unknown, non-Hispanic	337 (1.3)
Hispanic, any race	380 (1.5)
Race and ethnicity unknown	21,410 (82.8)
Reported Risk**	
PWID (alone or with other risks)	2,740 (10.6)
PWID (alone)	1,443 (5.6)
PWID and other risk(s)***	1,297 (5.0)
Other risk*** (no PWID)	1,251 (4.8)
No risk reported/identified	21,883 (84.6)

**Categories may not add up to total because of missing data for individual variables.*

***More than one risk type can be reported by each case, therefore percentages do not add up to 100%. PWID = persons who inject drugs.*

****Other risks include: Received factor concentrates before 1987; received blood products before 1992; organ or tissue transplant recipient; chronic hemodialysis; birth mother with history of HCV infection; job risk of exposure to body fluids; history of needle stick or splash; tattoo recipient; born outside US; close or sexual contact to HCV case; history of any sex with others; and history of incarceration.*

*****Includes cases classified as confirmed or probable. Cases from the Department of Corrections are also included.*

infection is combined with other potential sources of liver damage such as alcohol use, infection with another type of viral hepatitis, or HIV infection. Nationally, complications of chronic HCV are more common among males and among many racial or ethnic minority groups.[25]

Between 2010 and 2014 there was an average of 5,175 reported chronic HCV infections each year. Case reports of chronic infection include both probable and confirmed infections. Rates per year ranged from 63.8 to 85.6 per 100,000 persons, including HCV infections reported in incarcerated Washingtonians (Figure 15). The average age of persons with a newly reported infection was 47.2 years, ranging from under 1 year to 101 years. The majority of cases were born during the baby boom era of 1945–1965 (56%) and most cases were male (59%).

Race and ethnicity information were missing for 83% of cases reported (Table 4). Among cases with race and ethnicity information available, white race was reported in a majority of the cases (71%), about the same proportion as Washington's population. Injection drug use, whether reported alone or with other risks, was noted in 11% of cases overall and 69% of those with risk information available.

The Washington State Department of Health implemented statewide enhanced surveillance for chronic hepatitis C cases beginning in 2015. Each month, a sample of randomly selected cases is referred to local health jurisdictions for enhanced surveillance interviews in order obtain key demographics, risk history and case management information. Collecting, analyzing and distributing complete information obtained from a representative sample of cases will be essential to increase understanding of the burden of hepatitis C morbidity and mortality in Washington State (see section on enhanced surveillance).

Hospitalizations

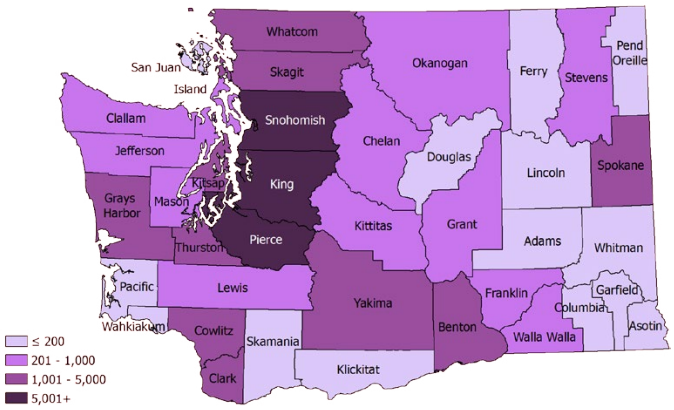
Chronic hepatitis C virus (HCV) infection can result in gradual liver scarring and cirrhosis. End-stage liver disease, liver cancer, and other complications of cirrhosis often result in increased healthcare needs, disability, or early death. Persons with these complications of chronic HCV may need repeated hospitalizations.

In recent years, the prevalence of complications related to the numbers of persons living with chronic HCV infection and related hospitalizations for chronic HCV have been increasing at the national level.[6,26,27] Patients with chronic HCV infection are estimated to have a hospitalization rate three times that of uninfected persons.[17] Many studies have also noted increased healthcare costs associated with HCV infection.[28,29]

Although the prevalence of HCV in the United States peaked in 1994,[30] it can take three decades or longer for complications of chronic HCV infection to develop. Mathematical models suggest that complications such as liver cancer and death associated with HCV in the United States will not peak until after 2030,[4,18] as those infected in the 1990s age and develop liver damage from their chronic infections.

Figure 17. Number of hospitalizations with a primary or secondary diagnosis of hepatitis C virus infection—Washington State, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System



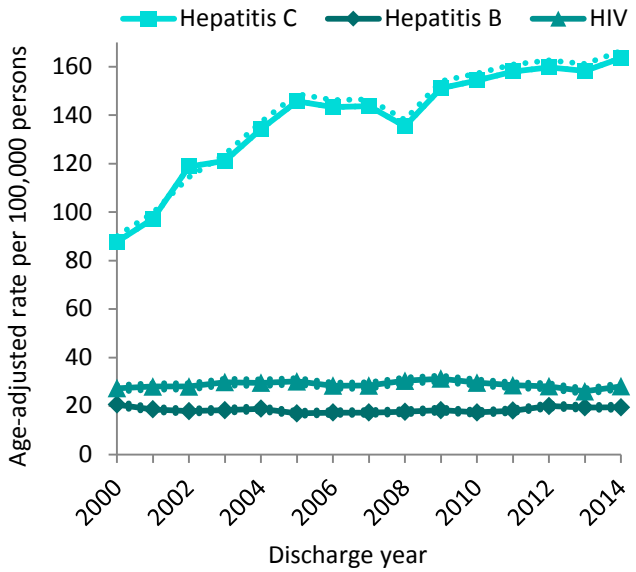
Hospital discharges in Washington State are summarized in the Comprehensive Hospital Abstract Reporting System (CHARS). HCV-related diagnoses for inpatient hospitalization data were determined using International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) and Procedure Codes (Appendix A). Primary diagnosis refers to the first diagnosis assigned to a hospitalization. In addition there may be up to 24 secondary diagnoses assigned.

Hospitalizations for HCV infection

Of the 9 million hospitalizations in Washington between 2000 and 2014, there were 5,155 with a primary diagnosis of HCV and 146,699 had any diagnosis of HCV (primary or secondary) (Figure 18). Since 2008, the proportion of these hospitalizations has remained stable. Hospitalizations with a primary diagnosis of HCV accounted for less than

Figure 18. Age-adjusted rate of hospitalizations with any diagnosis of hepatitis C, hepatitis B, or human immunodeficiency virus (HIV)—Washington State, 2000–2014

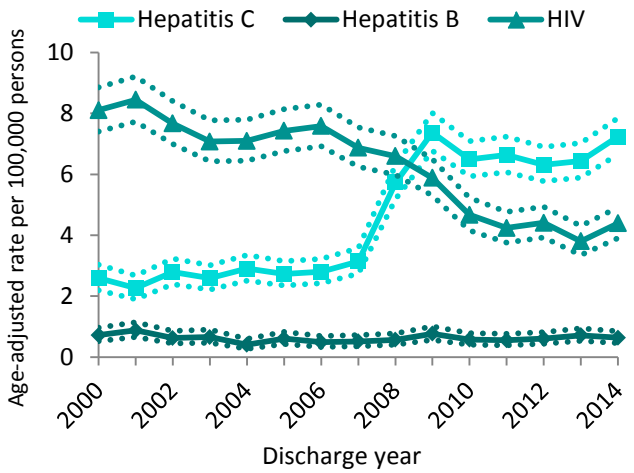
Source: Comprehensive Hospital Abstract Reporting System



Note: The dotted lines represent 95% confidence intervals.

Figure 19. Age-adjusted rate of hospitalizations with a primary diagnosis of hepatitis C, hepatitis B, or HIV—Washington State, 2000–2014

Source: Comprehensive Hospital Abstract Reporting System



Note: The dotted lines represent 95% confidence intervals.

1% of all hospitalizations in the state between 2010 and 2014.

In Washington, the age-adjusted and crude rates of hospitalizations with any diagnosis of HCV increased between 2000 and 2014. The HCV-related hospitalization rates far exceed rates of hospitalizations for any diagnosis of hepatitis B virus infection or HIV (Figure 18). In 2008, hospitalizations with a primary diagnosis of HCV surpassed and continued to exceed those for a primary diagnosis of HIV (Figure 19).

Almost all HCV-related hospitalizations were for emergency or urgent admissions in contrast to 43% of all hospitalizations (Appendix B, Table 11). This may represent the infected populations becoming hospitalized due to sudden changes in symptoms from acute or chronic HCV infections. Emergency room visits place a huge cost on the healthcare system, in addition to the costs of hospitalizations.

There were 2,714 hospitalizations with discharges between 2010 and 2014 and a primary diagnosis of HCV. Characteristics of those hospitalizations are described in Appendix B, Table 11 and Table 27. The data include multiple admissions for individual patients. Age, sex, and race/ethnicity of a single person may be counted more than once. The median age was 56 years and those hospitalized for HCV infection were more likely to be male than all hospitalized patients (63% vs 42%). Most were born between the years 1945 to 1965 (83% compared to 26% for all hospitalizations) and most were white (75% compared to 71% for all hospitalizations).

Age-adjusted rates of hospitalization were highest among males (Figure 20) and Native Hawaiians/other Pacific Islanders (Figure 21), followed by American Indians/Alaska Natives.

Readmissions

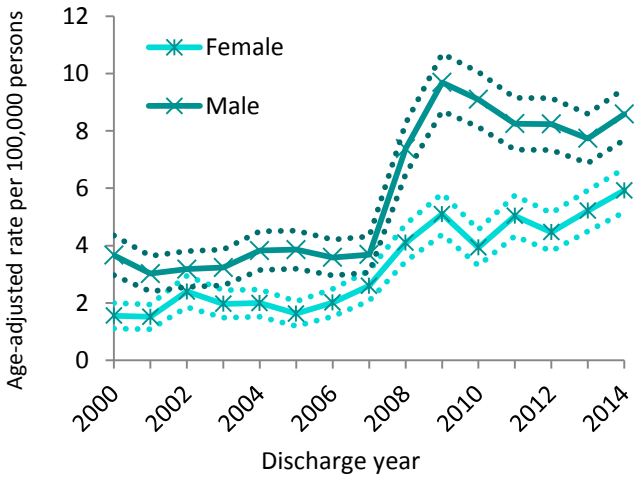
In total, there were 1,695 unique patients hospitalized at least once between 2010 and 2014 with a primary diagnosis of HCV infection. Characteristics of inpatients according to their first (or only) visit during 2010–2014 are described in Appendix B, Table 22. Of the 1,695 inpatients, 508 were hospitalized more than once for a primary diagnosis of HCV infection. Among 2,714 hospitalizations for the 1,695 inpatients, 1,019 were readmissions. The number of admissions for primary diagnosis of HCV per patient ranged from 1 to 15 in the five-year period.

These 1,019 readmissions may represent incomplete linkage to care. Hospitals may face reduced payments for patients with unplanned and avoidable readmissions within 30 days of discharge under the Hospital Readmissions Reduction Program, which is included in section 1886(q) of the Social Security Act, so linkage to care should be considered for each hospitalization.

Information on days to readmission was available for 1,018 of 1,019 hospital readmissions. There were 255 readmissions with a primary diagnosis of HCV infection where readmission took place within 30 days of a previous admission with primary diagnosis of HCV infection. Many patients also had addi-

Figure 20. Age-adjusted rate of hospitalizations with a primary diagnosis of hepatitis C by sex—Washington State, 2000–2014

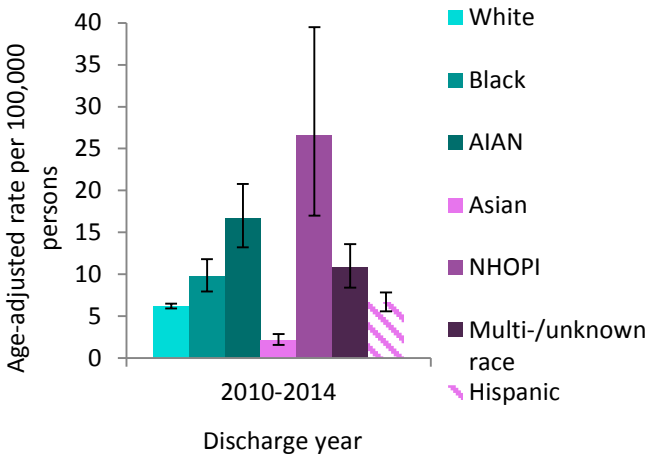
Source: Comprehensive Hospital Abstract Reporting System



Note: The dotted lines represent 95% confidence intervals.

Figure 21. Age-adjusted rate of inpatient hospitalization with a primary diagnosis of hepatitis C infection by race and ethnicity—Washington State, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System



tional hospitalizations for primary diagnoses other than HCV infection in this time period. Information on the percentage of hospitalizations that are readmissions by Accountable Community of Health and county are presented in Appendix B, Table 29.

Comorbidities

Among 5,155 hospitalizations between 2000 and 2014 with a primary diagnosis of HCV, 412 (8%) also had liver or intrahepatic bile duct (IHBD) cancer and 82 (2%) received a liver transplant. A total of 81 (2%) hospitalizations were for persons co-diagnosed with HIV infection. Opioid dependence or abuse was co-diagnosed in only 241 hospitalizations (5%) with a primary diagnosis of HCV, suggesting that most hospitalizations with a primary diagnosis of HCV are occurring among those with chronic HCV who are not currently using injection drugs. There were no HCV hospitalizations with a secondary diagnosis of opioid-related poisoning.

Information on comorbidities for all HCV-related hospitalizations is presented in Appendix B, Table 8. Among 61,634 hospitalizations between 2000 and 2014 with any diagnosis of HCV, 2,103 (3%) also had liver or IHBD cancer and 190 (<1%) received a liver transplant. There were 2,322 (4%) co-diagnosed with HIV infection. Opioid dependence or abuse was co-diagnosed in 12,704 hospitalizations (21%), opioid poisoning in 32 (<1%) hospitalizations, and alcohol dependence in 11,651 (18%) hospitalizations. Diabetes was present in 14,314 (23%) of these hospitalizations.

Hospitalization charges and payers

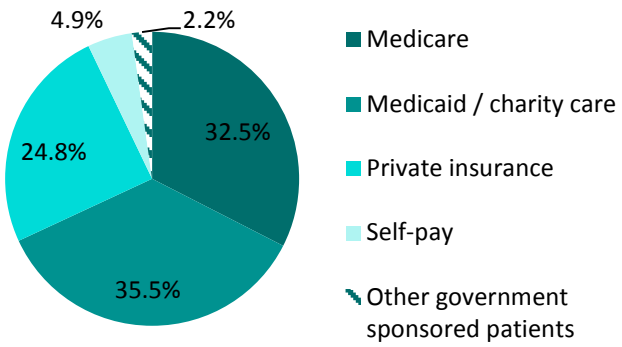
Charges are used to estimate hospital facility costs and do not reflect actual costs and payments made by any payer (i.e. health insurance). They also do not include professional fees or outpatient care. Hospitalizations for a primary diagnosis of HCV between 2010 and 2014 in Washington had an average of $42,038 in assigned charges and lasted an average of 5.0 days. Information on hospitalization charges by Accountable Community of Health and county are available in Appendix B, Table 28.

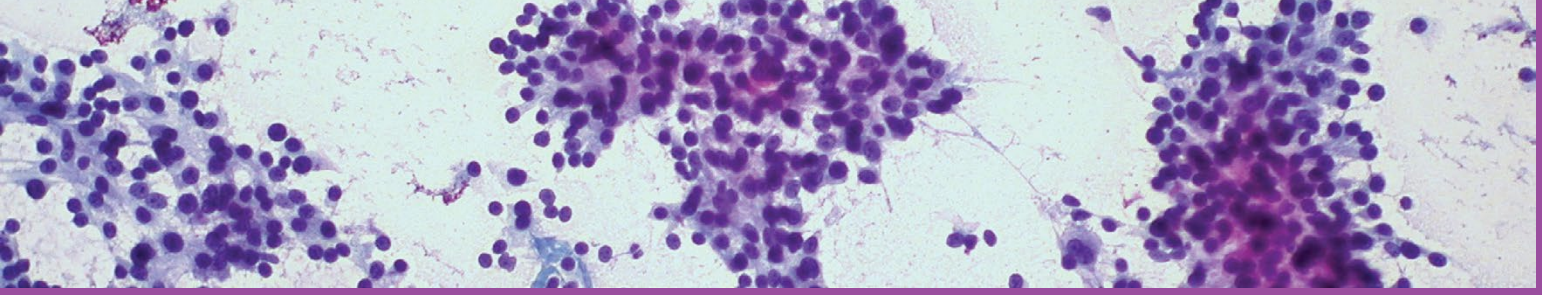
Charges in the state for hospitalizations with a primary diagnosis of HCV between 2010 and 2014 totaled $114 million. Of the $114 million in charges, $88 million were for hospitalizations with secondary diagnoses of cirrhosis, $28 million were associated with liver transplants, $21 million were associated with liver and bile duct cancers, and $9 million were associated with opioid dependence or abuse (Appendix B, Table 7). Total charges for hospitalizations with a primary diagnosis of HCV 2014 alone were approximately $27 million.

Primary payer information (Figure 22) showed that charges for the 2,714 hospitalizations between 2010 and 2014 with HCV as the primary diagnosis were mostly billed to Medicaid (35%) and Medicare (33%). This billing suggests that HCV hospitalizations are occurring among those over age 65 years and covered by Medicare or among those with low income and covered by Medicaid.

Figure 22. Primary payer for hospitalizations with a primary diagnosis of hepatitis C—Washington State, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System





Liver and intrahepatic bile duct cancers

Liver cirrhosis can result from chronic hepatitis C virus (HCV) infection. Cirrhosis in turn can cause the development of cancer in the liver or intrahepatic bile duct (IHBD). The National Cancer Institute estimates that just under 1% of all Americans will develop liver or IHBD cancer during their lifetimes. However, for those with HCV, this risk increases around 17-fold.[31] These cancers carry a high risk of premature death. The five-year survival rate for liver and IHBD cancers is 18%.[32]

Persons with HCV infection and either liver or IBHD cancer were identified by linking data from the Washington State Cancer Registry (WSCR) to the Chronic Hepatitis Surveillance Records (CHSR) dataset. A more detailed description of the data sources is available in Appendix A.

Diagnosis of HCV infection generally followed diagnosis of liver or IHBD cancer. This may be due in part to under-testing and under-reporting of HCV, particularly when risk exposures occurred decades earlier, and diagnosis of HCV infection was not considered until the patient developed a complication such as liver or IBHD duct cancer. Moreover, chronic HCV infection was not reportable in Washington State until 2000, so HCV diagnosed before then would not be included in the CHSR dataset.

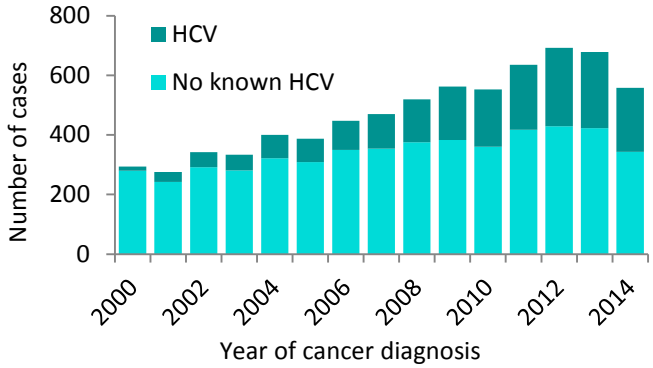
Due to the limitations of the data, it cannot be determined whether the presence of HCV infection directly caused cancer when both occur in a patient. However, HCV is a known risk factor for the development of liver and IHBD cancer.

Between 2000 and 2014, 7,150 cases of liver and IHBD cancers were reported to WSCR. Of those, 1,986 (28%) occurred in residents with documented chronic HCV infection. As the number of cancer cases increased over time, the proportion of cancer cases with documented HCV infection increased from 12% in 2001 to 39% in 2014 (Figure 23).

Of the 1,986 HCV-related cancer cases, 1,144 occurred in the last five years. This increase in HCV-associated cases may be due to earlier cancer cases being diagnosed before chronic HCV was reportable in Washington, and so information on these infected persons was not available in the CHSR dataset. Alternatively, this increase may represent the aging baby boomer population developing complications of chronic HCV infections.

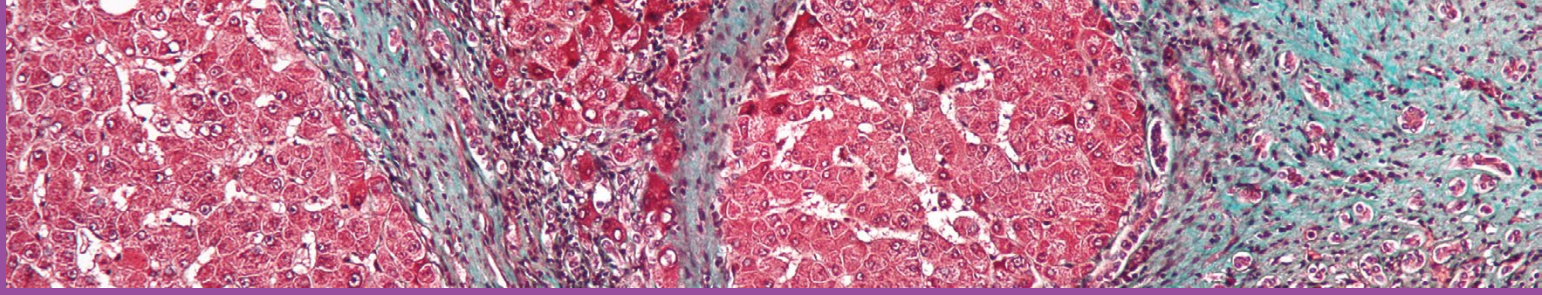
Figure 23. Cases of liver and intrahepatic bile duct cancers with and without chronic hepatitis C virus (HCV) infection—Washington State, 2000–2014

Source: Washington State Cancer Registry (WSCR) and Chronic Hepatitis Surveillance Records (CHSR)



Of the 1,144 HCV-related cancers, 1,110 were liver cancers and 34 were IHBD cancers. Descriptive characteristics of these cases are shown in Appendix B, Table 12. The cases were much more likely to be male (80%). Compared to Washington's population there were larger proportions of blacks (9% vs 4%) and American Indian/Alaska Natives (3% vs 1%), and a lower proportion of Hispanics (5% vs 12%). Over three-quarters (83%) of these cancers occurred in residents born between 1945 and 1965, the baby boomer group known to have an increased risk for chronic HCV infection.

Cancer is a major cause of death for those with chronic HCV infection. Among the 1,144 HCV-related cases reported in Washington between 2000 and 2014, 587 (51%) were documented as deceased in the cancer registry. The average age at death among persons who died was 60.6 years. The leading causes of death for decedents are listed in Appendix B, Table 10.



Liver transplants

Chronic hepatitis C virus (HCV) infection can gradually damage the liver, causing cirrhosis. If the damage is severe, the liver may eventually stop functioning decades later, resulting in end-stage liver disease. End-stage liver disease causes severe symptoms and cannot be treated except with a liver transplant. Hospitalizations for end-stage liver disease and transplants are typically very expensive. In addition to transplant surgery, a liver recipient needs ongoing immunosuppressive medications to prevent rejection of the transplant. These medications can result in side effects such as susceptibility to infections or other medical problems.

Cirrhosis due to HCV infection is the leading cause of liver transplants in the United States, followed by cirrhosis due to long-term alcohol use. In 2013, 25% of the 5,921 liver transplant recipients and 29% of the 15,027 patients on the transplant waiting list in the United States had HCV as the primary diagnosis.[33]

In Washington, between 2010 and 2014 there were 82 hospitalizations of patients with a primary diagnosis of HCV who underwent a liver transplant (Figure 24). The total charges associated with these hospitalizations were $29 million, averaging $304,249 per hospitalization Appendix B, Table 7. Liver transplant patients may also need additional hospitalizations before and after the procedure, creating further healthcare charges. In Washington, there were 15 liver transplant-related hospitalizations for patients with a primary diagnosis of HCV in the five-year period that were not for transplant surgery, adding $250,000 in hospital charges.

Descriptive characteristics for hospitalizations for liver transplant surgeries are described in Appendix B, Table 13. Between 2010 and 2014, almost three-quarters of those hospitalized for liver transplants with a primary diagnosis of HCV were male and they were also more likely to be white (88%). In contrast, only 71% of chronic cases for whom information was available were white and 71% of the state's population was white. Small numbers in the other racial and ethnic groups may reflect disparities in access to liver transplants.

Most (95%) who received liver transplants were born between the years 1945–1965 and had an average age of 56.5 years. Half the primary payers for the liver transplants were private health insurances. Most of the remaining charges were covered by Medicare and Medicaid (Figure 25).

Figure 24. Number of liver transplant surgeries by diagnosis—Washington State, 2000–2014

Source: Comprehensive Hospital Abstract Reporting System

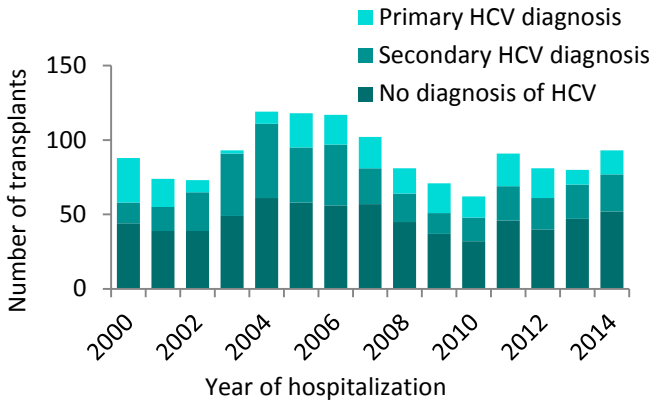
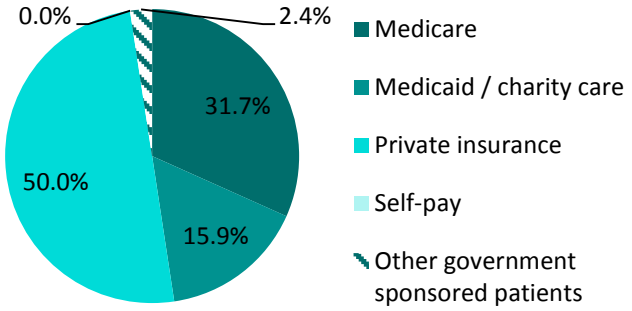


Figure 25. Primary payer for liver transplants with a primary diagnosis of hepatitis C infection—Washington State, 2000–2014

Source: Comprehensive Hospital Abstract Reporting System



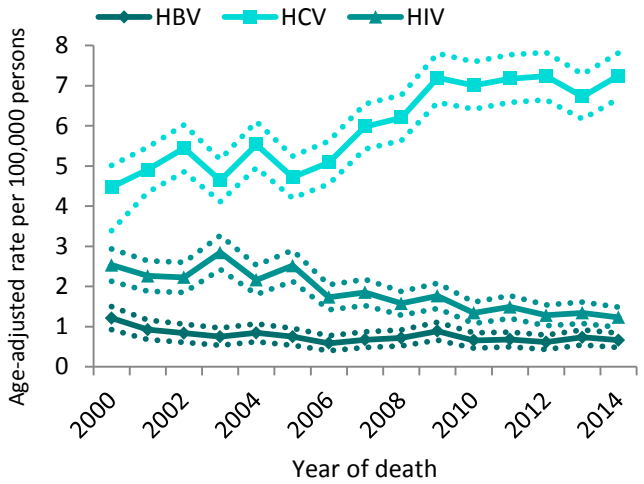
Mortality

Deaths associated with hepatitis C virus (HCV) infection result from chronic complications rather than acute infections, which are often mild and rarely fatal. In the United States, chronic HCV infections account for the majority of deaths related to liver fibrosis, non-alcoholic cirrhosis, and liver cancer. Baby boomers (born in the years 1945 to 1965) are disproportionately affected by HCV-associated mortality. Other groups with premature mortality due to HCV include males and racial and ethnic minorities.[34]

In 2010, the age-adjusted rate of HCV-related deaths in the United States was 4.6 per 100,000 persons.[34] By 2014, half the national HCV-related deaths were among those 55–64 years of age.[23] A study found that HCV is often absent as a cause of death on death certificates of HCV-infected persons despite its contribution to the events leading to death.[21] Consequently, the numbers presented here should be interpreted as the minimum number of HCV-related deaths.

Figure 26. Age-adjusted rate with hepatitis C, hepatitis B, or HIV infection documented as an underlying or multiple cause of death—Washington State, 2000–2014

Source: Washington State death records

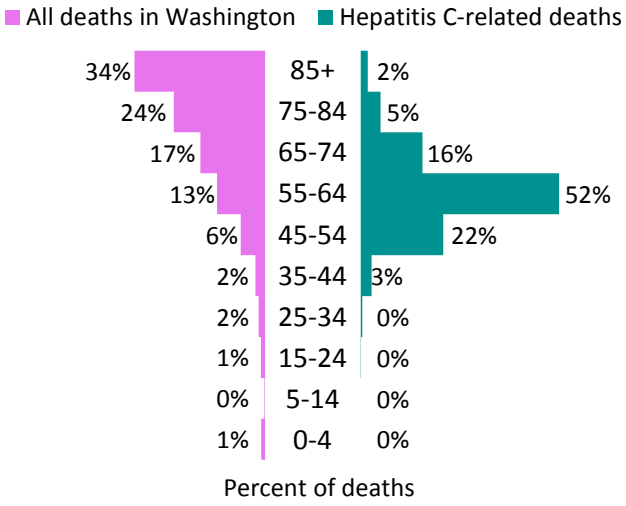


Note: The dotted lines represent 95% confidence intervals.

HCV-related deaths in Washington are defined as deaths with HCV listed as an underlying or contributing cause on the death certificate. The number of HCV-related deaths in the state more than doubled between 2000 and 2014, from 262 to 645 deaths (4.4 to 7.2 deaths per 100,000 persons). The rate of deaths related to HCV began increasing in 1990, and by 1998 exceeded those due to HIV, similar to national patterns. In 2014, there were 645 deaths associated with HCV, in contrast to 97 associated with HIV. The age-adjusted mortality rate in Washington for HCV is almost six times higher than the rate for HIV. Even fewer deaths are associated with chronic hepatitis B virus infections (Figure 26).

Figure 27. All-cause and hepatitis C-related mortality by age group—Washington State, 2010–2014

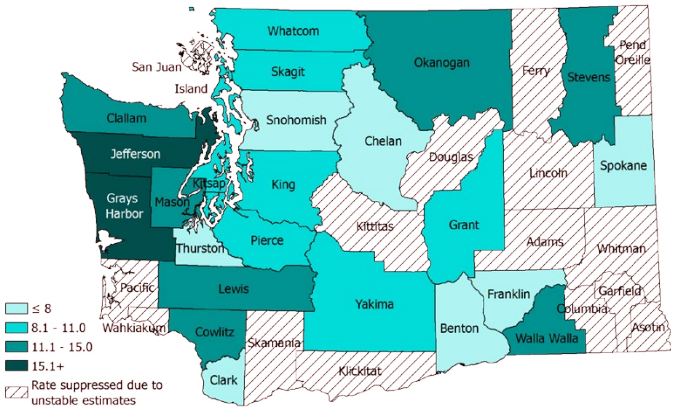
Source: Washington State death records



Baby boomers born 1945–1965 in the United States have a higher rate of risk exposures and therefore a higher rate of HCV infection compared to other age groups. The age distribution of HCV-related deaths reflects this increased risk. Between 2010 and 2014, over half of deaths in Washington were in persons 75 years of age or older. However, three-quarters (74%) of HCV-associated deaths were in persons 45

Figure 28. Five-year rate of hepatitis C-related deaths per 100,000 persons—Washington State, 2010–2014

Source: Washington State death records

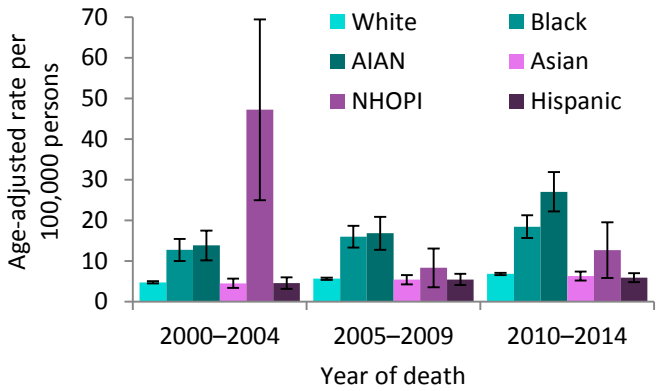


to 64 years of age (Figure 27), when baby boomers were ages 49 to 69 years.

Between 2010 and 2014, Washington residents with HCV-related deaths had an average age at death of 59.8 years. Average age for all deaths was 73.9 years. Counties with the highest rates of HCV-related death were Jefferson and Grays Harbor (Figure 28). Males are at greater risk for HCV infection and accounted for 70% of the HCV-related deaths (Appendix B, Table 14) while only composing half of the state's population. In contrast to all deaths in Washington, rates for HCV-associated deaths were higher ($p<0.001$) among black, American Indian/Alaska Native, and Hispanic populations (Figure 29).

Figure 29. Age-adjusted rate of hepatitis C -related death by race/ethnicity—Washington State, 2000–2014

Source: Washington State death records

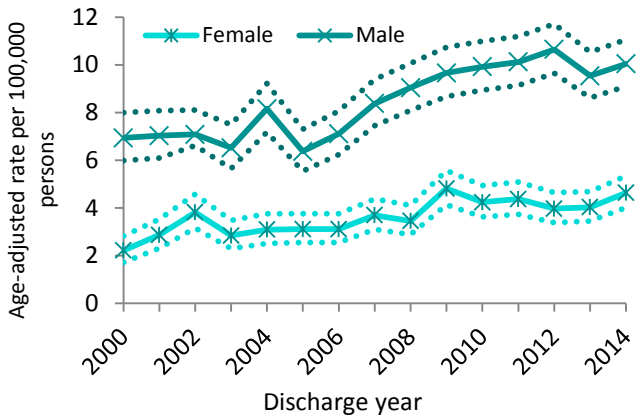


AIAN: American Indian/Alaska Native
NHOPI: Native Hawaiian/other Pacific Islander

The nine Accountable Community of Health regions had similar mortality patterns. For HCV-associated deaths, average age at death was similar across the ACHs, ranging from 59 to 61 years. Baby boomers accounted for 77% to 81% of HCV-related deaths, and males were around twice as likely to be affected as females (Appendix B, Table 14).

Figure 30. Age-adjusted rate of hepatitis C-related deaths by sex—Washington State, 2010–2014

Source: Washington State death records



Note: The dotted lines represent 95% confidence intervals.

Years of potential life lost

There can be considerable years of potential life lost (YPLL) due to HCV infection. Studies have found the average age at death for persons with chronic HCV is markedly lower than for remainder of the population. Estimates vary for years of potential life lost, ranging from 19 to 22 years in various studies.[21,34,35] This means a person with complications of chronic HCV might die at age 53 to 56 instead of the expected 75 years.

In Washington, the mean age at death between 2010 and 2014 was 73.9 years overall, and 74.1 years for those without HCV, but was 59.8 years for HCV-related deaths. Median age at death was 78 years overall and for those without HCV, but 59 years for HCV-related deaths.

Using the median age at death for the population overall as the cutoff (78 years), the median YPLL for 2,839 HCV-related deaths where the decedent was 78 years and under at time of death was 19 years. These HCV-related deaths account for 54,839 YPLL for the five-year period. All regions of the state were impacted by the premature deaths (Appendix B, Table 14).

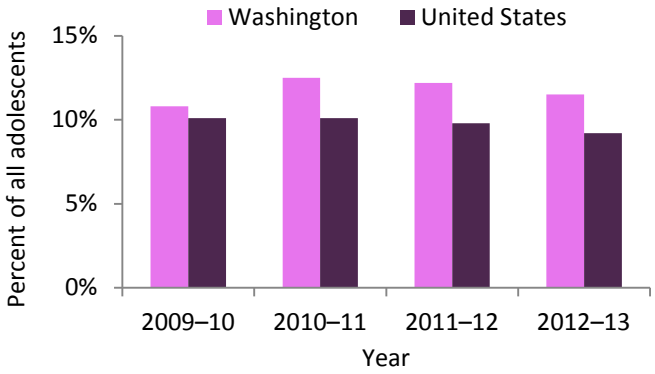
Adolescents under 21 years old

Some adolescent behaviors can have life-long health consequences. Among these is injection drug use, which increases the risk of hepatitis C virus (HCV) infection through shared injection drug equipment. A national survey of high school students found 13% had ever used nonmedical prescription opioids[36] and more recent surveys found 2.5% ever used heroin.[37] Adolescents not in school were excluded, so teen drug use may be higher.

