State of Oklahoma

Hepatitis Prevention and Control Plan 2013-2018

Prepared by
Oklahoma State Department of Health

Reviewed by
Oklahoma Hepatitis Task Force
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http://www.ok.gov/health/

click on “communicable disease information”

For further information or for assistance in implementing aspects of this Plan, contact the

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Abbreviations Used in This Document

AIDS	Acquired Immunodeficiency Syndrome
Anti-Hbc	Antibody to Hepatitis B Core Antigen
BHFA OK	Bureau of Health Facilities Administration
CDC	U.S. Centers for Disease Control and Prevention
CDCS	Communicable Disease Control Section
CDECC	Communicable Disease Epidemic Control Committee
CDSS	Communicable Disease Surveillance Section
DHHS	OK Department of Health and Human Services
DOC	OK Department of Correctional Facilities
DOS	OK Department of Safety
DPHS	DHHS, Division of Public Health Services
EIA	Enzyme immunoassay
ELISA	Enzyme-linked immunosorbent assay
HAART	Highly Active Antiretroviral Therapy
HAV	Hepatitis A virus
HBIG	Hepatitis B immune globulin
HbSAg	Hepatitis B surface antigen
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HCW	Health care worker
HIV	Human immunodeficiency virus
IDSA	Infectious Disease Society of America
IDU	Injection drug user
IG	Immune Globulin
IgG	Immunoglobulin G
IgM	Immunoglobulin M
IP	Immunization Program
MMWR	Morbidity & Mortality Weekly Report
MOAMOU	Memorandum of Agreement Memorandum of Understanding
MSM	Men who have sex with men
NHANES	National Health and Nutrition Examination Survey
NIOSH	National Institute of Occupational Safety & Health
OK	Oklahoma
OKHA	Oklahoma Hospital Association
OSHA	Occupational Safety and Health Administration
PCR	Polymerase chain reaction
PEG	Polyethylene Glycol
PHL	Public Health Laboratories
PIO	Public Information Office
RIBA	Recombinant Immunoblast Assay
STI	Sexually Transmitted Infection
U.S.	United States
USPHS	U.S. Public Health Service
VHPC	Viral Hepatitis Prevention Coordinator

I. Introduction

The Oklahoma *Hepatitis Prevention and Control Plan* identifies strategies for the prevention and control of hepatitis infection. The plan focuses on the integration of prevention activities into existing programs and services and identifies goals aimed at health education directed toward health care providers, high-risk populations and the general public.

The primary activities are grouped into four focus areas: 1) Prevention, 2) Education and Training, 3) Medical and Case Management, and 4) Surveillance. This plan does not estimate cost, propose funding strategies or provide evaluation methods, but rather provides a framework for state and local agencies to develop and implement hepatitis prevention activities as resources become available.

The strategic priorities of the plan are to substantially increase awareness and knowledge about hepatitis through increased access to screening, testing, counseling, vaccination, referral, and treatment. As funding becomes available, activities that may improve hepatitis surveillance are identified to generate data to support primary and secondary prevention efforts and promote discussions with policymakers on funding priorities. The plan's long-term goal is to prevent the spread of hepatitis infection and to improve services to those already infected in Oklahoma.

Oklahoma State Department of Health Role and Responsibilities

The role of Oklahoma State Department of Health (OSDH) is to provide recommendations to help control the emergence of hepatitis and to identify and respond to hepatitis-related threats to Oklahoma citizens.
Responsibilities of OSDH include the following:

- Encourage education and training for healthcare providers and communities.
- Provide and update recommendations as appropriate.
- Advise regarding any additions/changes to the Reportable Disease List.
- Provide data and statistical reports on the occurrence of reportable hepatitis in Oklahoma.
- Track and respond to outbreaks of hepatitis.

Local and regional health departments will conduct educational campaigns for hepatitis prevention.

Vision, Mission, Goal

Vision
To achieve high quality of life and minimize the burden of acute and chronic infections and diseases related to hepatitis infection among the citizens of Oklahoma.

Mission
To decrease the incidence of hepatitis A, B, and C infections and to improve the quality of life of those chronically infected with hepatitis B and C.

Goal
Implement a statewide-integrated strategy for the prevention and control of hepatitis infection by joining efforts with existing programs and initiatives targeting high-risk populations.

II. Overview of Hepatitis

Hepatitis is liver inflammation that can be caused by viruses. Specific hepatitis viruses have been labeled A, B, C, D and E. This plan will focus on the three types that account for the majority of hepatitis cases: hepatitis A virus (HAV), hepatitis B virus (HBV), and hepatitis C virus (HCV). While Hepatitis A is an acute disease caused by HAV infection, HBV or HCV can produce a chronic infection, which may lead to death from chronic liver disease or hepatocellular carcinoma.

A. Hepatitis A Overview

Hepatitis A is caused by an infection with the Hepatitis A virus (HAV). HAV infection continues to be one of the most frequently reported vaccine-preventable diseases in the United States. According to the National Health and Nutrition Examination Survey (NHANES) III, about one third (31.3%) of the U.S. population has serologic evidence of ever having had HAV infection.[25] In 2006, 3,579 acute symptomatic cases of hepatitis A were reported to the U.S. Centers for Disease Control and Prevention (CDC); the lowest rate ever recorded. Hepatitis A rates in the United States have declined by 89% since the hepatitis A vaccine first became available in 1995, when over 30,000 acute symptomatic cases were reported.[25] Hepatitis A is reportable in Oklahoma. In 2005, Oklahoma experienced an increase in HAV cases. A total of 82 cases were reported, most of which appeared to be related to injection drug use (IDU). Prior to 2005, the risk factors identified in Oklahoma cases mirrored national statistics, and international travel was the greatest known risk factor. In 2004, the percentage of reported HAV cases with IDU as a known risk factor was 8%, while in 2005 that figure rose to 64% of cases linked to IDU. Oklahoma has not experienced another large outbreak since that time. From 2003-2007, an average of 32 cases were reported each year. The majority of these cases with a known risk factor were attributed to international travel.

1. Clinical Signs and Symptoms

The incubation period for HAV infection ranges from 15-50 days with an average of 28-30 days. HAV infection may be asymptomatic or its clinical manifestations may range in severity from a mild illness lasting 1-2 weeks to a severely disabling disease lasting several months. Clinical manifestations of HAV infection most often include fever, malaise, anorexia, nausea, abdominal discomfort, dark urine and jaundice. Persons who are asymptomatic may still shed the virus and adults tend to have symptoms more often than children.

2. Diagnosis

The most common serological test to diagnose acute HAV infection is the HAV Immunoglobulin M antibody test. The test is usually positive within 5-10 days before symptom onset, because of the presence of antibodies, which remain present for approximately six months. The HAV Immunoglobulin G antibody test is an indication of either past infection or past immunization. It is present early in the course of HAV infection and remains detectable and provides lifelong protection against HAV.

3. Transmission

Hepatitis A is transmitted in several different ways, but the most common route is fecal-oral, even in microscopic amounts. This can occur by putting something in the mouth that has been contaminated by the feces of a person with HAV infection, or through close person-to-person contact such as HAV infected household or sexual contacts. Hepatitis A may be spread through contaminated food or water, specifically when an infected food handler directly handles uncooked or cooked foods. This type of transmission most often occurs due to poor hand washing by the infected food handler. HAV transmission can also occur as a result of blood exposures during injecting drug use. Hepatitis A is rarely transmitted through blood or blood products due to screening of blood products for HAV.

4. At-Risk Persons

The following persons are at risk for contracting HAV infection:

- Household contacts of infected persons
- Sexual contacts of infected persons
- Persons, especially children, living in areas with increased rates of hepatitis A during the baseline period of 1987-1997
- Travelers to countries where hepatitis A is common, such as Central and South America, Africa, Middle East, Asia, and the Western Pacific
- Men who have sex with men (MSM)
- Users of injection and non-injection drugs
- Health-care and public safety workers with exposure to blood

5. Treatment

There are no specific medicines or antibiotics that can be used to cure HAV infection once the symptoms appear. Immune globulin (IG) or Hepatitis A vaccine can be used for exposures.

