



Viral Hepatitis: New U.S. Screening Recommendations, Assessment Tools, and Treatments

Nurses' expanding role in public health and coordination of care.

OVERVIEW: Over the past 15 years, the incidences of hepatitis A and B virus infection in the United States have declined significantly. By contrast, the incidence of hepatitis C virus infection, formerly stable or in decline, has increased by 75% since 2010. Suboptimal therapies of the past, insufficient provider awareness, and low screening rates have hampered efforts to improve diagnosis, management, and treatment of viral hepatitis. New screening recommendations, innovations in assessment and treatment, and an updated action plan from the U.S. Department of Health and Human Services (HHS) seem likely to lead to significant progress in the coming years. This article reviews the epidemiology, natural history, and diagnosis of viral hepatitis; discusses new screening recommendations, assessment tools, and treatments; and outlines the HHS action plan, focusing on the role of nurses in prevention and treatment.

Keywords: chronic hepatitis, hepatitis A, hepatitis B, hepatitis C, hepatitis treatment, liver disease, viral hepatitis

In the United States, the epidemiology of viral hepatitis, most commonly caused by hepatitis A, B, or C viruses, has changed dramatically over the past three decades. With the development of vaccines for hepatitis A and B viruses and the introduction of universal precautions and blood supply safety measures, hepatitis A virus (HAV) and hepatitis B virus (HBV) infection rates have declined by 88% and 64%, respectively, since 2000.¹ By contrast, after years of stable or declining rates, the incidence of hepatitis C virus (HCV) infection has increased by

75% since 2010.¹ In 2011, the U.S. Department of Health and Human Services (HHS) released the first national, comprehensive, multiagency action plan for preventing and treating viral hepatitis.² The HHS action plan, which was updated in 2014, outlines measures that can be taken to improve health outcomes for people infected with HBV and HCV, both of which can progress to chronic disease that often produces minimal symptoms before resulting in cirrhosis or hepatocellular carcinoma.³ With new recommendations calling for wider screening, the

approval of new therapies that can cure more than 90% of those with chronic HCV, and the introduction of noninvasive technology for evaluating liver fibrosis, nurses are positioned to play a critical role in this plan—providing the clinical leadership and patient counseling that can

- reduce the number of new viral hepatitis infections.
- ensure that existing infections are diagnosed.
- minimize the impact of chronic infection on the patients they care for and the communities they serve.

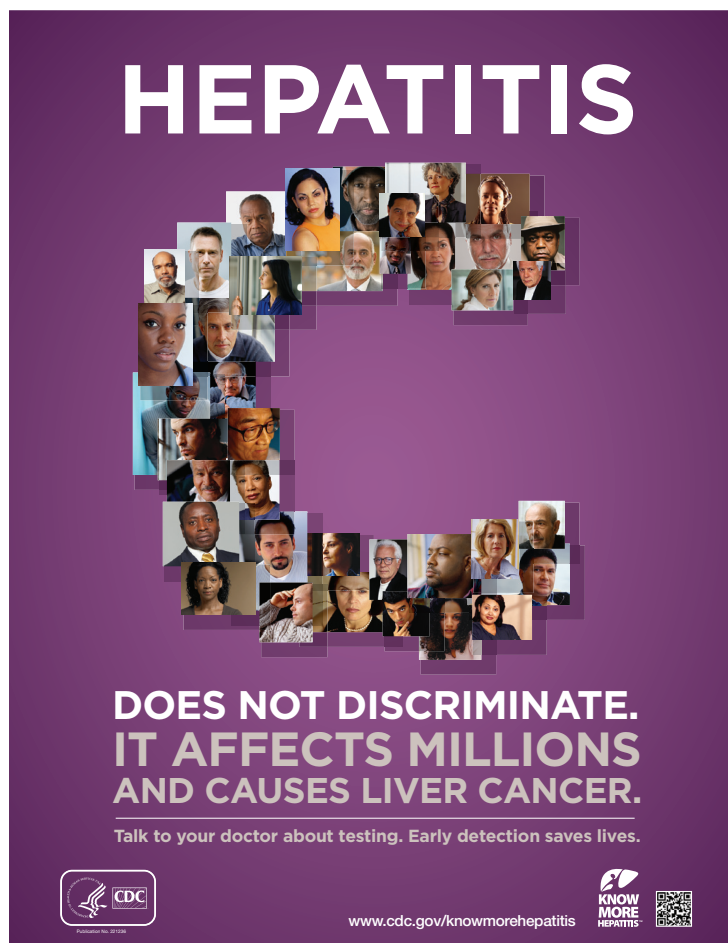
This article reviews the epidemiology and diagnosis of HAV, HBV, and HCV; discusses the natural history of chronic HBV and HCV; and outlines the HHS action plan, focusing on the role of nurses in prevention, treatment, and—in the case of HCV—cure.