Recent national patterns suggest that non-urban white young adults are increasingly using drugs, often starting with prescription opioids and later injecting heroin. A study in Rhode Island found that young adults started injection drug use at an average age of 19.[38] Use of illicit drugs among adolescents in Washington was higher than the national average. Between 2009–2013, past-month illicit drug use reported among Washingtonians ages 12–17 exceeded the national number by 1–3% (Figure 31).[39]

Figure 31. Past-month illicit drug use among adolescents ages 12–17 in Washington and the United States, 2009-2013

Source: 2014 Behavioral Health Barometer

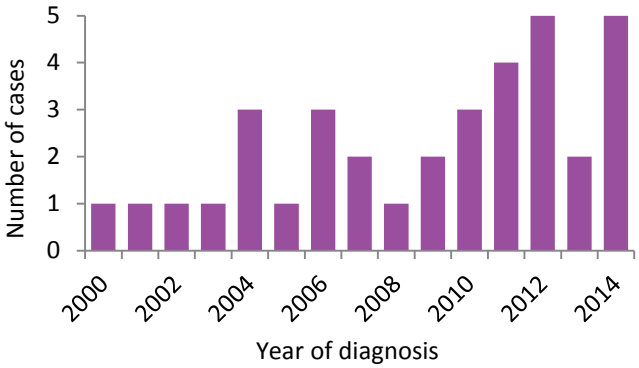


A survey conducted among adolescents and young adults in Seattle found younger drug users (<30 years) were more likely to engage in riskier injection practices such as syringe sharing.[40] Adolescents and young adults that acquire chronic HCV may develop complications by age 50. If untreated, they have decades with the potential to transmit the virus to others if risk behaviors continue.

Adolescent cases of acute HCV represented 7% of all cases in Washington between 2000 and 2014 (35 of 521). Of these 35 cases, five were ages 15–17 and 30 were 18–20. The Accountable Communities of Health with cases were Better Health Together (5), Cascade Pacific Action Alliance (2), King County ACH (9), North Sound ACH (13), Olympic Community of Health (2), and Pierce County ACH (4). Twenty-four cases (69%) reported injection drug use, seven reported no use, and no information on use was available for four cases. Three of the seven not injecting drugs reported other drug use. The years with the highest number of adolescent acute HCV cases were 2011, 2012, and 2014 (Figure 32).

Figure 32. Acute hepatitis cases among adolescents ages 21 and under—Washington State, 2000–2014

Source: Public Health Issues Management System (PHIMS)



Adolescent cases of chronic HCV represented 2% of all chronic HCV cases reported between 2000 and 2014 with known age (1,477 of 76,327 cases). Of these 1,528 cases, 223 were under the age of 13 years, 286 were ages 13–17 and 968 were ages 18 to 20.

Seven adolescents were hospitalized with a primary diagnosis of HCV infection between 2010 and 2014, five with acute HCV infection. One adolescent with a secondary diagnosis of HCV infection received a liver transplant. Compared to adults, adolescents may have less access to healthcare or may not admit substance use to a provider, so HCV may be missed.

Baby boomers

Baby boomers, those born from 1945 to 1965 in the United States, had higher risk of bloodborne exposures to hepatitis C virus (HCV) as young adults when compared with earlier or later birth groups. Exposures were due to drug use, unscreened blood products, and medical or dental exposures before modern infection control measures began.

Baby boomers are about one-quarter of the US population but around three-quarters of the country's chronic HCV cases.[5] They also account for at least two-thirds of HCV-associated outpatient, emergency department, and hospital visits,[6] as well as almost three-quarters of all HCV-associated deaths.

In 2014, baby boomers were 49–69 years of age. Washington had 1,848,653 persons in this group, or 27% of the state's population. If Washington followed the national pattern, there were an estimated 61,000 baby boomers (3.3%) in the state with chronic HCV infection.

Between 2010 and 2014, baby boomers accounted for 26% of all hospitalizations in Washington, but 83% of hospitalizations with primary diagnoses of HCV infection and 70% of all HCV-related hospitalizations (Appendix B, Table 11). While those born between 1945 and 1965 accounted for 22% of deaths in Washington, they made up 79% of the deaths with HCV infection listed as an underlying or contributing cause of death (Appendix B, Table 14).

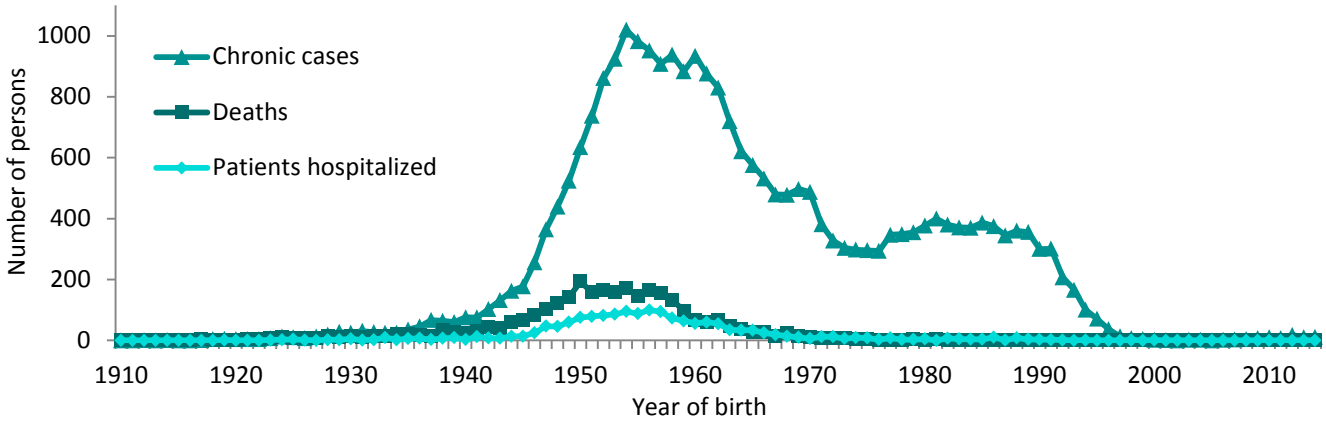
As baby boomers with chronic HCV infection age and progress to complications, these complications will likely lead to increased charges to Medicare and more HCV-related deaths. The peak impact of HCV-related disease from baby boomers may not yet occur for 15 or more years.

Many baby boomers still do not know they are infected with HCV. In 2012, the Centers for Disease Control and Prevention (CDC) recommended that adults born between 1945 and 1965 have one-time screening for HCV regardless of other risk factors.[8] Those with chronic HCV infection can benefit from: education such as advising alcohol cessation and promoting means to avoid transmission; linkage to clinical prevention services such as hepatitis A and B vaccination; and referral for treatment with newer regimens that can halt disease progression.

To increase awareness about HCV and baby boomers, public health agencies and healthcare providers can publicize the CDC's self-administered online hepatitis risk assessment through newsletters, websites, emails, and other social media. This can encourage patients to determine their own risk for chronic HCV and as appropriate consult their providers about screening: http://www.cdc.gov/hepatitis/RiskAssessment/

Figure 33. Persons affected by hepatitis C infection by year of birth—Washington State, 2000–2014

Source: Washington State death records



Children born to women with hepatitis C

Hepatitis C virus (HCV) is a bloodborne disease which can be transmitted from an infected mother to her baby during pregnancy or delivery. Approximately 3–10% of births to HCV-infected women result in HCV infection of the baby.[42] The risk of transmission increases if the woman has a high level of HCV in her blood; if she is also infected with HIV; or if the newborn had extended exposure to her blood, such as through prolonged labor or use of invasive fetal monitoring or delivery methods.[43,48]

About 20% of infants infected with HCV at birth clear the virus, and 80% become chronically infected.[44] Prevalence of HCV antibody among children and adolescents in the United States between 1999 and 2002 was 0.2% for children ages 6–11 years and 0.4% for children ages 12–19. Extrapolated to the state's 2014 population, there would be an estimated 1,066 HCV-infected children ages 6–11 years and 2,828 HCV-infected children ages 12–19 in Washington.

Infants born to HCV-infected women who inject drugs are at the greatest risk for persistent viral replication and development of advanced liver disease.[45] One study found that 3% of HCV-infected children had severe liver inflammation, 6% showed significant fibrosis, and 2% had cirrhosis.[46] A small number of children with HCV infection require liver transplants.[47]

Options for reducing transmission of HCV during birth are limited. Medications currently available to treat HCV in adults are not licensed nor recommended for use during pregnancy, elective caesarian (C-section) delivery does not consistently reduce the risk of HCV transmission,[48] and there is no HCV vaccine or post-exposure treatment for exposed infants. Moreover, Washington does not have a case management program to ensure that at-risk children receive testing and appropriate medical management after birth.

Antibody testing of an infant born to a woman known to be infected with HCV should be done after 18 months of age. Testing for HCV RNA can be done during the first routine visit at age 1–2 months and repeated at a later visit regardless of initial results. Treatment of HCV in younger children is not routinely recommended, and rarely done for children less than 3 years of age. Results are pending ongoing clinical trials of medications and the FDA has not yet approved newer antiviral agents for children.

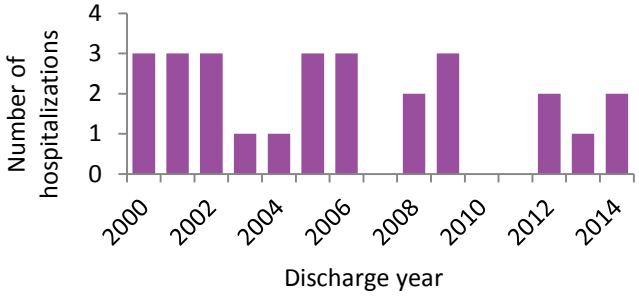
When a child is infected with HCV, it is important to reduce long-term complications and chances of transmission to others later in life through pregnancy, injection drug use, or sex. However, delaying HCV treatment until adolescence or adulthood may provide better choices as additional medications are tested and approved that will provide more effective treatment with fewer side effects.[44]

Recent increases in heroin use among young adults may result in more HCV-infected women who could transmit the infection during pregnancy. Preventing HCV infections in young adults and treating HCV-infected women before conception would help prevent HCV transmission to babies.

Of 5,155 HCV-related hospitalizations in Washington State between 2000 and 2014, 29 were for children ages 5 and under (Figure 34). Only one hospitalization of the 29 had chronic HCV infection listed as the primary diagnosis. Two hospitalizations had primary diagnoses related to drug withdrawal. Over two-thirds of the hospitalizations (21) were for children under 1 year old.

Figure 34. HCV-related hospitalizations among children five years and under—Washington State, 2000–2014

Source: Comprehensive Hospital Abstract Reporting System



** Discharge year is missing for 2 of the 29 hospitalizations*

Incarcerated Washingtonians

In the United States, the burden of hepatitis C virus (HCV) infection is much higher in the correctional population compared to the general community.[51] Prisons house persons with felony convictions who have usually received sentences of at least one year. Typical HCV prevalence among inmates nationally has been reported as 17%[52] to 29%,[53] ranging from 10%[52] to 49%[38] as compared to just over 1% in the noninstitutionalized civilian population.[11]

The pattern of HCV among incarcerated persons may not necessarily be representative of the disease among the general population. A study in Rhode Island offered HCV testing to inmates, most of whom had risk factors for HCV, but had never been screened. Overall, 24% were infected with HCV, with a slightly higher prevalence among women. In general, women who are incarcerated tend to have a higher HCV prevalence as compared to men, likely due to higher rates of risk behaviors such as sharing needles or having sex with infected partners.[38] Most of those newly diagnosed with HCV were young (60% were <35 years), reflecting the tendency of younger people to be incarcerated.[53]

Under the Eighth Amendment of the US Constitution, states must provide inmates with necessary services.[54] The Federal Bureau of Prisons (BOP) 2016 guidance for managing chronic HCV among inmates recommends prioritizing HCV treatment for patients with advanced liver fibrosis or other major medical condition including prior liver transplant or HIV co-infection. The BOP also allows for continuity of care for those who are already under treatment for HCV at the time of incarceration.[55]

Washington corrections system

The Washington State Department of Corrections (DOC) includes 12 prison facilities that house a total of around 16,600 persons (15,500 males and 1,100 females) on any given day. Between 2010 and 2015, just under 8,000 inmates were admitted to prison each year (4,000 new admissions and 4,000 re-admissions). The average length of stay in a correctional facility was 15.4 months for women and 25.3 months for men.

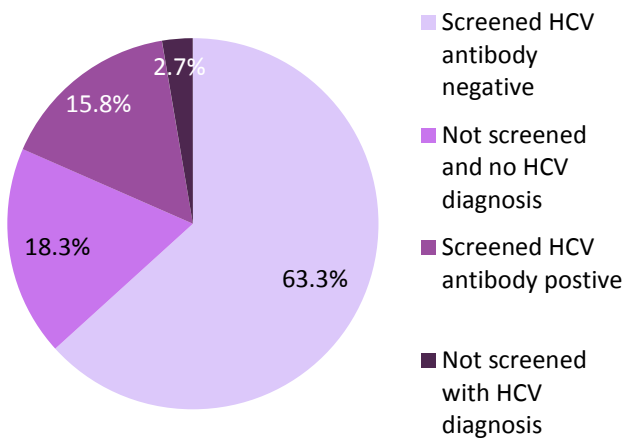
A blood test for HCV infection can be drawn at any of the 12 DOC facilities. The DOC began opt-in (test on request) screening for HCV at prison intake in 2007 along with HIV and hepatitis B testing and changed to opt-out (test unless refused) HCV screening in 2010. Additional HCV testing is done upon request but no more frequently than every 6 months or if there has been a known possible exposure.

In 2015, 79% of all new inmates were screened for HCV antibody. Of those, 16% were antibody-positive (Figure 35). An additional 3% of all new inmates, among those who were not screened, already had a prior HCV diagnosis. Among inmates with a positive antibody screening, 68% received confirmatory ribonucleic acid (RNA) testing. Previous research indicates that HCV infection becomes chronic in approximately 75–85% of cases exposed to HCV.[23] However, HCV was confirmed in only 58% of inmates receiving confirmatory testing at DOC facilities in 2015.

DOC currently offers treatment for HCV during incarceration, prioritizing persons with more

Figure 35. Intake population by hepatitis C virus (HCV) screening status—Washington State, 2015

Source: Washington State Department of Corrections (DOC)



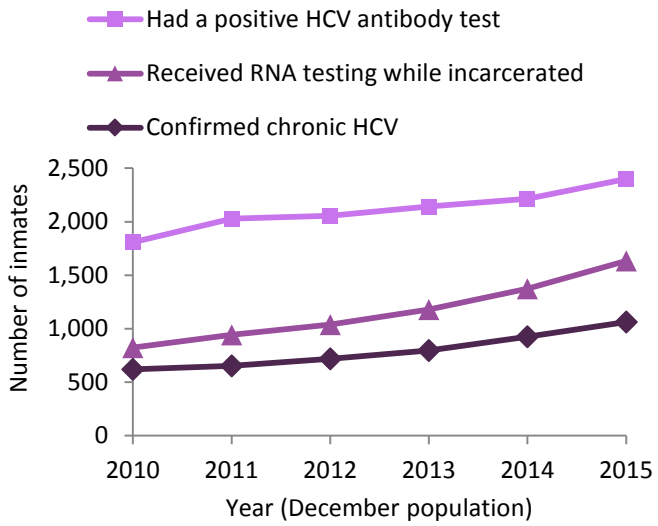
advanced disease. In 2015, the DOC created a database to assist with getting patients on treatment for HCV, especially to identify those who should be prioritized for treatment. The DOC database also allowed identification of inmates in the resident population who had never previously been tested for HCV, either because they declined testing upon intake or they entered the system before routine screening was available. Screening is now being offered to that group, especially to inmates with evidence of significant liver fibrosis.

Between 2010 and 2014 there were 39,316 new DOC intakes. Of these, 76% had HCV intake screening and 12–16% were antibody positive. The total HCV intake prevalence, based on antibody screening or on diagnosis of HCV infection, was 16–18%. Rates of confirmatory HCV RNA testing by DOC have improved, increasing from 46% in 2010 to 62% in 2014 and 68% in 2015. Prevalence of confirmed chronic HCV among intakes was 4–6%. About 40% of the confirmed chronic HCV cases were baby boomers born 1945–1965 and almost all the remainder were born after 1965 (Appendix B, Table 17).

In the United States, one-third of persons with chronic HCV interact with the criminal justice system each year, totaling over a million persons. This makes jails and prisons ideal sites to identify HCV infected persons and link them to services. Screening to identify chronic HCV cases in the correctional system followed by education of those infected can reduce HCV transmission after inmates are released. Universal HCV screening on entry to a correctional facility has been recommended as socially cost-effective, even if there are not adequate resources to provide all those diagnosed with HCV treatment within the correctional system.[56,57]

Figure 36. Prevalence of hepatitis C virus (HCV) infection and confirmatory ribonucleic acid (RNA) testing among inmates—Washington State, 2010–2014

Source: Washington State Department of Corrections (DOC)



DOC collaborates with the Hepatitis Education Project (HEP) to implement an existing evidence-based HIV intervention curriculum (Project SHIELD) modified for the correctional setting. The curriculum trains peer educators to talk to others in their social networks in and out of prison about risk reduction for HIV and viral hepatitis (hepatitis B virus and HCV). Peers often have greater credibility inside these networks, especially in prison, and they have the ability to reach people who may not be engaged in traditional voluntary educational programming.

Project SHIELD currently exists at two DOC facilities with plans to expand over time. Preliminary data indicate that training the peer educators increased their knowledge of HIV and viral hepatitis and also increased their willingness to discuss prevention information with other people. In addition, peer educators in the project indicated they intended to reduce their own HIV/viral hepatitis risk behaviors in the future.

In addition, DOC and some Washington jails are enrolling inmates in Medicaid health insurance plans that are active upon release. However, the availability of community providers willing to accept Medicaid is a challenge for connecting released inmates to ongoing care for HCV infection.

HIV coinfected

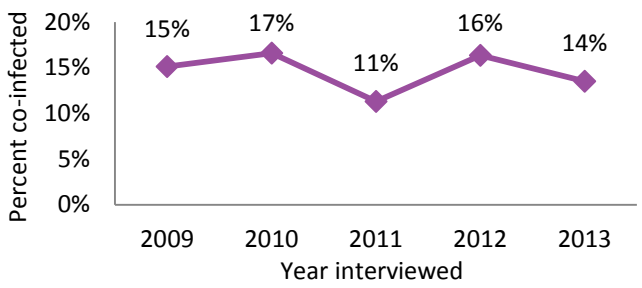
Hepatitis C virus (HCV) and human immunodeficiency virus (HIV) are both spread through blood and body fluids and can be transmitted through shared injection drug equipment and sexual transmission. Transmission risk is higher for HCV than HIV with shared injection drug equipment, but higher for HIV than HCV for sexual transmission. High risk populations can be coinfected. Most coinfections result from injecting drugs, but men who have sex with men are also at increased risk for HCV/HIV coinfection. Around 250,000 to 300,000 persons in the United States have HCV/HIV coinfection. An estimated 8% of persons with HCV also have HIV and 30% of those with HIV also have HCV.[49]

Health outcomes are usually poorer with HCV/HIV coinfection. A person with existing HIV infection is only one-fourth as likely to clear a new HCV infection. Liver disease progresses faster with HCV/HIV coinfection and survival is poorer if liver failure occurs. Liver cancer may be more common and a coinfected pregnant woman is more likely to transmit HCV to the infant.[49]

The Medical Monitoring Project (MMP) is a federally-funded surveillance project to learn about the experiences and needs of people with HIV who are in care for HIV. Between 2009 and 2013, about 15% of HIV positive individuals in care in Washington were identified as coinfected with HCV (Figure 37).

Figure 37. Human immunodeficiency virus (HIV) and hepatitis C virus (HCV) coinfection among HIV-positive people in care in Washington, 2009-2013

Source: Medical Monitoring Project (MMP)



The HIV-only and HCV/HIV coinfected groups had several significant socioeconomic and behavioral differences (Appendix B, Table 15). The coinfected group was more likely to be lower income, have lower education, have experienced more homelessness, be heterosexual, have unmet care needs, have an unsuppressed viral load, and have injected drugs in the prior 12 months.

Matching between chronic HCV and HIV surveillance records provides an opportunity to better understand the epidemiology of people coinfected with HCV and HIV (Appendix B, Table 16). Among the 12,567 persons living with HIV in Washington State at the end of 2014, 1,011 (8.0%) were HCV/HIV coinfected. A higher proportion of those coinfected were in the older age groups of 45–54 and 55+ years of age. A higher percentage of coinfected people reported injection drug use alone or with other risks (58% versus 12%). Although a higher proportion of coinfected people were retained in care for their HIV infection (63% versus 55%), both groups had similar proportions of people with HIV viral suppression (71% versus 69%).

An average of 1.3% (range: 1.0–1.6%) people living with diagnosed HIV infection (PLWDH) without HCV died each year from 2010–2014. The average all-cause mortality rate among PLWDH with HCV was higher at 4.7% (range: 3.8–5.3%). An average of 26.6% of the deaths occurring from 2010–2014 among PLWDH occurred in those individuals diagnosed with HCV/HIV coinfection (Appendix B, Table 17).

HCV/HIV coinfections can be difficult to manage because of medication interactions and may require specialist involvement.[50] Many medication regimens for HIV can injure the liver, making treatment more difficult. Even so, highly effective treatment for both HIV and HCV are available. Persons with HCV/HIV coinfections may need case management with access to counseling and preventive education, psychiatric services, opioid substitution therapy, and a unified treatment plan. Health insurance coverage, pharmaceutical assistance, and directly observed therapy may also be needed.

Persons who inject drugs

Injection drug use is currently the major source of new infections of hepatitis C virus (HCV) in the United States. HCV can infect those who receive and use contaminated drug equipment such as needles, syringes, filters, rinse water, or containers. Nationally, 68% of acute HCV cases reported in 2014 with information available indicated use of injection drugs.[23] Various studies found that 27–93% of injection drug users are infected with HCV.[12] HCV can also be transmitted when non-injection drug users share equipment to sniff drugs.[58]

Risk of HCV infection among persons who inject drugs (PWID) increases with frequency and duration of drug use.[12] Transmission risk is higher for HCV than for HIV among PWID,[59] but the limited research that has been done about specific risk behaviors or interventions was mainly done outside the the US. Unlike HIV, the risk for becoming infected with HCV is high during the first years of injection drug use. Estimates are that 8–25% of PWID are infected during each year of drug use.[60] Younger females are particularly likely to share equipment.[60]

Nationally, a decrease in prescription opioid abuse has been paralleled by an increase in heroin use.[61] Heroin use has risen throughout the United States but most noticeably in the northeastern followed by western states.[62] There are increased deaths associated with injection drug use since 2010,[61] supporting the pattern of increased heroin use. Compared to heroin users in the 1960s, current PWID are more likely to live in small urban or non-urban areas, more likely to initiate drug use with prescription opioids, and more likely to be white. Previously, heroin users were predominantly male, but current users are nearly equally male and female.[62]

A conservative estimate of the number of PWID in Washington is 25,636, based on injection and syringe usage patterns reported by syringe exchange clients in 2015.[63] Recent injection drug use was reported by 12,687 Washingtonians who entered publicly funded treatment for the first time between 2006 and 2015.[63] In a recent statewide survey of syringe exchange clients in the state, 69% identified heroin as their main drug of choice, followed by methamphetamine (meth) (22%), meth and heroin together (5%), and prescription opiates (3%).

Overall prevalence of heroin use among PWID was 82%, and prevalence of use of meth and heroin together was 40%. Over half (57%) of those using heroin first used prescription opiates. The 1,036 survey participants were primarily white (82%) and 39 years of age or younger (65%). Most had been tested at least once for HCV (86%) and HIV (89%). The survey respondents had high rates of homelessness and incarceration.[63]

Figure 38. Percent of treatment admissions by type of drug—Washington State, 2010–2014

Source: Treatment Episode Data Set (TEDS)

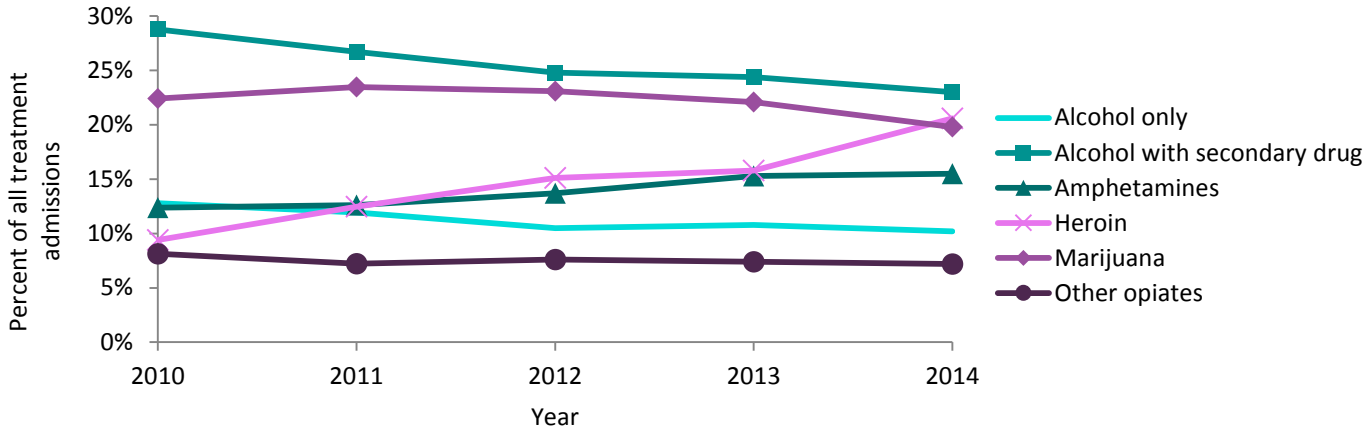
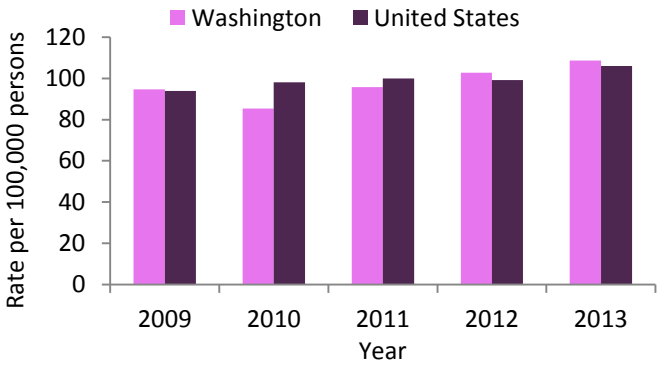


Figure 39. Rate of individuals enrolled in opioid treatment programs (OTPs) in Washington and the United States receiving methadone from single-day counts, 2009-2013

Source: Treatment Episode Data Set (TEDS)



Prescription opioid use appears to be contributing to the increase in HCV cases among young white non-urban adults. In Massachusetts, reports of HCV infection among persons ages 18–24 years nearly doubled between 2002 and 2009.[64] In the central Appalachian states, HCV infections among persons 30 years or younger more than tripled between 2006 and 2012, with non-Hispanic whites accounting for the majority of cases. Equal numbers of males and females were affected.[65] Wisconsin had a tripling of HCV cases among rural young adults in 2010,[66] and a community outbreak of HIV linked to injection of oxymorphone in rural Indiana during 2015 found coinfection with HCV in 84% of the HIV cases.[67]

The Seattle metropolitan statistical area participates in the National HIV Behavioral Surveillance System (NHBS). In 2009, 67% of the Seattle respondents reported using injection equipment after it had been used by someone else, compared to 62% nationally.[68] In 2013, over 50% of PWID in the western United States reused equipment after another person.[69]

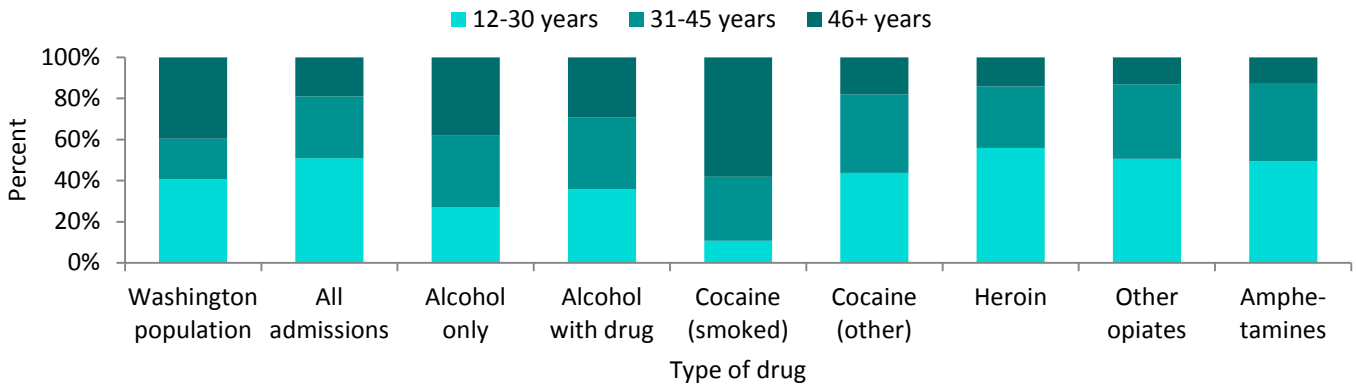
Of 262 acute HCV cases reported in Washington between 2010 and 2014, 196 of 218 (84%) with risk information available had injection drug use as a risk factor. Only 3,991 (15%) of 25,874 chronic HCV case reports for residents between 2010 and 2014 had information available about risk factors. Of these cases, 2,740 (69%) reported injection drug use either alone or with another risk factor such as: receiving blood products before screening tests were available, chronic hemodialysis, birth mother with HCV infection, history of a needle stick or blood splash, or close or sexual contact with HCV cases.

Risk of HCV infection is reduced by interrupting drug use or receiving drug treatment.[60] PWID who were screened and informed of their seroconversion had sustained reduction in risk behaviors such as syringe sharing.[70] In addition to reducing long term medical complications in the patient, HCV treatment can reduce future transmission by PWID, termed "treatment for prevention."[71] However, PWID have low rates of treatment for HCV. As well as cost of treatment and limited access to health care, barriers to healthcare access include marginalization of PWID, criminalization of drug use ("War on Drugs") or possession of drug equipment, and lack of advocacy.

Research suggests that combinations of interventions can reduce HCV prevalence and transmission among PWID. Opiate substitution therapy, high-coverage needle and syringe services, regular HCV screening, treatment management, and education all have roles in controlling the disease. Screening should be followed with confirmatory testing and linkage to care as well as education and counseling. Treatment management may involve telemedicine, multidisciplinary teams, drug and alcohol services, and social supports.[72]

Figure 40. Age at time of admission to drug treatment center, by primary drug of use—Washington State, 2014

Source: Treatment Episode Data Set (TEDS)



Harm reduction

Among persons who inject drugs (PWID), acquiring HCV is strongly linked to sharing of needles, syringes and other drug equipment including filters, rinse water, and containers.[60] Unlike HIV, acute HCV cases among PWID are most common among younger users.[60] Previous research has addressed HIV spread and control among PWID. However, little research has been done to find ways to reduce HCV spread in this group. Existing studies usually looked at a single intervention, and most of the available research was done in Canada, Europe, and Australia.

Interventions for HCV are aimed at preventing infections and reducing transmission. Effective syringe service programs offer needles, syringes, filters, and containers; educate about avoiding HCV transmission; and offer counseling, HCV screening and testing, and referral to treatment. Syringe service programs must be coupled with local decriminalization of drug works possession to encourage PWID to use the programs without fear of arrest. Drug treatment may not end use completely, but can reduce transmission risk.[60]

In the 1990s the Tacoma syringe exchange found evidence that use of the exchange reduced risk of bloodborne hepatitis.[58] However, trials with single interventions for PWID generally do not show reduced transmission of HCV. Nonetheless, some transmission reduction has been seen by combining syringe service programs with opiate substitution treatment. Opioid substitution therapy reduced risk of HCV infection by 60% in San Francisco[73] and methadone maintenance treatment in British Columbia reduced the risk of HCV infection by 50%.[74] Opioid substitution therapy may also reduce overdose mortality.[74] Similar results were reported from Europe when opiate substitution therapy and wide coverage of needle-syringe programs were available.[75]

Research suggested that large reductions in prevalence of chronic HCV among PWID will require multiple interventions. These include high-coverage syringe service programs to reduce sharing of equipment, education of both risk groups and healthcare providers, opioid substitution treatment, screening with testing and counseling, and treatment for HCV infection.[76,77] CDC stated that a combination of syringe service programs and drug treatment can reduce transmission of HCV among PWID more than 80%.[78]

Results of studies around HIV have addressed the cost-effectiveness of interventions that can also apply to HCV prevention. Chronic HCV cases result in a major burden due to costs of healthcare, hospitalizations, premature death, and years of productive life lost. The average cost for syringe service programs was estimated at $23 to $71 per person per year and were considered cost-effective from societal and healthcare viewpoints.[79]

Access to syringe service programs benefits the entire community by reducing improper syringe disposal by PWID.[80] Syringes discarded in public areas can put children and maintenance workers at risk. A US city without syringe service programs had eight times the number of syringes in areas with high levels of injection drug use compared to a city with such programs.[81]

Persons with chronic HCV infection may be marginalized due to race, ethnicity, drug use, lower socioeconomic status, or lower education, impeding diagnosis and access to healthcare for their infections.[11] Adolescents and young adults, groups at risk for developing drug use and being infected with HCV, may have particularly low access to healthcare services.

It is a public health principle to control a communicable disease by controlling its source. HCV could in theory be eradicated since cases occur only in humans and effective treatment is available. PWID are the main reservoir for HCV transmission and should be the focus of intervention to prevent transmission and future disease complications. As is done with sexually transmitted diseases, treating PWIDs and their immediate contacts together may be necessary to control HCV.[71]

Services needed for PWID to avoid HCV infection and spread include: education to change injection behaviors; access to syringe service programs that are convenient in hours and location; supportive staff; absence of police harassment for carrying drug equipment; readily available opiate substitution treatment; and substance use treatment. For many reasons, there is a lack of advocacy around HCV. However, public health and health care agencies could take on such an advocacy role. Without interventions to reduce HCV infections, society and individuals will continue to face the impact of this disease.

Racial and ethnic subpopulations

Racial and ethnic groups are used to describe those at risk, but these groupings are more social than biological. Analyzing disease data by race and ethnicity may ignore many more complex factors, such as socioeconomic status. Each group includes persons with a wide range of historical, cultural, and even language backgrounds. Outcomes of chronic hepatitis C virus (HCV) infections may be worsened by other medical conditions that affect the liver, such as alcoholism, diabetes, obesity, and HIV infection. All of these conditions tend to be more common in marginalized populations.

Missing information and coding errors for race and ethnicity occur in all data sets used in this profile. In addition, many acute and chronic HCV infections cannot be described by race and ethnicity because they remain undiagnosed. Language or immigration status concerns may limit participation by some racial or ethnic groups in medical studies or even in public health interviews for case reporting. Changes in healthcare practice can affect data. For example, during 2012–2015 the Indian Health Service (IHS) increased the screening of baby boomers for HCV by four-fold[82] and from 2012 to 2015 a Cherokee Nation HCV screening policy increased HCV testing five-fold.[83] Increased screening will identify more cases.