6. Prevention

Hepatitis A vaccine, proper sanitation, and good personal hygiene (e.g., hand washing) are the best protection against HAV infection.

B. Hepatitis B Overview

Hepatitis B is a serious disease caused by the hepatitis B virus (HBV), which attacks the liver. It is estimated that 1.25 million Americans are chronically infected, of whom 20-30% acquired their infection in childhood. The number of new (acute) infections per year has declined from an average of 260,000 in the 1980s to about 60,000 in 2004. The highest rate of acute infection occurs in 20 to 49 year-olds. The greatest decline has occurred among children and adolescents, which is attributed to routine hepatitis B vaccination.[3] Chronic HBV infection is responsible for

most of the morbidity and mortality due to hepatitis B, including chronic hepatitis, cirrhosis, hepatocellular carcinoma, and death. Chronic active hepatitis B develops in over 25% of HBV carriers and often results in cirrhosis. Estimated 1,000-5,000 persons die each year in the U.S. from HBV related liver cancer.

Since 2008, there has been a decrease in acute hepatitis B cases in Oklahoma. There were 129 cases reported that year. From 2008-2011, an average of 117 acute cases were reported each year. The highest rate of acute infection occurred in 25-39 year-olds. In addition, from 2008-2011, an average of 82 hepatitis B positive pregnant women were identified and tracked through the OSDH Perinatal Hepatitis B Program.

1. Clinical Signs and Symptoms

The incubation period for hepatitis B ranges from 45 to 160 days with an average of 120 days. Approximately 30% of infected individuals may experience few or no symptoms, and children are less likely to have symptoms than adults. Individuals who do have symptoms experience jaundice, fatigue, abdominal pain, loss of appetite, nausea, vomiting and joint pain. HBV infection can cause lifelong infection, cirrhosis (scarring) of the liver, liver cancer, liver failure, and death.

2. Diagnosis

Serologic testing is required to make the diagnosis of HBV infection. Hepatitis B surface antigen (HBsAg) is present in both acute (recent) and chronic infection. The presence of IgM antibody to hepatitis B core antigen (IgM anti-HBc), along with clinical symptoms, is diagnostic of acute HBV infection. Antibody to HBsAg (anti-HBs) is produced following a resolved infection and is the only HBV marker found following vaccination. The presence of HBsAg with a negative test for IgM anti-HBc may be indicative of chronic HBV infection, but further testing is needed to confirm the diagnosis if clinical suspicion is high. The presence of hepatitis B core antibody anti-HBc may indicate either acute, resolved, chronic infection, or a false positive result. Individuals with hepatitis B may also have elevated liver function tests, especially during the acute phase of illness.

3. Transmission

HBV is found in blood and certain body fluids, such as serum, semen, vaginal secretions, of persons infected with HBV. Person-to-person spread of HBV can occur among those living with someone chronically infected with hepatitis B. HBV is mainly spread by sexual contact with an infected person, sharing needles during injection drug use, occupational needle sticks or sharps exposure, or transmission from an infected mother to her baby during birth.

4. At-Risk Persons

The following persons are at risk for contracting HBV infection:

- ♂ Persons with multiple sex partners or diagnosis of a sexually transmitted disease
- ♂ Men who have sex with men (MSM)

- Sexual contacts of infected persons
- Injection drug users
- Household contacts of chronically infected persons
- Infants born to infected mothers
- Immigrants from areas with high rates of HBV infection
- Health-care and public safety workers with exposure to blood
- Hemodialysis patients

5. Treatment

There is no specific therapy for the acute HBV infection; however, medications (i.e., Adefovir dipivoxil, interferon alfa-2b, pegylated interferon alfa-2a, lamivudine, entecavir, and telbivudine) have been approved for treatment of chronic infection in certain individuals. Medical evaluation by a physician experienced in the management of chronic liver disease should be done to determine whether or not treatment is appropriate.

6. Prevention

Hepatitis B vaccine is available for all age groups and is the most effective means of preventing HBV infection. Additional measures include the correct use of latex condoms, which may reduce sexual transmission, and avoidance of illicit drug use. Pregnant women should be tested for hepatitis B surface antigen with each pregnancy, and infants born to HBV-infected mothers should be given hepatitis B immune globulin (HBIG) and hepatitis B vaccine within 12 hours of birth.

C. Hepatitis C Overview

Hepatitis C is a liver disease caused by an infection with the hepatitis C virus (HCV). It is the most common chronic blood-borne infection in the United States. It is believed that HCV infections account for most of what was previously known as non-A, non-B hepatitis. HCV infection is the leading cause of liver transplants in the United States. According to the CDC, it is estimated that 170 million people worldwide and 4.1 million (1.6%) Americans have been infected with HCV, of whom 3.2 million are chronically infected.[5] There are about 35,000 to 185,000 new cases a year in the United States. Each year 10,000-20,000 deaths in the United States are from HCV, and expectations are that this number will increase.[5] Currently in Oklahoma, HCV infection is reportable. Hepatitis C can be either acute (recently infected) or chronic but the Oklahoma reportable disease rules specify reporting of hepatitis C in persons aged 40 years or younger, or in persons having jaundice, or alanine transaminase (ALT) of 400 or higher, regardless of age, with laboratory confirmation, which represents only acute cases of hepatitis C infection. The acute form is a short-term illness that occurs within the first six months after a person is exposed to HCV which causes hepatitis C infection. However, the disease can become chronic, and people who received a blood transfusion before 1992 or are past or current injection-drug users are at risk for chronic hepatitis C, and should be screened for the disease. Chronic HCV infection progresses slowly over the course of 15-30 years and can lead to cirrhosis of the liver or liver cancer. Eight to ten thousand deaths occur annually in the United States as a result of chronic HCV infection.

In 2011, confirmed cases of acute hepatitis C in Oklahoma reflected a 22% increase from 2010. Based on the most current national data, Oklahoma's case rate (1.4 per 100,000) continues to be above the national rate (0.3 per 100,000) for confirmed cases of acute hepatitis C. Tulsa and Oklahoma County had the highest number of cases of acute hepatitis C in 2011 with 6 cases each (23%). The highest incidence rate occurred in Ottawa county with 9.4 cases per 100,000 (n = 3), followed by Johnston county with 9.13 per 100,000 (n = 1) and Latimer county with 8.96 per 100,000 (n = 1).

Cases of acute hepatitis C ranged in age from 17 years to 67 years. The highest number of cases, 21 (40%), occurred in the 20 - 29 year age group. Age groups of the remaining cases were as follows: two (4%) 13 to 19 years, 17 (32%) 30 to 39 years, six (11%) 40 to 49 years, five (10%) 50 to 59 years, and one (2%) > 60 years. There were 25 females (48%) and 27males (51%) infected with confirmed acute hepatitis C. The confirmed acute hepatitis C cases broken down by race occurred in: Whites (1.6 per 100,000, n = 33), Native Americans 4.7 per 100,000, n = 15), Asian American (1.5 per 100,000, n = 1) and unknown race (n =3).