SYMPTOMS, EPIDEMIOLOGY, AND PREVENTION

In the acute phase of infection, HAV, HBV, and HCV may produce similar symptoms (see *Common Signs and Symptoms of Acute Viral Hepatitis A, B, and C*). The viruses, however, differ from each other in terms of mode of transmission, natural history, and vaccine availability (see Table 1^{1,4,5}).

HAV is spread primarily through the fecal–oral route, either from person to person, or through exposure to contaminated food or water.⁴ Typically, the virus causes a self-limited infection of less than two months' duration, which confers immunity when resolved.⁴ Most acute infections (85%) are symptomatic.⁶ In rare cases, acute HAV infection can result in death. In 2012, the Centers for Disease Control and Prevention (CDC) received 1,562 case reports of HAV—a number estimated to represent as many as 3,050 actual cases, since, as with HBV and HCV, some infected patients are asymptomatic and some fail to seek care and testing.^{1,6} For HAV, each reported case is believed to represent nearly two actual infections.⁶ In primate studies, HAV has remained infectious on environmental surfaces for more than a month.⁷ Preventive measures include vaccination, proper hand hygiene, and proper food handling, as well as disinfection of contaminated surfaces.



A safe and effective vaccine for HAV has been available in the United States since 1995. In 1999, the Advisory Committee on Immunization Practices called for the routine vaccination of children living in 17 states with consistently high HAV incidence rates.^{8,9} By 2003, those states saw an 88% drop in HAV incidence—to 2.5 cases per 100,000 population from the average rate of 21.1 cases per 100,000 population recorded in the prevaccination period.¹⁰ The series of two HAV vaccinations administered over a six-month period was shown to protect adults



HEPATITIS

DOES NOT DISCRIMINATE.
IT AFFECTS MILLIONS
AND CAUSES LIVER CANCER.

Talk to your doctor about testing. Early detection saves lives.

 www.cdc.gov/knowmorehepatitis 

One of several posters created by the Centers for Disease Control and Prevention to raise awareness that millions of Americans of all ages, races, and ethnicities have hepatitis C—and many don't know it. Posters are available to order or download for printing at www.cdc.gov/knowmorehepatitis/media/posters.htm. Poster © Centers for Disease Control and Prevention.

for at least 10 years and 99% of children for five to six years.¹⁰

Children, who are generally asymptomatic, have played an important role in transmitting HAV. Although initial recommendations for HAV vaccination among children focused on states with high incidence rates, the recommendation has since been expanded to include all infants, starting at one year of age, as part of the primary childhood immunization series.¹⁰ Unvaccinated adults should be considered for HAV vaccination if they are at risk for exposure or severe adverse consequences of infection (see *HAV Vaccination Recommendations*¹⁰).