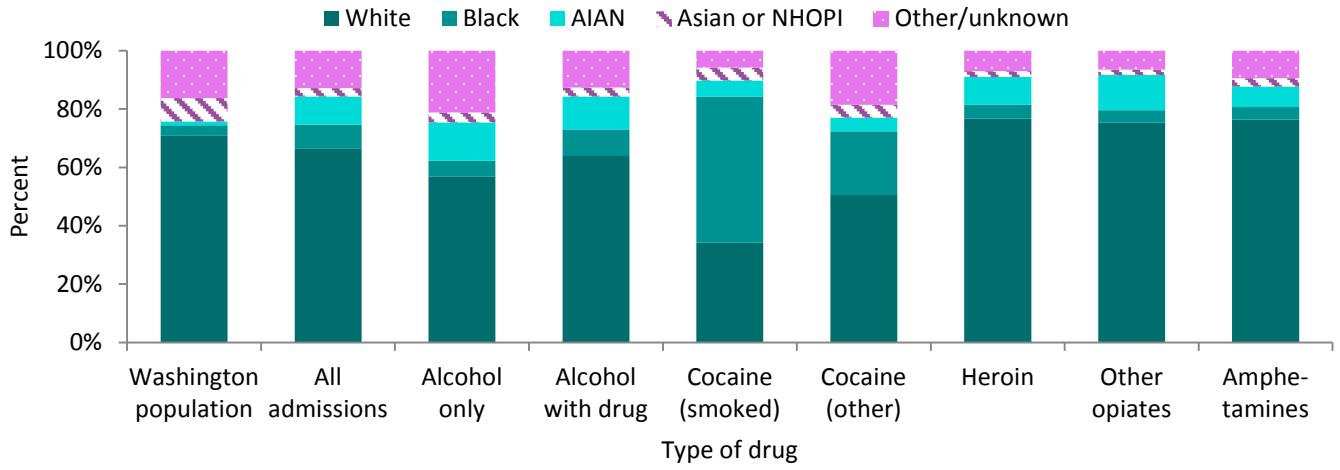
Differences in HCV levels by race and ethnicity mainly represent disparities in risk factors and access to healthcare, not biological differences. Admissions for drug treatment in Washington suggest substance use varies by race. Reported primary drug of use was more likely to be alcohol for American Indians/Native Alaskans, cocaine for blacks, and heroin for whites. Injecting drugs like heroin is a major risk for HCV infection.

Nationally, acute HCV rates have been increasing in all racial/ethnic populations since around 2011. From 2012–2014, acute HCV rates increased for non-Hispanic blacks (33%), non-Hispanic whites (28%), and Hispanics (5%). The 2013 acute HCV rates were 2 per 100,000 persons for the American Indians/Alaska Native population, 0.8 for the white population, and less than 1 per 100,000 for Asians/Pacific Islander, black, and Hispanic populations.[23]

In the United States, blacks represent 12% of the population but around 22% of chronic HCV cases.[84] American Indians have a higher prevalence of HCV infection based on clinic studies with 7% to 24% infected.[85] For the periods 1995–1997 to period 2005–2007, American Indian HCV-related hospitalizations tripled[86] and HCV-related deaths doubled, reaching 10.6 per 100,000 persons.[87] Screening in

Figure 41. Admissions to drug treatment center, by primary drug of use and race—Washington State, 2014

Source: Treatment Episode Data Set (TEDS)



2011 at Veterans Administration facilities found HCV prevalence was 8% overall, 15% for blacks, 11% for Hispanics, 8% for American Indians, 7% for whites, and 3% for Asians.[88]

Washington's non-Hispanic population is 71% white. Between 2010 and 2014, this group had comparative proportions for chronic HCV reports (71%) and HCV-related liver and intrahepatic bile duct (IHBD) cancers (73%). The proportions of whites with acute HCV reports (80%), inpatients admitted for HCV infection (81%), HCV-related liver transplants (83%), and HCV-related deaths (80%) were elevated (Figure 42).

Washington's non-Hispanic population is 4% black. Between 2010 and 2014, this group had comparative proportions for acute (4%) and chronic (3%) HCV reports, as well as inpatients admitted for HCV infection (5%) and HCV-related liver transplants (3%). HCV-related liver and IHBD cancers (9%) and HCV-related deaths (6%) were elevated.

Washington's non-Hispanic population is 1% American Indian/Alaska Native. Between 2010 and 2014, this group had elevated proportions for acute (8%) and chronic (7%) HCV reports, inpatients admitted for HCV infection (4%), HCV-related liver and IHBD cancers (3%) and HCV-related deaths (4%). American Indians/Alaska Natives accounted for 2% of HCV-related liver transplants.

Washington's non-Hispanic population is 8% Asian. Between 2010 and 2014, this group had lower proportions of acute (1%) and chronic (2%) HCV reports, inpatients admitted for HCV infection (2%), HCV-related liver transplants (3%), and HCV-related deaths (4%). The proportion of HCV-related liver and IHBD cancers (8%) was elevated.

Washington's non-Hispanic population is less than 1% Native Hawaiian/other Pacific Islander. Between 2010 and 2014, this group had comparative proportions for acute (<1%) and chronic (<1%) HCV reports, inpatients admitted for HCV infection (1%), HCV-related liver and IHBD cancers (<1%) and HCV-related deaths (<1%). However, Native Hawaiians/other Pacific Islanders accounted for 2% of HCV-related liver transplants.

Washington's non-Hispanic population is 4% multi-racial or of unknown race. Proportions of this group were included in all calculations but not further analyzed.

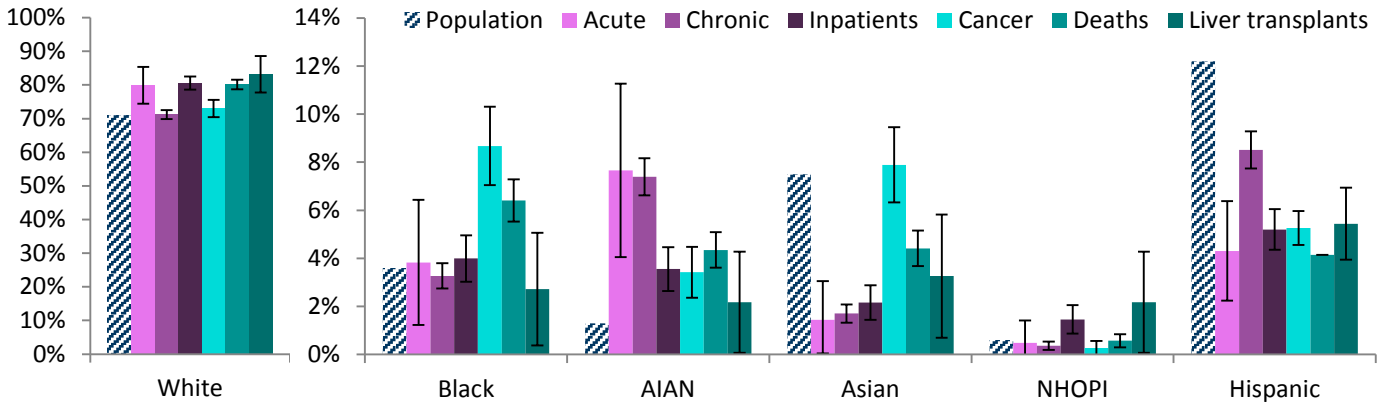
Washington's population is 12% Hispanic, of any race. Between 2010 and 2014, this group had lower proportions for acute (4%) and chronic (9%) HCV reports, inpatients admitted for HCV infection (5%), HCV-related liver and IHBD cancers (5%), HCV-related deaths (4%), and HCV-related liver transplants (5%).

Race and ethnicity information summarized above are based on a limited number of cases reported to Washington State with complete data. Identification of cases also depends on a group's access to healthcare. There appear to be disparities in HCV-related morbidity and mortality, and interventions could be directed towards reducing HCV in affected groups.

Internationally, medical exposures are a major risk factor for acquiring HCV infection. Regions with the highest prevalence of HCV infection are North Africa, the Middle East, former Soviet Socialist Republics, and China. Different screening priorities may be appropriate for immigrants and refugees from these areas.

Figure 42. Percent of HCV-related case reports of acute and chronic infection, inpatients, liver and bile duct cancers, deaths, or liver transplants by race and ethnicity—Washington State, 2010–2014

Source: OFM, PHIMS, CHSR, CHARS, death records (see Appendix A)

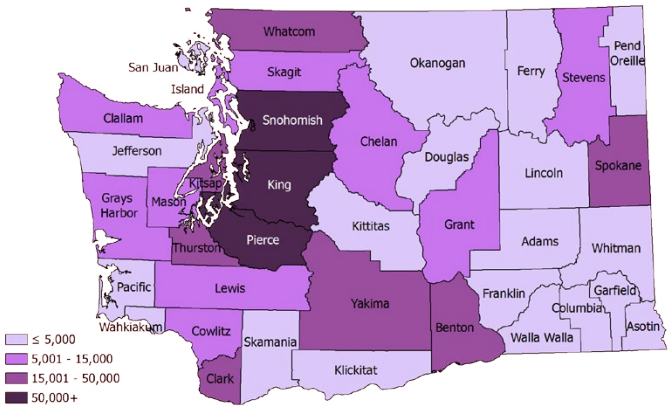


Veterans

In 2015, there were just under 600,000 veterans residing in Washington State (Figure 43). Nearly 90% of these veterans were male and approximately 43% were baby boomers (born 1945–1965) with an increased risk for hepatitis C virus (HCV) infection. However, information about veteran status is not included in most databases used for HCV surveillance.

Figure 43. Number of veterans in Washington State by county, 2015

Source: Department of Veterans Affairs



Approximately 13% of those in the United States with HCV infection are cared for by the Veterans Affairs (VA) healthcare system, and veterans receiving care through the VA system represent about a quarter of the total veteran population. However veterans cared for by the VA system are not representative of all veterans and likely have higher risk of HCV infection.[16]

Screening done in 2011 for 2.8 million VA patients found 8% prevalence overall, but 14% in those born 1945–1965. Women had about half the rate overall as well as among baby boomers.[88] Overall prevalence of HCV infection in veterans receiving care through the VA system was estimated at 5%—two to three times that of a similar non-veteran population. Prevalence varies with the veterans populations involved and may reach up to 42% in subgroups; homeless veterans or veterans with mental illnesses are at particular risk.[12] The risks for other bloodborne diseases such as HIV or hepatitis B virus are considerably lower in veterans.[88]

Most VA patients currently living with HCV infection are baby boomers and were infected with HCV between 1970 and 1990. The VA has screened an estimated 70% of its baby boomer patients. The risk factors for veterans to acquire HCV appear to be the same as for the US population overall. Veterans have an elevated prevalence of HCV infections due to the major risk factors of unscreened blood products before 1992 and injection drug use, not a separate risk from exposures related to military activities.[16]

In Washington, there are VA healthcare stations located in Puget Sound (Seattle and American Lake Divisions), Spokane, and Walla Walla. Prevalence of HCV infection among patients at the Puget Sound station was 9% in 2015, while the Spokane and Walla Walla stations matched the national prevalence among veterans in the VA system at 8%. Prevalence of HCV infection among veterans in the Puget Sound system from 2012–2015 exceeded the national rate in all years (Figure 44). Most veterans in the Washington VA system are seen at the Puget Sound station, where 74% of baby boomers were screened for HCV

Figure 44. Prevalence of hepatitis C infection among baby boomers at Veterans Affairs stations in Washington State and nationally, 2012-2015

Source: Department of Veterans Affairs

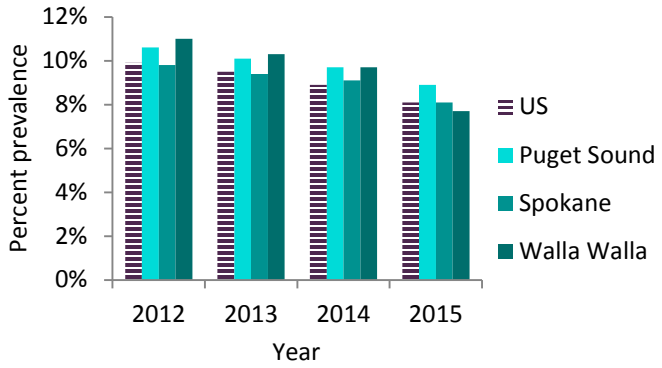
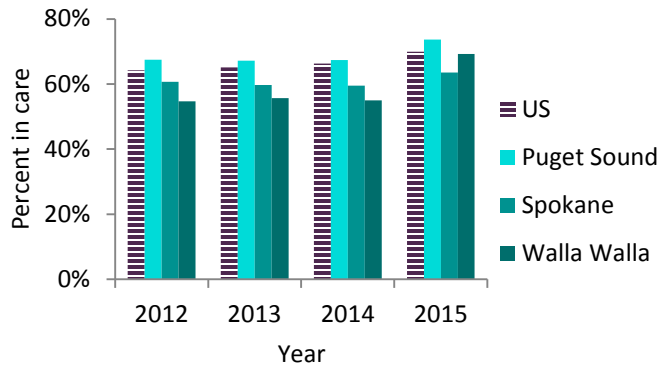


Figure 45. Percent of baby boomers in care who have been screened for hepatitis C at Veterans Affairs stations in Washington State and nationally, 2012-2015

Source: Department of Veterans Affairs

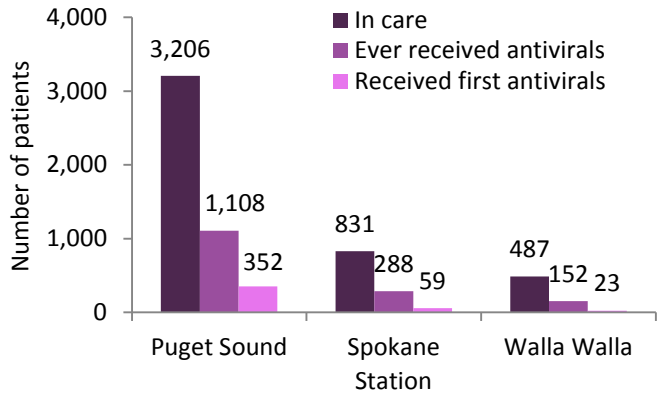


by the end of 2015. This is higher than the 70% screening seen in the VA system overall (Figure 45).

Of 3,206 veterans with HCV in care at the Puget Sound station, over one-third (35%) have received HCV antiviral treatment at some point. Likewise, at the Spokane and Walla Walla stations 35% and 31% of veterans have ever received antivirals. During 2015, treatment was started for 434 VA patients including 352 at the Puget Sound station, 59 at the Spokane station, and 23 at the Walla Walla station (Figure 46).

Figure 46. Number of Veterans Affairs patients in care with hepatitis C virus infection, and number who have received antiviral treatment at stations in Washington State, 2015

Source: Department of Veterans Affairs



One major challenge for the VA system in Washington State is the fact that many veterans live in locations geographically very distant from the main stations or from providers experienced with HCV antiviral treatment. To address this, the VA has introduced a very extensive peer-to-peer telemedicine program called Specialty Care Access Network-Extension for Community Healthcare Outcomes (SCAN-ECHO). This program allows case presentations and case-based training for primary care providers and their teams, often located at smaller VAs or in rural areas, who telecommunicate weekly with HCV expert teams in central locations. An additional goal of the program is to develop a mentor-mentee relationship between the specialist team and the primary care provider. The SCAN-ECHO program has enabled HCV treatment of many veterans in remote locations who otherwise would not have access to treatment.

HCV is a main cause of cirrhosis, liver cancer, and liver failure among veterans. From 2001 to 2013 the national incidence of liver cancer increased 2.5-fold and associated deaths tripled in VA-treated veterans; incidence of liver cancer increased nearly 3-fold. Liver cancer and associated mortality were continuing to increase through 2013.[89] The VA response includes telemedicine-supported HCV treatment.[16] However, the cost of antiviral agents is of concern. Nonetheless, according to the VA, the cost of HCV antiviral medications in the VA system was substantially reduced in 2016 while funds available for antiviral medications were doubled, raising the possibility that the VA can realistically offer treatment to the majority of the HCV-infected patients in VA care in the next 2–3 years.

Better Health Together

Washington State's Accountable Communities of Health (ACH) were designed to recognize and leverage the innovation and collaboration occurring in local communities by bringing public and private entities together to work on shared health goals. The Better Health Together (BHT) ACH covers Adams, Ferry, Lincoln, Pend Oreille, Spokane, and Stevens counties. Major cities include Davenport, Newport, Othello, Republic, and Spokane. BHT shares borders with the Colville Confederated Tribes, Kalispel Tribe, and Spokane Tribe.

BHT represents health plans, tribes, behavioral health, public health, city and county government, hospitals, federally qualified health centers, rural health providers, private health systems, aging and long term care, housing, consumers, employers, philanthropy, school systems, higher education, health information technology, and community-based organizations.

The BHT 2014 population was 579,370. This represents 8% of the state's population. The population is largely white (84% compared to 71% statewide) and has a lower Hispanic population than the state overall (7% vs. 12%). Five of the six counties are rural and federally designated Health Provider Shortage Areas. Median household income for the six counties in 2014 ranged from $39,992 to $50,083 compared to $61,358 for the state overall. The percent of counties' populations living in poverty ranged from 13% to 22% compared to 13% statewide.

Healthcare and public health services

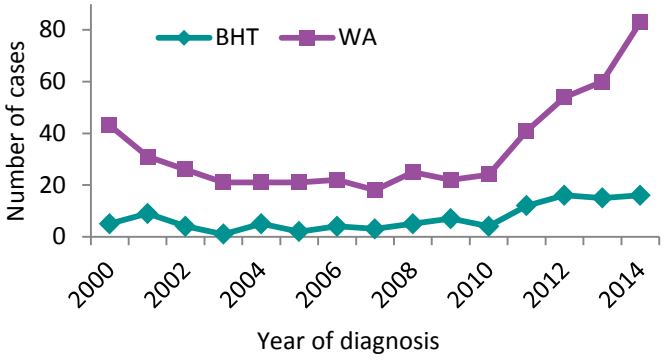
Spokane Regional Health District has a syringe service program. In addition to exchanging needles, services provided by the program include: supplying condoms, referral to HIV/STD prevention services, referral to treatment services, and providing rapid hepatitis C virus (HCV) testing services for eligible populations.

Acute hepatitis C

Between 2010 and 2014 there were 4 to 16 acute HCV infections reported each year in the BHT region. Over the last few years, the number of Spokane County cases have increased. Increases have also been seen in Stevens County. Rates of acute HCV infections in BHT from 2000 through 2014 were 0.2 to 2.8 cases per 100,000 persons. Since 2004 these rates have exceeded those of the state, which reached 1.2 per 100,000 in 2014.

Figure 1. Number of acute hepatitis C infections in the BHT region, 2000–2014

Source: Public Health Issues Management System (PHIMS)



Chronic hepatitis C

Between 2010 and 2014 there was an average of 617 chronic HCV cases diagnosed each year in the BHT Region (range: 467 to 772). Disease onset for these chronic cases may have been any time in the past.

Figure 2. Rate of diagnosis of chronic hepatitis C infection in the BHT region, 2000–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)

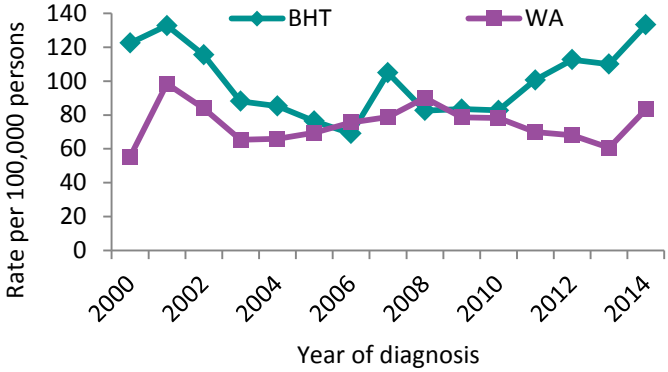
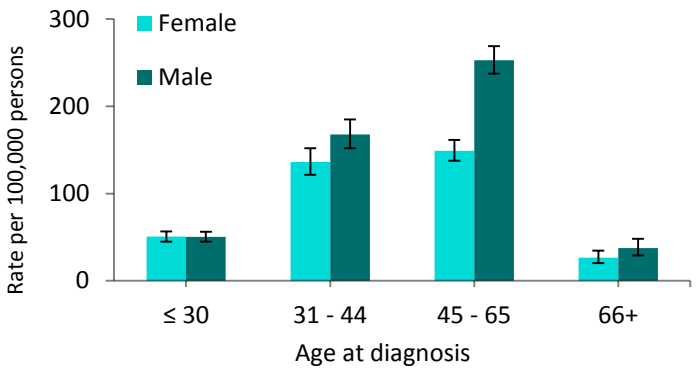


Figure 3. Rate of chronic hepatitis C infection by gender and age at diagnosis in the BHT region, 2010–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)



Unadjusted yearly rates of newly diagnosed chronic HCV cases ranged from 82.6 to 133.2 per 100,000 persons, higher than Washington's rates.

As with the state overall, the majority of chronic HCV cases reported in BHT from 2010 through 2014 were among males (58%). Males ages 31–44 and 45–65 had higher rates of reported cases than females. However, among those ages ≤ 30 and 66+, males and females had similar rates of diagnosis. The baby boomers (born 1945–1965) were disproportionately affected, a pattern seen in Washington and nationally. Race and ethnicity are missing from 92% of chronic HCV cases reported in BHT from 2010 to 2014. A majority of the cases with known race/ethnicity were white, non-Hispanic (67%), a group that is 84% of the BHT population.

Healthcare burden

Between 2010 and 2014, among BHT residents there were 283 inpatient hospitalizations with a primary diagnosis of acute or chronic HCV infection. Median length of stay was 3.0 days (average 5.4) with a total of 1,535 hospital-days. These hospitalizations had a five-year average charge of $43,723 (median $18,433, adjusted for inflation to 2014 dollars). The majority of admissions came from Spokane County (243 hospitalizations). Charges per HCV hospitalization ranged from a low of $2,914 to a high of $1,058,950. Total charges for the 283 hospitalizations were $12,373,563 over the five-year period. The major payer was Medicare. For the state overall there were 2,714 hospitalizations with a primary diagnosis of HCV infection and $114,090,862 in total charges.

Figure 4. Hospitalizations, hospital days, and charges for a primary diagnosis of hepatitis C in the BHT region, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System

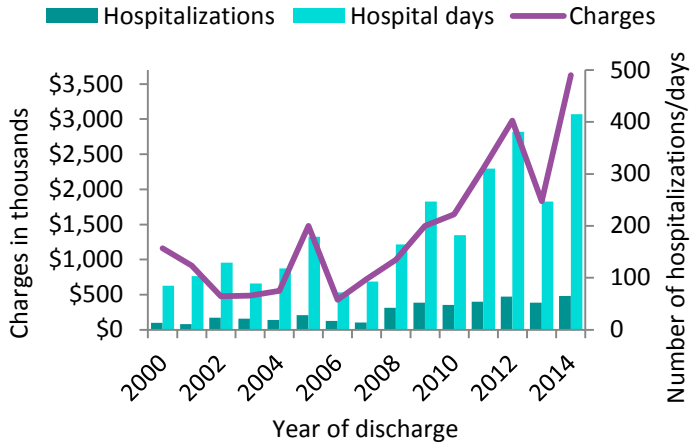
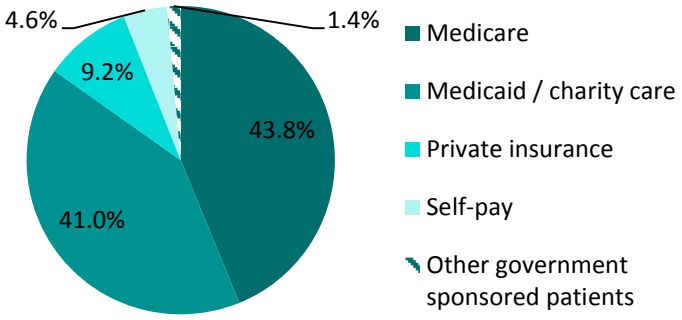


Figure 5. Primary payer for hospitalizations with a primary diagnosis of hepatitis C in the BHT region, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System



In the same time period, there were 86 cases of liver and bile duct cancer in the BHT region among persons with HCV infection. Of those cases, 74 (86%) were among baby boomers and 73 (85%) were male, compared to 83% in baby boomers and 80% in males for the state overall. Most of the cases were white (90%).

Mortality

From 2010 to 2014 there were 262 BHT deaths with HCV listed as an underlying or contributing cause of death. Average age at death was 59 years. Most decedents were white (87%), male (66%), and baby boomers (81%), resembling the statewide profile for all HCV deaths in this time period.

Risk factors

Of the 63 acute HCV cases reported in BHT between 2010 and 2014, 40 of 54 (74%) with information available had injection drug use as a risk factor. There was risk factor information for only 19% of chronic HCV cases from 2010 to 2014. Injection drug use, whether reported alone or with other risks, was observed in 62% of BHT chronic HCV cases with risk information.

Cascade Pacific Action Alliance

Washington State's Accountable Communities of Health (ACH) were designed to recognize and leverage the innovation and collaboration occurring in local communities by bringing public and private entities together to work on shared health goals. The Cascade Pacific Action Alliance (CPAA) covers Cowlitz, Grays Harbor, Lewis, Mason, Pacific, Thurston, and Wahkiakum counties. Major cities include Aberdeen, Cathlamet, Centralia, Lacey, Longview, Olympia, Raymond, and Shelton. CPAA shares borders with the Chehalis Confederated Tribes, Cowlitz Indian Tribe, Nisqually Tribe, Quinault Indian Nation, Shoalwater Bay Tribe, Skokomish Tribe, and Squaxin Island Tribe.

CPAA incorporates representatives from criminal justice, education, employers, health plans, hospitals, government, long-term care, primary and specialty providers, public health, social services, and tribes.

The CPAA 2014 population was 604,410. This represents 9% of the state's population. The population is largely white (81% compared to 71% statewide) and has a lower Hispanic population than Washington overall (9% vs. 12%). Median household income for the seven counties in 2014 ranged from $40,189 to $61,653 compared to $61,358 for the state overall. The percent of counties' populations living in poverty ranged from 12% to 21% compared to 13% statewide.

Healthcare and public health services

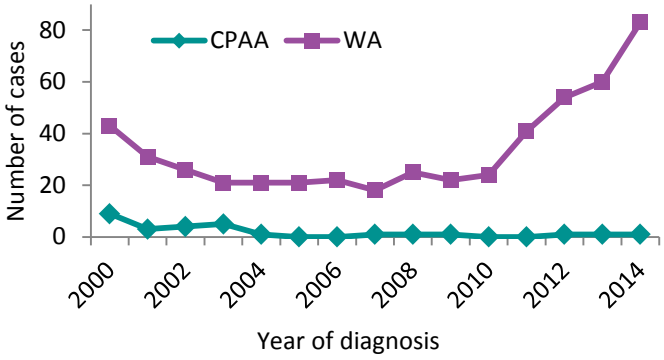
CPAA advocates for improved access to health care, improved care coordination and integration, mitigation of adverse childhood experiences, and enhanced economic and educational opportunities. One current CPAA project is the Youth Behavioral Health Coordination Project, a mental health and chemical dependency program that may contribute to reducing injection drug use, likely preventing future hepatitis C virus (HCV) infections. Local health jurisdictions for Cowlitz, Grays Harbor, and Thurston counties all have some form of syringe service programs.

Acute hepatitis C

Between 2010 and 2014 there were zero or 1 acute HCV infections reported each year. Rates were unreliable for CPAA and its counties due to the small number of reports.

Figure 1. Number of acute hepatitis C infections in the CPAA region, 2000–2014

Source: Public Health Issues Management System (PHIMS)



Chronic hepatitis C

Between 2010 and 2014 there was an average of 661 chronic HCV cases diagnosed each year in the CPAA region (range: 559 to 948). Disease onset may have been any time in the past. Unadjusted yearly rates of newly diagnosed chronic HCV cases ranged from 95.2 to 158.0 per 100,000 persons, higher than Washington's rates during 2010 to 2014.

Figure 2. Rate of diagnosis of chronic hepatitis C infection in the CPAA region, 2000–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)

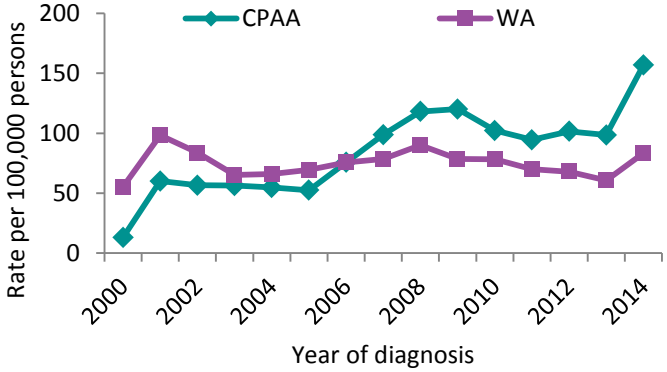
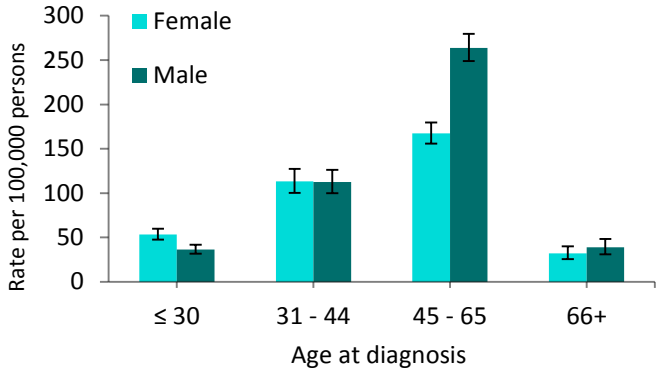


Figure 3. Rate of chronic hepatitis C infection by gender and age at diagnosis in the CPAA region, 2010–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)



As with the state overall, the majority of chronic HCV cases reported in CPAA from 2010 through 2014 were among males (55%). Females and males had similar rates of diagnosis in every age category, except for those ages 45–65 years old. Males ages 45–65 had a higher rate of diagnosis than females. Baby boomers (born 1945–1965) were disproportionately affected, a pattern seen in Washington and nationally. Race and ethnicity were missing from 86% of cases reported in CPAA from 2010 to 2014. A majority of chronic cases with known race/ethnicity were white, non-Hispanic (66%), a group that is 81% of the CPAA population.

Healthcare burden

Between 2010 and 2014, among CPAA residents there were 329 inpatient hospitalizations with a primary diagnosis of acute or chronic HCV infection. The majority of admissions came from Thurston (84 hospitalizations), Cowlitz (81 hospitalizations), and Grays Harbor (78 hospitalizations) counties. Median length of stay was 3.0 days (average 4.7) with a total of 1,560 hospital-days for CPAA residents. These hospitalizations had a five-year average charge of $39,345 (median $19,267, adjusted for inflation to 2014 dollars). Charges per HCV hospitalization ranged from a low of $2,654 to a high of $964,956. Total charges for the 329 hospitalizations were $12,944,575 over the five-year period. The major payer was Medicare. For the state overall there were 2,714 hospitalizations with a primary diagnosis of HCV infection and $114,090,862 in total charges.

Figure 4. Hospitalizations, hospital days, and charges for a primary diagnosis of hepatitis C in the CPAA region, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System

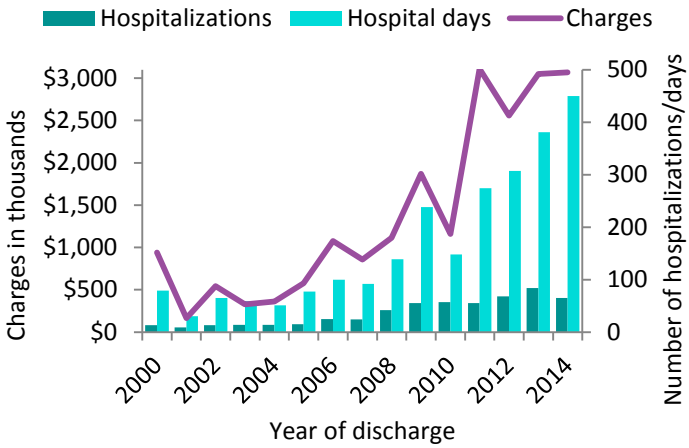
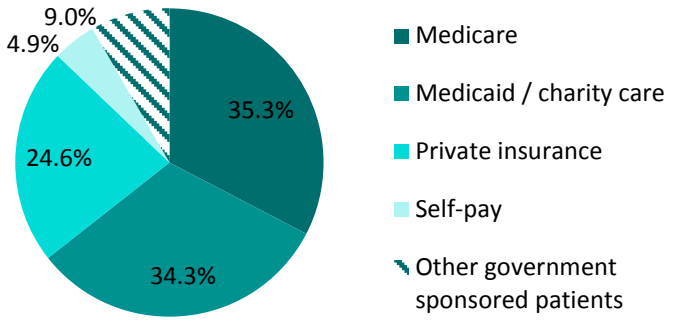


Figure 5. Primary payer for hospitalizations with a primary diagnosis of hepatitis C in the CPAA region, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System



In the same time period, there were 101 cases of liver and bile duct cancer in the CPAA region among persons with HCV infection. Of those cases, 87 (86%) were among baby boomers and 86 (85%) were male, compared to 83% in baby boomers and 80% in males for the statewide. Most cases were white (90%).

Mortality

From 2010 to 2014 there were 328 CPAA deaths with HCV listed as an underlying or contributing cause of death. Average age at death was 59 years. Most decedents were white (88%), male (74%), and baby boomers (83%), resembling the statewide profile for all HCV deaths in this time period.

Risk factors

Of the 3 acute HCV cases reported in CPAA between 2010 and 2014, 2 of 3 (67%) with information available had injection drug use as a risk factor. There was risk factor information for only 6% of chronic HCV cases diagnosed from 2010 to 2014. Injection drug use, whether reported alone or with other risks, was observed in 70% of CPAA chronic HCV cases with risk information.

Greater Columbia Accountable Community of Health

Washington State's Accountable Communities of Health (ACH) were designed to recognize and leverage the innovation and collaboration occurring in local communities by bringing public and private entities together to work on shared health goals. Greater Columbia ACH (GC ACH) covers Asotin, Benton, Columbia, Franklin, Kittitas, Garfield, Klickitat Walla Walla, Whitman, and Yakima counties. Major cities include Clarkston, Dayton, Ellensburg, Goldendale, Kennewick, Pasco, Pomeroy, Pullman, Richland, Walla Walla, and Yakima. GC ACH shares borders with the Yakima Nation.

The GC ACH 2014 population was 719,770. This represents 10% of the state's population. The population is 61% white compared to 71% for the state and has a higher Hispanic population than Washington overall (32% vs. 12%). Median household income for the ten counties in 2014 ranged from $41,837 to $58,750 compared to $61,358 for the state overall. The percent of counties' populations living in poverty ranged from 14% to 28% compared to 13% statewide.

Healthcare and public health services

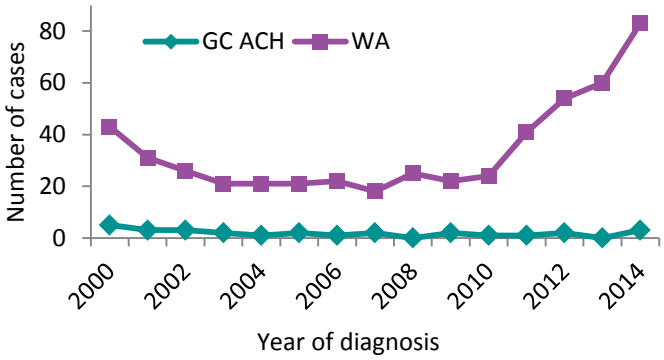
The state Department of Health (DOH) provides funds to support a syringe service program at a community-based organization in Walla Walla County. Funds are provided to increase the availability, accessibility and utilization of clean needles and syringes in addition to other services. DOH also provides indirect support in the form of needle exchange supplies and hepatitis C virus (HCV) rapid test kits to the Kittitas County Public Health Department and indirect support to the needle exchange located at the Yakima Health District.

Acute hepatitis C

Between 2010 and 2014 there were zero to 3 acute HCV infections reported each year. Rates were unreliable due to the small numbers. Over the past 20 years GC ACH had no or few acute HCV cases each year.

Figure 1. Number of acute hepatitis C infections in the GC ACH region, 2000–2014

Source: Public Health Issues Management System (PHIMS)



Chronic hepatitis C

Between 2010 and 2014 there was an average of 228 chronic HCV cases diagnosed each year in the GC ACH region (range: 127 to 429). Disease onset for these chronic cases may have been any time in the past. Unadjusted yearly rates of newly diagnosed chronic HCV cases ranged from 18.0 to 60.2 per 100,000 persons and were much lower than Washington's rates during 2010 to 2014.