The Centers for Disease Control and Prevention states that "of the cases reported in 2007 for which information concerning exposures during the incubation period was available, the most common risk factor identified was IDU [injection drug use] (48%). During 1998–2007, IDU was reported for an average of 44% of persons (range: 38%–54%)". In 2011, the risk factors most frequently reported in Oklahoma were: IDU (51%), other drug use besides IDU (55%), tattoos (51%), and 2 or more sexual partners (17%). Nineteen (36%) of the cases reported both IDU and other drug use. Three (6%) of the cases reported all four of the listed risk factors. Seroprevalence data suggest high positivity among the incarcerated population and among HIV/STD clinic patients.[3] The CDC estimates that 1.6% of Americans are infected; therefore, we can estimate that 20,800 Oklahoma citizens are living with HCV infection based on the 2008 population estimate of 1.3 million persons.[5]

1. Clinical Signs and Symptoms

The incubation period for hepatitis C infection ranges from 14-180 days, with an average of 45 days. The majority of individuals infected with hepatitis C do not have symptoms. When symptoms are present, they include jaundice, fatigue, dark urine, abdominal pain, loss of appetite and nausea. Of those infected, 70-85% will become chronically infected. About 15-30% of patients exposed will clear the virus without treatment. Complications from HCV infection include cirrhosis and hepatocellular carcinoma. Five to 20% of individuals infected with HCV will develop cirrhosis as a complication of HCV infection. Approximately 80% of individuals with HCV infection have no symptoms, thus the disease is infrequently diagnosed.

2. Diagnosis

The laboratory diagnosis of HCV infection is based principally on two main types of testing for the detection of the anti-HCV antibody: enzyme immunoassay (EIA) and recombinant immunoblot assay (RIBA). In most cases, the EIA serves as screening test, and the RIBA test is used to confirm the presence of antibodies to the HCV virus.

Although these tests are useful in detecting antibodies for hepatitis C virus, a positive hepatitis C antibody does not distinguish active from resolved infection. Real-time polymerase chain reaction (PCR) testing is being used to determine the presence of HCV RNA and a positive HCV RNA in the serum confirms the diagnosis of active hepatitis C. This type of testing may be either qualitative or quantitative. If loads (the amount of virus circulating in the blood) are below certain values, these tests may elicit a false negative test result. Thus, it is recommended that if clinical suspicion is high repeat the testing to confirm infection.

3. Transmission

Hepatitis C is a blood-borne pathogen and is transmitted primarily by percutaneous (any medical procedure where access to inner organs or other tissue is done via needle-puncture of the skin) exposure to blood. IDU currently accounts for most HCV transmission in the U.S. and has accounted for a substantial proportion of HCV infections in past decades. Other factors associated with transmission include receiving a transfusion or organ transplant before 1992, receiving long-term hemodialysis, or receiving clotting factor produced before 1987. HCV is less efficiently transmitted between sexual partners or from mother to infant. The estimated seroprevalence of HCV infection among long-term spouses of patients with chronic HCV is 1.5%. The average rate of HCV infection is 5% among infants born to HCV-positive women and 14% among infants born to women co-infected with HCV and human immunodeficiency virus (HIV).

4. At-Risk Persons

The following persons are at risk for HCV infection:

- Intravenous drug users
- Individuals who received a blood transfusion/organ donation prior to 1992
- Individuals who received clotting factors before 1987
- Long-term hemodialysis patients
- Health-care and public safety workers with exposure to blood

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5. Injection Drug Users

In the U.S., millions of people have hepatitis.[4] It is a particularly significant problem among IDUs. It is estimated that 60%, or 17,000, of the 30,000 new cases of HCV in 2000 occurred among IDUs. HCV infection tends to be the first blood-borne disease IDUs acquire. CDC estimates that within 5 years after beginning to inject drugs, 50% to 80% of IDUs become infected with HCV.[22] The rapid spread of HCV infection among IDUs is due to several factors:

- Blood is an efficient route of transmission
- Many individuals are infected; this provides an ongoing source for new infections
- Often IDUs share drugs and drug preparation materials, such as syringes, solutions, mixing containers, and cotton filters

6. Incarcerated Persons

Persons incarcerated in correctional systems comprise approximately 0.7% of the U.S. population and have a disproportionately greater burden of infectious diseases.[9] An estimated 15% to 40% of incarcerated persons in the U.S. are infected with HCV, and the number of released inmates with chronic hepatitis C infection is 1.4 million.[16] Given that the leading risk factor for acquiring HCV infection is injection drug use, a contributing factor is that in the last 20 years, the number of people incarcerated for drug-related offenses has increased from 40,000 to 450,000. To reduce risk factors for infection with HCV, the focus must be on behavioral interventions. To prevent further disease transmission and to reduce liver disease progression, identifying HCV chronically infected persons is crucial. This offers the opportunity to initiate counseling, treatment, and vaccination for hepatitis A and B.

7. Treatment

There are six genotypes of HCV infection. The genotype is an important factor in determining treatment and evaluating response to treatment. The treatment of choice for HCV infection is often combination therapy with interferon and ribavirin. The highest response rates are achieved with pegylated interferon in combination with ribavirin. Pegylation is the process of attaching one or more chains of a substance called polyethylene glycol (also known as PEG) to a protein molecule such as interferon. Since the body does not react to PEG, it helps provide a protective barrier around an attached protein so that it can survive in the body longer. Pegylated interferon is injected once a week, while the traditional interferon needs to be injected three times a week.

8. Prevention

Recommended methods of prevention and control include raising awareness about the epidemic to the public and health care professionals, as well as education revolving around prevention, early detection, and medical management of the disease. Currently, there is no vaccine to prevent hepatitis C infection, which leaves behavior change as the most viable option for preventing new infections while limiting the spread of the disease.

9. Co-Infection with Hepatitis C Virus and Human Immunodeficiency Virus

Co-infection with HCV and HIV is a significant problem within the United States. It is estimated that one-quarter of the people infected with HIV also have HCV.[12] This is mainly due to the fact that both viruses are blood-borne and present in similar populations. It is estimated that 50% to 90% of IDUs with HIV also have HCV infection.[4] Co-infection is also common in hemophilia patients who received clotting products made before 1987, which is the year inactivation of both viruses began. The U.S. Public Health Service Infectious Disease Society of America (USPHS/IDSA) issued guidelines to screen all HIV-infected persons for HCV infection. With the introduction of highly active antiretro therapy (HAART) in the mid-1990s for HIV

treatment, the number of deaths from Acquired Immunodeficiency Syndrome (AIDS) has decreased. People with HIV are living longer and those with HCV co-infection may live the 20-30 years it takes to develop complications from HCV infection, such as cirrhosis, liver cancer, and end-stage liver disease. Studies have shown that HIV infection in a person who is also infected with HCV results in higher levels of HCV in the blood, more rapid progression to HCV related liver disease, and increased risk for cirrhosis and liver cancer.

III. Hepatitis Program Activities in Oklahoma

The Oklahoma State Department of Health is committed to supporting the development of a comprehensive program of prevention, control and surveillance of hepatitis in Oklahoma. OSDH has the support of the CDC through technical support and grant funding. The CDC provides clear guidelines on hepatitis prevention planning, implementation, and management. Currently in Oklahoma, the OSDH STD/HIV Section conducts hepatitis prevention activities, including education, vaccination, and provision of rapid HCV test kits to 6 community based organizations. All OSDH county health department sites offer hepatitis HAV/HBV vaccinations to all unvaccinated clients age 19 and older. HBV antibody testing is offered to high-risk persons (IDUs, MSM, household contacts of cases) either before vaccine is given or during the same clinic visit that the first dose of vaccine is given. Additional doses are not to be given if client is confirmed HBV positive. The Immunization Section and the STD/HIV Section distributes HAV/HBV vaccines to all county health departments and 2 medical clinics for the homeless population throughout the state. Adult hepatitis B vaccine is provided by the OSDH to 26 state correctional facilities and one city jail.

There are several non-profit HIV/AIDS/Hepatitis organizations that support hundreds of HIV and HCV-infected individuals and their affected family members. Services include case management, support groups, assistance with transportation to medical appointments, and emergency financial help for housing, food, clothing, and medical needs.