HBV is transmitted by percutaneous or mucosal exposure to the body fluids of an infected person.¹¹ In

Common Signs and Symptoms of Acute Viral Hepatitis A, B, and C

- fever
- fatigue
- malaise
- anorexia
- nausea
- vomiting
- right upper quadrant pain
- headache
- rashes
- arthralgia
- arthritis
- myalgia
- dark urine
- clay-colored stool
- jaundice

the United States, the most common modes of HBV transmission are sexual contact and injection drug use.^{1,4} Perinatal transmission is estimated to have occurred in 1,058 of all U.S. births in 2009.¹²

In 2012, the CDC received reports of 2,895 cases of acute HBV infection, suggesting that the actual number of new cases in the United States (including asymptomatic patients and those who seek no care) was actually closer to 19,000,¹ as each reported case of HBV is estimated to represent roughly 6.5 actual infections.⁶ Acute infection is symptomatic in up to 50% of adult cases; infants and children are usually asymptomatic.⁴ Acute HBV infection most often resolves completely and confers lifelong immunity, but in up to 2% of cases, infection results in fulminant hepatitis, which has a case fatality rate of 63% to 93%.⁴

million people in the United States are chronically infected with HBV.^{1,13}

HBV is considered hardy and remains infectious outside the body for about seven days.⁴ To prevent HBV infection, people are advised to get vaccinated, avoid unprotected sexual contact, and avoid percutaneous or mucosal contact with infected blood, body fluids, and items that have been in contact with potentially infected blood or body fluids, such as needles and other equipment used to inject drugs.

A safe and effective vaccine for HBV has been available since 1986.⁴ It was first used to protect adults at risk, but a comprehensive infant and childhood vaccination strategy was introduced in 1991 (see *HBV Vaccination Recommendations*¹⁴⁻¹⁷).¹⁴ Between 2000 and 2012, the rate of new HBV infections in the United States declined by 64%, primarily because of this effective immunization strategy.¹ In adults, the series of three HBV vaccinations should be administered within a six-month period regardless of age, with no need to restart the series if the intervals between injections exceed recommendations.⁴ (CDC vaccine recommendations for infants, children, and adolescents can be found at www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hepb.html.) Three doses of the vaccine provide protection for 98% to 100% of vaccinated infants and 90% to 95% of vaccinated adolescents and adults.⁴

HCV is transmitted parenterally, usually through injection drug use and less frequently through poor infection control practices during health care procedures.¹⁸ Sexual transmission occurs rarely, though among both men who have sex with men and heterosexuals, the likelihood of sexual transmission rises with the number of sex partners and when sex partners are coinfecting with HIV.¹⁸⁻²⁰ In addition, there is evidence that men who have sex with men and take HIV preexposure prophylaxis may be at risk for sexual

Chronic HCV infection is the leading cause of liver-related death and hepatocellular carcinoma in the Western world.

Acute HBV progresses to chronic infection in about 90% of infants infected at birth, 30% to 50% of children ages one to five, and 5% of adults.¹ People with a compromised immune system are at elevated risk of developing chronic infection. Those with chronic infection tend to be asymptomatic carriers, though roughly 25% eventually develop cirrhosis or hepatocellular carcinoma. An estimated 240 million people worldwide and 700,000 to 1.4

million people in the United States are chronically infected with HCV if they have unprotected sex with HCV-infected partners.²¹

In 2012, the CDC received reports of 1,778 cases of acute HCV infection,¹ which suggests that the actual number of acute cases was 21,869, since each reported case is estimated to represent 12.3 actual cases.⁶ The CDC also documented a 75% increase in new HCV infections between 2010 and 2012 and linked the increase to rising injection drug use, primarily among

Table 1. Mode of Transmission, Natural History, and Vaccine Availability of Viral Hepatitis A, B, and C^{1,4,5}