As with the state overall, the majority of chronic HCV cases reported in GC ACH from 2010 through 2014 were among males (58%). Females and males had

Figure 2. Rate of diagnosis of chronic hepatitis C infection in the GC ACH region, 2000–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)

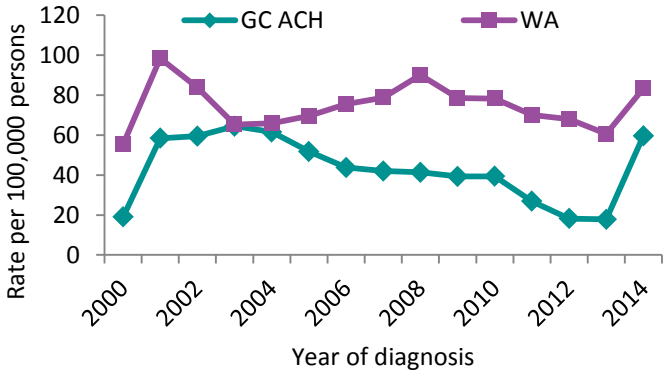
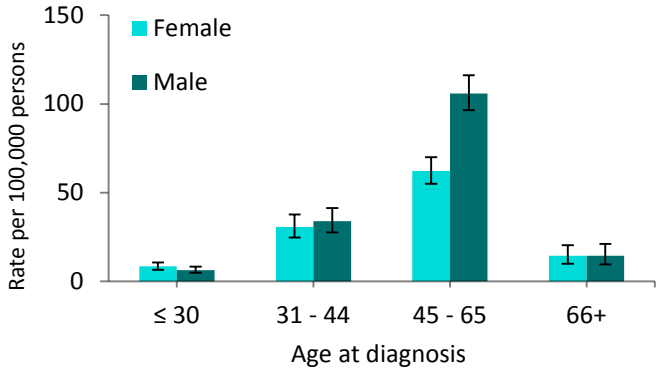


Figure 3. Rate of chronic hepatitis C infection by gender and age at diagnosis in the GC ACH region, 2010–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)



similar rates of diagnosis in every age category, except for those ages 45–65 years old. Males ages 45–65 had a higher rate of diagnosis than females. Baby boomers (born 1945–1965) were disproportionately affected, a pattern seen in Washington and nationally. Race and ethnicity were missing from 62% of cases reported in GC ACH from 2010–2014. A majority of chronic cases with known race/ethnicity were white, non-Hispanic (68%), a group that is 61% of the GC ACH population.

Healthcare burden

Between 2010 and 2014, among GC ACH residents there were 271 inpatient hospitalizations with a primary diagnosis of acute or chronic HCV infection. Median length of stay was 3.0 days (average 4.0) with a total of 1,071 hospital-days for GC ACH residents. GC ACH hospitalizations had a five-year average charge of $27,527 (median $16,625, adjusted for inflation to 2014 dollars). The majority of admissions came from Yakima (106 hospitalizations) and Benton (95 hospitalizations) counties. Charges per HCV hospitalization ranged from a low of $2,073 to a high of $325,014. Total charges for the 271 hospitalizations were $7,459,835 over the five-year period. The major payer was private insurance. For the state overall there were 2,714 hospitalizations with a primary diagnosis of HCV infection and $114,090,862 in total charges.

Figure 4. Hospitalizations, hospital days, and charges for a primary diagnosis of hepatitis C in the GC ACH region, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System

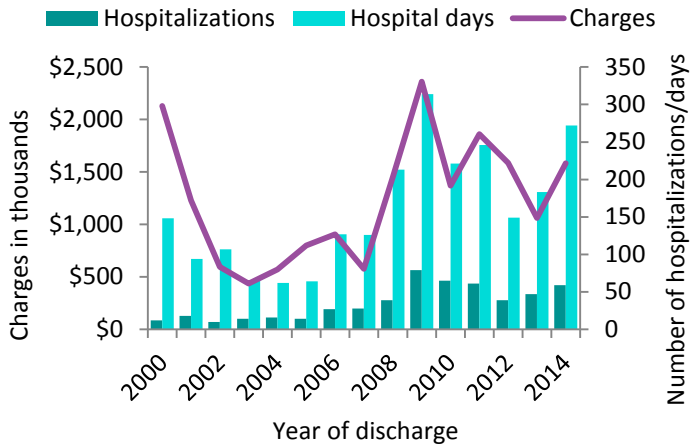
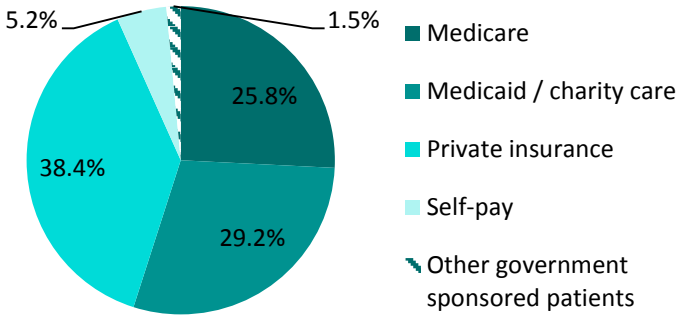


Figure 5. Primary payer for hospitalizations with a primary diagnosis of hepatitis C in the GC ACH region, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System



In the same time period, there were 61 cases of liver and bile duct cancer in the GC ACH region among persons with HCV infection. Of those cases, 55 (90%) were among baby boomers and 50 (79%) were male, compared to 83% in baby boomers and 80% in males for the state overall. Most were white (69%).

Mortality

From 2010 to 2014 there were 302 GC ACH deaths with HCV listed as an underlying or contributing cause of death. Average age at death was 59 years. Most decedents were white (80%), male (74%), and baby boomers (81%), resembling the statewide profile for all HCV deaths in this time period.

Risk factors

Of the 7 acute HCV cases reported in GC ACH during 2010–2014, 2 of 4 (50%) with information available had injection drug use as a risk factor. There was risk factor information for 29% of chronic HCV cases diagnosed from 2010 to 2014. Injection drug use, whether reported alone or with other risks, was observed in 53% of GC ACH chronic HCV cases with risk information.

King County Accountable Community of Health

Washington State's Accountable Communities of Health (ACH) were designed to recognize and leverage the innovation and collaboration occurring in local communities by bringing public and private entities together to work on shared health goals. The King County ACH covers King County. Major cities include Bellevue, Federal Way, Renton, and Seattle. King County shares borders with the Snoqualmie and Muckleshoot tribes.

King County ACH brings together social services and supports, housing and community development, networks focused on eliminating health disparities and inequities, hospital and healthcare systems, community health centers, mental health and substance abuse providers, public health, Medicaid managed care organizations, tribes, local government, higher education, the criminal justice system and correctional health, philanthropy, and information technology.

The King County 2014 population was 2,017,250. This represents 29% of the state's population. The population is 63% white compared to 71% for the state and has a lower Hispanic population than Washington overall (10% vs. 12%). Median household income in 2014 was $75,738 compared to $61,358 statewide. The percent of population living in poverty was 11% compared to 13% statewide.

Healthcare and public health services

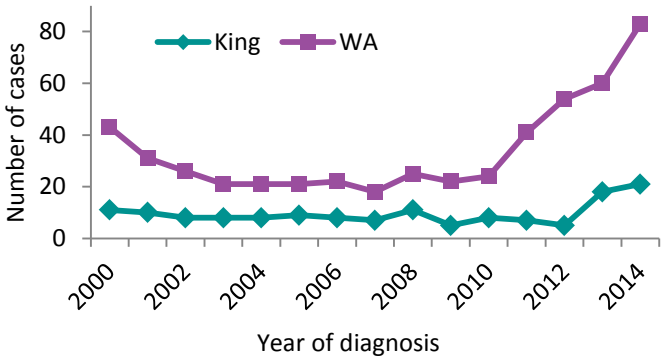
Multiple syringe service programs are present in King County, including PHSKC, Evergreen Treatment Services, Gay City Health Project, and the People's Harm Reduction Alliance. The Seattle metropolitan statistical area participates in the National HIV Behavioral Surveillance System (NHBS), a survey which includes data about risk factors among injection drug users. PHSKC has received a Hepatitis C Test and Cure (HCV-TAC) grant from the federal government in order to improve hepatitis C virus (HCV) testing and linkage to care for persons who inject drugs.

Acute hepatitis C

Between 2010 and 2014 there were 5 to 21 acute HCV infections reported each year with a marked increase for 2013 and 2014. Rates of acute HCV were 0.3 to 1.0 per 100,000 persons and were roughly similar to recent state rates, which reached 1.2 in 2014.

Figure 1. Number of acute hepatitis C infections in King County, 2000–2014

Source: Public Health Issues Management System (PHIMS)



Chronic hepatitis C

Between 2010 and 2014 there was an average of 1,198 chronic HCV cases diagnosed each year in King County (range: 899 to 1,551). Disease onset for these chronic cases may have been any time in the past. Unadjusted yearly rates of newly diagnosed chronic HCV cases ranged from 45.4 to 80.3 per 100,000 persons and were generally lower than Washington's rates during 2010 to 2014.

Figure 2. Rate of diagnosis of chronic hepatitis C infection in King County, 2000–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)

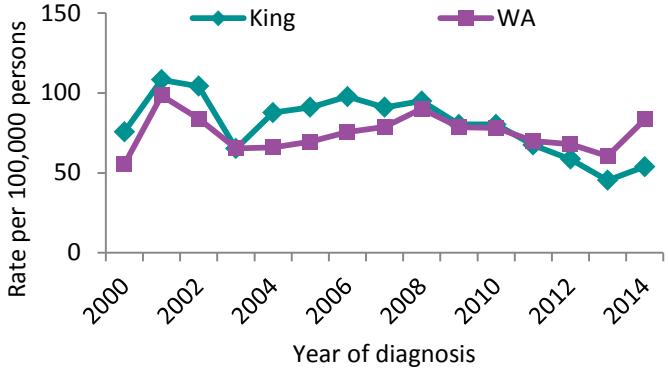
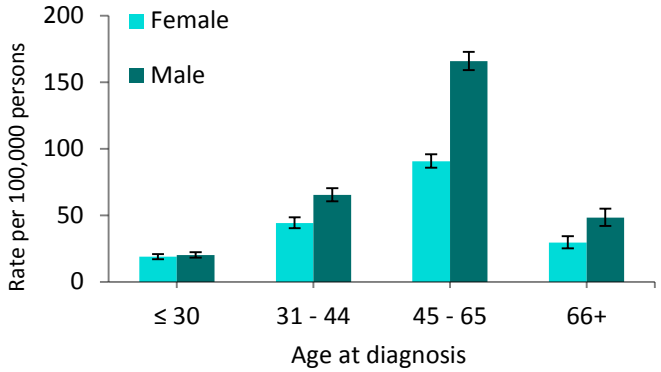


Figure 3. Rate of chronic hepatitis C infection by gender and age at diagnosis in King County, 2010–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)



As with the state overall, the majority of chronic HCV cases reported in King County were among males (62%). Males had higher diagnosis rates for every age category except those ≤30 years. Males and Females ≤30 years of age had similar diagnosis rates. Baby boomers (born 1945–1965) were disproportionately affected, a pattern seen in Washington and nationally. Race and ethnicity were missing from 93% of cases reported in King County from 2010 to 2014. A majority of the chronic HCV cases with known race/ethnicity were white, non-Hispanic (54%), a group that is 63% of the King County population overall.

Healthcare burden

Between 2010 and 2014 there were 613 hospitalizations for King County residents with a primary diagnosis of acute or chronic HCV infection. Median length of stay was 3.0 days (average 5.6) with a total of 3,411 hospital-days for King County residents. The King County hospitalizations had a five-year average charge of $48,142 (median $23,023, adjusted for inflation to 2014 dollars). Charges per HCV hospitalization ranged from a low of $2,054 to a high of $579,867. Total charges for the 613 hospitalizations were $29,511,027 over the five-year period. The major payer was Medicare. For the state overall there were 2,714 hospitalizations with a primary diagnosis of HCV infection and $114,090,862 in total charges.

Figure 4. Hospitalizations, hospital days, and charges for a primary diagnosis of hepatitis C in King County, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System

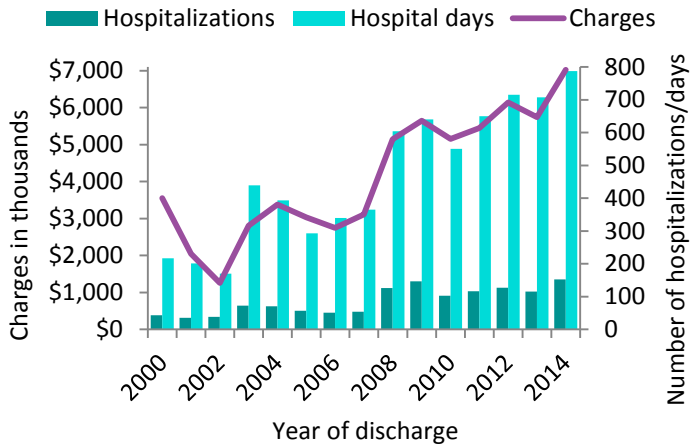
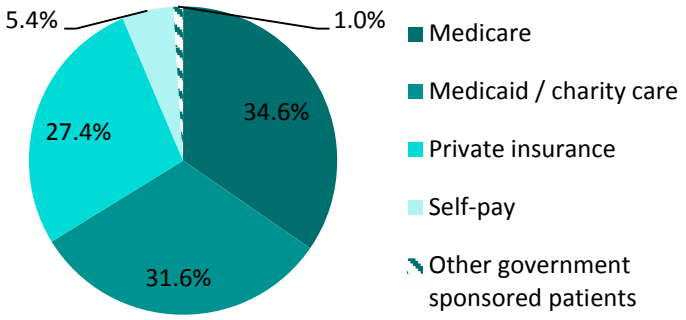


Figure 5. Primary payer for hospitalizations with a primary diagnosis of hepatitis C in King County, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System



In the same time period, there were 373 cases of liver and bile duct cancer in King County among persons with HCV infection. Of those, 298 (80%) were among baby boomers and 294 (79%) were male, compared to 83% in baby boomers and 80% in males for the state overall. More than half of the cases were white (62%).

Mortality

From 2010 to 2014 there were 814 King County deaths with HCV listed as an underlying or contributing cause of death. Average age at death was 61 years. Most decedents were male (68%), and baby boomers (77%), resembling the statewide profile for all HCV deaths in this time period. The decedents were less likely to be white than for Washington overall.

Risk factors

Of the 59 acute HCV cases reported in King County between 2010 and 2014, 47 of 55 (85%) with information available had injection drug use as a risk factor. There was risk factor information for 10% of chronic HCV cases diagnosed from 2010 to 2014. Injection drug use, whether reported alone or with other risks, was observed in 93% of chronic HCV cases with risk information.

North Central Accountable Community of Health

Washington State's Accountable Communities of Health (ACH) were designed to recognize and leverage the innovation and collaboration occurring in local communities by bringing public and private entities together to work on shared health goals. The North Central Accountable Community of Health (NCACH) covers Chelan, Douglas, Grant and Okanogan counties. Major cities include Ephrata, Moses Lake, Omak, and Wenatchee. NCACH also shares borders with the Colville Confederated Tribes.

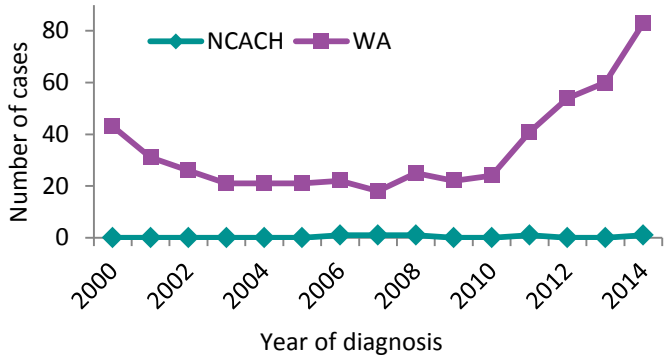
The NCACH 2014 population was 248,600. This represents 4% of the state's population. The population is 63% white compared to 71% for the state and has a higher Hispanic population than Washington overall (32% vs. 12%). Median household income for the four counties in 2014 ranged from $37,782 to $51,151 compared to $61,358 for the state overall. The percent of counties' populations living in poverty ranged from 14% to 23% compared to 13% statewide.

Healthcare and public health services

The state Department of Health provides indirect support in the form of needle exchange supplies to Okanogan County Public Health.

Figure 1. Number of acute hepatitis C infections in the NCHP region, 2000–2014

Source: Public Health Issues Management System (PHIMS)



Acute hepatitis C

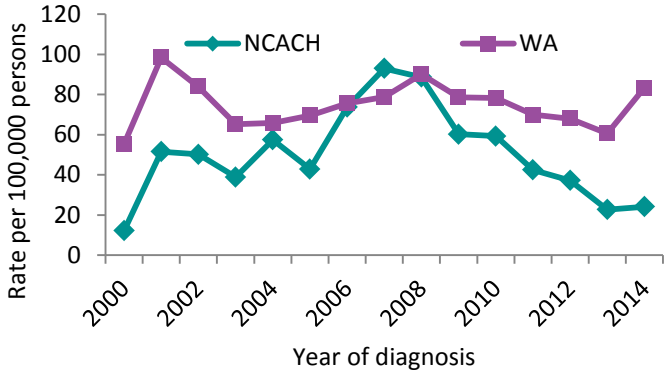
Between 2010 and 2014 there were zero or 1 acute hepatitis C virus (HCV) infections reported each year. Rates were unreliable due to the small numbers. Over the past 20 years NCACH had no or few cases a year.

Chronic hepatitis C

Between 2010 and 2014 there was an average of 91 chronic HCV cases diagnosed each year in the NCACH region (range: 56 to 143). Disease onset for these chronic cases may have been any time in the past. Unadjusted yearly rates of newly diagnosed chronic HCV cases ranged from 22.7 to 59.3 per 100,000 persons and were generally much lower than Washington's rates.

Figure 2. Rate of diagnosis of chronic hepatitis C infection in the NCACH region, 2000–2014

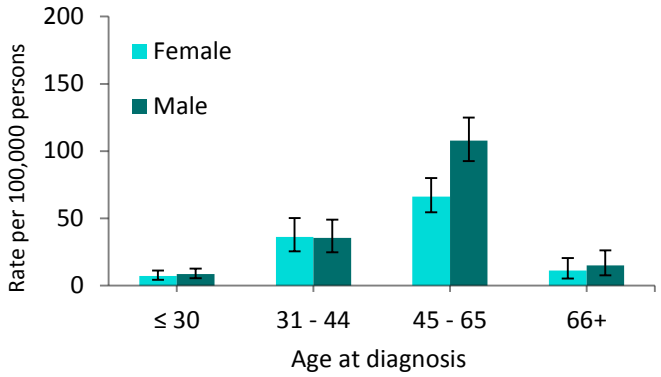
Source: Chronic Hepatitis Surveillance Records (CHSR)



As with the state overall, the majority of chronic HCV cases reported in NCACH from 2010 through 2014 were among males (59%). Females and males had similar rates of diagnosis in every age category, except for those ages 45–65 years old. Males ages 45–65 had a higher rate of diagnosis than females. Baby boomers (born 1945–1965) were disproportionately affected, a pattern seen in Washington and nationally. Race and ethnicity were reported for 64% of cases in NCACH from 2010 to 2014. Nearly three-quarters of chronic HCV cases with known race/ethnicity were white,

Figure 3. Rate of chronic hepatitis C infection by gender and age at diagnosis in the NCACH region, 2010–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)



non-Hispanic (74%), a group that represents only 62% of the general NCACH population.

Healthcare burden

Between 2010 and 2014, among NCACH residents there were 65 inpatient hospitalizations with a primary diagnosis of acute or chronic HCV infection. The majority of admissions came from Grant County (34 hospitalizations). Median length of stay was 3.0 days (average 4.8) with a total of 313 hospital-days for NCACH residents. These hospitalizations had a five-year average charge of $35,699 (median $16,531, adjusted for inflation to 2014 dollars). Charges per HCV hospitalization ranged from a low of $3,588 to a high of $427,967. Total charges for the 65 NCACH hospitalizations were $2,320,462 over the five-year period. The major payer was Medicaid. For the state overall there were 2,714 hospitalizations with a

Figure 4. Hospitalizations, hospital days, and charges for a primary diagnosis of hepatitis C in the NCACH region, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System

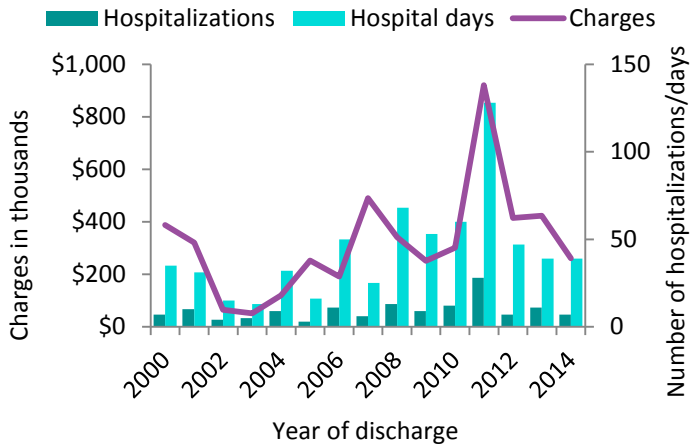
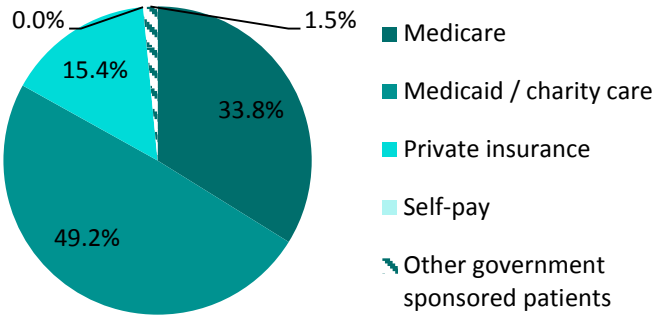


Figure 5. Primary payer for hospitalizations with a primary diagnosis of hepatitis C in the NCACH region, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System



primary diagnosis of HCV infection and $114,090,862 in total charges.

In the same time period, there were 14 cases of liver and bile duct cancer in the NCACH region among persons with HCV infections. Of those cases, 11 (79%) were among baby boomers and 12 (86%) were male, compared to 83% in baby boomers and 80% in males for the state overall. In addition, most of the cases were white (71%).

Mortality

From 2010 to 2014 there were 76 NCACH deaths with HCV listed as an underlying or contributing cause of death. Average age at death was 60 years. Most decedents were white (86%), male (71%), and baby boomers (79%), resembling the statewide profile for all HCV deaths in this time period.

Risk factors

Of the two acute HCV cases reported in NCACH between 2010 and 2014, 1 of 2 (50%) with information available had injection drug use listed as a risk factor. There was risk factor information for 38% of chronic HCV cases diagnosed from 2010 to 2014. Injection drug use, whether reported alone or with other risks, was observed in 51% of cases with risk information. The remaining 49% of chronic HCV cases reported other common non-injection drug use risks for HCV infection.

North Sound Accountable Community of Health

Washington State's Accountable Communities of Health (ACH) were designed to recognize and leverage the innovation and collaboration occurring in local communities by bringing public and private entities together to work on shared health goals. The North Sound Accountable Community of Health (NSACH) covers Island, San Juan, Skagit, and Whatcom counties. Major cities include Bellingham, Edmonds, Everett, Friday Harbor, Mount Vernon, and Oak Harbor. NSACH shares borders with the Lummi Nation, the Nooksack Tribe, the Sauk-Suiattle Tribe, the Samish Indian Nation, the Tulalip Tribes, the Stillaguamish Tribe, the Upper Skagit Tribe, and the Swinomish Tribe.

The NSACH 2014 population was 1,164,200. This represents 17% of the state's population. The population is 75% white compared to 71% for the state and has a lower Hispanic population than Washington overall (10% vs. 12%). Median household income for the five counties in 2014 ranged from $51,395 to $71,890 compared to $61,358 for the state overall. The percent of counties' populations living in poverty ranged from 10% to 16% compared to 13% statewide.

Healthcare and public health services

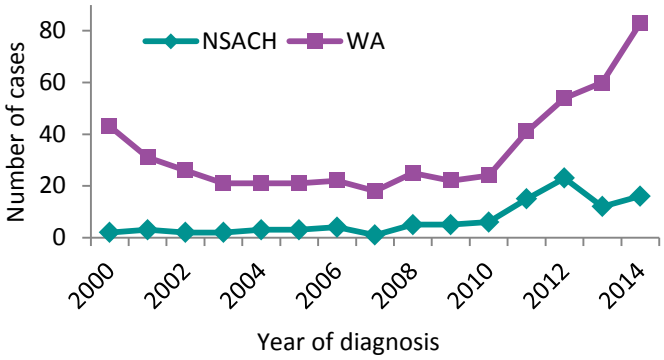
The state Department of Health provides funds to support syringe service programs at Snohomish Health District, Whatcom County Health Department, and Pacific Treatment Alternatives. Funds increase the availability, accessibility and utilization of clean needles and syringes. In addition to exchanging needles, services may also include providing condoms, referrals to HIV/STD prevention services, referrals to treatment services, and directly providing or referring out for HCV testing services for eligible populations.

Acute hepatitis C

Between 2010 and 2014 there were 6 to 23 acute hepatitis C virus (HCV) infections reported each year with a marked increase over previous years. Rates were 0.1 to 1.9 per 100,000 persons and exceeded the state rate which reached 1.2 in 2014.

Figure 1. Number of acute hepatitis C infections in the NSACH region, 2000–2014

Source: Public Health Issues Management System (PHIMS)



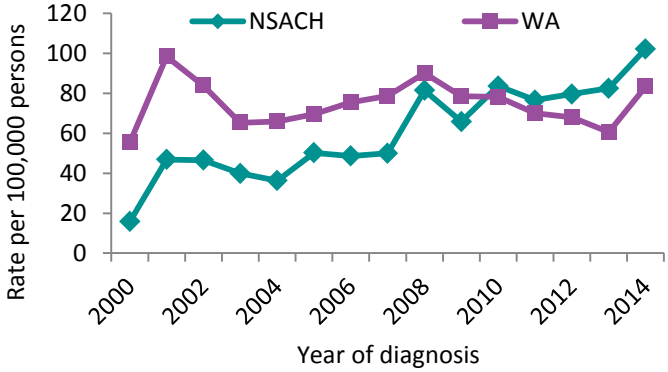
Chronic hepatitis C

Between 2010 to 2014 there was an average of 971 chronic hepatitis C cases diagnosed each year in the NSACH region (range: 866 to 1,190). Disease onset for these chronic cases may have been any time in the past. Unadjusted yearly rates of newly diagnosed chronic hepatitis C cases ranged from 76.7 to 102.4 per 100,000 persons and were higher than Washington's rates during 2010 to 2014.

As with the state overall, the majority of chronic HCV cases reported in NSACH from 2010 through 2014 were among males (58%). Females and males had

Figure 2. Rate of diagnosis of chronic hepatitis C infection in the NSACH region, 2000–2014

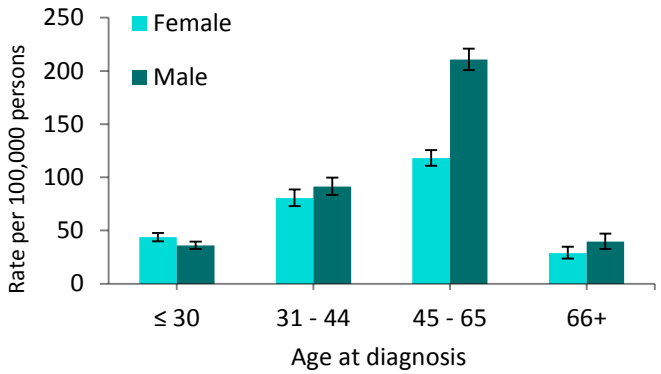
Source: Chronic Hepatitis Surveillance Records (CHSR)



similar rates of diagnosis in every age category, except for those ages 45–65 years old. Males ages 45–65 had a higher rate of diagnosis than females. Baby boomers (born 1945–1965) were disproportionately affected, a pattern seen in Washington and nationally. Race and ethnicity were missing from 70% of cases reported in NSACH from 2010–2014. A majority of chronic cases with known race/ethnicity were white, non-Hispanic (74%), a group that is 75% of the NSACH population.

Figure 3. Rate of chronic hepatitis C infection by gender and age at diagnosis in the NSACH region, 2010–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)



Healthcare burden

Between 2010 and 2014, among NSACH residents there were 465 inpatient hospitalizations with a primary diagnosis of acute or chronic HCV infection. The majority of admissions came from Snohomish County (288 hospitalizations). Median length of stay was 3.0 days (average 5.4) with a total of 2,513 hospital-days for NSACH residents. These hospitalizations had a five-year average charge of $43,301 (median $22,051, adjusted for inflation to 2014 dollars). Charges per HCV hospitalization ranged from a low of $1,980 to a high of $595,940. Total charges for the 465 hospitalizations were $20,134,757 over the five-year period. The major payers were Medicaid and private insurance. For the state overall there were 2,714 hospitalizations with a primary diagnosis of HCV infection and $114,090,862 in charges.

Figure 4. Hospitalizations, hospital days, and charges for a primary diagnosis of hepatitis C in the NSACH region, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System

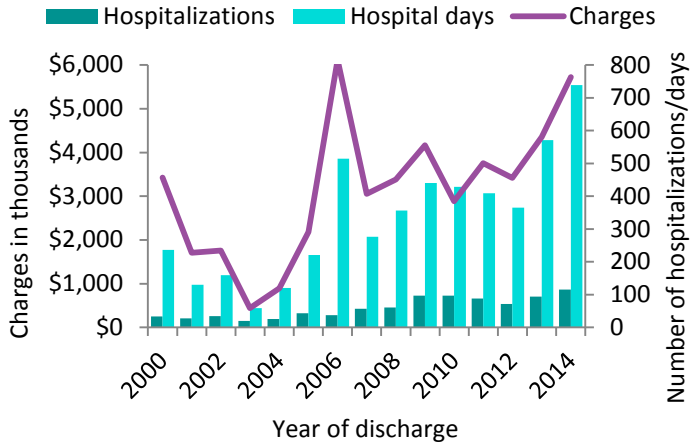
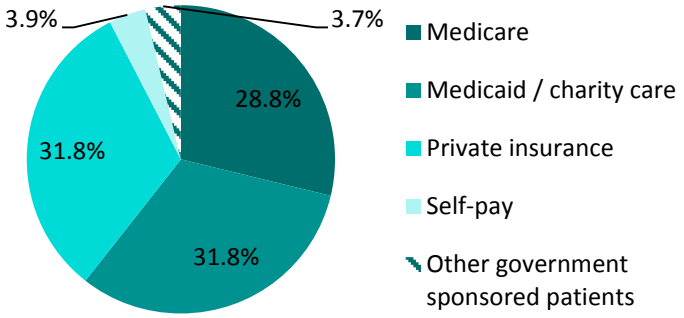


Figure 5. Primary payer for hospitalizations with a primary diagnosis of hepatitis C in the NSACH region, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System



In the same time period, there were 215 cases of liver and bile duct cancer in the NSACH region among persons with HCV infection. Of those cases, 184 (86%) were among baby boomers and 170 (79%) were male, compared to 83% in baby boomers and 80% in males for the state overall. Most of the cases were white (79%).

Mortality

From 2010 to 2014 there were 476 NSACH deaths with HCV listed as an underlying or contributing cause of death. Average age at death was 60 years. Most decedents were white (83%), male (71%), and baby boomers (78%), resembling the statewide profile for all HCV deaths in this time period.

Risk factors

Of the 72 acute HCV cases reported in NSACH between 2010 and 2014, 59 of 68 (87%) with information available had injection drug use as a risk factor. There was risk factor information for only 17% of chronic HCV cases diagnosed from 2010 to 2014. Injection drug use, whether reported alone or with other risks, was observed in 69% of NSACH chronic HCV cases with risk information.

Olympic Community of Health

Washington State's Accountable Communities of Health (ACH) were designed to recognize and leverage the innovation and collaboration occurring in local communities. ACHs bring public and private entities together to work on shared health goals. The Olympic Community of Health (OCH) covers Clallam, Jefferson, and Kitsap counties. Major cities include Bremerton, Port Angeles, and Port Townsend. OCH shares borders with the Hoh, Quileute, Makah, Lower Elwha Klallam, Jamestown S'Klallam, Port Gamble S'Klallam, and Suquamish tribes as well as the Quinault Indian Nation.

The OCH 2014 population was 359,100. This represents 5% of the state's population. The population is 80% white compared to 71% for the state and has a lower Hispanic population than Washington overall (6% vs. 12%). There are lower population densities around the Olympic National Forest, resulting in areas with healthcare provider shortages. Kitsap County has 5% of the population on active military duty with some high transient sub-populations. Military veterans compose 12% of Clallam County and nearly 15% of Jefferson County. Median household income for the three counties in 2014 ranged from $47,185 to $61,898 compared to $61,358 for the state overall. The percent of counties' populations living in poverty ranged from 11% to 16% compared to 13% statewide.

Healthcare and public health services

Inpatient facilities include private hospitals and the US Navy. Outpatient clinics include multiple rural health clinics, Veterans Health Administration outpatient clinics in Bremerton and Port Angeles, and three free clinics. Six of the seven sovereign tribal nations operate primary care clinics. Most specialty and imaging services must be obtained outside the region.

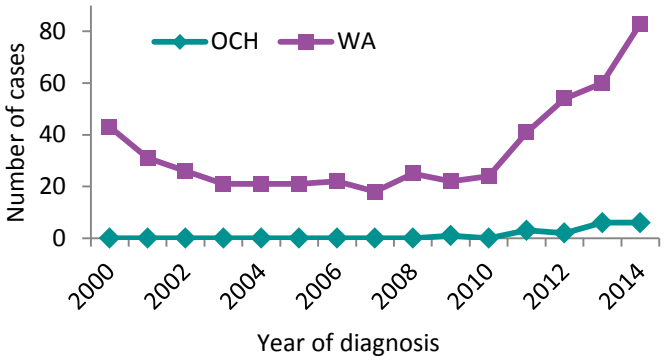
Kitsap and Clallam counties offer syringe service programs. In addition, there are numerous non-profit and for-profit outpatient and inpatient substance abuse treatment providers in the region. However, there is a lack of early intervention and treatment services for substance use.

Acute hepatitis C

Between 2010 and 2014 there were zero to 6 acute hepatitis C virus (HCV) infections reported each year in the OCH region. Numbers increased in the last few years over all three counties. Rates of acute HCV in 2012 and 2014 were 1.7 per 100,000 persons, higher than recent state rates, which reached 1.2 in 2014.

Figure 1. Number of acute hepatitis C infections in the OCH region, 2000–2014

Source: Public Health Issues Management System (PHIMS)



Chronic hepatitis C

Between 2010 and 2014 there was an average of 270 chronic HCV cases diagnosed each year in the OCH region (range: 225 to 337). Disease onset for these

Figure 2. Rate of diagnosis of chronic hepatitis C infection in the OCH region, 2000–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)

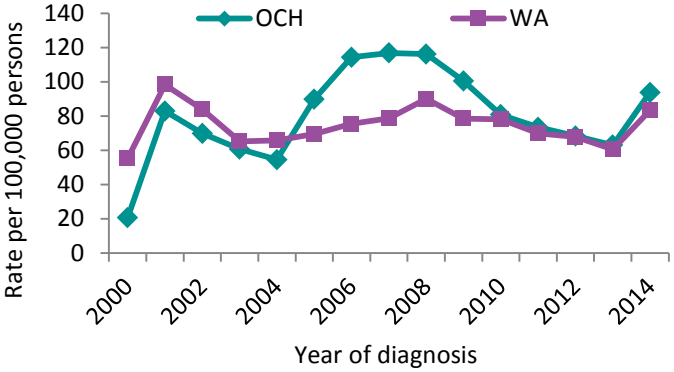
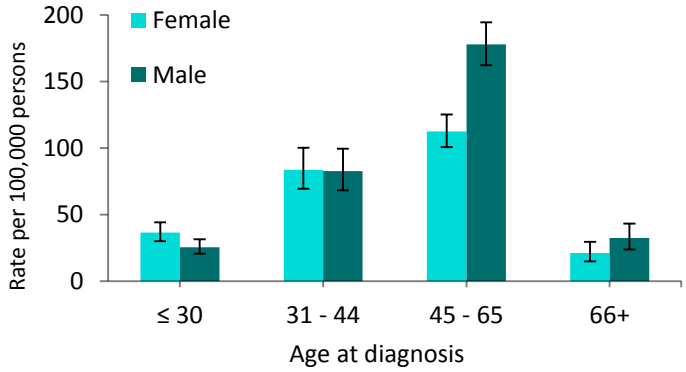


Figure 3. Rate of chronic hepatitis C infection by gender and age at diagnosis in the OCH region, 2010–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)



chronic cases may have been any time in the past. Unadjusted yearly rates of newly diagnosed chronic HCV cases ranged from 63.3 to 94.2 per 100,000 persons, similar to the state's rates.