The PHL provides experienced technical staff and the resource capacity to perform approved tests for the diagnosis of HAV infection (HAV total and HAV IgM), HBV infection (HBsAg, total anti-HBc, IgM anti-HBc, and anti-HBs), and HCV infection (ELISA). The Oklahoma PHL Virology and Molecular Diagnostics Section is a valuable resource to healthcare providers, and provides quality services to a variety of agencies throughout the state.

OSDH has an established Perinatal Hepatitis B Program. The primary objective is to prevent transmission of the HBV from a hepatitis B-positive pregnant woman to her infant.

The Perinatal Hepatitis B program goals are:

- Promote screening of all pregnant women for hepatitis B surface antigen (HBsAg)
- Ensure that all laboratories, hospitals, and prenatal care providers are aware of the need to report HBsAg-positive test results to the Oklahoma OSDH (per RSA-141: C)
- Identify and case manage hepatitis B-positive pregnant women, their infants, and household/sexual contacts

- Ensure that all infants born to hepatitis B positive mothers receive hepatitis B vaccine and hepatitis B immune globulin at birth, complete the three-dose hepatitis B vaccine series, and have post-vaccination blood testing done to determine immunity
- Ensure that household/sexual contacts of hepatitis B positive pregnant women are identified, have a blood test if their hepatitis B status is unknown, and receive hepatitis B vaccine, if needed
- Provide educational materials to hepatitis B positive pregnant women
- Provide current recommendations and guidelines to prenatal and pediatric healthcare providers and hospital maternity nurse managers

IV. Strategic Plan Recommendations

1. Prevention

Primary prevention of infection with hepatitis viruses can be achieved either through immunization (i.e., HAV or HBV) or behavioral interventions to reduce risk factors for infection. Secondary prevention attempts to reduce the risk of transmission from those infected to those not infected. Tertiary prevention focuses on persons already infected with hepatitis and includes appropriate medical management and counseling (i.e., avoid alcohol, vaccination if indicated), in order to prevent further damage to the liver and reduce the risk of chronic liver disease.

Effective methods of prevention include:

- Raise awareness about hepatitis infection and promote the adoption of safe behaviors at appropriate locations
- Immunize high-risk populations for hepatitis A and B
- Screen and test blood, plasma, organ, tissue, and semen donors
- Offer harm-reduction programs among high-risk populations
- Adopt and practice standard infection control practices in healthcare settings
- Routinely screen, test and counsel high-risk individuals: injection drug users, recipients of clotting factors made before 1987, recipients of blood and/or solid organs before 1992, people who have ever been on long-term kidney dialysis, and people with undiagnosed liver problems
- Counsel, test, and refer individuals for substance abuse treatment and disease management, as appropriate

Suggested Action Steps

Step 1: Create and implement a consumer media campaign to increase awareness and provide risk reduction information regarding hepatitis.

1.1. Organize special events/activities yearly in May for “hepatitis awareness month.”
1.2. Identify high-risk populations and create marketing strategies.
1.3. Distribute written and verbal messages through appropriate means.
1.4. Collaborate with the HIV/STD program to integrate hepatitis with the HIV/STD hotline, to establish a HIV/STD/ Hepatitis Hotline.

Step 2: Provide at-risk individuals access to HBV and HCV screening and testing.

2.1. Assess current hepatitis services and identify gaps among agencies providing testing.
2.2. Expand existing screening and testing efforts at various facilities that target populations at risk for hepatitis (STD, HIV, inmates, IDUs, MSMs).
2.3. Provide technical assistance to providers and agencies as necessary to provide screening and testing services.
2.4. Ensure that all licensed Oklahoma obstetricians and pediatric healthcare providers have access to the current national guidelines for screening high-risk pregnant woman and children born to hepatitis B and C mothers.
2.5. Provide educational materials to health professionals to distribute in facilities to increase hepatitis awareness.
2.6. Continue to support the Oklahoma PHL to provide testing services for hepatitis.

Step 3: Immunize high-risk populations for hepatitis A and B.

3.1. Expand existing vaccination efforts at various facilities that target populations at risk for hepatitis (STD, HIV, inmates, IDUs, MSMs, persons with chronic liver disease).
3.2. Assess current services and identify gaps among agencies providing vaccinations.
3.3. Provide technical assistance to providers and agencies to acquire resources necessary to provide vaccination services.
3.4. Provide educational materials to health professionals to distribute in facilities to promote vaccine awareness, inquiry, and requests among consumers.

Step 4: Improve access to sterile syringes, in conjunction with prevention education and outreach services.

4.1. Expand access to sterile syringes available through Oklahoma pharmacies, which allows the sale of ten or fewer syringes without a prescription.
4.2. Collaborate with Oklahoma Board of Pharmacy to increase pharmacy participation.
4.3. Provide technical assistance to pharmacy personnel as necessary to assist in their efforts to fulfill requirements to provide purchasers with information on safe disposal of syringes.

Step 5: Healthcare facilities, public safety organizations, and employers will implement and maintain appropriate infection control practices as determined by their industry standards.

5.1. Provide guidance and education regarding protocols as necessary.
5.2. Oklahoma Bureau of Health Facilities Administration (BHFA), National Institute for Occupational Safety and Health (NIOSH), and Occupational Safety and Health Administration (OSHA) will ensure compliance with standards for blood-borne pathogen training and control.

Step 6: Strengthen collaboration among state agencies, community-based organizations, and private stakeholders to prevent the spread of hepatitis.

6.1. Review existing prevention services among agencies and identify barriers to providing hepatitis interventions to high-risk populations.
6.2. Establish an Oklahoma Adult Hepatitis Advisory Group to advise on interventions and programs at quarterly meetings.

6.3. Collaborate with community-based organizations and private sector organizations to integrate hepatitis interventions into existing programs offered to high-risk populations.
6.4. Provide guidance and technical assistance on hepatitis prevention interventions to advocacy groups, community-based organizations, and health professionals.

2. Public Education and Professional Training

The goal of education and training is to create awareness, increase knowledge, and improve attitudes and practices that aid in the prevention and control of hepatitis among health professionals, high-risk populations, and the general public.

Suggested Action Steps

Step 1: Integrate hepatitis education into other appropriate health education materials, curricula, and protocols.

1.1. Review existing educational materials (i.e., booklets, brochures, fact sheets) within the State pertaining to HIV, STDs, Drug/Alcohol, and infection control, and incorporate hepatitis information where appropriate.
1.2. Collaborate with programs serving high-risk populations to encourage the incorporation of hepatitis prevention messages and interventions into existing prevention curricula, procedures and protocols.

Step 2: Provide educational opportunities for health professionals on screening, testing, diagnosis, transmission, symptoms, and disease management for those infected with hepatitis and for at-risk populations.

2.1. Provide educational programs, in-service trainings and materials targeting primary care providers (i.e., physicians, nurse practitioners, and physician assistants).
2.2. Provide educational programs, in-service trainings, and materials targeting other health professionals (i.e., health educators, HIV/STD counselors, substance abuse counselors, case managers, support group leaders, and correctional facility personnel).

Step 3: Educate at-risk populations and promote the need for hepatitis C testing and hepatitis A and B vaccination.

3.1. Survey community-based and private sector agencies to assess current hepatitis services.
3.2. Collaborate with agencies to develop educational programs and interventions.
3.3. Develop and disseminate educational materials to promote hepatitis C testing and hepatitis A and hepatitis B vaccination.
3.4. Provide training and guidance to agencies to facilitate promotion of hepatitis education.

Step 4: Educate the general public on hepatitis prevention and control measures.

4.1. Update and disseminate hepatitis A, B, and C fact sheets.
4.2. Disseminate the *Oklahoma Hepatitis Prevention and Control Plan*.