Agent	Mode of Transmission	Progress to Chronic Infection?	Resolved Infection Confers Immunity?	Vaccine Available?
HAV	HAV is transmitted through ingestion of fecal matter, even in microscopic amounts, from <ul style="list-style-type: none">• close contact with an infected person.• sexual contact with an infected person.• ingestion of contaminated food or drinks.	No	Yes	Yes
HBV	HBV is transmitted through contact with infectious blood, semen, and other body fluids, primarily through <ul style="list-style-type: none">• sexual contact with an infected person (most common HBV transmission route among U.S. adults).• birth to an infected mother.• sharing of contaminated needles, syringes, or other injection drug equipment.• sharing of items such as razors or toothbrushes with an infected person.• needlestick or other sharp-instrument injuries.• direct contact with the blood or open sores of an infected person.• transfusions of blood or blood products prior to universal blood donor screening.	Yes	Yes	Yes
HCV	HCV is transmitted through contact with infectious blood, primarily through <ul style="list-style-type: none">• sharing of contaminated needles, syringes, or other injection drug equipment (most common risk factor for new HCV cases).• birth to an infected mother.• transfusions of blood or blood products prior to 1992.• direct contact with the blood or open sores of an infected person.• needlestick or other sharp-instrument injuries. HCV is less commonly transmitted through <ul style="list-style-type: none">• sexual contact with an infected person.• sharing of items such as razors or toothbrushes with an infected person.	Yes	No	No

white adolescents and young adults who reside in non-urban settings.¹

Acute infection progresses to chronic disease in 75% to 85% of cases.¹ Infection is usually asymptomatic, even in the presence of mild to severe liver disease.¹ Chronic HCV infection is the leading cause of liver-related death and hepatocellular carcinoma

in the Western world, with persistent inflammation causing cirrhosis within 30 years in 10% to 20% of those infected and putting 1% to 5% of these patients at annual risk for hepatocellular carcinoma.⁵

As many as 150 million people worldwide and up to 3.9 million people in the United States are chronically infected with HCV.^{1,13} Little is known about the

HAV Vaccination Recommendations¹⁰

People recommended for HAV vaccination include

- all children at one year.
- travelers to regions with intermediate or high rates of HAV.
- men who have sex with men.
- users of certain illegal drugs (injection and noninjection).
- people with clotting-factor disorders.
- people who work with HAV-infected primates or with HAV in a research laboratory.
- people with chronic liver disease, including chronic liver disease related to HBV and HCV.

factors associated with spontaneous clearance of the virus, though immune response is determined in part by genetics, sex, and mode of acquisition.⁵

HCV is considered very hardy; a recent study found that cell culture–derived HCV can remain infectious on surfaces up to six weeks, suggesting that accidental contact with contaminated surfaces may be a source of health care–associated transmission.²² In light of these findings, health care providers would be well advised to avoid percutaneous exposure to infected blood. Currently there is no vaccine for HCV.

SEROLOGIC TESTING FOR VIRAL HEPATITIS

To confirm a specific diagnosis of HAV, HBV, or HCV, serologic testing is required (see Table 2^{1, 16, 18, 36}). Screening tests are generally conducted on asymptomatic people with an increased probability of having or developing a disease, whereas diagnostic testing is conducted to establish the presence of a disease, typically in patients who are symptomatic. Previous screening strategies for HBV and HCV were based on the identification of such potentially stigmatizing risk factors as a history of injection drug use or unprotected sex with multiple partners, which were seldom assessed by providers or disclosed by patients. Because this strategy failed to identify many patients who were chronically infected with HBV or HCV, the CDC and the U.S. Preventive Services Task Force (USPSTF) now recommend expanded HBV and HCV serologic screening for all people considered to be at high risk as well as for members of groups known to have high prevalence rates, such as people born between 1945 and 1965 and those born in certain countries or regions.^{11, 23-25} Both HBV and HCV serologic screening of patients at high risk for infection are Grade B USPSTF recommendations, meaning that they qualify as preventive services covered without copay under the Affordable Care Act (ACA).

HBV serologic screening is recommended for the following groups^{11, 23}:

- people born in countries or regions with a chronic HBV prevalence of 2% or more, or born in the United States but not vaccinated at birth
- people living with HIV
- people who use injection drugs
- men who have sex with men
- household members or sexual partners of someone with HBV infection
- patients who have weakened immune systems or are undergoing hemodialysis

HCV serologic screening. Those with the following risk factors should undergo HCV serologic screening at least once^{24, 26}:

- birth date between 1945 and 1965, regardless of other risk factors
- receipt of clotting factor concentrates produced before 1987
- persistently abnormal alanine aminotransferase levels
- history of long-term hemodialysis treatment
- receipt of blood, blood products, or an organ transplant prior to July 1992 or receipt of blood from a donor who later tested positive for HCV

Those in the following groups should undergo HCV serologic screening routinely^{24, 26}:

- people with HIV infection
- anyone who has ever used injection drugs (even once)
- health care, emergency medical, and public safety workers after needlestick injury or mucosal exposure to HCV-contaminated blood
- children born to mothers who test positive for HCV

Cell culture–derived HCV can remain infectious on surfaces up to six weeks.