As with the state overall, the majority of chronic HCV cases reported in OCH from 2010 through 2014 were among males (56%). Females and males had similar rates in every age category, except for those ages 45–65. Males ages 45–65 had a higher rate of diagnosis than females. Baby boomers (born 1945–1965) were disproportionately affected, a pattern seen in Washington and nationally. Race and ethnicity were missing from 83% of cases reported in the OCH from 2010 to 2014. A majority of chronic HCV cases with known race are white, non-Hispanic (77%), a group that is 80% of the OCH population.

Healthcare burden

Between 2010 and 2014, among OCH residents there were 159 inpatient hospitalizations with a primary diagnosis of acute or chronic HCV infection. The majority of admissions came from Kitsap County (120 hospitalizations). Median length of stay was 3.0 days (average 4.1) with a total of 653 hospital-days for OCH residents. These hospitalizations had a five-year average charge of $36,527 (median $21,535, adjusted for inflation to 2014 dollars). Charges per HCV hospitalization ranged from $3,452 to $353,366. Total charges for the 159 hospitalizations were $5,807,845 over the five-year period. The major payer was Medicare. For the state overall there were 2,714 hospitalizations with a primary diagnosis of HCV infection and $114,090,862 in total charges.

Figure 4. Hospitalizations, hospital days, and charges for a primary diagnosis of hepatitis C in the OCH region, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System

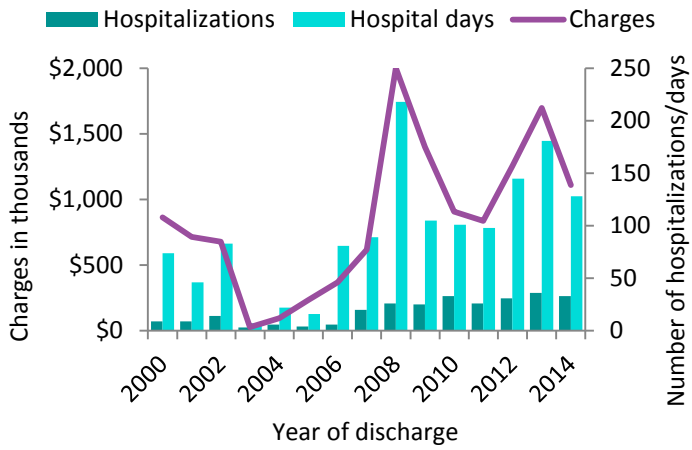
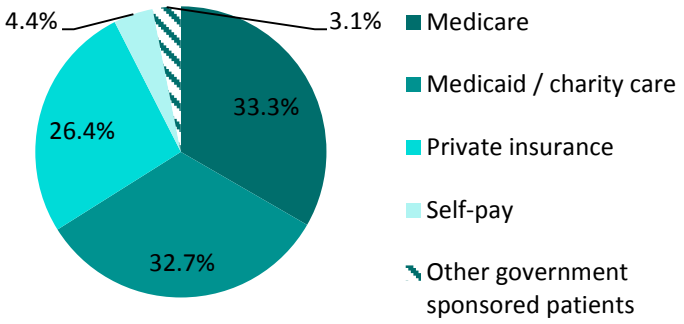


Figure 5. Primary payer for hospitalizations with a primary diagnosis of hepatitis C in the OCH region, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System



In the same time period, there were 72 cases of liver and bile duct cancer in the OCH region among persons with HCV infection. Of those cases, 60 (83%) were among baby boomers and 59 (82%) were male, compared to 83% in baby boomers and 80% in males for the state overall. Most of the cases were white (76%).

Mortality

From 2010 to 2014 there were 197 OCH deaths with HCV listed as an underlying or contributing cause of death. Average age at death was 60 years. Most decedents were white (87%), male (67%), and baby boomers (79%), resembling the statewide profile for all HCV deaths in this time period.

Risk factors

Of the 17 acute HCV cases reported in OCH between 2010 and 2014, all 16 with information available had injection drug use as a risk factor. There was risk factor information for only 10% of chronic HCV cases diagnosed from 2010 to 2014. Injection drug use, alone or with other risks, was noted for 63% of chronic HCV cases with risk information.

Pierce County Accountable Community of Health

Washington State's Accountable Communities of Health (ACH) were designed to recognize and leverage the innovation and collaboration occurring in local communities by bringing public and private entities together to work on shared health goals. The Pierce County ACH covers Pierce County. Major cities include Lakewood and Tacoma. Pierce County includes military presence and shares borders with the Puyallup Tribe.

The Pierce County 2014 population was 821,300. This represents 12% of the state's population, the second largest among Washington's counties. The population is diverse, with urban and rural areas. The population is 69% white compared to 71% for the state and has a lower Hispanic population than Washington overall (9% vs. 12%). Median household income for the county in 2014 was $60,397 compared to $61,358 for the state overall. The percent of population living in poverty was 13% compared to 13% statewide.

Healthcare and public health services

Tacoma-Pierce County Health Department (TPCHD) provides outpatient opioid substitution maintenance and monitoring services for individuals who are opioid dependent. Evidence-based groups and treatment modalities are offered with the goal of promoting abstinence, while supporting the patient's overall recovery, health, and wellbeing.

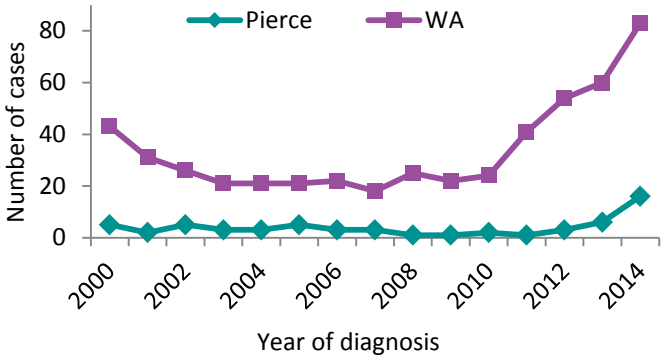
Pierce County has one of the first syringe service programs in the country. Currently, the state Department of Health provides funds to support a syringe service program through the Point Defiance AIDS Project. The funds help increase the availability, accessibility and utilization of clean needles and syringes. Additional services include providing rapid hepatitis C virus (HCV) testing services for eligible populations.

Acute hepatitis C

Between 2010 and 2014 there were 1 to 16 acute HCV infections reported each year in Pierce County with a marked increase for 2013–2014. Rates of acute HCV between 2010–2014 were 0.5 to 2.0 per 100,000 persons and during each of the five years exceeded the state rates, which reached 1.2 in 2014.

Figure 1. Number of acute hepatitis C infections in Pierce County, 2000–2014

Source: Public Health Issues Management System (PHIMS)



Chronic hepatitis C

Between 2010 and 2014 there was an average of 413 chronic HCV cases diagnosed each year in Pierce County (range: 284 to 570). Disease onset for these chronic cases may have been any time in the past. Unadjusted yearly rates of newly diagnosed chronic HCV cases ranged from 34.9 to 71.9 per 100,000 persons, lower than Washington's rates during 2010 to 2014.

Figure 2. Rate of diagnosis of chronic hepatitis C infection in Pierce County, 2000–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)

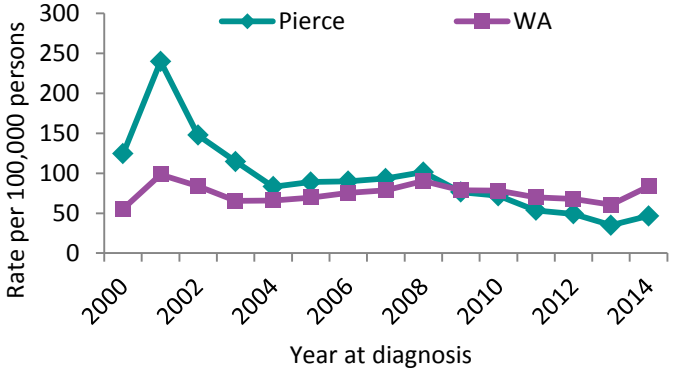
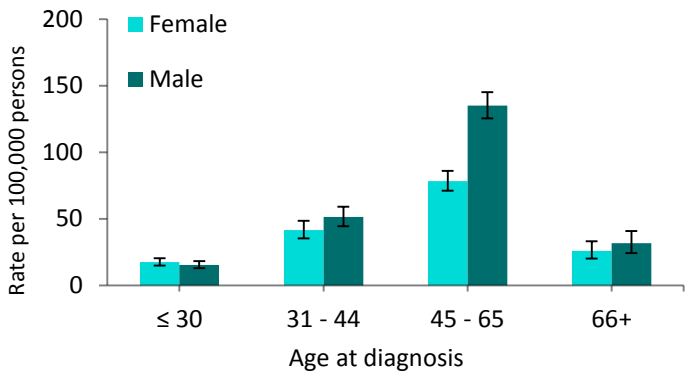


Figure 3. Rate of chronic hepatitis C infection by gender and age at diagnosis in Pierce County, 2010–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)



As with the state overall, the majority of chronic HCV cases reported in Pierce County from 2010 through 2014 were among males (58%). Females and males had similar rates of diagnosis in every age category, except for those ages 45–65 years old. Males ages 45–65 had a higher rate of diagnosis than females. Baby boomers (born 1945–1965) were disproportionately affected, a pattern seen in Washington and nationally. Race and ethnicity were missing from a majority of chronic HCV cases reported in Pierce County from 2010 to 2014. Enhancements to local surveillance practices by TPCHD are expected to greatly improve the collection of race and ethnicity among cases identified in 2015 and beyond.

Healthcare burden

Between 2010 and 2014, among Pierce County residents there were 291 inpatient hospitalizations with a primary diagnosis of acute or chronic HCV infection. Median length of stay was 4.0 days (average 5.4) with a total of 1,570 hospital-days for Pierce County residents. These hospitalizations had a five-year average charge of $52,479 (median $35,336, adjusted for inflation to 2014 dollars). Charges per HCV hospitalization ranged from a low of $4,249 to a high of $605,785. Total charges for the 291 hospitalizations were $15,271,299 over the five-year period. The major payer was Medicaid. For the state overall there were 2,714 hospitalizations with a primary diagnosis of HCV infection and $114,090,862 in charges.

Figure 4. Hospitalizations, hospital days, and charges for a primary diagnosis of hepatitis C in Pierce County, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System

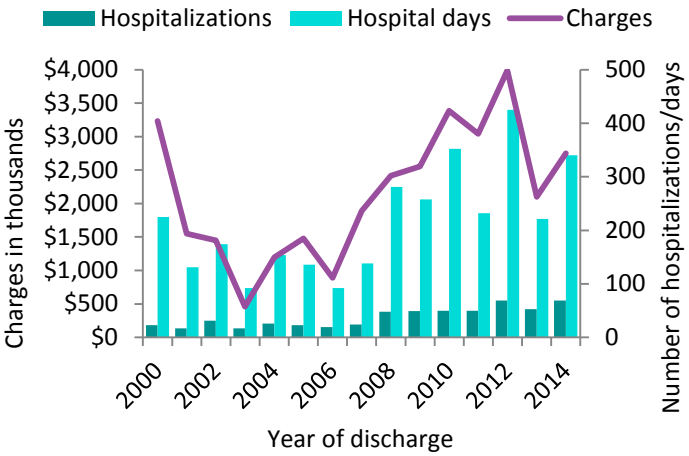
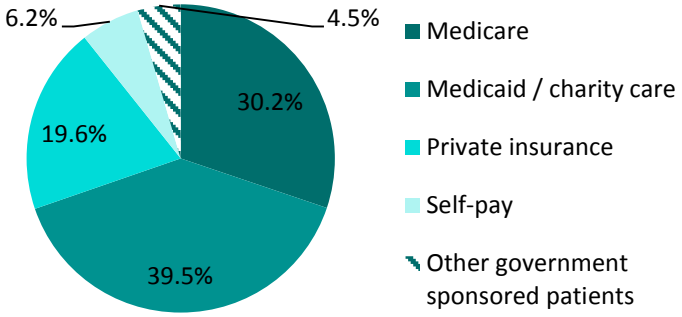


Figure 5. Primary payer for hospitalizations with a primary diagnosis of hepatitis C in Pierce County, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System



In the same time period, there were 173 cases of liver and bile duct cancer in Pierce County among persons with HCV infection. Of those cases, 141 (82%) were among baby boomers and 137 (79%) were male, compared to 83% in baby boomers and 80% in males for the state overall. Most of the cases were white (69%).

Mortality

From 2010 to 2014 there were 347 Pierce County deaths with HCV listed as an underlying or contributing cause of death. Average age at death was 60 years. Most decedents were white (75%), male (69%), and baby boomers (78%), resembling the statewide profile for all HCV deaths in this time period.

Risk factors

Of the 28 acute HCV cases reported in Pierce County between 2010 and 2014, 21 of 22 (95%) with information available had injection drug use as a risk factor. There was risk factor information for only 7% of chronic HCV cases diagnosed from 2010 to 2014. Injection drug use, whether reported alone or with other risks, was observed in 92% of Pierce County chronic HCV cases with risk information.

Southwest Washington Regional Health Alliance

Washington State's Accountable Communities of Health (ACH) were designed to recognize and leverage the innovation and collaboration occurring in local communities by bringing public and private entities together to work on shared health goals. The Southwest Washington Regional Health Alliance (SWWA RHA) covers Clark and Skamania counties. Major cities include Stevenson and Vancouver. SWWA RHA shares borders with the Cowlitz Indian Tribe.

The SWWA RHA 2014 population was 454,170. This represents 7% of the state's population. The population is 81% white compared to 71% for the state and has a lower Hispanic population than Washington overall (8% vs. 12%). Median household income for the two counties in 2014 ranged from $52,673 to $61,747 compared to $61,358 for the state overall. The percent of counties' populations living in poverty ranged from 10% to 13% compared to 13% statewide.

Healthcare and public health services

Healthcare providers include various hospitals and clinics. One of the goals addressed by SWWA RHA was to help persons with chronic conditions navigate multiple service delivery systems. Clark County supports a needle exchange which provides needles and other supplies to reduce the spread of disease, as well as offers hepatitis C virus (HCV) rapid testing and immunizations for hepatitis A and B.

Acute hepatitis C

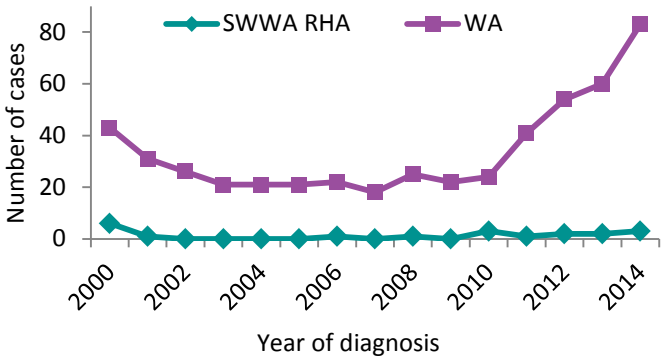
Between 2010 and 2014 there were 1 to 3 acute HCV infections reported each year. Rates were unreliable due to small numbers.

Chronic hepatitis C

Between 2010 and 2014 there was an average of 474 chronic HCV cases diagnosed each year in the SWWA RHA region (range: 408 to 607). Disease onset for these chronic cases may have been any time in the past. Unadjusted yearly rates of newly diagnosed chronic HCV cases ranged from 91.4 to 133.8 per 100,000 persons, higher than Washington's rates during 2010 to 2014.

Figure 1. Number of acute hepatitis C infections in the SWWA RHA region, 2000–2014

Source: Public Health Issues Management System (PHIMS)



As with the state overall, the majority of chronic HCV cases reported in SWWA RHA from 2010 through 2014 were among males (59%). Females and males had similar rates of diagnosis in every age category, except for those ages 45–65 years old. Males ages 45–65 had a higher rate of diagnosis than females. The baby boomers (born 1945–1965) were disproportionately affected, a pattern seen in Washington and nationally. Race and ethnicity were missing from 81% of cases reported in the OCH from 2010 to 2014. A

Figure 2. Rate of diagnosis of chronic hepatitis C infection in the SWWA RHA region, 2000–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)

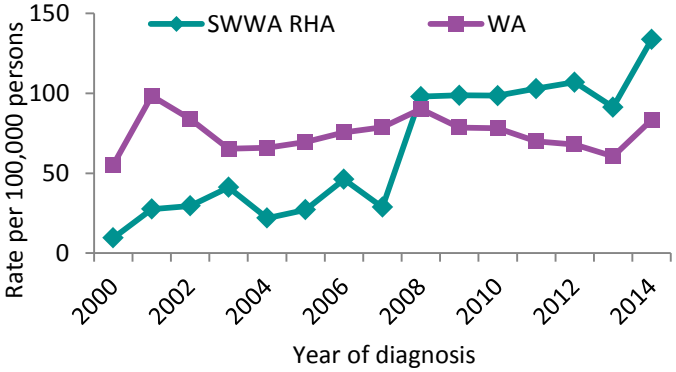
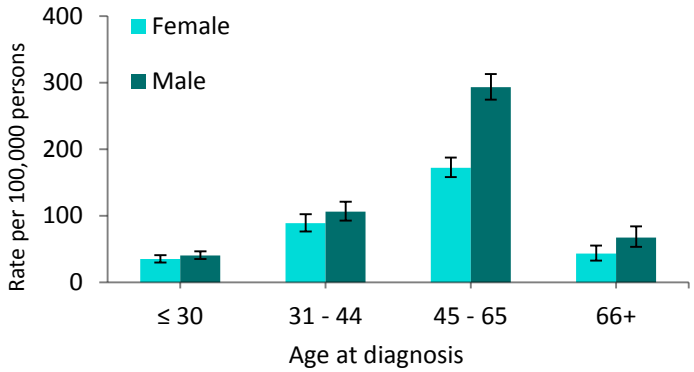


Figure 3. Rate of chronic hepatitis C infection by gender and age at diagnosis in the SWWA RHA region, 2010–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)



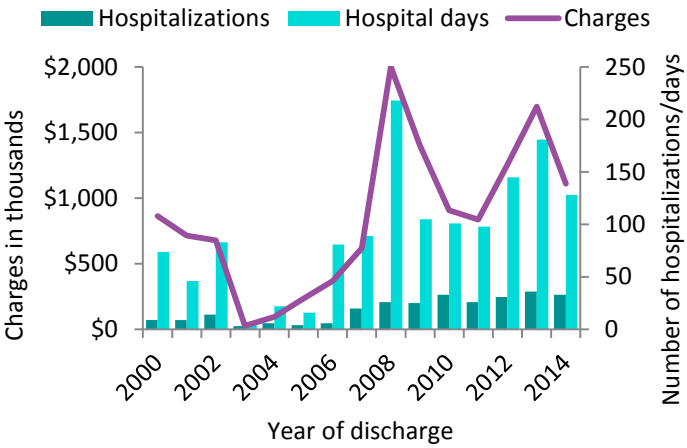
majority of chronic HCV cases with known race are white, non-Hispanic (83%), a group that is 80% of the SWWA RHA population.

Healthcare burden

Between 2010 and 2014, among SWWA RHA residents there were 238 inpatient hospitalizations with a primary diagnosis of acute or chronic HCV infection. The majority of admissions came from Clark County (232 hospitalizations). Median length of stay was 3.0 days (average 4.2) with a total of 997 hospital-days for SWWA RHA residents. These hospitalizations had a five-year average charge of $34,737 (median $23,192 adjusted for inflation to 2014 dollars). Charges per HCV hospitalization ranged from a low of $3,724 to a high of $340,808. Total charges for the 238 hospitalizations were $8,267,499 over the five-year period. The major payer was Medicaid. For the state overall there were 2,714 hospitalizations with a primary diagnosis of HCV infection and $114,090,862 in total charges.

Figure 4. Hospitalizations, hospital days, and charges for a primary diagnosis of hepatitis C in the SWWA RHA region, 2010–2014

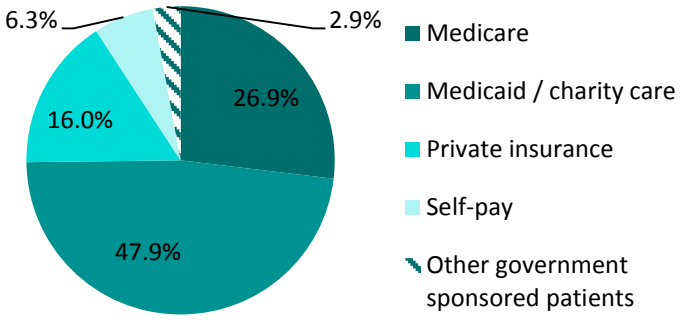
Source: Comprehensive Hospital Abstract Reporting System



In the same time period, there were 49 cases of liver and bile duct cancer in the SWWA RHA among persons with HCV infection. Of those cases, 41 (84%) were among baby boomers and 35 (71%) were male, compared to 83% in baby boomers and 80% in males for the state overall. Most of the cases were white (92%).

Figure 5. Primary payer for hospitalizations with a primary diagnosis of hepatitis C in the SWWA RHA region, 2010–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)



Mortality

From 2010 to 2014 there were 171 SWWA RHA deaths with HCV infection listed as an underlying or contributing cause of death. Average age at death was 59 years. Most decedents were white (90%), male (74%), and baby boomers (82%), resembling the statewide profile for all HCV deaths in this time period.

Risk factors

Of the 11 acute HCV cases reported in SWWA RHA between 2010 and 2014, 8 of the 10 (80%) with information available had injection drug use as a risk factor. There was risk factor information for only 12% of chronic HCV cases diagnosed from 2010 to 2014. Injection drug use, whether reported alone or with other risks, was observed in 71% of SWWA RHA chronic HCV cases with risk information.

Enhanced hepatitis C surveillance

A total of 76,730 chronic hepatitis C virus (HCV) cases were reported from 2000 to 2014 in Washington. Case reports from the local health jurisdiction (LHJs) to the state Department of Health (DOH) are the primary source of information on residents infected with HCV. Wide variations exist in how LHJs investigate chronic HCV cases and the LHJs face many challenges, including large numbers of reports, both initial and duplicate; limited information available on reports; lack of timely response from providers; lack of training on case follow-up; and difficulty contacting cases. Due to these barriers there is lack of information about key demographics, exposure history and case management information on a majority of chronic cases reported to DOH.

In 2013, DOH received funding from a CDC PS13-1303 Viral Hepatitis–Prevention and Surveillance grant. DOH partnered with Public Health—Seattle & King County (PHSKC) to explore enhancing surveillance on a random sample of chronic HCV cases, instead of completing comprehensive investigations for all new cases, to obtain sufficient data for assessing the burden of HCV infection in Washington.

Cases for enhanced surveillance were selected at random from new chronic HCV cases reported to DOH quarterly by PHSKC. Enhanced investigation for eligible (i.e. newly diagnosed) cases includes contacting the primary care provider or accessing electronic medical records to obtain clinical management data. In addition, patient interviews were attempted for each individual. Around 10% of the cases reported by PHSKC from 2013–2014 were selected for enhanced surveillance. For these, information was obtained from providers for a total of 210 (99.5%) of the eligible cases investigated. Staff at PHSKC completed case interviews for 65 (31%).

Statewide enhanced surveillance

In April 2015, DOH implemented statewide enhanced surveillance for Washington residents recently diagnosed with chronic HCV (excluding King County residents). Statewide sampling of chronic HCV cases was done on a monthly basis using laboratory data from the Public Health Reporting of Electronic Data (PHRED) system. Only patients with test results in PHRED meeting criteria for a confirmed diagnosis of chronic HCV were included in the group sampled for cases. Enhanced investigations involved contacting the primary care provider (or accessing electronic medical records) for medical management information and attempting to interview the case for missing demographic and risk factor information.

Standardization of sampling method in Washington State

DOH will evaluate the timeliness, completeness, and accuracy of data from enhanced surveillance from January 2013 to April 2016. From this evaluation, DOH will implement a standard statewide sampling process using case reports and/or laboratory data to obtain a representative sample for analysis. Collecting, analyzing and distributing complete information obtained from a representative sample of cases will be essential to better understand the impact of chronic HCV infection in Washington.

Enhanced surveillance interviews among King County residents with chronic hepatitis C, 2013–2014

Source: Office of Infectious Disease

Year	Cases in cohort	Cases sampled and eligible for investigation	Patient healthcare provider questionnaire returned N (%)	Patient interviews completed N (%)
2013	925	94	93 (98.9)	46 (48.9)
2014	1,167	117	117 (100)	19 (16.2)
Total	2,092	211	210 (99.5)	65 (30.8)

Snohomish County Viral Hepatitis Outreach

Snohomish Health District (SHD) has a Viral Hepatitis Outreach (VHO) program that provides services to persons who inject drugs (PWID). The VHO program started in 1998 as a two-year grant-funded half-time position in response to increased rates of hepatitis C virus (HCV) among PWID in Snohomish County. Due to increased injecting and changing patterns of drug use, the position became full-time in 2007, and activities include annual data collection and analysis, in addition to providing services.

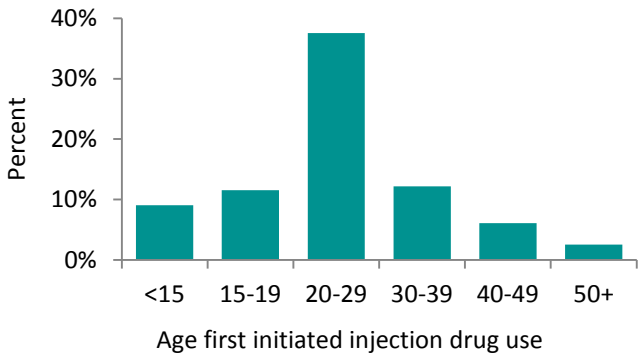
The VHO program is a coordinated effort to intervene by offering services where the PWID population is present. VHO provides outreach services in many community settings to increase use of prevention services' potential for intervention, including doing 36% of its work in correctional settings. The program provides targeted counseling, testing, education, and vaccinations to persons who are current or past injection drug users at high risk for contracting HCV. Testing is done both in the district's office and in community settings. Staff link HCV-positive persons to care through community healthcare resources and to healthcare coverage through the Affordable Care Act.

There were 281 clients served through the VHO program from January to December 2014. Of these, 70% were ages 20–39 and 54% were male. Nearly all clients were white (91%), although the program also served some black, Hispanic, and American Indian clients. Approximately half (45%) of VHO clients were homeless, while one-quarter rented (26%) and another quarter lived with family (26%). Most had no health insurance (59%), while a third (34%) had public insurance. Only 9% were known to be employed.

During 2014 the majority of VHO clients were current injection drug users (77%). Approximately 71% of clients had participated in drug treatment at least once, and 28% had participated 3 or more times. Over 87% of VHO clients injected either heroin or methamphetamines, and most began injecting drugs before the age of 30 years (64%, excluding 30% unknown). Included in the 281 clients were 82 persons who started to inject drugs before age 21. Nearly all clients started using oral prescriptions drugs before beginning to inject (92%). There were 56 (20%) clients in 2014 who experienced a drug overdose.

Age at first use of injection drugs for 197 persons who inject drugs in Snohomish County, 2014

Source: Viral Hepatitis Outreach (VHO) program



Over two-thirds of the clients reported they shared drug paraphernalia (78%), nearly half used the needle exchange service (43%), and more than half used a pharmacy to obtain syringes (54%). Sharing drug equipment is a known risk for transmission of HCV, hepatitis B virus, and HIV. HBV is the only of these three conditions with a vaccine available, and vaccination for HBV was completed for 158 clients.

The full 2014 report is available at:

http://www.snohd.org/Portals/0/Snohd/Reports/files/VHO_2014_hbkp%20docxFINAL112015.pdf.

To learn more about this program, please contact Kathy Perkins at: kperkins@snohd.org.

Hepatitis Testing & Linkage to Care

Identifying and treating persons with hepatitis C virus (HCV) infections involves several steps. Initial antibody screening identifies those who ever had an infection. Further testing can determine if there is an active infection with viral RNA present. After HCV infection is confirmed, linkage to care is essential for the person to receive evaluation and appropriate treatment.

The Seattle area Hepatitis and Linkage to Care (HepTLC) project was a collaborative effort between Public Health–Seattle & King County (PHSKC), the Washington State Department of Health (DOH), the Harborview Medical Center (HMC) Pioneer Square Clinic, Evergreen Treatment Services (ETS), the People's Harm Reduction Alliance (PHRA), and the Hepatitis Education Project (HEP) to test persons who inject drugs (PWID) for HCV infection and link them to care and prevention services. Funding for the two-year project was provided by the Centers for Disease Control and Prevention (CDC) with hepatitis C test kits provided by DOH.

The HepTLC Project was managed by the PHSKC HIV/STD Program and assessment of linkage to care for actively infected persons was conducted by the PHSKC Communicable Disease Epidemiology & Immunization Program. Written procedures were developed with each test site including: (1) eligibility criteria, (2) HCV rapid testing, counseling, provision of results and reporting to PHSKC, (3) referral to medical care, and (4) data entry and tracking in EvaluationWeb (secure CDC portal). Monthly site-specific data reports were provided by PHSKC

Table 1. Test sites and model by site

Source: Public Health—Seattle & King County

Test Sites and Testing Model	Test Providers
Evergreen Treatment Services (ETS) - Onsite hepatitis C antibody testing twice a week - Referral to on-site hepatitis C RNA testing (for persons with positive hepatitis C antibody result) - $5 grocery gift card for hepatitis C antibody result provided to patients	Hepatitis Education Project (HEP)
People's Harm Reduction Alliance (PHRA) - Onsite hepatitis C antibody testing once a week - Skilled phlebotomist on-site during hepatitis C antibody testing (for persons with positive hepatitis C antibody result) - $10 grocery gift card for hepatitis C antibody result, $15 for hepatitis C RNA result provided to patients	Hepatitis Education Project (HEP)
PHSKC Robert Clewis Center (RCC) - Onsite hepatitis C antibody and RNA testing during routine hours (5 days a week) - Access to prior hepatitis C test history and status (Harborview Medical Center electronic medical record) - $10 for hepatitis C antibody result, $15 for hepatitis C RNA test result provided to patients	Harborview Medical Center Pioneer Square Clinic (HMC)

to each site in order to discuss progress and ways to address challenges. A different HCV testing model was implemented by each site (Table 1).

Results

A total of 1,004 HCV antibody tests were performed at the three sites (Table 2). Slightly less than half of the rapid antibody tests were positive. Almost everyone received results. Only 38% of those with a positive antibody result had a confirmatory RNA test, but 84% got their RNA results. Linkage to care was defined as having a medical appointment with a healthcare provider for HCV management. Although 76% of those with confirmed HCV infection were referred to care, the study was only able to verify linkage to care for 21% of those referred. All of the confirmed cases were reported for public health surveillance (either via laboratory reporting or by request from PHSKC staff). About half had previously been reported.

Conclusions and lessons learned

Although the study did not achieve the goals for confirmatory testing and linkage to care, some important lessons for ongoing HCV testing programs for PWID were learned. Importantly, it is possible to successfully provide HCV testing at syringe exchange and drug treatment sites. Some helpful items included having skilled, dependable and friendly testing staff on-site during testing sessions including a skilled phlebotomist, and having access to prior test results to prioritize testing and save resources. Incentives were useful in increasing the number of people who had antibody and confirmatory RNA testing done and received results, but most likely also contributed to people with known HCV infection being tested unnecessarily.

Even though half of the people diagnosed with HCV were previously reported as cases to PHSKC, some people were not in care and benefitted from referral to care during the HepTLC Project. Since a confirmatory test was not required for a case report, it is also possible that not all of the previously reported cases had received a confirmatory test. Linkage to medical care for HCV management was challenging to define and measure, especially for cases previously reported. Additional funding would be needed to support linkage to care activities.

Next steps

DOH continues to develop the HCV testing program by providing funding, tracking outcomes for ongoing testing, and free test kits at all three PHSKC sites (and other sites) and has developed an HCV testing manual. In 2014, PHSKC was awarded the Hepatitis C Test and Cure (HCV-TAC) grant, a four-year $6 million dollar grant from the Department of Health and Human Services and CDC, to continue improving diagnostic and treatment services for persons with HCV.

Table 2. Hepatitis C test results, counselling done, and linkage to care by site

Source: Public Health—Seattle & King County

Item	Total N (%)	Total (or goal %)
Hepatitis C antibody tests performed (# persons screened)	1,004	n=1,180
# (%) persons with positive hepatitis C antibody results	485 (48)	
# (%) persons given hepatitis C antibody results (of those tested)	917 (92)	
# (%) hepatitis C antibody-positive persons who got hepatitis C RNA test	182 (38)	85%
# (%) hepatitis C RNA-positive persons (of those who received an RNA test)	129 (71)	
# (%) given hepatitis C RNA result (of persons who were RNA positive)	108 (84)	85%
# (%) counseled (of those with positive RNA results)	107 (83)	75%
# (%) referred for hepatitis C management (of those with positive RNA result)	98 (76)	
# (%) with confirmed appointment for hepatitis C management (linked to care) (of those referred)	21 (21)	75%
# (%) persons with RNA positive tests reported to PHSKC surveillance	129 (100)	85%
# (%) new case reports	63 (49)	
# (%) old case reports	66 (51)	

Hepatitis C–Test & Cure Project

Chronic hepatitis C virus (HCV) infection can result in long-term complications of cirrhosis, liver failure, and liver cancer. At particular risk are those born in the United States between 1945–1965. As young adults, baby boomers had exposure to unscreened blood transfusions or injection drug use. At least one-time screening for HCV has been recommended for this birth cohort.

In August 2014, Public Health—Seattle & King County (PHSKC) received a four-year $6 million dollar grant from the Centers for Disease Control and Prevention to improve testing, treatment, and cure of persons with chronic HCV. New, highly effective therapies, simplified HCV screening guidelines, use of electronic medical record systems, and increasing numbers of insured persons provide new opportunities for persons with chronic HCV infection to be identified and successfully treated.

The Hepatitis C Test & Cure project (HCV-TAC) is a collaboration of public health agencies, academia, and community-based primary care organizations to ensure the successful identification, monitoring, clinical evaluation, treatment, and cure of persons with chronic HCV infections. This project also seeks to build a coordinated and sustainable public health and community-based healthcare system for HCV. Project activities include increasing treatment capacity, training healthcare providers on the diagnosis, evaluation, and treatment of HCV; utilizing HCV case management; optimizing the use of electronic health records; strengthening public health surveillance; enhancing integration of clinical and public health data systems; and leveraging the Affordable Care Act to increase access to care and treatment.

Partners include PHSKC, the University of Washington's Project ECHO telehealth program, and a broad-based coalition including Harborview Medical Center, HealthPoint Community Health Centers, NeighborCare Health Community Health Centers, Swedish Medical Center, Group Health Cooperative, Country Doctor Community Health Centers, the Hepatitis Education Project, Washington State Department of Health, and the Washington State Health Care Authority.

Unlike hepatitis A and hepatitis B virus infections, there is no vaccine to prevent HCV infection. Until recently, treatment options had limited effectiveness in most patients. However, newly developed antiviral drugs are revolutionizing HCV treatment with shorter, better tolerated treatment regimens and greatly improved outcomes. Despite these promising new treatments, nationally as few as 50% of those infected with HCV have been diagnosed and are aware of their infection. About one-third of patients diagnosed with HCV are referred to care, and only a fraction is prescribed treatment for HCV.