4.3. Update the OSDH Hepatitis Website page to include all Oklahoma Hepatitis Program materials and appropriate links to resources (i.e., education, advocacy, testing sites, substance abuse treatment facilities, treating physicians).
4.4. Develop an STD/HIV/ Hepatitis Resource Directory to identify and share sources of information on Programs and Services in Oklahoma (i.e., support groups, counseling, testing and vaccination sites, substance abuse treatment facilities, and treating physicians).

Step 5: Target efforts toward specific at-risk populations on hepatitis prevention and control measures.

5.1. Provide educational materials (i.e., brochures, videos) targeting specific populations (i.e. youth, inmates, IDUs, infected persons).
5.2. Establish partnerships and collaborate with Oklahoma Department of Education, high schools, universities, and colleges to integrate prevention messages into curricula where appropriate.
5.3. Provide technical assistance and trainings to organizations (i.e., schools, correctional facilities, STD/HIV clinics, substance abuse clinics, private practitioners) to facilitate hepatitis education.

3. Medical and Case Management

Tertiary prevention and long-term care consist of effective medical management of advanced liver disease and rehabilitation of patients who develop complications. The goal is to limit the disease burden from chronic hepatitis. Chronic HBV or HCV infection is a life-altering event for the affected individual and can also have a great impact on his/her family, friends, and employers. The limitation of infrastructure and resources cause further distress, underscoring the need to strengthen clinical and support infrastructure.

Suggested Action Steps

Step 1: Integrate hepatitis education, counseling, and referral services into existing programs serving at-risk populations.

1.1. Assess current hepatitis services offered by agencies serving high-risk populations.
1.2. Provide training and technical assistance to facilities to ensure consumers receive appropriate education and referral for medical treatment and risk reduction.
1.3. Provide consumers with educational materials on measures to prevent liver complications and other associated chronic diseases.
1.4. Encourage the incorporation of hepatitis prevention messages and interventions into existing procedures and protocols of programs serving high-risk populations.

Step 2: Provide access for those living with chronic hepatitis to quality medical treatment.

2.1. Increase the number of physicians who are experienced in treating hepatitis and chronic liver disease in Oklahoma.
2.2. Identify and recruit local providers.
2.3. Advocate for drug and medical care assistance for patients living with chronic hepatitis.
2.4. Promote awareness among policymakers of the need for funding for HCV treatment.

2.5. Educate physicians and infected individuals regarding funding sources for treatment.
2.6. Promote awareness among health professionals and infected individuals of the need for hepatitis A and hepatitis B vaccination.

Step 3: Provide access to behavioral health services for those living with chronic hepatitis.

3.1. Increase awareness of the need for expanded behavioral health services.
3.2. Assess current behavioral health services offered among stakeholders and identify barriers.
3.3. Encourage collaboration of stakeholders to integrate and promote behavioral health services for individuals with chronic hepatitis.

Step 4: Promote self-advocacy among individuals diagnosed with chronic hepatitis.

4.1. Provide guidance and technical assistance to facilities to develop, institute, and promote participation in hepatitis support groups.
4.2. Educate consumers regarding available services by collaborating with healthcare providers and hepatitis testing sites to provide newly diagnosed individuals with an Oklahoma Hepatitis Resource Directory.

4. Surveillance and Research

Surveillance involves the collection and analysis and dissemination of hepatitis data. The purpose of establishing a surveillance system is to support primary and secondary prevention, education, and medical management. The goal of hepatitis surveillance is to measure the burden of disease; determine risk factors; identify outbreaks; monitor trends; evaluate control measures, interventions, and programs; and identify infected persons for medical referral, education, and counseling.
This plan encourages the promotion of hepatitis research activities in an effort to assist with decreasing the incidence of hepatitis and benefit those infected with chronic hepatitis.

Suggested Action Steps

Step 1: Collect data on hepatitis A, B and C to direct and support prevention, medical management, and policy development.

1.1. Maintain the existing data management system to monitor incidence, prevalence, trends, demographics and risk groups for hepatitis, co-infection with HIV, and other reportable diseases.
1.2. Utilize existing protocols and forms for data collection, investigation, and case management.
1.3. Create a hepatitis epidemiological profile for Oklahoma based upon existing and new data sources.
1.4. Distribute the epidemiological profile to policy and decision-makers to educate them on the burden of hepatitis infection in Oklahoma.
1.5. Establish data system for those who are in care.

Step 2: Encourage and promote research initiatives to support prevention, control and surveillance programs.

2.1. Assess hepatitis A and hepatitis B immunization among high-risk groups; identify barriers.

2.2. Conduct research studies targeted at the incarcerated population burdened with HBV, HCV, and HIV to identify barriers, aid in the design of educational materials and training, and promote awareness.
2.3. Survey community-based and private-sector agencies to assess current hepatitis services to identify barriers and guide recommendations.
2.4. Utilize PHL data to guide prevention efforts to address the impact of hepatitis B and C.

5. Evaluation

The *Oklahoma Hepatitis Prevention and Control Plan* will be reviewed annually to assess program objectives and progress and to recommend future initiatives. Throughout this plan, evaluations will be conducted after training sessions to identify effectiveness and make future recommendations. Bi-annually, follow-up will be conducted with state and partner agencies to assess barriers and successes of integrating hepatitis counseling/messages into practices and literature.

The Oklahoma OSDH Hepatitis Program will prepare a progress report on prevention and control activities and future recommendations as required by CDC for the Hepatitis Prevention Coordinator (VHPC) grant. Future revisions and updates will be created by the Oklahoma OSDH Hepatitis Program and edited by the Oklahoma Hepatitis Task Force (OHTF).

Hepatitis C Resources

Tulsa, OK Area

- Utica Park Clinic-1145 South Utica, Suite 115, 918-582-6544. Accepts Sooner Care, drug assistance program (cash customers will be responsible for lab fees, fees vary monthly depending on the amount of lab work needed but lab will make payment arrangements).

- Healthcare Research Consultants- 4619 S. Harvard, Suite A-918-743-4002. This clinic specializes in facilitating drug trials and similar services. If you try out a new medication or testing service for them, they provide all the Hepatitis related blood work for free. The trials have different requirements, so make sure to call them to see what they have available and if you are eligible. The wait time can be up to several months so ask to be put on a waiting list or check back every few months until something is available.

- Options Health Research, 1145 S. Utica, Suite 700 (near Hillcrest), 918-513-3473. This clinic specializes in facilitating drug trials and similar services. If you try out a new medication or testing service for them, they provide all the Hepatitis related blood work for free. The trials have different requirements, so make sure to call them to see what they have available and if you are eligible. The wait time can be up to several months so ask to be put on a waiting list or check back every few months until something is available.

- Gastroenterology United Tulsa- 3345 S. Harvard, 918-749-3399. This clinic specializes in facilitating drug trials and similar services. If you try out a new medication or testing service for them, they provide all the Hepatitis related blood work for free. The trials have different requirements, so make sure to call them to see what they have available and if you are eligible. The wait time can be up to several months so ask to be put on a waiting list or check back every few months until something is available.

- Indian Health Care Resource Center, 550 S Peoria, 918-588-1900. This clinic requires a valid CDIB (Certified Degree of Indian Blood) card and a referral from us or your primary care physician. If you meet those requirements they can provide a range of blood testing and treatment options.

- Veterans Administration Tulsa Clinic, 9322 E 41st Street, 918-628-2500 ext. 1551. Full services available for veterans but you must be enrolled first. Services also available in Hartshorne, Muskogee, and Vinita, call 1-888-397-8387 for more information.

- Morton Clinic, 1334 N Lansing Ave., 918-587-2171, you will need the following to enroll as a patient with Morton Clinic: Valid State ID, Proof of residency (utility bill or lease agreement), Social Security card.