HCV screening is a two-step process. People recommended for screening should first be tested using an HCV antibody test. A positive antibody test indicates a history of exposure to HCV but does not distinguish resolved from active infections. Since HCV antibodies can persist for years following a naturally resolved infection or successful antiviral therapy, further testing with a nucleic acid test is required to determine whether infection is active.

EMERGING OPPORTUNITIES TO ADDRESS HEPATITIS C

Since more than 1% of the U.S. population is estimated to be chronically infected with HCV,¹ nurses are likely to see patients with chronic HCV infection

in their practices. The recent rise in new HCV infections among young people further underscores the need to screen patients. Past efforts to address HCV have been hampered by therapies with limited efficacy, a lack of awareness among providers, and low screening rates. Today, however, recently approved antiviral therapies have fewer adverse effects, with some having cure rates of 90% to 100% in clinical trials.²⁷ Furthermore, the ACA has expanded access to hepatitis screening while encouraging previously uninsured people to enter the health care system. All of this creates important opportunities for nurses to improve health outcomes for patients with viral hepatitis, particularly those with HCV.

Potential HCV manifestations. Since most patients with chronic HCV infection are asymptomatic until they develop advanced liver disease, it's important to maintain a high level of clinical suspicion. Mild to moderate liver damage may produce vague symptoms, such as fatigue, over a period ranging from years to decades. HCV, however, may also have a number of extrahepatic manifestations because it's associated with cryoglobulinemia and a lymphoproliferative immune complex disorder that causes arthralgia, purpura, glomerular disease, peripheral neuropathy, central nervous system vasculitis, and reduced complement levels.²⁸ The CDC estimates that²⁹

- of those who are chronically infected with HCV, only half have been diagnosed.

- fewer than 38% of those with an HCV diagnosis have been referred to care.
- fewer than 11% of those referred to care have been treated.

Identifying extrahepatic manifestations of chronic HCV infection may increase the likelihood of diagnosis, referral, and treatment (and now the possibility of cure). As we work to understand the true burden of HCV in the United States and how to better target the use of limited resources, accurate diagnosis and appropriate reporting are paramount.

Of those who are chronically infected with HCV, only about half have been diagnosed.

EVALUATING LIVER DISEASE

All patients who have both a positive HCV antibody test and a positive nucleic acid test are considered to have ongoing infection. They should be evaluated for liver disease and receive counseling and disease management services. Liver disease evaluation involves determining liver function and the degree of liver damage or fibrosis. Severity of fibrosis is usually described

Table 2. Viral Hepatitis Serology Tests and Their Interpretation^{1, 16, 18, 36}

Serologic Marker						Interpretation
HAV:	IgM	IgG				
	–	+				Immune
	+	–				Acutely infected
HBV:	HBsAg	anti-HBc	anti-HBs	IgM	HBV DNA	
	–	+/-	+	–	–	Immune
	+	+	–	+	+	Acutely infected
	+	+	–	–	+/-	Chronically infected
HCV:	HCVAb	HCV RNA				
	N/A ^a	N/A				Immune
	+/- ^b	+ ^b				Acutely infected
	+	+				Chronically infected

anti-HBc = HBV core antibody; anti-HBs = HBV surface antibody; HBsAg = HBV surface antigen; HCVAb = HCV antibody; IgG = immunoglobulin G; IgM = immunoglobulin M; N/A = not applicable; – = test negative; + = test positive.

^aAntibodies for HCV are not protective. Reinfection is possible, and infection with multiple genotypes of HCV has been documented.