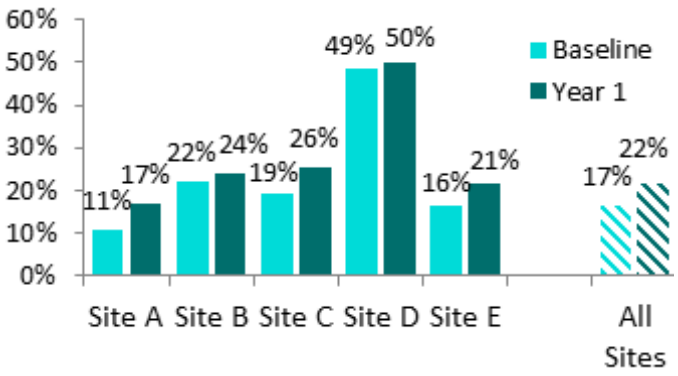
As we begin to receive data from our clinical partner sites, we are able to establish baseline criteria and prospectively monitor progress along the HCV care continuum. These data allows us to assess screening, diagnosis, staging and treatment of those living with HCV. This level of analysis was not possible with routine HCV surveillance data. Below is a preliminary summary of baby boomer screening data from partners for the baby boomer birth cohort.

Birth cohort screening

We examined visits to HCV-TAC partner primary care clinics to determine the percentage of the baby boomer patient population that had been screened for HCV over time. All birth cohort members with at least one primary care clinic visit were examined to determine the progress of HCV screening.

Figure 1. Percent of birth cohort patients with visits to primary care clinics* that have been screened for hepatitis C, by partner site and study time period, 2014–2015

Source: Public Health—Seattle & King County



**Primary care clinics include all from Sites B and C, and select clinics from Sites A, D, and E*

Combined, HCV-TAC coalition partner sites significantly increased screening from 17% of birth cohort patients with at least one visit during the baseline period to 22% of birth cohort patients with at least one visit during the Year 1 study period ($p<0.001$). Individually, all five sites increased the percentage of their screened birth cohort population during Year 1 when compared to the baseline period. The magnitude of these increases differed across sites, but all were statistically significant.

At the end of Year 1, Site D had screened half (50%) of birth cohort patients visiting primary care clinics in that period, the highest percentage of all sites; Sites C (26%) and B (24%) screened about one-quarter of their birth cohort patients; Site E screened 21% of birth cohort patients; and Site A screened 17%. Sites A and C increased screening from the baseline period to Year 1 by over 6%, and Site E increased screening by 5%. It should be noted that Year 1 was a start-up period and many sites did not fully implement their new screening systems until half-way through the year.

Screening results for HCV antibody positive cases

Increased screening has not led to an increase in the proportion of HCV antibody positive findings; in fact, nearly all sites saw either no change or a decrease in the percent of their screened patient population that was HCV antibody positive. Combined, the percentage of screened birth cohort patients at all sites who tested HCV antibody positive significantly decreased from 15% in the baseline period to 13% in Year 1.

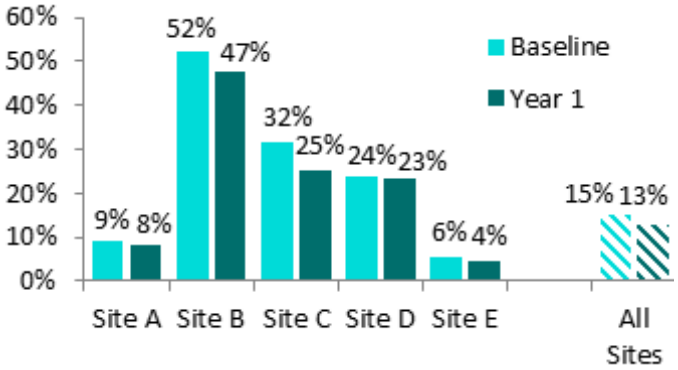
This decrease in percent positivity is potentially due to the change in the targeting of screening recommendations from a high-risk to an age-based cohort. Whereas previously screening was recommended only persons with risk factors, who were more likely to be positive, all baby boomer birth cohort members are currently being screened, and many of them are antibody negative. This does not mean that there were fewer HCV antibody positive patients found in Year 1, but rather it indicates there were more screened patients that were antibody negative.

This change in targeting is most pronounced in several of the sites that were previously screening patients for HCV based upon risk factors alone. For example, in the baseline period, Site C found that 32% of screened patients were antibody positive, but as the percent of screened patients increased in Year 1, the percentage that were found to be antibody positive decreased to 25%.

Although the percentage of screened patients testing HCV antibody-positive declined as screening of the birth cohort increased, all sites saw an increase in the number of positive patients that were identified in Year 1 compared to baseline, but this increase was only statistically significant for Site A.

Figure 2. Percent of screened birth cohort patients that tested hepatitis C antibody positive, by partner site and study time period, 2014–2015

Source: Public Health—Seattle & King County



The data described were collected largely during the start-up year of the project, and may not accurately reflect trends in HCV epidemiology. We anticipate more reliable data and analyses will be available in subsequent years.

To learn more about this project, please contact Elizabeth Barash: Elizabeth.Barash@kingcounty.gov

Recommendations

Simplified hepatitis C virus (HCV) testing and screening recommendations, improved access to health care through the Affordable Care Act (ACA), and new highly effective HCV treatments have created new opportunities for HCV prevention. The Department of Health's Hepatitis C Strategic Plan and the national Strategic Plan provide prevention goals and strategic recommendations. Specific state recommendations are in three broad areas:

- Identify people with HCV, link them to care, and treat them to achieve cure.
- Prevent new HCV infections.
- Strengthen data systems and increase data use around HCV.

The state's 2014 Hepatitis C Strategic Plan is a guide for public health prevention practices that include:

- Widespread use of electronic medical records and laboratory reporting of HCV results.
- Promising models for linkage to care being implemented at the local level.
- Efforts to link marginalized at-risk populations to health insurance.
- Syringe service programs being recognized by third party payers for the excellent work in navigating populations to healthcare.
- A successful HIV clinical training network (Project ECHO) that utilizes telemedicine.
- Statewide leadership invested in ensuring that HCV prevention efforts are successful.

Improved surveillance and reporting will assist in planning for future health needs of persons with chronic HCV. The failure to effectively treat and cure HCV reflects breakdowns in each step within the care continuum from screening to completion of effective treatment. To adequately address the challenges of HCV prevention and treatment, Washington needs the capacity to continue to characterize the populations at most risk and identify barriers to healthcare services.

To create a sustainable and scalable response to HCV, strategies must focus on three key domains:

1. **Provider Systems**: systems that provide direct HCV prevention and medical services including but not limited to clinical providers, community providers, and public health providers.
   - Influencing providers and medical systems to adopt United States Preventative Services Task Force HCV screening guidelines. There are still missed opportunities for screening the baby boomer cohort and other at-risk populations.
   - Improve access to and use of new data sources about healthcare for HCV. Develop data-sharing agreements among providers, laboratories, and public health agencies to identify missed screening and treatment opportunities, find opportunities for capacity-building training, set prevention goals with obtainable metrics for evaluation, and assist public health in directing resources to match areas of greatest need.
   - Increase provider capacity and readiness to diagnose and cure HCV through the use of targeted training opportunities.
2. **Payer System**: systems that pay for services including, but not limited to private insurance, public insurance, public health, and self-pay.
   - Improve access to treatment by cultivating partnerships with Medicaid, fee-for-service programs, and managed care programs to reduce treatment payment restrictions.
   - Work with Medicaid to ensure that coverage of preventative services is available for populations at highest risk.
3. **Communities**: individual users of prevention and clinical services as well as population health.
   - Increase awareness of HCV through public campaigns promoting testing among the baby boomers and others at high risk for HCV.
   - Promote linkage to healthcare and HCV case management models that provide support for individuals with HCV.
   - Educate communities on health insurance options to best meet the needs of individuals.

Resources

Washington resources for hepatitis C

Washington State Hepatitis C Strategic Plan. http://www.doh.wa.gov/Portals/1/Documents/Pubs/150-063-HepatitisCStrategicPlan2014.pdf

Washington State chronic hepatitis surveillance report. http://www.doh.wa.gov/Portals/1/Documents/Pubs/150-028-ChronicHepatitisBandCSurveillanceReport.pdf

Washington State 2014 communicable disease report. http://www.doh.wa.gov/Portals/1/Documents/5100/420-004-CDAnnualReport2014.pdf

EIP drug assistance program for HIV/HCV co-infections. http://www.doh.wa.gov/YouandYourFamily/IllnessandDisease/HIVAIDS/HIVCareClientServices/ADAPandEIP

Accountable Communities of Health

Better Health Together
http://www.betterhealthtogether.org/

Cascade Pacific Action Alliance
https://crhn.org/pages/choice_projects/cascade-pacific-action-alliance/

Greater Columbia ACH
http://www.greatercolumbiaach.org/

King County ACH
http://www.kingcounty.gov/elected/executive/health-human-services-transformation/ach.aspx

North Central ACH www.mydocvault.us

North Sound ACH http://www.nsach.org/

Olympic Community of Health http://www.olympiccommunityofhealth.org/Pages/Welcome.aspx

Pierce County ACH http://www.tpchd.org/providers-partners/pchip/

Southwest Washington Regional Health Alliance
http://www.swrha.org/

United States resources for HCV

Department of Health and Human Services Action Plan for viral hepatitis. https://www.aids.gov/pdf/viral-hepatitis-action-plan.pdf

CDC national 2014 surveillance report for hepatitis. http://www.cdc.gov/hepatitis/statistics/2014surveillance/commentary.htm

American Association for the Study of Liver Disease/Infectious Diseases Society of America guidelines. http://www.hcvguidelines.org/

Information on HCV for the public

CDC self-assessment for hepatitis risk. http://www.cdc.gov/hepatitis/RiskAssessment/index.htm

CDC frequently asked questions on HCV. http://www.cdc.gov/hepatitis/hcv/cfaq.htm

CDC patient education. http://www.cdc.gov/hepatitis/hcv/patienteduhcv.htm

CDC hepatitis C lessons on a chalkboard. https://www.youtube.com/watch?v=zo4VZ2FdZvo

National Institutes of Health on hepatitis C. http://www.niddk.nih.gov/health-information/health-topics/liver-disease/hepatitis-c/Pages/ez.aspx

Veterans Administration resources. http://www.hepatitis.va.gov/patient/hcv/index.asp

Information on HCV for providers

CDC professional hepatitis C resources. http://www.cdc.gov/hepatitis/hcv/profresourcesc.htm

CDC testing and counseling manual. http://www.cdc.gov/hepatitis/resources/professionals/pdfs/counselingandtesting.pdf

The University of Washington was funded by the CDC's Division of Viral Hepatitis to develop a website that offers free CME/CNE credits. The interactive case studies cover a broad array of topics related to prevention, management, and treatment of viral hepatitis. http://depts.washington.edu/hepstudy/

The University of Washington was funded by the CDC's Division of Viral Hepatitis to develop a self-study, interactive course for medical providers on hepatitis C infection. http://www.hepatitisc.uw.edu/

Reuse of a needle or syringe can put patients in danger of getting HCV. http://www.cdc.gov/injectionsafety/ders.html

Treatment for HCV/HIV coinfected

The increase in co-infections with human immunodeficiency virus (HIV) and hepatitis C virus (HCV) is a growing public health concern. Both can be transmitted through exposure to contaminated blood. Existing HIV infection increases the risk of developing chronic HCV infection and its complications after contracting HCV. The Centers for Disease Control and Prevention (CDC) estimate that one-quarter of HIV-infected persons in the United States are also infected with HCV.

HIV and HCV infections are complicated to manage. Coinfected persons should be treated for both infections, with the goal of curing the HCV infection.

Several recently approved oral medications make HCV treatment simpler and more effective, with shorter treatment duration and fewer side effects. Older treatment protocols with oral ribavirin and interferon injections caused universal and sometimes severe side effects along with treatment lasting up to a year. The drawback to the newer medications is the cost—as high as $84,000 for twelve weeks of treatment with one medication.

Early Intervention Program coverage of hepatitis C treatment

Washington's AIDS Drug Assistance Program is known as the Early Intervention Program (EIP). Since March 2015, EIP added the following HCV medications to the insured and uninsured formularies:

- Harvoni (ledipasvir and sofosbuvir)
- Sovaldi (sofosbuvir)
- Olysio (simeprevir)
- Viekira Pak (ombitasvir, paritaprevir, ritonavir and dasabuvir)
- Technivie (ombitasvir, paritaprevir and ritonavir)
- Zepatier (elbasvir and grazoprevir)

For EIP-eligible persons who are coinfected with HIV and HCV, EIP will pay full cost or co-payments for these medications once prescribed by a healthcare provider. Due to the high cost, complex management, and potential for drug interactions, EIP has limited enrollment to 25 persons at a time.

From March 2015 to June 2016, EIP had 18 clients approved, all covered by Medicare or other insurance. EIP paid full cost of medication for one client when private insurance denied payment. Of the 18 clients, 13 completed treatment. One was approved but treatment status is unknown. As of June 2016 there were 21 EIP coverage slots available.

EIP participation requirements

Healthcare providers must complete and submit a prior authorization supplemental form with client's HCV genotype and medical justification to the EIP pharmacy benefit manager before payment approval.

http://www.ramsellcorp.com/PDF/Washington%20EIP%20Hepatitis%20Treatment%20Supplemental%20Form.pdf

Clients must have EIP eligibility for duration of treatment. Providers must submit HCV ribonucleic acid (RNA) result from 12 weeks after treatment completion to the EIP.

http://www.doh.wa.gov/YouandYourFamily/IllnessandDisease/HIVAIDS/HIVCareClientServices/ADAPandEIP

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Appendix A: Data sources and coding

Chronic Hepatitis Surveillance Records

The Chronic Hepatitis Surveillance Records (CHSR) dataset contains deduplicated records of chronic hepatitis B and hepatitis C cases reported to Washington State Department of Health from various reporting sources, including Washington's 35 local health jurisdictions, and more recently the Department of Veterans Affairs and the Washington State Department of Corrections. The dataset serves as final analytical dataset for epidemiological analysis and surveillance reports around chronic hepatitis.

Comprehensive Hospital Abstract Reporting System

The Comprehensive Hospital Abstract Reporting System (CHARS) is a Washington State Department of Health system used to identify and analyze hospitalization trends; to establish statewide weights for comparing hospital stays across all hospitals; and to identify and quantify healthcare access, quality, and cost containment issues.

Hospital charges were calculated from inpatient discharges with diseases of interest listed as the primary diagnosis. Hospital charges represent the total facility-based charges for the entire length of stay and not the actual reimbursement paid by a payer. Hospital charges do not include professional fees, outpatient care, or medical equipment. In this epidemiologic profile the charges were adjusted for inflation to 2014 dollars using the Personal Consumption Expenditure index (PCE).

Death records

Washington State death records are collected by the Department of Health from death certificates. Cause of death information is provided by the certifying physician, medical examiner, or coroner, and classified using the International Classification of Diseases 10th Revision (ICD-10-CM). Only deaths of Washington residents are reported in this profile.

Enhanced HIV/AIDS Reporting System

The Enhanced HIV/AIDS Reporting System (eHARS) is a browser-based application provided by the Centers for Disease Control and Prevention (CDC). Washington State's HIV/AIDS Program uses eHARS to collect, manage and report its HIV/AIDS case surveillance data to CDC.

Medical Monitoring Project

The Medical Monitoring Project (MMP) is a federally funded surveillance project designed to learn about the experiences and needs of people who are receiving healthcare for HIV. The project includes interviewing and conducting medical record abstractions for a random sample of people who received HIV-related care in Washington.

Office of Financial Management

RCW 43.62.030 states that the Office of Financial Management (OFM) shall annually determine the April 1 populations of all cities and towns of the state.

Public Health Issues Management System

The Public Health Issues Management System (PHIMS) is Washington State's electronic system for local health jurisdictions to report notifiable conditions in accordance with WAC 246-101.

Treatment Episode Data Set

The Treatment Episode Data Set (TEDS) is a national database with information on admissions and discharges from substance abuse treatment. TEDS does not represent individuals, and does not include early intervention and crisis intervention programs. In addition, the number of admissions reported may overestimate the number of treatment episodes as some admissions records may in fact represent transfers.

Washington State Cancer Registry

The Washington State Cancer Registry (WSCR) was established in 1991 in accordance with RCW 70.54.230 to accurately monitor the incidence of cancer for the purposes of understanding, controlling, and reducing the occurrence of cancer. Healthcare providers who diagnose or treat cancers are mandated to report cases to the WSCR.

WSCR data from 2000 to 2013 are more than 95% complete. Data from 2014 were published 13 months from the close of the diagnosis year at 77% completeness. The preliminary data should be used with caution because counts for some counties may differ from the final 2014 counts.

Coding of race and ethnicity

Race and ethnicity were merged into a single variable. Ethnicity (i.e. Hispanic origin/affiliation) is considered jointly with race. A population presented as "white" in this profile is by default "white, non-Hispanic" although this may not always be explicitly noted. A population presented as "Hispanic" in this profile may be of any race.

Attributions

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ICD-9-CM codes

Condition	Codes
Cirrhosis (alcoholic, nonalcoholic, or biliary)	5712, 5715, 5716
Hepatic decompensation	3483, 34830-9, 4560-2, 45621-2, 5722-4, 5678-9, 7895, 78959
Hepatitis B virus (HBV)	07020-3, 07030-3, V0261
Hepatitis C virus (HCV)	07041-4, 07051-4, 07070-1, V0262
Human immunodeficiency virus (HIV)	042, 07953, 79571, V08
Liver and intrahepatic bile duct cancers	1150-2, 1977, 2308
Liver transplants	V427, 99682; procedure codes: 505, 5051, 5059
Alcohol dependence	303-3039
Opioid overdose	9650-9, E8500-2, E9350-2
Opioid dependence or abuse	3040-30403, 3055-30553
Diabetes	2500-9, V5867

ICD-10-CM codes

Condition	Codes
Hepatitis B virus (HBV)	B160-9, B170, B181, B191
Hepatitis C virus (HCV)	B171, B182, B192, Z2252
Human immunodeficiency virus (HIV)	B200-9, B210-9, B220-7, B230-8, B24, R75

Appendix B: Supplemental data tables
State-level data

Table 5. Cases and rates of acute hepatitis C infection—Washington State, 2000–2014

Source: Public Health Issues Management System (PHIMS)

Year	Washington population	Cases	Incidence rate per 100,000 persons
2000	5,894,141	44	0.7
2001	5,970,330	31	0.5
2002	6,059,316	27	0.4
2003	6,126,885	21	0.3
2004	6,208,515	23	0.4
2005	6,298,816	21	0.3
2006	6,420,258	23	0.4
2007	6,525,086	18	0.3
2008	6,608,244	25	0.4
2009	6,672,159	22	0.3
2010	6,724,540	25	0.4
2011	6,767,900	41	0.6
2012	6,817,770	54	0.8
2013	6,882,400	63	0.9
2014	6,968,170	83	1.2

Table 6. Cases and rates of chronic hepatitis C infection—Washington State, 2000–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)

Year	Washington population	Cases	Diagnosis rate per 100,000 persons
2000	5,894,141	3,358	57.0
2001	5,970,330	6,057	101.5
2002	6,059,316	5,216	86.1
2003	6,126,885	4,135	67.5
2004	6,208,515	4,672	75.3
2005	6,298,816	4,696	74.6
2006	6,420,258	5,285	82.3
2007	6,525,086	5,480	84.0
2008	6,608,244	6,447	97.6
2009	6,672,159	5,510	82.6
2010	6,724,540	5,620	83.6
2011	6,767,900	5,060	74.8
2012	6,817,770	4,834	70.9
2013	6,882,400	4,393	63.8
2014	6,968,170	5,967	85.6

Table 7. Lengths of stay (LOS) and charges for 2,714 hospitalizations with a primary diagnosis of hepatitis C virus (HCV) infection by category of liver disease or comorbid condition—Washington State, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System (CHARS)

	Cirrhosis						
	Hospitalizations	Length of stay (days)			Charges		
Year	**Number**	**Mean (SD)**	**Median (range)**	**Total LOS**	**Mean**	**Median**	**Total**
2010	367	4.3 (5.0)	3 (1–53)	1,577	$34,573	$18,765	$12,688,253
2011	409	4.9 (5.8)	3 (1–66)	1,997	$41,025	$21,175	$16,779,323
2012	387	5.6 (7.4)	3 (1–58)	2,157	$48,032	$22,785	$18,588,266
2013	430	5.2 (7.0)	3 (1–93)	2,233	$40,738	$23,848	$17,517,493
2014	522	5.6 (8.5)	3 (1–118)	2,918	$44,383	$23,004	$23,168,044
Total/average	**2,115**	**5.1 (7.0)**	**3 (1–118)**	**10,882**	**$41,958**	**$22,230**	**$88,741,379**

Table 7, continued

	Hepatic decompensation						
	Hospitalizations	Length of stay (days)			Charges		
Year	**Number**	**Mean (SD)**	**Median (range)**	**Total LOS**	**Mean**	**Median**	**Total**
2010	300	4.7 (5.5)	3 (1-53)	1,405	$35,560	$20,182	$10,668,138
2011	349	5.3 (6.1)	4 (1-66)	1,856	$46,901	$23,813	$16,368,556
2012	331	6 (7.9)	4 (1-58)	1,991	$56,248	$27,565	$18,618,183
2013	332	6.2 (8.5)	4 (1-93)	2,043	$50,432	$28,260	$16,743,481
2014	412	6.3 (10.2)	4 (1-118)	2,598	$50,638	$27,037	$20,862,721
Total/average	**1,724**	**5.7 (8.0)**	**4 (1-118)**	**9,893**	**$48,295**	**$25,268**	**$83,261,078**

	Liver transplants						
	Hospitalizations	Length of stay (days)			Charges		
Year	**Number**	**Mean (SD)**	**Median (range)**	**Total LOS**	**Mean**	**Median**	**Total**
2010	14	14.1 (6.4)	13 (6–25)	198	$333,676	$302,806	$4,671,458
2011	22	14.8 (8.5)	12 (6–34)	325	$330,945	$310,380	$7,280,787
2012	20	23.2 (17.4)	16 (8–58)	464	$388,387	$318,187	$7,767,734
2013	10	14.3 (9.8)	11 (6–36)	143	$326,430	$286,606	$3,264,303
2014	16	18.9 (21.8)	12 (5–93)	302	$369,751	$303,264	$5,916,022
Total/average	**82**	**17.5 (14.4)**	**12 (6–93)**	**1,432**	**$352,443**	**$302,806**	**$28,900,304**

	Liver and intrahepatic bile duct cancers						
	Hospitalizations	Length of stay (days)			Charges		
Year	**Number**	**Mean (SD)**	**Median (range)**	**Total LOS**	**Mean**	**Median**	**Total**
2010	42	7.2 (10.5)	3 (1–53)	301	$84,488	$26,877	$3,548,491
2011	61	5.8 (5.2)	4 (1–28)	351	$80,810	$25,111	$4,929,390
2012	51	7.5 (11.3)	4 (1–58)	380	$98,247	$23,742	$5,010,578
2013	48	7.1 (11.1)	4 (1–71)	341	$63,179	$32,609	$3,032,583
2014	59	6.9 (6.4)	5 (1–31)	407	$87,621	$31,472	$5,169,615
Total/average	**261**	**6.8 (8.9)**	**4 (1–71)**	**1,780**	**$83,106**	**$27,252**	**$21,690,657**

	Opioid dependence or abuse						
	Hospitalizations	Length of stay (days)			Charges		
Year	**Number**	**Mean (SD)**	**Median (range)**	**Total LOS**	**Mean**	**Median**	**Total**
2010	40	3.9 (2.7)	3 (1–12)	156	$28,835	$17,104	$1,153,405
2011	54	4.8 (4.5)	3 (1–25)	257	$36,939	$19,337	$1,994,695
2012	38	5.4 (7.4)	4 (1–46)	207	$50,320	$25,617	$1,912,156
2013	42	4.5 (3.6)	4 (1–17)	190	$37,295	$25,172	$1,566,403
2014	73	5.5 (10.6)	3 (1–90)	402	$36,221	$24,855	$2,644,151
Total/average	**247**	**4.9 (7.0)**	**3 (1–90)**	**1,212**	**$37,534**	**$23,610**	**$9,270,810**

Table 8. Comorbid conditions among hospitalizations with any diagnosis of hepatitis C virus (HCV) infection—Washington State, 2000–2014

Source: Comprehensive Hospital Abstract Reporting System (CHARS)

Year	Hepatitis C	Hepatitis B N (%)	HIV N (%)	Liver transplant N (%)	Liver or IHBD cancer N (%)	Cirrhosis N (%)	Decompensated cirrhosis N (%)
2000	5,272	550 (10.4)	266 (5.0)	44 (0.0)	69 (1.3)	1,025 (19.4)	920 (17.5)
2001	5,963	479 (8.0)	229 (3.8)	35 (0.0)	89 (1.5)	1,163 (21.8)	1,002 (16.8)
2002	6,984	425 (6.1)	290 (4.2)	34 (0.0)	140 (2.0)	1,525 (21.8)	1,270 (18.2)
2003	7,705	439 (5.7)	350 (4.5)	44 (0.0)	152 (2.0)	1,577 (20.5)	1,311 (17.0)
2004	8,704	441 (5.1)	350 (4.0)	58 (0.0)	165 (1.90	1,888 (21.7)	1,610 (18.5)
2005	9,654	407 (4.2)	378 (3.9)	60 (0.0)	212 (2.2)	1,986 (20.6)	1,618 (16.8)
2006	9,809	371 (3.8)	364 (3.7)	61 (0.0)	203 (2.1)	2,041 (20.8)	1,653 (16.9)
2007	10,089	351 (3.5)	353 (3.5)	45 (0.0)	231 (2.3)	2,283 (22.6)	1,779 (17.6)
2008	9,765	356 (3.6)	379 (3.9)	36 (0.0)	257 (2.6)	2,408 (24.7)	1,832 (18.8)
2009	11,120	415 (3.7)	487 (4.4)	34 (0.0)	344 (3.1)	2,976 (26.8)	2,778 (25.0)
2010	11,617	358 (3.1)	465 (4.0)	30 (0.0)	299 (2.6)	3,055 (26.3)	2,312 (19.9)
2011	12,099	355 (2.9)	473 (3.9)	45 (0.0)	370 (3.1)	3,286 (27.2)	2,650 (21.9)
2012	12,368	421 (3.4)	478 (3.9)	41 (0.0)	488 (3.9)	3,505 (28.3)	2,808 (22.7)
2013	12,472	376 (3.0)	468 (3.8)	33 (0.0)	447 (3.6)	3,578 (28.7)	2,915 (23.4)
2014	13,078	378 (2.9)	438 (3.3)	41 (0.0)	499 (3.8)	3,694 (28.2)	3,186 (24.4)
2010–2014	**61,634**	**1,888 (3.1)**	**2,322 (3.8)**	**190 (0.0)**	**2,103 (3.4)**	**17,118 (27.8)**	**13,871 (22.5)**
2000–2014	**146,699**	**6,122 (4.2)**	**5,768 (3.9)**	**641 (0.0)**	**3,965 (2.7)**	**35,990 (24.5)**	**29,144 (19.9)**
Trend statistics		**PC: -0.0717 SC: -0.0673 CA: <0.001 (Decreasing)**	**PC: -0.0106 SC: -0.0104 CA: <0.001 (Decreasing)**	**PC: -0.0203 SC: -0.0199 CA: <0.001 (Decreasing)**	**PC: 0.0453 SC: 0.0456 CA: <0.001 (Increasing)**	**PC: 0.0730 SC: 0.0732 CA: <0.001 (Increasing)**	**PC: 0.0589 SC: 0.0608 CA: <0.001 (Increasing)**

Year	Hepatitis C	Opioid dependence or abuse N (%)	Opioid poisoning N (%)	Alcohol dependence N (%)	Diabetes N (%)
2000	5,272	901 (17.1)	1 (0.0)	1,068 (20.3)	530 (10.1)
2001	5,963	1,098 (18.4)	7 (0.0)	1,067 (17.9)	578 (9.7)
2002	6,984	1,146 (16.4)	3 (0.0)	1,157 (16.6)	901 (12.9)
2003	7,705	1,311 (17.0)	0 (0.0)	1,216 (15.8)	1,013 (13.1)
2004	8,704	1,409 (16.2)	4 (0.0)	1,229 (14.1)	1,270 (14.6)
2005	9,654	1,561 (16.2)	4 (0.0)	1,302 (13.5)	1,452 (15.0)
2006	9,809	1,529 (15.6)	2 (0.0)	1,462 (14.9)	1,613 (16.4)
2007	10,089	1,542 (15.3)	1 (0.0)	1,578 (15.6)	1,635 (16.2)
2008	9,765	1,477 (15.1)	10 (0.0)	1,477 (15.1)	1,857 (19.0)
2009	11,120	1,729 (15.5)	3 (0.0)	2,138 (19.2)	2,572 (23.1)
2010	11,617	1,971 (17.0)	2 (0.0)	2,348 (20.2)	2,767 (23.8)
2011	12,099	2,270 (18.8)	6 (0.0)	2,415 (20.0)	2,796 (23.1)
2012	12,368	2,482 (20.1)	10 (0.0)	2,440 (19.7)	2,978 (24.1)
2013	12,472	2,758 (22.1)	10 (0.0)	2,293 (18.4)	2,782 (22.3)
2014	13,078	3,223 (24.6)	4 (0.0)	2,155 (16.5)	2,991 (22.9)
2010–2014	**61,634**	**12,704 (20.6)**	**32 (0.0)**	**11,651 (18.9)**	**14,314 (23.2)**
2000–2014	**146,699**	**26,407 (18.0)**	**67 (0.0)**	**25,245 (17.2)**	**27,735 (18.9)**
Trend statistics		**PC: 0.0505 SC: 0.0551 CA: <0.001 (Increasing)**	**PC: 0.0023 SC: 0.0026 CA: 0.3810 (None)**	**PC: 0.0233 SC: 0.0249 CA: <0.001 (Increasing)**	**PC: 0.1123 SC: 0.1099 CA: <0.001 (Increasing)**

HIV = Human Immunodeficiency Virus

IHBD = Intrahepatic bile duct

PC = Pearson correlation coefficient

SC = Spearman correlation coefficient

CA = Cochran-Armitage trend test

Table 9. Leading underlying causes of death among Washingtonian decedents with hepatitis C virus infection documented as a multiple cause of death—Washington State, 2010–2014

Source: Washington State death records

ICD-10 code	Number of deaths	%	Description
B182	1,167	43.0%	Chronic viral hepatitis C
C220	470	17.3%	Liver cell carcinoma
K703	207	7.6%	Alcoholic cirrhosis of liver
C229	101	3.7%	Malignant neoplasm of liver, not specified as primary or secondary
J449	65	2.4%	Chronic obstructive pulmonary disease, unspecified
C349	54	2.0%	Malignant neoplasm of unspecified part of bronchus or lung
K709	53	2.0%	Alcoholic liver disease, unspecified
K746	45	1.7%	Other and unspecified cirrhosis of liver
I251	34	1.3%	Atherosclerotic heart disease of native coronary artery
A419	26	1.0%	Sepsis, unspecified organism
↓	↓	↓	↓
C221	17	0.6%	Intrahepatic bile duct carcinoma
↓	↓	↓	↓
B169	11	0.4%	Acute hepatitis B without delta-agent and without hepatic coma
Other	464	17.1%	
Total	**2,714**	**100%**	

Table 10. Leading underlying causes of death among decedents with documented liver or intrahepatic bile duct cancer and hepatitis C virus infection—Washington State, 2010–2014

Source: Washington State Cancer Registry (WSCR) and Chronic Hepatitis Surveillance Records (CHSR)

ICD-10 code	Number of deaths	%	Description
C220	275	49%	Liver cell carcinoma
-	63	11%	State death certificate not available
C229	56	10%	Malignant neoplasm of liver, not specified as primary or secondary
B182	50	9%	Chronic viral hepatitis C
C221	19	3%	Intrahepatic bile duct carcinoma
K703	15	3%	Alcoholic cirrhosis of liver
K746	8	1%	Other and unspecified cirrhosis of liver
C787	4	1%	Secondary malignant neoplasm of liver and intrahepatic bile duct
C349	3	1%	Malignant neoplasm of unspecified part of bronchus or lung
↓	↓	↓	↓
-	2	0%	State death certificate available but underlying cause of death is not coded
Other	62	11%	
Total	**557**	**100%**	

Table 11. Descriptive characteristics of hospitalizations—Washington State, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System (CHARS)

Characteristic	All hospitalizations N (%)	No diagnosis of HCV N (%)	Primary diagnosis of HCV N (%)	Any diagnosis of HCV N (%)
Total	3,090,399	3,028,765	2,714	61,634
Age				
Average age (SD)	47.0 (28.2)	46.9 (28.5)	55.3 (9.0)	52.7 (11.6)
Median age (range)	51 (0–120)	51 (0–120)	56 (13–91)	54 (0–98)
≤30 years	946,287 (30.6)	942,885 (31.1)	53 (2.0)	3,402 (5.5)
31–44 years	397,126 (12.9)	388,233 (12.8)	188 (6.9)	8,893 (14.4)
45–65 years	773,727 (25.0)	729,958 (24.1)	2,259 (83.2)	43,769 (71.0)
66+ years	973,259 (31.5)	967,689 (31.9)	214 (7.9)	5,570 (9.0)
Birth year				
Born before 1945	906,418 (29.3)	902,157 (29.8)	149 (5.5)	4,261 (6.9)
Born 1945-1965	806,983 (26.1)	763,613 (25.2)	2,257 (83.2)	43,370 (70.4)
Born after 1965	1,376,998 (44.6)	1,362,995 (45.0)	308 (11.3)	14,003 (22.7)
Sex at birth				
Male	1,291,758 (41.8)	1,774,232 (58.6)	1,712 (63.1)	37,229 (60.4)
Female	1,798,637 (58.2)	1,254,529 (41.4)	1,002 (36.9)	24,405 (39.6)
Race/ethnicity				
White, non-Hispanic	2,187,309 (70.8)	2,142,241 (70.7)	2,027 (74.7)	45,068 (73.1)
Black, non-Hispanic	122,426 (4.0)	116,799 (3.9)	115 (4.2)	5,627 (9.1)
American Indian/Alaska Native, non-Hispanic	45,721 (1.5)	43,340 (1.4)	83 (3.1)	2,381 (3.9)
Asian, non-Hispanic	108,352 (3.5)	107,389 (3.5)	50 (1.8)	963 (1.6)
Native Hawaiian/other Pacific Islander, non-Hispanic	32,211 (1.0)	31,720 (1.0)	37 (1.4)	491 (8.0)
Multi-race/race unknown, non-Hispanic	93,151 (3.0)	91,652 (3.0)	76 (2.8)	1,499 (2.4)
Hispanic, any race	191,323 (6.2)	188,944 (6.2)	144 (5.3)	2,379 (3.9)
Race and ethnicity unknown	309,906 (10.0)	306,680 (10.1)	182 (6.7)	3,226 (5.2)
Primary payer				
Medicare	1,034,670 (33.5)	1,014,474 (33.5)	883 (32.5)	20,196 (32.8)
Medicaid/charity care	631,198 (20.4)	606,898 (20.0)	963 (35.5)	24,300 (39.4)
Private insurance	1,259,462 (40.8)	1,247,704 (41.2)	674 (24.8)	11,758 (19.1)
Self-pay	106,754 (3.5)	102,428 (3.4)	134 (4.9)	4,326 (7.0)
Other government-sponsored patients	58,314 (1.9)	57,261 (1.9)	60 (2.2)	1,054 (1.7)
Admission type				
Emergency	1,320,323 (42.7)	1,277,781 (42.2)	2,162 (79.7)	42,542 (69.0)
Urgent	450,032 (14.6)	441,237 (14.6)	444 (16.4)	8,795 (14.3)
Elective	921,506 (29.8)	911,447 (30.1)	106 (3.9)	10,059 (16.3)
Newborn	384,326 (12.4)	384,325 (12.7)	0 (0.0)	1 (0.0)
Trauma	12,908 (4.0)	12,699 (4.0)	1 (0.0)	209 (0.0)
Information not available	1,304 (0.0)	1,276 (0.0)	1 (0.0)	28 (0.0)

Table 12. Descriptive characteristics of persons with liver and intrahepatic bile duct (IHBD) cancer—Washington State, 2010–2014

Source: Washington State Cancer Registry (WSCR) and Chronic Hepatitis Surveillance Records (CHSR)