- **Individuals diagnosed with HCV are greatly encouraged to find a support group in their area. The contact for the Tulsa area is Rick Cavin: rickcavin51@yahoo.com. God's Shining Light Church 9897 E. 11th St (918) 836-7788**

Hepatitis C Resources

Oklahoma City Area

- OU Health Sciences Center, NE 10th Street, Gastroenterology, 405-271-3445. This department may work on a sliding scale fee system if the patient is unable to pay.

- INTEGRIS Baptist Medical Center 3300 N.W. Expressway, Oklahoma City, OK 73112, 405-949-3349 Toll-free: 800-991-3349. This hospital specializes in Hepatitis and will work on a self-pay system if the client is able to make a deposit upon the first visit.

Hepatitis Specialists in the Tulsa Area

Any gastroenterologist will probably be a good fit for your continued care but listed below are some physicians who specialize in Hepatitis treatment. If you have insurance you may need a referral from your primary care physician. Also, check to confirms they are in your network first. Ask for a referral if they are not accepting new patients. If you do not have insurance, some offices will give you a discounted rate or work out a payment plan. Be sure to check in advance.

Cancer Treatment Centers of America (Leon Yoder)
10109 E 79th St, Tulsa, OK 74133, 918-286-5000

Claremore Internal Medicine LLC (Stephen Medina)
1501 N Florence Pl, Suite 201, Claremore, OK 74017, 918-333-7172

Gastroenterology Clinic (Polepalle Chandrasekhar)
3720 W Broadway St, Muskogee, OK 74401, 918-683-5939

Gastroenterology Specialists Inc. (John Hood, Michael Martin, Thomas Schiller, William Briggs)
6565 S Yale Ave, Kelly Professional Building, Suite 1200, Tulsa OK 74136, 918-494-9433

Gastroenterology Specialists Inc. (David Morris, Sheldon Berger)
9228 S Mingo Rd, Room 102, Tulsa, OK 74133, 918-806-5222
****** TAKES SELF PAY CLIENTS**

Gopi Vasudevan, MD
3400 E Frank Phillips Blvd, Bartlesville, OK 74006, 918-331-2544

Sarah VonMuller, MD
1615 S Eucalyptus Ave, Suite 3, Broken Arrow, OK 74012, 918-294-3332

Warren Clinic (Frances Haas)
6565 S Yale Ave, Suite 312, Tulsa, OK 74136, 918-502-7050

Other Hepatitis Resources

Commitment to Care
Clinical Trials and medication assistance
1-888-437-2608
www.beincharge.com

Support Group
Tulsa Transplant Group
September through April (only)
Norma Hughes 918-835-0173

Together Rx Access
Provides a 25% to 40% discount on the price of medication offered by the plan
1-800-444-4106
www.togetherrxaccess.com

Dr. Sarah VonMuller
1615 South Eucalyptus Ave Suite 3
Broken Arrow
918-294-3332

Veterans Administration
9322 East 41st
Tulsa; 918-628-2500 ext. 1551

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Gastroenterology Clinic
Dr. Polepalle Chandrasekhar
3720 W. Broadway St
Muskogee; 918-683-5939

Gastroenterology Specialists
6566 S. Yale; Kelly Bldg. Suite 1200
Tulsa; 918-494-9433

Green County Gastroenterology
Dr. Sheldon Berger
Tulsa; 918-496-4373

Green Country Diagnostic Center
Dr. David James
3345 S. Harvard
Tulsa; 918-749-3399

HCV Advocate
www.hcvadvocate.org

Hep C Challenge; Caring Ambassadors
www.hepcchallenge.org

Health Outreach Prevention Education, Inc.

Schering Corporation

3540 East 31st Street, Suite 3
Tulsa, OK 74135-1526
Tulsa; 918-749-8378

Hearts that Care Free Medical Clinic
304 SW A Ave.
Lawton, OK 73501.
580-354-9007

Morton Healthcare
Classes –free- Basics of Hepatitis C
Must pre-register; 918-295-6124

Partnership for Prescription Assistance
www.pparx.org/intro.php
1-888-4-PPA NOW

Roche Laboratories
Clinical Trials and medication assistance
1-877-Pegasys
www.pegasys.com

Hepatitis Glossary

A

Acute Hepatitis C: Acute hepatitis C is a short-term illness that usually occurs within the first six months after someone is exposed to the hepatitis C virus (HCV). Approximately 75%-85% of people who become infected with HCV develop chronic infection. A person may or may not have symptoms.

Adverse Event: An adverse event is an undesirable experience associated with the use of a medicinal product in a patient.

Alanine Aminotransferase (ALT): A liver enzyme that plays a role in protein metabolism. Serum level is checked as part of a liver function test. ALT level (particularly if the level is repeatedly high) suggests that the liver may be inflamed. HCV is one of the many causes of elevated ALT.

Alopecia: Thinning or loss of hair.

Alpha-fetoprotein (AFP): A protein made by fetal liver cells and sometimes by liver cancer cells. In hepatitis, the AFP level is a marker for liver cancer. AFP is not a perfect test for liver cancer- some without cancer have high AFP, some with cancer have normal AFP. If doctors suspects cancer, they will conduct additional tests to confirm the diagnosis.

Anemia A condition in which blood contains a lower than normal number of red blood cells or not enough hemoglobin (which is an iron-rich protein that gives blood its red color).

Anorexia: Decreased appetite or aversion to food.

Antibody [HCV directed]: Proteins that are normally produced as part of the body's immune response to viruses, bacteria, and other foreign substances. Antibodies help your body recognize infections and fight them. Vaccines work by helping the body produce antibodies to protect against

infections. Antibodies circulate in the blood and their presence can indicate a current or past infection. Antibodies may remain in the bloodstream, even if the person clears the virus. As a first step, a person would get a screening test that looks for "antibodies" to HCV. If the antibody test is positive, different blood tests are then needed to determine whether the infection has been cleared or has become chronic.

Antigen: A substance that the body recognizes as foreign- or something it should destroy. The body makes antibodies that recognize these antigens.

Anti-inflammatory: Counteracting or suppressing inflammation.

Antiviral: A substance that fights viruses.

Antiviral Drug A drug that is directed against a virus.

Aspartate Aminotransferase (AST): An enzyme normally present in liver, heart, muscle and red blood cells. It is released into the blood following hepatic or cardiac injury, including HCV. Elevated AST levels may also indicate hepatic inflammation or injury. Elevated (high) AST levels may indicate liver damage or damage to other organs (A heart attack, for example, will increase the level of AST in the blood). AST is also known as serum glutamic oxalacetic transaminase [SGOT].

Ascites: An abnormal accumulation of fluid in the abdomen. Ascites can result from liver failure, cirrhosis and liver cancer. This condition requires medical attention.
Asymptomatic: Means "without symptoms". Many people with hepatitis are asymptomatic.

B
Bile: A yellow-green fluid that made by the liver to help digest fat. Bile contains cholesterol, bile salts, and the pigment bilirubin.

Blood Transfusion: The transfer of blood from a donor to a recipient. Risk factors for HCV infection include having received a blood transfusion prior to July 1992. After 1992, better practices for the screening of blood donors became available.

C
Chronic Carrier: A person with a long-term infection. A chronic viral hepatitis carrier can transmit hepatitis virus to others.

Chronic Hepatitis C: A serious condition that damages the liver and can lead to potentially fatal liver diseases such as cirrhosis, liver failure and liver cancer.

Chronic Viral Hepatitis: A hepatitis infection lasting more than 6 months.

Cirrhosis: A process by which liver cells are either damaged or killed and replaced by scar tissue. Cirrhosis is caused by many of the various chronic progressive conditions that affect the liver, including the hepatitis viruses. Liver damage, including the development of cirrhosis, has been identified as a potential consequence of long-term infection with HCV. Cirrhosis is a serious medical condition and it can lead to liver failure, liver cancer, and death.

Cirrhosis is the end-stage form of chronic liver disease and has three defined characteristics: presence of fibrosis "scar tissue", disruption of the normal liver structure, and nodules created by liver cell regeneration. Cirrhosis is a cause of death in patients with liver disease.