^bThere is no specific test for acute HCV. If exposure to HCV within the past six months is suspected, test for HCV RNA or repeat HCV antibody test.

HBV Vaccination Recommendations¹⁴⁻¹⁷

People recommended for HBV vaccination include

- all infants at birth.
- older children who have not previously been vaccinated.
- people with household members who are at risk for or infected with HBV.
- health care and public safety workers who may be exposed to blood on the job.
- adults at risk for infection by sexual exposure, including men who have sex with men.
- people who use injection drugs.
- people with chronic liver disease, including chronic liver disease related to HCV.
- people with HIV infection.
- people with end-stage renal disease, including patients not yet treated with dialysis and those treated with hemodialysis, peritoneal dialysis, and home dialysis.
- residents and staff of facilities for developmentally disabled people.
- travelers to regions with intermediate or high rates of HBV.
- unvaccinated adults ages 19 to 59 with diabetes mellitus.
- anyone seeking long-term protection.

in terms of a Metavir score, which ranges from F0, indicating no fibrosis, to F4, indicating cirrhosis. Historically, liver disease was evaluated on the basis of a liver biopsy, which was invasive, expensive, not without discomfort, and susceptible to sampling error, meaning that the findings could vary depending on the portion of the liver sampled. In 2013, however, the U.S. Food and Drug Administration approved a noninvasive technology known as transient elastography (FibroScan) for determining the degree of liver fibrosis. The technology's accuracy is improved when it is paired with serologic tests developed to monitor liver disease progression. Following liver evaluation,

that when providers share positive HCV test results with patients, they also evaluate patients' level of alcohol use.²⁶ Screening adults ages 18 and older for alcohol misuse and providing brief behavioral counseling to reduce alcohol misuse is a Grade B recommendation of the USPSTF.³⁰ As with HCV and HBV screening, screening for alcohol misuse is covered as a preventive service without copay under the ACA.

For people with substance use disorders and those at risk for developing such disorders, the Substance Abuse and Mental Health Services Administration recommends screening, brief intervention, and referral to treatment (SBIRT).³¹ The SBIRT process provides a standardized framework that enables nurses to

- quickly assess the severity of substance use and the appropriate level of treatment.
- focus on increasing the patient's insight and awareness regarding substance use.
- motivate the patient to change risky behavior.
- identify patients in need of specialty care and help them gain access.

To protect the liver from further harm, counsel patients to

- reduce or discontinue alcohol consumption.
- avoid taking new medications, including over-the-counter and herbal agents, without first checking with their health care provider.
- obtain HIV risk assessment and testing.
- receive HAV and HBV vaccination (if not immune).

To minimize the risk of transmission to others, advise patients *not* to

- donate blood, tissue, or semen.
- share appliances that might come into contact with blood, such as toothbrushes, dental appliances, razors, or nail clippers.
- share needles or other injection equipment if using injection drugs.

The goal of HCV therapy is to achieve sustained viral response, which represents a cure for HCV.

providers should discuss possible treatment options with patients and teach them how to maintain optimal liver health, even if antiviral treatment is not prescribed at that time.

HCV COUNSELING, EDUCATION, AND INTERVENTION

All patients with chronic HCV infection should receive education, counseling, and intervention to reduce the likelihood of liver disease progression and viral transmission to others. The CDC recommends

Encourage overweight or obese patients to lose weight by following a healthy diet and staying physically active. Remind them that excess weight can cause or exacerbate liver damage.

HCV TREATMENT

The goal of HCV therapy is to achieve sustained viral response (SVR), or viral clearance, which represents a cure for HCV.³² HCV treatments have been shown to be effective and to reduce the sequelae of

untreated chronic infection. Treatments, however, are underutilized for a number of reasons. Notably, most patients are unaware of their HCV status, patients and many providers are unaware of new treatments, and the policies of insurance companies and other payers often restrict access to treatment (by requiring evidence of advanced liver fibrosis or cirrhosis before approving treatment, for example).