Characteristic	All liver and IBHD cancers N (%)	Not hepatitis C-related N (%)	Hepatitis C-related N (%)
Total number of liver and intrahepatic bile duct cancers	3,116	1,972	1,144
Cancer site			
Liver	2,685 (86.2)	1,575 (79.9)	1,110 (97.0)
Bile duct	431 (13.8)	397 (20.1)	34 (3.0)
Age			
Average age (SD)	64.2 (12.2)	66.2 (13.6)	59.5 (8.7)
Median age (range)	63 (0–101)	66 (0–101)	58 (23–94)
≤30 years	32 (1.0)	30 (1.5)	2 (0.2)
31–44 years	64 (2.1)	50 (2.5)	14 (1.2)
45–65 years	1,781 (57.2)	864 (43.8)	917 (80.2)
66+ years	1,239 (39.8)	1,028 (52.1)	211 (18.4)
Birth year			
Born before 1945	1,107 (35.5)	937 (47.5)	170 (14.9)
Born 1945–1965	1,892 (60.7)	941 (47.7)	951 (83.1)
Born after 1965	117 (3.8)	94 (4.8)	23 (2.0)
Sex at birth			
Male	2,226 (71.4)	1,310 (66.4)	916 (80.1)
Female	888 (28.5)	660 (33.5)	228 (19.9)
Race/ethnicity			
White, non-Hispanic	2,251 (72.2)	1,418 (71.9)	833 (72.8)
Black, non-Hispanic	167 (5.4)	68 (3.4)	99 (8.7)
American Indian/Alaska Native, non-Hispanic	80 (2.6)	41 (2.1)	39 (3.4)
Asian, non-Hispanic	375 (12.0)	285 (14.5)	90 (7.9)
Native Hawaiian/other Pacific Islander, non-Hispanic	26 (0.8)	23 (1.2)	3 (0.3)
Multi-race/race unknown, non-Hispanic	33 (1.1)	16 (0.8)	17 (1.5)
Hispanic, any race	170 (5.5)	110 (5.6)	60 (5.2)
Race and ethnicity unknown	14 (0.4)	11 (0.6)	3 (0.3)
Vital status			
Living	1,743 (55.9)	1,186 (60.1)	557 (48.7)
Deceased	1,373 (44.1)	786 (39.9)	587 (51.3)

Table 13. Descriptive characteristics of hospitalizations for liver transplant procedures with and without diagnosis of hepatitis C virus (HCV) infection—Washington State, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System (CHARS)

Characteristic	All liver transplant procedures N (%)	No diagnosis of HCV N (%)	Primary diagnosis of HCV N (%)	Secondary diagnosis of HCV N (%)	Any diagnosis of HCV N (%)
Total number of liver transplants	407	217	82	108	190
Age					
Average age (SD)	48.2 (19.4)	39.9 (23.0)	56.5 (5.7)	58.4 (6.4)	57.6 (6.2)
Median age (range)	55 (0–70)	49 (0–70)	56 (35–68)	60 (21–69)	58 (21–69)
≤30 years	69 (17.0)	68 (31.3)	0 (0.0)	1 (0.9)	1 (0.5)
31–44 years	29 (7.1)	26 (12)	2 (2.4)	1 (0.9)	3 (1.6)
45–65 years	282 (69.3)	107 (49.3)	78 (95.1)	97 (89.8)	175 (92.1)
66+ years	27 (6.6)	16 (7.4)	2 (2.4)	9 (8.3)	11 (5.8)
Birth year					
Born before 1945	9 (2.2)	5 (2.3)	0 (0.0)	4 (3.7)	4 (2.1)
Born 1945–1965	292 (71.7)	113 (52.1)	78 (95.1)	101 (93.5)	179 (94.2)
Born after 1965	106 (26.0)	99 (45.6)	4 (4.9)	3 (2.8)	7 (3.7)
Sex at birth					
Male	267 (65.6)	128 (59.0)	60 (73.2)	79 (73.1)	139 (73.2)
Female	140 (34.4)	89 (41.0)	22 (26.8)	29 (26.9)	51 (26.8)
Race					
White, non-Hispanic	298 (73.2)	145 (66.8)	72 (87.8)	81 (75.0)	153 (80.5)
Black, non-Hispanic	9 (2.2)	4 (1.8)	1 (1.2)	4 (3.7)	5 (2.6)
American Indian/Alaska Native, non-Hispanic	10 (2.5)	6 (2.8)	0 (0.0)	4 (3.7)	4 (2.1)
Asian, non-Hispanic	18 (4.4)	12 (5.5)	2 (2.4)	4 (3.7)	6 (3.2)
Native Hawaiian/other Pacific Islander, non-Hispanic	15 (3.7)	11 (5.1)	2 (2.4)	2 (1.9)	4 (2.1)
Multi-race/race unknown, non-Hispanic	11 (2.7)	9 (4.1)	1 (1.2)	1 (0.9)	2 (1.1)
Hispanic, any race or race unknown	35 (8.6)	25 (11.5)	1 (1.2)	9 (8.3)	10 (5.3)
Race/ethnicity unknown	11 (2.7)	5 (2.3)	3 (3.7)	3 (2.8)	6 (3.2)
Primary payer					
Medicare	95 (23.3)	35 (16.1)	26 (31.7)	34 (31.5)	60 (31.6)
Medicaid/charity care	83 (20.4)	56 (25.8)	13 (15.9)	14 (13.0)	27 (14.2)
Private insurance	215 (52.8)	119 (54.8)	41 (50.0)	55 (50.9)	96 (50.5)
Self-pay	2 (0.5)	1 (0.5)	0 (0.0)	1 (0.9)	1 (0.5)
Other government-sponsored patients	12 (2.9)	6 (2.8)	2 (2.4)	4 (3.7)	6 (3.2)

Table 14. Descriptive characteristics of decedents overall and with deaths related to hepatitis C virus (HCV) infection—Washington State, 2010–2014

Source: Washington State death records

Characteristic	All deaths N (%)	Deaths without HCV N (%)	HCV-related deaths N (%)
Total	250,430		2,973
Age			
Average age at death (SD)	73.9 (18.2)	74.1 (18.1)	59.8 (9.2)
Median age at death (range)	78 (0–112)	78 (0–112)	59 (21–98)
≤30 years	7,831 (3.1)	7,821 (3.2)	10 (0.3)
31–44 years	7,945 (3.2)	7,854 (3.2)	91 (3.1)
45–65 years	52,844 (21.1)	50,561 (20.4)	2,283 (76.8)
66+ years	181,810 (72.6)	181,221 (73.2)	589 (19.8)
Birth year			
Born before 1945	176,020 (70.3)	175,542 (70.9)	478 (16.1)
Born 1945–1965	57,252 (22.9)	54,891 (22.2)	2,361 (79.4)
Born after 1965	17,158 (6.9)	17,024 (6.9)	134 (4.5)
Sex at birth			
Male	126,931 (50.7)	124,853 (50.5)	2,078 (69.9)
Female	123,494 (49.3)	122,599 (49.5)	895 (30.1)
Unknown	5 (0.0)	5 (0.0)	0 (0.0)
Race/ethnicity			
White, non-Hispanic	224,616 (89.7)	222,239 (89.8)	2,377 (80.0)
Black, non-Hispanic	6,808 (2.8)	6,618 (2.7)	190 (6.4)
American Indian/Alaska Native, non-Hispanic	3,876 (1.6)	3,747 (1.5)	129 (4.3)
Asian, non-Hispanic	8,960 (3.6)	8,829 (3.6)	131 (4.4)
Native Hawaiian/other Pacific Islander, non-Hispanic	1,051 (0.4)	1,034 (0.4)	17 (0.6)
Hispanic, any race or race unknown	4,727 (1.9)	2 (0.0)	123 (4.1)
Multi-race/race unknown, non-Hispanic	2 (0.0)	4,604 (1.9)	0 (0.0)
Race/ethnicity unknown	390 (0.2)	384 (0.2)	6 (0.2)
Accountable Community of Health (ACH)			
Better Health Together	24,831 (9.9)	24,597 (9.9)	234 (7.9)
Cascade Pacific Action Alliance	27,826 (11.1)	27,498 (11.1)	328 (11.0)
Greater Columbia ACH	25,051 (10.0)	24,749 (10.0)	302 (10.2)
King County ACH	61,014 (24.4)	60,200 (24.3)	814 (27.4)
North Central ACH	10,128 (4.0)	10,024 (4.1)	104 (3.5)
North Sound ACH	40,446 (16.2)	39,970 (16.2)	476 (16.0)
Olympic Community of Health	16,297 (6.5)	16,100 (6.5)	197 (6.6)
Pierce County ACH	29,208 (11.7)	28,861 (11.7)	347 (11.7)
Southwest Washington Regional Health Alliance	15,629 (6.2)	15,458 (6.3)	171 (5.8)

Table 15. Human immunodeficiency virus (HIV)-only and HIV/hepatitis C virus (HCV) coinfection among individuals in care—Washington State, 2009–2013

Source: Medical Monitoring Program (MMP)

Characteristic	HIV monoinfected	HIV/HCV coinfected	P-value
Weighted frequency (total = 6,329)	5,401	928	
Age group			**0.026**
18–34 years	12%	8%	
35–44 years	27%	17%	
45–54 years	38%	49%	
55+ years	23%	26%	
Sex at birth			**0.097**
Male	88%	83%	
Female	12%	17%	
Race/ethnicity			**0.042**
White, non-Hispanic	68%	65%	
Black, non-Hispanic	12%	16%	
Hispanic, any race	11%	6%	
Other	9%	14%	
Income			**<0.001**
<100% federal poverty level (FPL)	26%	59%	
100% FPL to < 400% FPL	47%	32%	
400%+ FPL	27%	9%	
Education			**<0.001**
Less than high school	8%	23%	
High school diploma or equivalent	18%	29%	
More than high school	74%	48%	
Sexual orientation			**<0.001**
Homosexual	71%	48%	
Heterosexual	20%	39%	
Bisexual	7%	11%	
Other/unclassified	2%	3%	
Homeless			**<0.001**
Not homeless in the last 12 months	92%	79%	
Homeless in the last 12 months	8%	21%	
Viral load suppression			**0.020**
All viral loads in the last 12 months undetectable, ≤200 copies/mL	70%	61%	
Any viral load in the last 12 months >200 copies/mL or missing/unknown	30%	39%	
Injection drug use in prior 12 months			**<0.001**
No	95%	78%	
Yes	5%	22%	

Table 16. Comparison of characteristics of persons living with diagnosed HIV infection (PLWDH) by hepatitis C virus (HCV) coinfection status—Washington State, as of year-end 2014

Source: Chronic Hepatitis Surveillance Records (CHSR) and HIV database

Characteristic	Hepatitis C Diagnosis? N (%)		Total PLWDH N (%)
	Yes	No	
Total	1,011 (100)	11,556 (100)	12,567 (100)
Stage of disease			
Human immunodeficiency virus (HIV)	359 (35.5)	5,280 (45.7)	5,639 (44.9)
Acquired immune deficiency syndrome (AIDS)	652 (64.5)	6,276 (54.3)	6,928 (55.1)
Sex at birth			
Male	835 (82.6)	9,926 (85.9)	10,761 (85.6)
Female	176 (17.4)	1,630 (14.1)	1,806 (14.4)
Age			
≤12 years	0 (0.0)	47 (0.4)	47 (0.4)
13–24 years	13 (1.3)	292 (2.5)	305 (2.4)
25–34 years	72 (7.1)	1,521 (13.2)	1,593 (12.7)
35–44 years	192 (19.0)	2,637 (22.8)	2,829 (22.5)
45–54 years	428 (42.3)	4,099 (35.5)	4,527 (36.0)
55+ years	306 (30.3)	2,960 (25.6)	3,266 (26.0)
Race/ethnicity			
White, non-Hispanic	685 (67.8)	7,271 (62.9)	7,956 (63.3)
Black, non-Hispanic	146 (14.4)	1,893 (16.4)	2,039 (16.2)
American Indian/Alaska Native, non-Hispanic	26 (2.6)	129 (1.1)	155 (1.2)
Asian, non-Hispanic	25 (2.5)	391 (3.4)	416 (3.3)
Native Hawaiian/other Pacific Islander, non-Hispanic	2 (0.2)	62 (0.5)	64 (0.5)
Multi-race/race unknown, non-Hispanic	35 (3.5)	254 (2.2)	289 (2.3)
Hispanic, any race	92 (9.1)	1,556 (13.5)	1,648 (13.1)
Mode of HIV exposure			
Men/transgendered persons who have sex with men (MSM/TSM)	301 (29.8)	7,354 (63.6)	7,655 (60.9)
Persons who inject drugs (PWID)	213 (30.7)	516 (4.5)	826 (6.6)
MSM/TSM/PWID	269 (26.6)	873 (7.6)	1,142 (9.1)
Heterosexual	60 (5.9)	1,510 (13.1)	1,570 (12.5)
Blood/pediatric/other	20 (2.0)	134 (1.2)	154 (1.2)
No identified risk	51 (5.0)	1,169 (10.1)	1,220 (9.7)
County of current residence			
Clark County	24 (2.4)	400 (3.5)	424 (3.4)
King County	455 (45.0)	5,357 (46.4)	5,812 (46.2)
Pierce County	108 (10.7)	859 (7.4)	967 (7.7)
Snohomish County	40 (4.0)	613 (5.3)	653 (5.2)
Spokane County	48 (4.7)	336 (2.9)	384 (3.1)
Other	336 (33.2)	3,991 (34.5)	4,327 (34.4)
HIV care outcomes*			
Engaged in care	876 (86.6)	9,282 (80.3)	10,158 (80.8)
Retained in care	634 (62.7)	6,323 (54.7)	6,957 (55.4)
Virologically suppressed	718 (71.0)	8,030 (69.5)	8,748 (69.6)

**Care outcomes are not mutually exclusive. Individuals may be listed in more than one care outcome category.*

All HIV/AIDS surveillance data reported to the Washington State Department of Health as of May 31, 2016.

Table 18. Mortality among people living with diagnosed HIV infection (PLWDH) by hepatitis C virus (HCV) coinfection status—Washington State, 2014

Source: Chronic Hepatitis Surveillance Records (CHSR) and HIV database

	HIV only			HCV/HIV coinfected			Total deaths among PLWDH	% of total deaths with HCV/HIV coinfection
Year of death	Deaths	PLWDH	% deceased	Deaths	PLWDH	% deceased		
2010	170	10,627	1.6	44	1,107	3.8	214	20.6
2011	160	10,658	1.5	61	1,082	5.3	221	27.6
2012	149	10,850	1.4	56	1,038	5.1	205	27.3
2013	116	11,225	1.0	57	1,026	5.3	173	32.9
2014	134	11,556	1.1	44	1,011	4.2	178	24.7
		Average:	**1.3**		**Average:**	**4.7**	**Average:**	**26.6**

Table 17. Descriptive characteristics of Department of Corrections inmates with hepatitis C virus (HCV) infection and co-infection with other viruses—Washington State, 2014

Source: Washington State Department of Corrections (DOC)

Characteristic	Intake population N (%)	Screened at intake N (%)	Total population N (%)	Prevalence of HCV exposure N (%)	Confirmed chronic HCV N (%)	HBV co-infected N (%)
Total	7,853	6,205	16,736	1,829	1,063	7
Age						
Average age (SD)	34.5 (10.5)	34.3 (10.4)	38.6 (12.0)	43.4 (11.5)	45.2 (11.1)	-
Range	16–90	18–80	18–91	19–77	20–73	-
≤30 years	3,271 (41.7)	2,634 (42.4)	4,904 (29.3)	292 (16.0)	115 (10.8)	0 (0.0)
31–44 years	3,108 (39.6)	2,438 (39.3)	6,824 (40.8)	657 (35.9)	382 (35.9)	3 (42.9)
45–65 years	1,425 (18.1)	1,101 (17.7)	4,585 (27.4)	845 (46.2)	539 (50.7)	3 (42.9)
66+ years	49 (0.6)	32 (0.5)	423 (2.5)	35 (1.9)	27 (2.5)	1 (14.3)
Birth year						
Born before 1945	17 (0.2)	7 (0.1)	175 (1.0)	3 (0.2)	2 (0.2)	1 (14.3)
Born 1945–1965	853 (10.9)	660 (10.6)	3,096 (18.5)	630 (34.4)	410 (38.6)	2 (28.6)
Born after 1965	6,983 (88.9)	5,538 (89.3)	13,465 (80.5)	1,196 (65.4)	651 (61.2)	4 (57.1)
Sex at birth						
Male	6,895 (87.8)	5,333 (85.9)	15,545 (92.9)	1,616 (88.4)	957 (90.0)	7 (100)
Female	958 (12.2)	872 (14.1)	1,191 (7.1)	213 (11.6)	106 (10.0)	0 (0.0)
Race						
White, non-Hispanic	4,947 (63.0)	3,839 (61.9)	10,068 (60.2)	1,359 (74.3)	790 (74.3)	5 (71.4)
Black, non-Hispanic	1,171 (14.9)	934 (15.1)	3,031 (18.1)	194 (10.6)	129 (12.1)	2 (28.6)
American Indian/Alaska Native, non-Hispanic	415 (5.3)	343 (5.5)	726 (4.3)	112 (6.1)	57 (5.4)	0 (0.0)
Asian/Pacific Islander, non-Hispanic	245 (3.1)	186 (3.0)	599 (3.6)	18 (1.0)	9 (0.8)	0 (0.0)
Hispanic, any race	1,001 (12.7)	840 (13.5)	2,172 (13.0)	136 (7.4)	74 (7.0)	0 (0.0)
Race/ethnicity unknown	74 (0.9)	63 (1.0)	140 (0.8)	10 (0.5)	4 (0.4)	0 (0.0)

State and ACH-level data

Table 19. Washington State population by Accountable Community of Health region, 2014

Source: Office of Financial Management (OFM)

Area	Population	% of state population	% change from 2000
Washington	6,968,170	100	15.4
Better Health Together (BHT)	579,370	8.3	15.0
Cascade Pacific Action Alliance (CPAA)	604,410	8.7	18.4
Greater Columbia Accountable Community of Health (GC ACH)	719,770	10.3	22.0
King County Accountable Community of Health	2,017,250	28.9	16.1
North Central Accountable Community of Health (NCACH)	248,600	3.6	14.1
North Sound Accountable Community of Health (NSACH)	1,164,200	16.7	21.1
Olympic Community of Health (OCH)	359,100	5.2	11.4
Pierce County Accountable Community of Health	821,300	11.8	17.2
Southwest Washington Regional Health Alliance (SWWA RHA)	454,170	6.5	27.9

Table 20. Race and ethnicity by Accountable Community of Health region—Washington State, 2014

Source: Office of Financial Management (OFM)

Area	White	Black	AIAN*	Asian	NHOPI**	Multi-/ unknown race	Hispanic
Washington	70.8%	3.6%	1.3%	7.5%	0.6%	4.0%	12.2%
Better Health Together	84.2%	1.5%	1.9%	1.9%	0.4%	3.4%	6.7%
Cascade Pacific Action Alliance	80.6%	1.6%	1.8%	3.1%	0.5%	3.9%	8.5%
Greater Columbia Accountable Community of Health	61.3%	1.1%	1.7%	2.2%	0.1%	2.1%	31.5%
King County Accountable Community of Health	62.8%	6.3%	0.7%	15.4%	0.8%	4.4%	9.7%
North Central Accountable Community of Health	62.6%	0.5%	2.4%	0.8%	0.1%	1.8%	31.8%
North Sound Accountable Community of Health	75.2%	2.0%	1.4%	7.2%	0.4%	3.7%	10.2%
Olympic Community of Health	80.0%	2.1%	2.1%	4.0%	0.7%	4.8%	6.2%
Pierce County Accountable Community of Health	68.7%	6.6%	1.1%	6.1%	1.4%	6.1%	9.9%
Southwest Washington Regional Health Alliance	80.8%	1.9%	0.7%	4.2%	0.7%	3.5%	8.2%

*AIAN = American Indian/Alaska Native
**NHOPI = Native Hawaiian/other Pacific Islander
All race categories represent non-Hispanics.

Table 21. Descriptive characteristics of persons infected with chronic hepatitis C by Accountable Community of Health region—Washington State, 2010–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)

Characteristic	All WA N (%)	BHT N (%)	CPAA N (%)	GC ACH N (%)	King N (%)	NCACH N (%)	NSACH N (%)	OCH N (%)	Pierce N (%)	SWWA RHA N (%)
Total										
Age										
Average age (SD)	46.6 (12.3)	44.7 (12.3)	46.3 (12.6)	46.1 (11.9)	47.1 (12.1)	47.3 (12.3)	46.1 (13.1)	48.1 (12.2)	46.6 (11.4)	48.0 (12.8)
Median age (range)	48 (0–101)	46 (0–95)	48 (0–95)	47 (0–91)	48 (0–100)	49 (0–90)	48 (0–100)	50 (0-101)	47 (0–99)	50 (0–101)
≤30 years	3,847 (15.7)	609 (19.8)	523 (15.9)	124 (10.9)	774 (12.9)	45 (10.0)	926 (19.1)	203 (15.1)	289 (14.1)	354 (15.0)
31–44 years	4,678 (19.0)	717 (23.3)	591 (18.0)	200 (17.5)	1,175 (19.6)	79 (17.5)	914 (18.9)	232 (17.3)	356 (17.3)	414 (17.5)
45–65 years	14,679 (59.7)	1,634 (53.0)	2,008 (61.1)	754 (66.1)	3,640 (60.8)	302 (67.0)	2,772 (57.2)	828 (61.6)	1,281 (62.3)	1,460 (61.7)
66+ years	1,368 (5.6)	123 (4.0)	167 (5.1)	63 (5.5)	401 (6.7)	25 (5.5)	238 (4.9)	81 (6.0)	131 (6.4)	139 (5.9)
Birth year										
Born before 1945	1,219 (5.0)	117 (3.8)	148 (4.5)	55 (4.8)	373 (6.2)	21 (4.7)	203 (4.2)	68 (5.0)	116 (5.6)	118 (5.0)
Born 1945–1965	14,147 (57.6)	1,538 (49.9)	1,918 (58.3)	728 (63.8)	3,525 (58.9)	303 (67.2)	2,676 (55.2)	806 (60.0)	1,239 (60.2)	1,414 (59.7)
Born after 1965	9,207 (37.5)	1,428 (46.3)	1,223 (37.2)	358 (31.4)	2,092 (34.9)	127 (28.2)	1,971 (40.6)	470 (35.0)	702 (34.1)	836 (35.3)
Sex at birth										
Male	13,994 (58.5)	1,777 (58.1)	1,734 (54.9)	638 (58.2)	3,596 (61.6)	250 (59.1)	2,761 (57.9)	722 (55.8)	1,132 (58.1)	1,384 (59.2)
Female	9,935 (41.5)	1,281 (41.9)	1,423 (45.1)	459 (41.8)	2,245 (38.4)	173 (40.9)	2,011 (42.1)	571 (44.2)	816 (41.9)	956 (40.9)
Race/ethnicity										
White, non-Hispanic	2,852 (11.6)	160 (5.2)	303 (9.2)	297 (26.0)	243 (4.1)	217 (47.9)	1,070 (22.1)	178 (13.2)	10 (0.5)	374 (15.8)
Black, non-Hispanic	120 (0.5)	5 (0.2)	4 (0.1)	3 (0.3)	65 (1.1)	4 (0.9)	16 (0.3)	1 (0.1)	0 (0.0)	22 (0.9)
AIAN, non-Hispanic	311 (1.3)	16 (0.5)	24 (0.7)	31 (2.7)	17 (0.3)	24 (5.3)	174 (3.6)	19 (1.4)	1 (0.1)	5 (0.2)
Asian, non-Hispanic	74 (0.3)	10 (0.3)	19 (0.6)	6 (0.5)	13 (0.2)	3 (0.7)	6 (0.1)	1 (0.1)	3 (0.2)	13 (0.6)
NHOPI, non-Hispanic	12 (0.1)	1 (0.0)	2 (0.1)	1 (0.1)	0 (0.0)	0 (0.0)	3 (0.1)	3 (0.2)	0 (0.1)	2 (0.1)
Multi-race/race unknown, non-Hispanic	322 (1.3)	22 (0.7)	77 (2.3)	45 (3.9)	10 (0.2)	12 (2.65)	110 (2.3)	25 (1.9)	2 (0.1)	19 (0.8)
Hispanic, any race	346 (1.4)	24 (0.8)	31 (0.9)	51 (4.5)	103 (1.7)	32 (7.06)	68 (1.4)	4 (0.3)	19 (0.9)	14 (0.6)
Race and ethnicity unknown	20,576 (83.6)	2,845 (92.3)	2,845 (86.1)	708 (62.0)	5,541 (92.5)	161 (35.54)	3,406 (70.2)	1,121 (82.9)	2,028 (98.3)	1,921 (81.1)
Risk factor										
PWID only	1,432 (5.8)	154 (0.5)	64 (1.9)	48 (4.2)	535 (8.9)	43 (9.49)	308 (6.4)	59 (4.4)	121 (5.9)	100 (4.2)
PWID with one or more other risks	879 (3.6)	205 (6.7)	71 (2.2)	126 (11.0)	33 (0.6)	44 (9.71)	263 (5.4)	28 (2.1)	3 (0.2)	106 (4.5)
One or more other risks	959 (3.9)	216 (7.0)	57 (1.7)	156 (13.7)	45 (0.8)	84 (18.54)	253 (5.2)	51 (3.8)	11 (0.5)	86 (3.6)
Unknown or missing risk	21,343 (86.7)	2,508 (81.4)	3,113 (94.2)	812 (71.1)	5,379 (89.8)	282 (62.25)	4,029 (83.0)	1,214 (89.8)	1,928 (93.5)	2,078 (87.7)

**WA = Washington State*

PWID = Person who inject drugs

AIAN = American Indian/Alaska Native

NHOPI = Native Hawaiian/other Pacific Islander

Table 22. Descriptive characteristics of inpatients with a primary diagnosis of hepatitis C virus infection by Accountable Community of Health region—Washington State, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System (CHARS)

Characteristic	All WA* N (%)	BHT N (%)	CPAA N (%)	GC ACH N (%)	King N (%)	NCACH N (%)	NSACH N (%)	OCH N (%)	Pierce N (%)	SWWA RHA N (%)
Primary diagnosis of hepatitis C	1,695	168	205	173	383	42	291	108	189	136
Average age (SD)	55.2 (9.8)	54 (11.6)	55.9 (10.2)	55 (8.7)	56.6 (9.5)	55.1 (9.7)	54.4 (9.8)	54.9 (10.2)	54.7 (8.9)	55.4 (9.5)
Median age (range)	56 (13–91)	56 (19–84)	56 (13–83)	56 (25–84)	56 (22–91)	57 (32–86)	56 (16–84)	56 (22–74)	55 (16–82)	55 (23–83)
Birth year										
Born before 1945	113 (6.7)	11 (6.5)	19 (9.3)	11 (6.4)	34 (8.9)	2 (4.8)	11 (3.8)	6 (5.6)	9 (4.8)	10 (7.4)
Born 1945–1965	1,383 (81.6)	126 (75.0)	163 (79.5)	142 (82.1)	314 (82.0)	34 (81.0)	238 (81.8)	91 (84.3)	161 (85.2)	114 (83.8)
Born after 1965	199 (11.7)	31 (18.5)	23 (11.2)	20 (11.6)	35 (9.1)	6 (14.3)	42 (14.4)	11 (10.2)	19 (10.1)	12 (8.8)
Sex at birth										
Male	1,077 (63.5)	103 (61.3)	127 (62.0)	123 (71.1)	247 (64.5)	26 (61.9)	180 (61.9)	64 (59.3)	121 (64.0)	86 (63.2)
Female	618 (36.5)	65 (38.7)	78 (38.0)	50 (28.9)	136 (35.5)	16 (38.1)	111 (38.1)	44 (40.7)	68 (36.0)	50 (36.8)
Race/ethnicity										
White, non-Hispanic	1,271 (75.0)	141 (83.9)	163 (79.5)	113 (65.3)	251 (65.5)	31 (73.8)	228 (78.4)	89 (82.4)	150 (79.4)	105 (77.2)
Black, non-Hispanic	63 (3.7)	4 (2.4)	1 (0.5)	2 (1.2)	37 (9.7)	0 (0.0)	4 (1.4)	2 (1.9)	12 (6.3)	1 (0.7)
AIAN, non-Hispanic	56 (3.3)	7 (4.2)	8 (3.9)	11 (6.4)	10 (2.6)	3 (7.1)	8 (2.7)	4 (3.7)	3 (1.6)	2 (1.5)
Asian, non-Hispanic	34 (2.0)	2 (1.2)	4 (2.0)	1 (0.6)	17 (4.4)	0 (0.0)	4 (1.4)	1 (0.9)	3 (1.6)	2 (1.5)
NHOPI, non-Hispanic	23 (1.4)	1 (0.6)	1 (0.5)	2 (1.2)	11 (2.9)	0 (0.0)	0 (0.0)	0 (0.0)	2 (1.1)	6 (4.4)
Multi-race/race unknown, non-Hispanic	48 (2.8)	3 (1.8)	6 (2.9)	1 (0.6)	19 (5.0)	0 (0.0)	8 (2.7)	1 (0.9)	7 (3.7)	3 (2.2)
Hispanic, any race	82 (4.8)	6 (3.6)	6 (2.9)	20 (11.6)	14 (3.7)	7 (16.7)	13 (4.5)	4 (3.7)	6 (3.2)	6 (4.4)
Race and ethnicity unknown	118 (7.0)	4 (2.4)	16 (7.8)	23 (13.3)	24 (6.3)	1 (2.4)	26 (8.9)	7 (6.5)	6 (3.2)	11 (8.1)

**WA = Washington State*
BHT = Better Health Together
CPAA = Cascade Pacific Action Alliance
GC ACH = Greater Columbia Accountable Community of Health
King = King County Accountable Community of Health
NCACH = North Central Accountable Community of Health
NSACH = North Sound Accountable Community of Health
OCH = Olympic Community of Health
Pierce = Pierce County Accountable Community of Health
SWWA RHA = Southwest Washington Regional Health Alliance

AIAN = American Indian/Alaska Native
NHOPI = Native Hawaiian/other Pacific Islander

Table 23. Descriptive characteristics of persons with liver or intrahepatic bile duct (IHBD) cancer and hepatitis C infection by Accountable Community of Health region—Washington State, 2010–2014

Source: Washington State Cancer Registry (WSCR) and Chronic Hepatitis Surveillance Records (CHSR)

Characteristic	All WA* N (%)	BHT N (%)	CPAA N (%)	GC ACH N (%)	King N (%)	NCACH N (%)	NSACH N (%)	OCH N (%)	Pierce N (%)	SWWA RHA N (%)
Total	1,144	86	101	61	373	14	215	72	173	49
Cancer site										
Liver	1,110 (97.0)	82 (95.3)	98 (97.0)	60 (98.4)	364 (97.6)	14 (100.0)	205 (95.3)	67 (93.1)	171 (98.8)	49 (100.0)
Bile duct	34 (3.0)	4 (4.7)	3 (3.0)	1 (1.6)	9 (2.4)	0 (0.0)	10 (4.7)	5 (6.9)	2 (1.2)	0 (0.0)
Age										
Average age (SD)	60.5 (8.0)	59.4 (8.2)	61.2 (7.4)	58.4 (7.0)	60.5 (8.3)	63.1 (7.9)	60.2 (8.0)	62.0 (6.8)	61.0 (8.5)	61.4 (7.6)
Median age (range)	60 (23–94)	59 (37–92)	61 (45–94)	58 (44–86)	60 (23–93)	63 (53–80)	59 (34–87)	61 (51–86)	60 (38–88)	61 (48–81)
Birth year										
Born before 1945	170 (14.9)	10 (11.6)	13 (12.9)	5 (8.2)	63 (16.9)	3 (21.4)	28 (13.0)	12 (16.7)	28 (16.2)	8 (16.3)
Born 1945–1965	951 (83.1)	74 (86.0)	87 (86.1)	55 (90.2)	298 (79.9)	11 (78.6)	184 (85.6)	60 (83.3)	141 (81.5)	41 (83.7)
Born after 1965	23 (2.0)	2 (2.3)	1 (1.0)	1 (1.6)	12 (3.2)	0 (0.0)	3 (1.4)	0 (0.0)	4 (2.3)	0 (0.0)
Sex at birth										
Male	916 (80.1)	73 (84.9)	86 (85.1)	50 (82.0)	294 (78.8)	12 (85.7)	170 (79.1)	59 (81.9)	137 (79.2)	35 (71.4)
Female	228 (19.9)	13 (15.1)	15 (14.9)	11 (18.0)	79 (21.2)	2 (14.3)	45 (20.9)	13 (18.1)	36 (20.8)	14 (28.6)
Race/ethnicity										
White, non-Hispanic	833 (72.8)	77 (89.5)	85 (84.2)	42 (68.9)	230 (61.7)	10 (71.4)	169 (78.6)	55 (76.4)	120 (69.4)	45 (91.8)
Black, non-Hispanic	99 (8.7)	2 (2.3)	1 (1.0)	2 (3.3)	61 (16.4)	1 (7.1)	10 (4.7)	3 (4.2)	19 (11.0)	0 (0.0)
AIAN, non-Hispanic	39 (3.4)	0 (0.0)	5 (5.0)	4 (6.6)	10 (2.7)	1 (7.1)	10 (4.7)	5 (6.9)	4 (2.3)	0 (0.0)
Asian, non-Hispanic	90 (7.9)	4 (4.7)	6 (5.9)	0 (0.0)	41 (11.0)	0 (0.0)	9 (4.2)	8 (11.1)	19 (11.0)	3 (6.1)
NHOPI, non-Hispanic	3 (0.3)	0 (0.0)	0 (0.0)	1 (1.6)	1 (0.3)	0 (0.0)	0 (0.0)	1 (1.4)	0 (0.0)	0 (0.0)
Multi-race/race unknown, non-Hispanic	17 (1.5)	2 (2.3)	1 (1.0)	0 (0.0)	8 (2.1)	0 (0.0)	3 (1.4)	0 (0.0)	3 (1.7)	0 (0.0)
Hispanic, any race	60 (5.2)	1 (1.2)	3 (3.0)	12 (19.7)	21 (5.6)	1 (7.1)	13 (6.0)	0 (0.0)	8 (4.6)	1 (2.0)
Race and ethnicity unknown	3 (0.3)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.3)	1 (7.1)	1 (0.5)	0 (0.0)	0 (0.0)	0 (0.0)
Vital status										
Living	557 (48.7)	51 (59.3)	52 (51.5)	41 (67.2)	182 (48.8)	9 (64.3)	86 (40.0)	39 (54.2)	75 (43.4)	22 (44.9)
Deceased	587 (51.3)	35 (40.7)	49 (48.5)	20 (32.8)	191 (51.2)	5 (35.7)	129 (60.0)	33 (45.8)	98 (56.6)	27 (55.1)

**WA = Washington State*
BHT = Better Health Together
CPAA = Cascade Pacific Action Alliance
GC ACH = Greater Columbia Accountable Community of Health
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OCH = Olympic Community of Health
Pierce = Pierce County Accountable Community of Health
SWWA RHA = Southwest Washington Regional Health Alliance
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AIAN = American Indian/Alaska Native
NHOPI = Native Hawaiian/other Pacific Islander

State, ACH, and county-level data

Table 24. Population by Accountable Community of Health and county—Washington State, 2014

Source: Office of Financial Managment (OFM)

Area	Population with DOC inmates	Population without DOC inmates
Washington	6,968,170	6,951,463
Better Health Together	**579,370**	**579,750**
Adams	19,400	21,950
Ferry	7,660	7,660
Lincoln	10,700	10,700
Pend Oreille	13,210	13,210
Spokane	484,500	482,330
Stevens	43,900	43,900
Cascade Pacific Action Alliance	**604,410**	**599,894**
Cowlitz	103,700	103,700
Grays Harbor	73,300	71,341
Lewis	76,300	76,300
Mason	62,000	59,921
Pacific	21,100	21,100
Thurston	264,000	263,522
Wahkiakum	4,010	4,010
Greater Columbia ACH	**719,770**	**712,407**
Asotin	21,950	19,400
Benton	186,500	186,500
Columbia	4,080	4,080
Franklin	86,600	84,125
Garfield	2,240	2,240
Kittitas	42,100	42,100
Klickitat	20,850	20,850
Walla Walla	60,150	57,812
Whitman	46,500	46,500
Yakima	248,800	248,800