Clinical Trials: Carefully controlled studies conducted in humans who volunteer to test the effectiveness and safety of new drugs, medical products or techniques. All prescription drugs in the United States undergo and succeed in three phases of clinical trials before they can be approved for general use.

Combination Therapy: The use of two or more therapies (such as drug therapy) in combination to treat a disease or condition. The currently approved treatment for HCV infection is a combination of two drugs: pegylated interferon alpha and ribavirin.

Compensated liver disease: Liver disease that is advanced or serious, but the liver still functions.

E

Encephalopathy: Change in brain function. Symptoms may include loss of memory, personality change, and difficulty concentrating.

End-Stage Liver Disease: The last phase in the course of liver disease. Patients are considered to have end-stage liver disease when they develop complications such as liver cancer or sustain extensive liver damage preventing proper liver function and potentially resulting in the need for liver transplant. The end-stage form of chronic liver disease has three defined characteristics: presence of fibrosis "scar tissue", disruption of the normal liver structure, and nodules created by liver cell regeneration. Cirrhosis is a cause of death in patients with liver disease and difficulty concentrating.

Enzymes: A protein that helps a chemical reaction take place. Your liver produces many enzymes such as ALT and AST.

F

False-positive: Test result that is positive when it should not be. For example, a test says hepatitis virus is present when it is not. Certain tests have higher false-positive rates than others.

Fatigue: Feeling of being very tired or lacking energy.

Fibrosis: Scar formation resulting from the repair of tissue damage. Fibrosis of the liver can lead to cirrhosis, which has been identified as a potential long-term consequence of infection with HCV.

G

Gastroenterology/Gastroenterologist: The field of medicine and the name for the type of medical specialist that focuses on the function and disorders of the Gastrointestinal (or GI) system, which includes the esophagus, stomach, pancreas, intestines, and liver.

Genotype: A pattern of genetic information that is present in related organisms that describes the genetic make-up of an organism or a virus and can affect a patient's response to drug therapy. Genotype describes the genetic heterogeneity of viral genomes that allows subtypes of virus to be classified based on the comparison of viral genomes. In HCV, a person's genotype may be important

in determining the severity of the disease and response to treatment. Hepatitis viruses vary by type (A, B, C, etc.) and each type has a number of genotypes (1, 2, 3, 4). Doctors may determine the genotype to help decide the best treatment.

Genotype 1: Current treatment for HCV is more often effective for people with genotype subtypes 2 or 3 than for those with genotype 1.

H

HCV Antibody (Anti-HCV): The antibody specific to HCV; the presence of which indicates infection with HCV. Anti-HCV does not tell whether the infection is new (acute), chronic (long-term) or is no longer present. Tests that are used to detect Anti-HCV include EIA (enzyme immunoassay), CIA (enhanced chemiluminescence immunoassay) or RIBA (recombinant immunoblot assay), which is usually a supplemental test used to confirm a positive EIA test.

HCV polymerase chain reaction (HCV PCR): A laboratory method for copying and amplifying a sequence of DNA.5 There are three types of HCV PCR tests:
• **HCV PCR** viral detection test - This qualitative test is designed to detect whether the hepatitis C virus is or is not present in the blood. The test is done to confirm the presence of viral RNA in the blood of a person with a positive HCV antibody test.
• **HCV PCR** viral load test - This quantitative test looks for the virus and estimates the number of HCV viral particles per milliliter of blood. The test is done to estimate the length of treatment that will be needed and to monitor the effectiveness of that treatment.
• **HCV PCR** genotype test - This test looks for the virus and determines the particular subtype of HCV. The genotype test is usually done before the start of treatment because it can differentiate among each of the major subtypes of HCV and tell which genotype the patient is infected with.

HCV RNA: Genetic material found in carriers of HCV. HCV RNA in the blood indicates a patient is currently infected with the hepatitis C virus.
• **Detectable HCV RNA –** HCV RNA becomes detectable in the blood five to 10 days after exposure. Detectable HCV RNA indicates an active infection.
• **Undetectable HCV RNA** – Undetectable HCV RNA in the blood indicates that there is no present HCV infection that is detectable in the blood.

Hepatic Portal Vein: A vein that carries nutrients absorbed in the digestive tract to the liver where they are processed. Increased blood pressure in the portal vein occurs in liver disease, such as cirrhosis, and may lead to various complications and death.

Hepatitis: Inflammation of the liver. Many things can lead to inflammation in the liver including viruses, bacterial infections, trauma, medications, and alcohol.

Hepatitis C: A contagious liver disease that results from an infection with the hepatitis C virus (HCV). HCV is a major public health problem and the leading cause of chronic liver disease. Hepatitis C tends to persist in the blood and is usually transmitted by infected blood or contaminated needles.

Hepatitis B Surface Antigen (HbsAg): An antigen on the hepatitis B virus. Doctors look for this antigen to see if the hepatitis B virus is present in the blood. If the test for the HbsAG is positive, a person has hepatitis B.

Hepatitis B Surface Antibody (HbsAb or anti-HBs): The antibody formed in response to the surface antigen of the hepatitis B virus. The body produces this antibody in response to hepatitis B vaccine or actual hepatitis B infection. If this test is positive, the immune system successfully developed protection against the hepatitis B virus.

Hepatitis B Core Antibody (HbcAb or anti-HBc): An antibody produced in response to a part of the hepatitis B virus. Blood banks use this test to screen blood donations. A positive test indicates exposure to the hepatitis B virus. This antibody does not protect against future HBV infection.

Hepatitis B Immune Globulin (HBIG): A medication given after a person is exposed to blood or bodily fluids that might be infected with hepatitis B virus. It helps stop infection before it takes hold.

Hepatocellular Carcinoma (HCC): A type of liver cancer. It is a malignant tumor of the liver.

Hepatocyte: A liver cell.

Hepatology/ Hepatologist: The field of medicine (and type of doctor) focusing on diseases of the liver. It is a sub-specialty within gastroenterology (GI).
Histology: The field of medicine that studies tissue under the microscope to look for evidence of damage or disease.

I
Illicit drug: (See recreational drug)

Immune System: The body's defense system against foreign substances such as bacteria, viruses, fungi, parasites, and malignant cells.

Immunocompromised: A situation where the immune system is weakened or not functioning normally because of illness or a drug or chemical.

Immunology: The field of medicine that studies the immune system, including allergic reactions.

Infection: The results of the presence of harmful microorganisms in the body. Infections can be acute (new) or chronic (persistent).

Inflammation: Redness, warmth, swelling, and/or pain that results when the immune system responds to infection, irritation, or other injury.

Interferon: Naturally occurring proteins that are made by the immune system in response to viral infection and other inflammatory diseases. Many different cells produce interferon, usually at low levels. One type, interferon alpha, is also produced in the laboratory, given by injection to treat HCV infection and is often combined with the drug ribavirin. Interferon is also used to treat conditions like multiple sclerosis.
Investigational Drug: A new drug that is undergoing clinical trials to prove its efficacy and safety.

J

Jaundice: A condition characterized by yellowness of the skin and eyes and darkening of the urine. Many illnesses and disorders can lead to jaundice including hepatitis. Jaundice can result when normal functioning of the liver is disrupted by liver disease, and it is one of the signs of infection with HCV.

L

Limit of Detection: The limit of detection is the level at which an assay cannot detect any trace of virus in the blood. There are tests that detect HCV at 30 and 15 international units per milliliter of blood (IU/mL). The most sensitive assays currently available can detect HCV at 10 IU/ml.

Liver: One of the largest organs in the body. The liver has many functions (over 500) including the production of proteins, cholesterol and hormones, bile and blood clotting factors. It aids in digestion of food, stores sugar, and breaks down fats. It also breaks down alcohol and other toxins.