In addition, older HCV therapies were very difficult to tolerate, with many adverse effects and numerous contraindications. Since 2001—and until very recently—the standard of care for HCV has been pegylated interferon (peginterferon) injected weekly and paired with oral ribavirin. Both patients and providers have been anxious about initiating the 48-week therapy regimen because of its considerable adverse effect profile and relatively low rate of SVR. In two large phase 3 clinical trials of peginterferon plus ribavirin, at least 20% of participants reported adverse events, with 43% to 64% of these reporting fatigue, headache, and fever; 28% to 43% reporting nausea, alopecia, and insomnia; and 22% to 31% reporting depression.³³

In the United States, peginterferon plus ribavirin is no longer the treatment of choice for most genotypes of HCV, though it is listed in the current guidelines²⁸ as an alternative therapy for genotype 5 and is still used in some countries that have not yet approved the newest antiviral agents. The approval of new combination antiviral treatments—such as simeprevir (Olysio) plus sofosbuvir (Sovaldi), ledipasvir–sofosbuvir (Harvoni), and ombitasvir–paritaprevir–ritonavir packaged with dasabuvir (Viekira Pak)—which have fewer adverse effects, shorter treatment durations (12 to 24 weeks), and higher cure rates, has changed the HCV treatment landscape. Additional HCV treatments are in development and are expected to become simpler and even more effective in curing chronic HCV. The availability of effective, curative treatments should serve as a great incentive to diagnose HCV early.

NATIONAL VIRAL HEPATITIS ACTION PLAN

In 2010, the Institute of Medicine (IOM) released a report that identified viral hepatitis as an underappreciated public health problem.² The report highlighted multiple barriers to viral hepatitis prevention and control and provided specific recommendations to improve efforts to stop the spread of viral hepatitis. In response to the IOM report, HHS developed and released *Combating the Silent Epidemic of Viral Hepatitis: Action Plan for the Prevention, Care and Treatment of Viral Hepatitis* in May 2011.² On April 3, 2014, an updated version of the action plan was released for the years 2014 through 2016.³ Detailing over 150 specific actions for federal agencies to take by 2016, the action plan sets goals within six major priority areas and provides a framework to focus the efforts of federal and nonfederal stakeholders in monitoring and measuring the achievement of these

goals (see *Key Elements of the National Viral Hepatitis Action Plan*^{2,3}).

The major federal contributors to the action plan (HHS, the Department of Justice's Federal Bureau of Prisons, the Department of Housing and Urban Development, and the Department of Veterans Affairs) recognize that its goals cannot be fully achieved without significant participation from other, nonfederal partners. As such, the action plan seeks to engage a broad range of stakeholders in efforts to address viral hepatitis in the United States. Because of the pivotal role that nurses play as educators, care coordinators, and health care providers, they are uniquely positioned to provide critical leadership in advancing our nation's efforts to address the "silent epidemic" of viral hepatitis.

THE CRITICAL ROLE OF NURSES

Nurses play an important role in all six priority areas of the action plan. As educators, nurses can give accurate information to patients and, as members of the health care team, help improve the quality of HCV care by ensuring that recommended screening, HAV and HBV vaccination, and HCV treatment are provided. For a variety of online educational resources, see *Resources for Nurses and Their Patients*.

In 2012, the American Academy of Nursing published a policy statement calling for a national response to inadequate HCV screening and testing. The statement concludes as follows: "Leveraging local, state and federal resources as well as the expertise of

Key Elements of the National Viral Hepatitis Action Plan^{2,3}

Action plan priority areas.

1. Educate health care providers and communities to reduce health disparities.
2. Improve testing, care, and treatment to prevent liver disease and cancer.
3. Strengthen surveillance to detect viral hepatitis transmission and disease.
4. Eliminate transmission of vaccine-preventable viral hepatitis.
5. Reduce viral hepatitis caused by drug use behaviors.
6. Protect patients and workers from health care–associated viral hepatitis.

Action plan goals.

The updated action plan (2014–2016) continues the pursuit of four overarching national goals to be achieved by 2020.