Area	Population with DOC inmates	Population without DOC inmates
King County ACH	**2,017,250**	**2,017,250**
North Central ACH	**248,600**	**248,600**
Chelan	74,300	74,300
Douglas	39,700	39,700
Grant	92,900	92,900
Okanogan	41,700	41,700
North Sound ACH	**1,164,200**	**1,161,646**
Island	80,000	80,000
San Juan	16,100	16,100
Skagit	119,500	119,500
Snohomish	741,000	738,446
Whatcom	207,600	207,600
Olympic Community of Health	**359,100**	**357,849**
Clallam	72,500	71,637
Jefferson	30,700	30,312
Kitsap	255,900	255,900
Pierce County ACH	**821,300**	**820,360**
SWWA RHA	**454,170**	**453,707**
Clark	442,800	442,337
Skamania	11,370	11,370

ACH = Accountable Community of Health
DOC = Department of Corrections
SWWA RHA = Southwest Washington Regional Health Alliance

Table 25. Chronic hepatitis C infections by area—Washington State, 2010–2014

Source: Chronic Hepatitis Surveillance Records (CHSR)

	OFM population estimates*					Number of hepatitis C reports*				
Area	2010	2011	2012	2013	2014	2010	2011	2012	2013	2014
Washington	6,708,237	6,751,577	6,801,452	6,865,869	6,951,463	5,260	4,738	4,633	4,171	5811
Better Health Together	**565,167**	**566,925**	**570,233**	**574,902**	**579,750**	**467**	**570**	**642**	**632**	**772**
Adams	21,623	21,650	21,700	21,800	21,950	3	1	7	0	7
Ferry	7,551	7,600	7,650	7,650	7,660	9	8	13	3	12
Lincoln	10,570	10,600	10,675	10,675	10,700	5	3	1	5	7
Pend Oreille	13,001	13,000	13,100	13,150	13,210	9	11	10	2	22
Spokane	468,891	470,475	473,408	477,827	482,330	404	509	562	594	667
Stevens	43,531	43,600	43,700	43,800	43,900	37	38	49	28	57
Cascade Pacific Action Alliance	**584,228**	**587,267**	**591,232**	**595,121**	**599,894**	**602**	**559**	**605**	**591**	**948**
Cowlitz	102,410	102,700	103,050	103,300	103,700	143	137	190	168	277
Grays Harbor	70,830	70,933	71,184	71,239	71,341	79	99	88	78	149
Lewis	75,455	76,000	76,300	76,200	76,300	49	40	62	74	108
Mason	58,848	59,117	59,384	59,741	59,921	71	59	62	59	91
Pacific	20,920	20,900	20,970	21,000	21,100	18	24	22	22	44
Thurston	251,787	253,617	256,319	259,621	263,522	242	196	176	189	279
Wahkiakum	3,978	4,000	4,025	4,020	4,010	0	4	5	1	0
Greater Columbia ACH	**682,682**	**689,132**	**696,475**	**704,410**	**712,407**	**271**	**187**	**128**	**127**	**429**
Asotin	18,728	18,950	19,050	19,200	19,400	20	20	19	18	17
Benton	175,177	177,900	180,000	183,400	186,500	3	5	11	36	51
Columbia	4,078	4,100	4,100	4,100	4,080	2	4	6	2	6
Franklin	76,712	78,133	79,988	82,304	84,125	3	0	9	6	12
Garfield	2,266	2,250	2,250	2,250	2,240	1	0	1	0	4
Kittitas	40,915	41,300	41,500	41,900	42,100	30	14	11	14	38
Klickitat	20,318	20,500	20,600	20,700	20,850	19	16	20	12	11
Walla Walla	56,481	56,499	57,037	57,306	57,812	23	35	37	24	34
Whitman	44,776	44,800	45,950	46,000	46,500	14	19	14	3	5
Yakima	243,231	244,700	246,000	247,250	248,800	156	74	0	12	251
King County ACH	**1,931,249**	**1,942,600**	**1,957,000**	**1,981,900**	**2,017,250**	**1,551**	**1,310**	**1,146**	**899**	**1,086**
North Central ACH	**241,124**	**242,650**	**244,525**	**246,180**	**248,600**	**143**	**103**	**91**	**56**	**60**
Chelan	72,453	72,700	73,200	73,600	74,300	42	32	18	14	31
Douglas	38,431	38,650	38,900	39,280	39,700	16	12	9	6	6
Grant	89,120	90,100	91,000	91,800	92,900	60	52	46	23	15
Okanogan	41,120	41,200	41,425	41,500	41,700	25	7	18	13	8
North Sound ACH	**1,123,188**	**1,128,764**	**1,137,210**	**1,148,078**	**1,161,646**	**941**	**866**	**907**	**949**	**1,190**
Island	78,506	78,800	79,350	79,700	80,000	52	41	38	42	59
San Juan	15,769	15,900	15,925	16,000	16,100	14	4	7	9	14
Skagit	116,901	117,400	117,950	118,600	119,500	138	89	104	105	160
Snohomish	710,872	714,564	720,485	727,978	738,446	486	485	513	498	655
Whatcom	201,140	202,100	203,500	205,800	207,600	251	247	245	295	302
Olympic Community of Health	**351,136**	**354,284**	**355,389**	**355,357**	**357,849**	**285**	**261**	**244**	**225**	**337**
Clallam	70,508	70,703	71,099	71,463	71,637	54	40	33	31	77
Jefferson	29,495	29,681	29,790	29,894	30,312	21	26	10	11	24
Kitsap	251,133	253,900	254,500	254,000	255,900	210	195	201	183	236
Pierce County ACH	**793,253**	**801,277**	**807,339**	**813,593**	**820,360**	**570**	**430**	**397**	**284**	**382**
SWWA Regional Health Alliance	**436,210**	**438,678**	**442,049**	**446,328**	**453,707**	**430**	**452**	**473**	**408**	**607**
Clark	425,144	427,528	430,774	435,028	442,337	420	444	469	407	607
Skamania	11,066	11,150	11,275	11,300	11,370	10	8	4	1	0

** Numbers and rates do not include information on Department of Corrections inmates; **Rates are suppressed where number < 5.*

	Hepatitis C rates/100,000 persons**					Population*	Number*	Rate/100,000**
Area	2010	2011	2012	2013	2014	5-year average	5-year average	5-year average
Washington	78.4	70.2	68.1	60.7	83.6	6,815,720	4,923	72.2
Better Health Together	**82.6**	**100.5**	**112.6**	**109.9**	**133.2**	**571,395**	**617**	**107.8**
Adams	-	-	32.3	-	31.9	21,745	4	-
Ferry	119.2	105.3	169.9	-	156.7	7,622	9	118.1
Lincoln	47.3	-	-	46.8	65.4	10,644	4	-
Pend Oreille	69.2	84.6	76.3	-	166.5	13,092	11	82.4
Spokane	86.2	108.2	118.7	124.3	138.3	474,586	547	115.1
Stevens	85.0	87.2	112.1	63.9	129.8	43,706	42	95.6
Cascade Pacific Action Alliance	**103.0**	**95.2**	**102.3**	**99.3**	**158.0**	**591,548**	**661**	**111.6**
Cowlitz	139.6	133.4	184.4	162.6	267.1	103,032	183	177.4
Grays Harbor	111.5	139.6	123.6	109.5	208.9	71,105	99	138.6
Lewis	64.9	52.6	81.3	97.1	141.5	76,051	67	87.5
Mason	120.6	99.8	104.4	98.8	151.9	59,402	68	115.1
Pacific	86.0	114.8	104.9	104.8	208.5	20,978	26	123.8
Thurston	96.1	77.3	68.7	72.8	105.9	256,973	216	84.1
Wahkiakum	-	-	124.2	-	-	4,007	2	-
Greater Columbia ACH	**39.7**	**27.1**	**18.4**	**18.0**	**60.2**	**697,021**	**228**	**32.7**
Asotin	106.8	105.5	99.7	93.8	87.6	19,066	19	98.7
Benton	-	2.8	6.1	19.6	27.3	180,595	21	11.5
Columbia	-	-	146.3	-	147.1	4,092	4	-
Franklin	-	-	11.3	7.3	14.3	80,252	6	7.3
Garfield	-	-	-	-	-	2,251	1	-
Kittitas	73.3	33.9	26.5	33.4	90.3	41,543	21	51.5
Klickitat	93.5	78.0	97.1	58.0	52.8	20,594	16	75.9
Walla Walla	40.7	61.9	64.9	41.9	58.8	57,027	31	53.6
Whitman	31.3	42.4	30.5	-	10.8	45,605	11	24.3
Yakima	64.1	30.2	-	4.9	100.9	245,996	99	40.0
King County ACH	**80.3**	**67.4**	**58.6**	**45.4**	**53.8**	**1,966,000**	**1,198**	**61.1**
North Central ACH	**59.3**	**42.4**	**37.2**	**22.7**	**24.1**	**244,616**	**91**	**37.2**
Chelan	58.0	44.0	24.6	19.0	41.7	73,251	27	37.5
Douglas	41.6	31.0	23.1	15.3	15.1	38,992	10	25.2
Grant	67.3	57.7	50.5	25.1	16.1	90,984	39	43.4
Okanogan	60.8	17.0	43.5	31.3	19.2	41,389	14	34.3
North Sound ACH	**83.8**	**76.7**	**79.8**	**82.7**	**102.4**	**1,139,777**	**971**	**85.1**
Island	66.2	52.0	47.9	52.7	73.8	79,271	46	58.5
San Juan	88.8	-	44.0	56.3	87.0	15,939	10	60.2
Skagit	118.0	75.8	88.2	88.5	133.9	118,070	119	100.9
Snohomish	68.4	67.9	71.2	68.4	88.7	722,469	527	72.9
Whatcom	124.8	122.2	120.4	143.3	145.5	204,028	268	131.2
Olympic Community of Health	**81.2**	**73.7**	**68.7**	**63.3**	**94.2**	**354,803**	**270**	**76.2**
Clallam	76.6	56.6	46.4	43.4	107.5	71,082	47	66.1
Jefferson	71.2	87.6	33.6	36.8	79.2	29,834	18	61.7
Kitsap	83.6	76.8	79.0	72.0	92.2	253,887	205	80.7
Pierce County ACH	**71.9**	**53.7**	**49.2**	**34.9**	**46.6**	**807,164**	**413**	**51.2**
SWWA Regional Health Alliance	**98.6**	**103.0**	**107.0**	**91.4**	**133.8**	**443,394**	**474**	**106.8**
Clark	98.8	103.9	108.9	93.6	137.2	432,162	469	108.5
Skamania	90.4	71.7	-	-	-	11,232	5	41.3

Table 26. Mortality from hepatitis C by area—Washington State, 2010–2014

Source: Washington State death records

	OFM population estimates*					Number of hepatitis C deaths*				
Area	2010	2011	2012	2013	2014	2010	2011	2012	2013	2014
Washington	6,724,540	6,767,900	6,817,770	6,882,400	6,968,170	560	580	604	584	645
Better Health Together	**564,602**	**566,400**	**569,775**	**574,475**	**579,370**	**46**	**46**	**45**	**45**	**52**
Adams	18,728	18,950	19,050	19,200	19,400	0	0	0	0	1
Ferry	7,551	7,600	7,650	7,650	7,660	0	2	1	1	0
Lincoln	10,570	10,600	10,675	10,675	10,700	2	0	1	2	0
Pend Oreille	13,001	13,000	13,100	13,150	13,210	7	4	2	2	2
Spokane	471,221	472,650	475,600	480,000	484,500	31	33	37	37	44
Stevens	43,531	43,600	43,700	43,800	43,900	6	7	4	3	5
Cascade Pacific Action Alliance	**588,523**	**591,700**	**595,745**	**599,620**	**604,410**	**66**	**60**	**73**	**68**	**61**
Cowlitz	102,410	102,700	103,050	103,300	103,700	14	12	16	17	12
Grays Harbor	72,797	72,900	73,150	73,200	73,300	13	10	10	11	14
Lewis	75,455	76,000	76,300	76,200	76,300	9	10	10	9	4
Mason	60,699	61,100	61,450	61,800	62,000	7	10	13	4	10
Pacific	20,920	20,900	20,970	21,000	21,100	4	5	3	3	3
Thurston	252,264	254,100	256,800	260,100	264,000	19	13	21	24	18
Wahkiakum	3,978	4,000	4,025	4,020	4,010	0	0	0	0	0
Greater Columbia ACH	**689,328**	**696,500**	**703,700**	**711,700**	**719,770**	**48**	**69**	**59**	**62**	**64**
Asotin	21,623	21,650	21,700	21,800	21,950	1	1	5	2	2
Benton	175,177	177,900	180,000	183,400	186,500	9	21	17	12	12
Columbia	4,078	4,100	4,100	4,100	4,080	1	0	0	2	0
Franklin	78,163	80,500	82,500	84,800	86,600	4	8	6	6	7
Garfield	2,266	2,250	2,250	2,250	2,240	0	0	0	0	0
Kittitas	40,915	41,300	41,500	41,900	42,100	1	6	5	2	3
Klickitat	20,318	20,500	20,600	20,700	20,850	2	2	2	1	5
Walla Walla	58,781	58,800	59,100	59,500	60,150	7	9	8	8	10
Whitman	44,776	44,800	45,950	46,000	46,500	1	0	1	1	3
Yakima	243,231	244,700	246,000	247,250	248,800	22	22	15	28	22
King County ACH	**1,931,249**	**1,942,600**	**1,957,000**	**1,981,900**	**2,017,250**	**147**	**154**	**167**	**158**	**188**
North Central ACH	**241,124**	**242,650**	**244,525**	**246,180**	**248,600**	**18**	**17**	**21**	**21**	**27**
Chelan	72,453	72,700	73,200	73,600	74,300	3	6	4	5	7
Douglas	38,431	38,650	38,900	39,280	39,700	4	1	4	2	1
Grant	89,120	90,100	91,000	91,800	92,900	7	6	11	5	10
Okanogan	41,120	41,200	41,425	41,500	41,700	4	4	2	9	9
North Sound ACH	**1,125,651**	**1,131,200**	**1,139,625**	**1,150,600**	**1,164,200**	**107**	**86**	**96**	**90**	**97**
Island	78,506	78,800	79,350	79,700	80,000	12	5	6	14	3
San Juan	15,769	15,900	15,925	16,000	16,100	3	1	2	1	0
Skagit	116,901	117,400	117,950	118,600	119,500	13	10	10	13	15
Snohomish	713,335	717,000	722,900	730,500	741,000	62	52	57	44	59
Whatcom	201,140	202,100	203,500	205,800	207,600	17	18	21	18	20
Olympic Community of Health	**352,409**	**355,550**	**356,675**	**356,625**	**359,100**	**36**	**45**	**42**	**31**	**43**
Clallam	71,404	71,600	72,000	72,350	72,500	9	11	12	4	8
Jefferson	29,872	30,050	30,175	30,275	30,700	4	6	8	3	5
Kitsap	251,133	253,900	254,500	254,000	255,900	23	28	22	24	30
Pierce County ACH	**795,225**	**802,150**	**808,200**	**814,500**	**821,300**	**66**	**71**	**67**	**67**	**76**
SWWA Regional Health Alliance	**436,429**	**439,150**	**442,525**	**446,800**	**454,170**	**26**	**32**	**34**	**42**	**37**
Clark	425,363	428,000	431,250	435,500	442,800	26	29	32	41	37
Skamania	11,066	11,150	11,275	11,300	11,370	0	3	2	1	0

** Numbers and rates include information on Department of Corrections inmates; **Rates are suppressed where number < 5.*

Area	Hepatitis C rates/100,000 persons** 2010	2011	2012	2013	2014	Population* 5-year average	Number* 5-year average	Rate/100,000** 5-year average
Washington	8.3	8.6	8.9	8.5	9.3	6,832,156	595	8.7
Better Health Together	**8.1**	**8.1**	**7.9**	**7.8**	**9.0**	**570,924**	**47**	**8.2**
Adams	-	-	-	-	-	19,066	<1	-
Ferry	-	-	-	-	-	7,622	<1	-
Lincoln	-	-	-	-	-	10,644	1	-
Pend Oreille	53.8	-	-	-	-	13,092	3	-
Spokane	6.6	7.0	7.8	7.7	9.1	476,794	36	7.6
Stevens	13.8	16.1	-	-	11.4	43,706	5	11.4
Cascade Pacific Action Alliance	**11.2**	**10.1**	**12.3**	**11.3**	**10.1**	**596,000**	**66**	**11.0**
Cowlitz	13.7	11.7	15.5	16.5	11.6	103,032	14	13.8
Grays Harbor	17.9	13.7	13.7	15.0	19.1	73,069	12	15.9
Lewis	11.9	13.2	13.1	11.8	-	76,051	8	11.0
Mason	11.5	16.4	21.2	-	16.1	61,410	9	14.3
Pacific	-	23.9	-	-	-	20,978	4	-
Thurston	7.5	5.1	8.2	9.2	6.8	257,453	19	7.4
Wahkiakum	-	-	-	-	-	4,007	0	-
Greater Columbia ACH	**7.0**	**9.9**	**8.4**	**8.7**	**8.9**	**704,200**	**60**	**8.6**
Asotin	-	-	23.0	-	-	21,745	2	-
Benton	5.1	11.8	9.4	6.5	6.4	180,595	14	-
Columbia	-	-	-	-	-	4,092	1	14.7
Franklin	-	9.9	7.3	7.1	8.1	82,513	6	7.5
Garfield	-	-	-	-	-	2,251	0	-
Kittitas	-	14.5	12.0	-	-	41,543	3	-
Klickitat	-	-	-	-	24.0	20,594	2	-
Walla Walla	11.9	15.3	13.5	13.4	16.6	59,266	8	14.2
Whitman	-	-	-	-	-	45,605	1	-
Yakima	9.0	9.0	6.1	11.3	8.8	245,996	22	8.9
King County ACH	**7.6**	**7.9**	**8.5**	**8.0**	**9.3**	**1,966,000**	**163**	**8.3**
North Central ACH	**7.5**	**7.0**	**8.6**	**8.5**	**10.9**	**244,616**	**21**	**8.5**
Chelan	-	8.3	-	6.8	9.4	73,251	5	6.8
Douglas	-	-	-	-	-	38,992	2	-
Grant	7.9	6.7	12.1	5.4	10.8	90,984	8	8.6
Okanogan	-	-	-	21.7	21.6	41,389	6	13.5
North Sound ACH	**9.5**	**7.6**	**8.4**	**7.8**	**8.3**	**1,142,255**	**95**	**8.3**
Island	15.3	6.3	7.6	17.6	-	79,271	8	10.1
San Juan	-	-	-	-	-	15,939	1	-
Skagit	11.1	8.5	8.5	11.0	12.6	118,070	12	10.3
Snohomish	8.7	7.3	7.9	6.0	8.0	724,947	55	7.6
Whatcom	8.5	8.9	10.3	8.7	9.6	204,028	19	9.2
Olympic Community of Health	**10.2**	**12.7**	**11.8**	**8.7**	**12.0**	**356,072**	**39**	**11.1**
Clallam	12.6	15.4	16.7	-	11.0	71,971	9	12.2
Jefferson	-	20.0	26.5	-	16.3	30,214	5	17.2
Kitsap	9.2	11.0	8.6	9.4	11.7	253,887	25	10.0
Pierce County ACH	**8.3**	**8.9**	**8.3**	**8.2**	**9.3**	**808,275**	**69**	**8.6**
SWWA Regional Health Alliance	**6.0**	**7.3**	**7.7**	**9.4**	**8.1**	**443,815**	**34**	**7.7**
Clark	6.1	6.8	7.4	9.4	8.4	432,583	33	7.6
Skamania	-	-	-	-	-	11,232	1	-

Table 27. Descriptive characteristics of hospitalizations with a primary diagnosis of chronic hepatitis C infection—Washington State, 2010–2014

Area	No.	5-year average rate per 100,000	Born before 1945	Born 1945–1965	Born after 1965	≤30	31–44	45–65	66+
Washington	2,714	39.7	149	2,257	308	53	188	2,259	214
Better Health Together	**283**	**49.6**	**13**	**202**	**68**	**10**	**37**	**216**	**20**
Adams	2	-	-	-	-	-	-	-	-
Ferry	1	-	-	-	-	-	-	-	-
Lincoln	0	-	-	-	-	-	-	-	-
Pend Oreille	16	122.2	2	12	2	1	1	12	2
Spokane	243	51.0	11	171	61	9	31	185	18
Stevens	21	48.0	0	18	3	0	3	18	0
Cascade Pacific Action Alliance	**329**	**55.2**	**22**	**273**	**34**	**6**	**24**	**273**	**26**
Cowlitz	81	78.6	2	74	5	1	4	72	4
Grays Harbor	73	99.9	4	64	5	2	3	64	4
Lewis	28	36.8	4	19	5	1	4	19	4
Mason	37	60.3	0	27	10	0	9	27	1
Pacific	26	123.9	3	23	0	0	0	23	3
Thurston	84	32.6	9	66	9	2	4	68	10
Wahkiakum	0	-	-	-	-	-	-	-	-
Greater Columbia ACH	**271**	**38.5**	**14**	**221**	**36**	**3**	**30**	**223**	**15**
Asotin	0	-	-	-	-	-	-	-	-
Benton	95	52.6	1	91	3	0	7	87	1
Columbia	2	-	-	-	-	-	-	-	-
Franklin	23	27.9	3	17	3	1	2	17	3
Garfield	0	-	-	-	-	-	-	-	-
Kittitas	12	28.9	0	12	0	0	0	12	0
Klickitat	3	-	-	-	-	-	-	-	-
Walla Walla	26	43.9	1	17	8	2	4	17	3
Whitman	4	-	-	-	-	-	-	-	-
Yakima	106	43.1	9	75	22	0	17	81	8
King County ACH	**613**	**31.2**	**47**	**522**	**44**	**8**	**19**	**521**	**65**
North Central ACH	**65**	**26.6**	**2**	**55**	**8**	**0**	**5**	**55**	**5**
Chelan	17	23.2	0	17	0	0	0	17	0
Douglas	2	-	-	-	-	-	-	-	-
Grant	34	37.4	1	28	5	0	2	28	4
Okanogan	12	29.0	1	8	3	0	3	8	1
North Sound ACH	**465**	**40.7**	**15**	**393**	**57**	**12**	**34**	**395**	**24**
Island	37	46.7	0	37	0	0	0	36	1
San Juan	1	-	-	-	-	-	-	-	-
Skagit	41	34.7	2	33	6	2	4	33	2
Snohomish	288	39.7	10	249	29	2	19	249	18
Whatcom	98	48.0	3	73	22	8	11	76	3
Olympic Community of Health	**159**	**44.7**	**10**	**137**	**12**	**6**	**7**	**128**	**18**
Clallam	30	41.7	1	26	3	3	1	25	1
Jefferson	9	29.8	0	9	0	0	0	9	0
Kitsap	120	47.3	9	102	9	3	6	94	17
Pierce County ACH	**291**	**36.0**	**10**	**254**	**27**	**5**	**14**	**255**	**17**
SWWA Regional Health Alliance	**238**	**53.6**	**16**	**200**	**22**	**3**	**18**	**193**	**24**
Clark	232	53.6	16	198	18	3	14	191	24
Skamania	6	53.4	0	2	4	0	4	2	0

Source: Comprehensive Hospital Abstract Reporting System (CHARS)

Area	Average age (SD)	Male	Female	White	Black	AIAN	Asian	NHOPI	Multi-/ unknown race	Hispanic	Race / ethinicity unknown
Washington	55 (9.0)	1,712	1,002	2,027	115	83	50	37	76	144	182
Better Health Together	**53 (11.0)**	**158**	**125**	**244**	**4**	**8**	**3**	**1**	**3**	**12**	**8**
Adams	-	-	-	-	-	-	-	-	-	-	-
Ferry	-	-	-	-	-	-	-	-	-	-	-
Lincoln	-	-	-	-	-	-	-	-	-	-	-
Pend Oreille	53 (13.0)	6	10	15	1	0	0	0	0	0	0
Spokane	53 (11.0)	133	110	205	3	8	3	1	3	12	8
Stevens	54 (8.8)	16	5	21	0	0	0	0	0	0	0
Cascade Pacific Action Alliance	**56 (9.0)**	**212**	**117**	**270**	**1**	**9**	**5**	**1**	**10**	**11**	**22**
Cowlitz	54 (7.8)	47	34	75	0	2	0	0	1	3	0
Grays Harbor	55 (9.1)	47	26	61	0	4	0	0	1	3	4
Lewis	55 (11.0)	15	13	21	0	0	0	0	3	2	2
Mason	54 (7.5)	27	10	36	0	0	0	0	0	0	1
Pacific	57 (8.1)	22	4	15	0	1	1	0	2	2	5
Thurston	57 (10.0)	54	30	62	1	2	4	1	3	1	10
Wahkiakum	-	-	-	-	-	-	-	-	-	-	-
Greater Columbia ACH	**54 (8.3)**	**184**	**87**	**163**	**12**	**17**	**1**	**3**	**2**	**30**	**43**
Asotin	-	-	-	-	-	-	-	-	-	-	-
Benton	55 (6.4)	53	42	51	6	1	0	1	0	5	31
Columbia	-	-	-	-	-	-	-	-	-	-	-
Franklin	54 (11.0)	17	6	15	0	0	1	0	1	2	4
Garfield	-	-	-	-	-	-	-	-	-	-	-
Kittitas	58 (3.6)	9	3	12	0	0	0	0	0	0	0
Klickitat	56 (6.6)	-	-	-	-	-	-	-	-	-	-
Walla Walla	51 (12.0)	18	8	15	0	3	0	0	0	2	6
Whitman	58 (3.0)	-	-	-	-	-	-	-	-	-	-
Yakima	54 (8.5)	79	27	64	6	11	0	2	1	21	1
King County ACH	**57 (8.5)**	**419**	**194**	**404**	**70**	**21**	**27**	**15**	**26**	**19**	**31**
North Central ACH	**55 (9.1)**	**41**	**24**	**38**	**0**	**4**	**0**	**0**	**0**	**17**	**6**
Chelan	55 (6.3)	16	1	15	0	0	0	0	0	0	2
Douglas	-	-	-	-	-	-	-	-	-	-	-
Grant	56 (9.0)	17	17	12	0	2	0	0	0	16	4
Okanogan	54 (13.0)	7	5	9	0	2	0	0	0	1	0
North Sound ACH	**55 (9.1)**	**286**	**179**	**372**	**6**	**9**	**6**	**0**	**11**	**25**	**36**
Island	54 (6.0)	24	13	33	1	0	0	0	0	0	3
	-	-	-	-	-	-	-	-	-	-	-
Skagit	53 (12.0)	23	18	34	0	0	0	0	0	3	4
Snohomish	56 (7.5)	170	118	224	5	1	6	0	10	14	28
Whatcom	52 (12.0)	69	29	80	0	8	0	0	1	8	1
Olympic Community of Health	**56 (9.4)**	**92**	**67**	**131**	**3**	**6**	**1**	**0**	**1**	**8**	**9**
Clallam	54 (11.0)	14	16	21	0	3	0	0	0	2	4
Jefferson	56 (3.4)	7	2	8	0	0	0	0	0	0	1
Kitsap	56 (9.1)	71	49	102	3	3	1	0	1	6	4
Pierce County ACH	**55 (7.9)**	**186**	**105**	**231**	**14**	**4**	**5**	**3**	**12**	**10**	**12**
SWWA Regional Health Alliance	**56 (9.3)**	**134**	**104**	**174**	**5**	**5**	**2**	**14**	**11**	**12**	**15**
Clark	56 (9.3)	128	104	170	5	5	2	12	11	12	15
Skamania	50 (9.6)	6	0	4	0	0	0	2	0	0	0

Table 28. Number of hospitalizations and charges associated for hospitalizations with a primary diagnosis of hepatitis C virus infection—Washington State, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System (CHARS)

Area	Number	Average (median) charge*	Range of charges*	Total charges*
Washington	2,714	$42,038 ($22,008)	$1,980–$1,058,950	$114,090,862
Better Health Together	**283**	**$43,723 ($18,433)**	**$2,914–$1,058,950**	**$12,373,563**
Adams	2	$12,926 ($12,926)	$10,773–$15,078	$25,851
Ferry	1	-	-	$265,306
Lincoln	0	-	-	-
Pend Oreille	16	$64,041 ($16,911)	$2,914–$258,097	$1,024,663
Spokane	243	$42,353 ($18,869)	$4,316–$1,058,950	$10,291,837
Stevens	21	$36,472 ($20,869)	$4,134–$286,077	$765,905
Cascade Pacific Action Alliance	**329**	**$39,345 ($19,267)**	**$2,654–$964,956**	**$12,944,575**
Cowlitz	81	$26,485 ($17,273)	$4,231–$272,943	$2,145,267
Grays Harbor	73	$41,007 ($15,710)	$2,654–$964,956	$2,993,523
Lewis	28	$45,452 ($26,822)	$6,966–$457,881	$1,272,660
Mason	37	$56,590 ($28,980)	$3,819–$520,509	$2,093,839
Pacific	26	$33,654 ($11,131)	$2,884–$464,564	$875,004
Thurston	84	$42,432 ($22,286)	$4,437–$404,663	$3,564,281
Wahkiakum	0	-	-	-
Greater Columbia ACH	**271**	**$27,527 ($16,625)**	**$2,073–$325,014**	**$7,459,835**
Asotin	0	-	-	-
Benton	95	$29,616 ($16,719)	$4,486–$244,959	$2,813,562
Columbia	2	$19,157 ($19,157)	$14,328–$23,986	$38,313
Franklin	23	$43,063 ($17,299)	$4,384–$284,118	$990,445
Garfield	0	-	-	-
Kittitas	12	$18,363 ($15,746)	$8,615–$50,252	$220,351
Klickitat	3	$11,950 ($8,019)	$6,368–$21,463	$35,850
Walla Walla	26	$35,051 ($17,287)	$4,986–$243,266	$911,318
Whitman	4	$26,481 ($26,530)	$24,304–$28,559	$105,923
Yakima	106	$22,114 ($15,140)	$2,073–$325,014	$2,344,072
King County ACH	**613**	**$48,142 ($23,023)**	**$2,054–$579,867**	**$29,511,027**
North Central ACH	**65**	**$35,699 ($16,531)**	**$3,588–$427,967**	**$2,320,462**
Chelan	17	$58,757 ($18,991)	$6,464–$427,967	$998,866
Douglas	2	$36,504 ($36,504)	$31,770–$41,237	$73,007
Grant	34	$29,454 ($12,509)	$3,588–$295,812	$1,001,435
Okanogan	12	$20,596 ($15,438)	$7,197–$60,536	$247,154
North Sound ACH	**465**	**$43,301 ($22,051)**	**$1,980–$595,940**	**$20,134,757**
Island	37	$19,624 ($14,000)	$1,980–$106,665	$726,070
San Juan	1	-	-	$98,887
Skagit	41	$62,525 ($23,279)	$4,843–$595,940	$2,563,522
Snohomish	288	$42,495 ($23,612)	$2,766–$541,754	$12,238,507
Whatcom	98	$45,998 ($21,191)	$6,634–$453,796	$4,507,771
Olympic Community of Health	**159**	**$36,527 ($21,535)**	**$3,452–$353,366**	**$5,807,845**
Clallam	30	$36,865 ($12,307)	$3,452–$353,366	$1,105,942
Jefferson	9	$47,870 ($25,234)	$8,797–$242,712	$430,833
Kitsap	120	$35,592 ($23,324)	$5,330–$340,562	$4,271,070
Pierce County ACH	**291**	**$52,479 ($35,336)**	**$4,249–$605,785**	**$15,271,299**
Southwest Washington Regional Health Alliance	**238**	**$34,737 ($23,192)**	**$3,724–$340,808**	**$8,267,499**
Clark	232	$35,094 ($23,394)	$3,724–$340,808	$8,141,865
Skamania	6	$20,939 ($10,131)	$7,260–$59,847	$125,633

** All charges are calculated to 2014 dollars, see Appendix A.*

Table 29. Number of hospitalizations and length of stay (LOS) in days for hospitalizations with a primary diagnosis of hepatitis C virus infection—Washington State, 2010–2014

Source: Comprehensive Hospital Abstract Reporting System (CHARS)

Area	Hospitalizations	Patients	% revisits	Average (SD) LOS	Median (range) LOS	Total days
Washington	2,714	1,695	38%	5.0 (6.8)	3.0 (1–118)	13,623
Better Health Together	**283**	**168**	**41%**	**5.4 (8.3)**	**3.0 (1–93)**	**1,535**
Adams	2	1	50%	3.0 (1.4)	3.0 (2–4)	6
Ferry	1	1	-	-	-	35
Lincoln	0	0	-	-	-	-
Pend Oreille	16	8	50%	4.6 (3.4)	3.0 (1–10)	73
Spokane	243	144	41%	5.4 (8.6)	3.0 (1–93)	1,322
Stevens	21	14	33%	4.7 (3.9)	3.0 (1–17)	99
Cascade Pacific Action Alliance	**329**	**205**	**38%**	**4.7 (8.6)**	**3.0 (1–118)**	**1,560**
Cowlitz	81	51	37%	4.7 (6.7)	3.0 (1–44)	379
Grays Harbor	73	43	41%	4.4 (7.6)	3.0 (1–58)	320
Lewis	28	22	21%	4.1 (2.9)	3.0 (1–13)	116
Mason	37	22	41%	4.9 (5.3)	3.0 (1–28)	183
Pacific	26	10	62%	8.4 (24.0)	2.5 (1–118)	218
Thurston	84	57	32%	4.1 (3.8)	3.0 (1–26)	344
Wahkiakum	0	0	-	-	-	-
Greater Columbia ACH	**271**	**173**	**36%**	**4.0 (4.8)**	**3.0 (1–61)**	**1,071**
Asotin	0	0	-	-	-	-
Benton	95	46	52%	3.9 (3.7)	3.0 (1–26)	371
Columbia	2	2	0%	2.0 (0.0)	2.0 (2–2)	4
Franklin	23	17	26%	4.7 (4.9)	3.0 (1–22)	107
Garfield	0	0	-	-	-	-
Kittitas	12	9	25%	3.5 (3.2)	2.5 (1–13)	42
Klickitat	3	3	0%	1.7 (0.6)	2.0 (1–2)	5
Walla Walla	26	22	15%	3.6 (3.4)	2.0 (1–13)	94
Whitman	4	3	25%	6.0 (2.0)	5.0 (5–9)	24
Yakima	106	71	33%	4.0 (6.2)	3.0 (1–61)	424
King County ACH	**613**	**383**	**38%**	**5.6 (7.6)**	**3.0 (1–93)**	**3,411**
North Central ACH	**65**	**42**	**35%**	**4.8 (5.2)**	**3.0 (1–29)**	**313**
Chelan	17	12	29%	5.8 (6.5)	4.0 (1–29)	98
Douglas	2	1	50%	9.0 (1.4)	9.0 (8–10)	18
Grant	34	19	44%	4.0 (4.4)	2.0 (1–17)	135
Okanogan	12	10	17%	5.2 (5.2)	3.5 (1–20)	62
North Sound ACH	**465**	**291**	**37%**	**5.4 (7.2)**	**3.0 (1–90)**	**2,513**
Island	37	17	54%	3.0 (2.8)	2.0 (1–12)	112
San Juan	1	1	0%	-	-	8
Skagit	41	28	32%	6.5 (7.6)	4.0 (1–45)	266
Snohomish	288	180	38%	5.3 (5.6)	3.0 (1–43)	1,539
Whatcom	98	65	34%	6.0 (11.0)	3.0 (1–90)	588
Olympic Community of Health	**159**	**108**	**32%**	**4.1 (3.2)**	**3.0 (1–22)**	**653**
Clallam	30	25	17%	4.0 (3.2)	3.5 (1–13)	119
Jefferson	9	6	33%	4.0 (2.3)	3.0 (2–8)	36
Kitsap	120	77	36%	4.2 (3.3)	3.0 (1–22)	498
Pierce County ACH	**291**	**189**	**35%**	**5.4 (6.0)**	**4.0 (1–46)**	**1,570**
SWWA Regional Health Alliance	**238**	**136**	**43%**	**4.2 (3.4)**	**3.0 (1–25)**	**997**
Clark	232	134	42%	4.2 (3.4)	3.0 (1–12)	977
Skamania	6	2	67%	3.3 (4.3)	2.0 (1–25)	20

**ACH = Accountable Community of Health; SWWA = Southwest Washington*

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