Liver Biopsy: A procedure used to monitor the progression of certain forms of liver disease, including HCV. During a liver biopsy, a small sample of liver tissue is collected and then examined under a microscope to evaluate suspected or known liver disease. A liver biopsy can reveal chronic inflammation, (chronic hepatitis), scar tissue formation (cirrhosis), or cancer.

Liver Function Tests (LFTs): A group of blood tests used to assess the functioning of the liver. Doctors use these tests to look for or monitor liver diseases. See ALT and AST.

Lymphocyte: A type of white blood cell that plays a role in defending the body against disease.

M

Monotherapy: Therapy with one drug or agent.

Mutation: A change in the genetic makeup of an organism. Hepatitis viruses often mutate slightly which makes them difficult to treat and to design vaccines to prevent infection.

N

Needlestick: An accidental puncture of the skin while handling hypodermic needles, usually in the healthcare setting.

Neutropenia: An abnormal decrease in the number of neutrophils, types of white blood cell.
Non-Responders: Patients who do not respond to therapy or a vaccine within a specified time-frame.

P

Patient Compliance: Level to which a patient follows the instructions of their physician. Compliance with hepatitis treatment is essential for best results.

Pegylated/pegalation: The attachment of a molecule of polyethylene glycol (PEG) to another substance. PEG was added to interferon to make it last longer in the body so that fewer injections are needed.

Pegylated Interferon (PEG-IFN): A synthetic (man-made) version of interferon alpha that is often used in combination with the drug ribavirin to treat HCV infection; also called PEG interferon. Pegylated interferon has a longer half-life than standard interferon alpha, which means injections are

taken weekly instead of the three times a week with standard interferon alpha. PEG-Intron® and Pegasys® are both brand name pegylated interferons.

Percutaneous: Absorption (or passing) of substances into the body through the skin.

Perinatal Transmission (also called vertical transmission): Transmission of an infectious disease from mother to newborn before or during birth

Persistent: A disease or other medical condition that returns or continues over a long time.

Pharmacokinetics: The study of the bodily absorption, distribution, metabolism, and excretion of drugs, or the characteristic interactions of a drug and the body in terms of its absorption, distribution, metabolism, and excretion.

Platelets: Cells produced in the bone marrow that control bleeding by helping the blood to clot. Cirrhosis can cause platelets to be stuck or sequestered and affect the ability of blood to clot.

Polymerase chain reaction (PCR): A method of detecting DNA or RNA from tissues or body fluids. PCR is used to determine if hepatitis B or hepatitis C virus is in the blood. Post-

Transfusion Hepatitis: Liver inflammation that occurs when the body reacts unfavorably to a blood transfusion. This is now rare in the United States due to careful blood screening.

Polymerase Inhibitor: A class of compounds being studied for the treatment of HCV that inhibits the polymerase enzyme, which is necessary for HCV replication.

Protease: An enzyme that plays a role in the replication of viruses. The NS3 protease plays a key role in the replication of the HCV

Protease Inhibitor: The latest class of drugs used to treat hepatitis C genotype 1 infections. Protease inhibitors prevent the hepatitis C virus from replicating and are taken along with pegylated interferon and ribavirin during hepatitis C treatment.

Protein: A substance made of a string of amino acids. Your body produces many kinds of proteins. Some serve as building blocks for the body and some help the body carry out functions.

Protocol: A step-by-step procedure or plan. A doctor may refer to a treatment plan as a protocol even if you are not in a clinical trial.

R

Rapid Virological Response (RVR): A rapid virological response (RVR) is indicated by undetectable HCV RNA (confirmed by HCV PCR) after 4 weeks of treatment. Failure to achieve RVR within 12 weeks of treatment is a positive predictor of the inability to achieve sustained virological response (SVR).

Recombinant Immunoblot Assay (RIBA): A type of test to measure the presence of antibodies in the blood.

Reconstitution: The process of adding liquid to a dry powder in order to make a solution. Prescription drugs that are given by injection are often provided as a dry powder, which must be reconstituted before it can be used.

Recreational Drugs (illicit drug use): Illegal drugs, such as marijuana, cocaine, and heroin or legal drugs (like medications) used for non-medical purposes.

Relapse: A recurrence of illness; especially a recurrence of symptoms of a disease after a period of improvement. A relapse of HCV is a recurrence of the virus after a sustained period of viral decline or after stopping therapy for HCV.

Remission: A period of time when all or some of the symptoms of a disease have disappeared or decreased. Remission may occur spontaneously (all by itself) or because of medical treatment.

Resistance: The capacity of a microorganism, such as a virus, to survive exposure to a drug formerly effective against it due to genetic mutation.

Ribavirin (RBV): Used in combination with interferon to treat HCV infection. Ribavirin is in a class of antiviral medications called nucleoside analogues. Ribavirin is usually used in combination with PEG-IFN, and is not generally effective in the treatment of HCV when used alone.

Risk Factors: Conditions, activities, or behaviors that increase an individual's chance of developing a certain disease. Risk factors are identified by observing large groups of people and seeing what they have in common. Having a risk factor does not guarantee a person will acquire or develop a disease. For example: smoking is a risk factor for lung cancer.

S

Screening: Testing for signs of a disease. A positive screening test is NOT the same as a diagnosis of a disease. Screening tests are often used to identify people who should be examined further.

Self-Administration: Patients administer (or give) themselves a therapy. Many hepatitis patients give themselves their interferon injections rather than having a doctor or nurse administer the injection.

Serology: Refers to the study of serum (the clear portion of body fluids) for certain substances like antibodies.

Specifically Targeted Antiviral Therapies for HCV (STAT-C): Class of compounds in development that target specific enzymes important in the replication of HCV, as opposed to current therapies that act through host-dependent mechanisms.

Spleen: An organ located in the left upper abdomen that removes old red blood cells and other blood cells from circulation. The spleen can enlarge in a person who has cirrhosis due to the large number of platelets.

STD or STI (sexually transmitted disease or infection): A disease transmitted through sexual contact.

Sustained Viral Response (SVR): A response to therapy that continues over a long period of time. In hepatitis C, SVR means the virus has not been detected for at least 6 months after treatment.

T

Transaminases: Refers to SGOT or SGPT, which are older terms for the ALT and AST.

Transfusion: The introduction of blood or components of blood (such as plasma, platelets) from one person into another.

Transmission: The spread of disease from one person or animal to another.

U

Universal precautions: A set of guidelines developed by the U.S. Centers for Disease Control intended to decrease the risk of spreading illness and disease in healthcare settings. Specifically, universal precautions are to be used when coming into contact with certain types of body fluids, such as blood, semen, and vaginal fluids. When handling these fluids, all measures to avoid exposure should be taken, including wearing gloves and other protective covers; avoiding injury; and proper disposal of affected materials.

V

Vaccine: A medication that stimulates the production of antibodies to protect against a specific disease. Vaccines are available for hepatitis A and B.

Variceal Bleeding: Abnormal bleeding from broken blood vessels in the esophagus (throat). The bleeding occurs when blood flow through the liver is blocked. Patients with advanced cirrhosis can develop this condition. Variceal bleeding is an EMERGENCY. CALL 911!

Viral hepatitis: Inflammation of the liver caused by viruses that specifically attack the liver. Viruses include hepatitis A, B, C, D, E, F, and G. Viral hepatitis is inflammation caused by a hepatitis virus.

Viral Load: Viral load is the amount of HCV RNA in the blood. Test results are typically reported in terms of international units per milliliter (IU/mL).

Viremia: Refers to the presence of a given virus in the bloodstream.

Virologic response: A reduction in the amount of virus in the blood in response to treatment.

Virus: A microorganism that can infect the body. Many types of viruses exist such as those causing influenza, and hepatitis.

W

White blood cells: Cells the body makes to help fight infection.

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