- Increase the proportion of people who are aware of their HBV infection from 33% to 66%.
- Increase the proportion of people who are aware of their HCV infection from 45% to 66%.
- Reduce by 25% the number of new cases of HCV infection.
- Eliminate mother-to-child transmission of HBV.

Resources for Nurses and Their Patients

Resources for Nurses

Free online training	Centers for Disease Control and Prevention (CDC) www.cdc.gov/hepatitis/Resources/Professionals/TrainingResources.htm#CDC <ul style="list-style-type: none">• Viral Hepatitis Serology Online Training• Hepatitis Web Study—Interactive modules, free CNE• Hepatitis C Online Course—Interactive modules, from screening to treatment, free CNE
Key resources	American Association for the Study of Liver Diseases (AASLD) <ul style="list-style-type: none">• ACT-First—Training for primary care providers, free CME www.aasld.org/act-first-free-online-cme-course-primary-care-providers• HCV Treatment Guidelines from AASLD and the Infectious Diseases Society of America www.hcvguidelines.org

Resources for Patients

Hepatitis risk assessment	Are you at risk? Take this five-minute hepatitis risk assessment developed by the CDC and get a personalized report. Available at www.cdc.gov/hepatitis/riskassessment
Patient education materials	Printable fact sheets contain general information, perinatal information, the Know Hepatitis B and Know More Hepatitis campaigns, and information for specific populations. Available at www.cdc.gov/hepatitis/Resources/PatientEdMaterials.htm
Free hepatitis C posters	Available to order or download for printing at www.cdc.gov/knowmorehepatitis/media/posters.htm

advanced practice nurses and RNs can provide accurate education [and] information regarding screening, testing, surveillance and evaluation of [the] impact of strategies. Nurses, and their vast health promotion networks, are poised to best assess, intervene and evaluate the impact of enforcing these recommendations.^{33,34}

In practice settings, nurses may be responsible for

- reporting communicable diseases to state and local health departments, thereby improving surveillance data in their communities.
- assisting in disease outbreak investigations, helping to identify sources of infection, and protecting people from exposure.
- educating patients on recommended vaccines, including those for HAV and HBV, as research has shown that patients are more likely to accept a service if recommended by a health care provider.³⁵
- educating parents on infant HBV, ensuring that standing orders for HBV vaccination are in place, and vaccinating all infants in their care within 12 hours of birth.
- counseling patients with chronic HBV or HCV infection about liver health and treatment.
- assessing patients for alcohol or substance use, making referrals as appropriate.

Nurses can also help to identify patients who are using substances at initial assessments and during annual physical examinations, or when patients present

with an accidental injury or wound that may be related to injecting drugs. Upon identifying a patient at risk, they can

- refer patients to substance abuse treatment programs.
- confirm HBV vaccination completion and HCV screening.
- provide education on HCV transmission.

Nurses also play a significant role in infection control. They can identify and address threats to sterile technique before such threats put patients or other health care workers at risk for exposure to such blood-borne pathogens as HBV and HCV. By ensuring that HBV vaccination coverage for all health care workers is in accordance with the Occupational Safety and Health Administration guidelines, nurses can help protect their colleagues from HBV infection due to accidental needlestick. As leaders in preventing new hepatitis infections, providing care and treatment for those living with viral hepatitis, and ensuring the safety of patients and providers in health care settings, nurses are integral to achieving the goals of the HHS viral hepatitis action plan. ▼

For eight additional continuing nursing education activities related to hepatitis, go to www.nursingcenter.com/ce.

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REFERENCES

- Centers for Disease Control and Prevention. *Surveillance for viral hepatitis—United States, 2012*. Atlanta; 2014. <http://www.cdc.gov/hepatitis/Statistics/2012Surveillance/PDFs/2012HepSurveillanceRpt.pdf>.
- U.S. Department of Health and Human Services. *Combating the silent epidemic of viral hepatitis: action plan for the prevention, care and treatment of viral hepatitis*. Washington, DC; 2011. https://www.aids.gov/pdf/actionplan_viralhepatitis2011.pdf
- U.S. Department of Health and Human Services. *Action plan for the prevention, care, and treatment of viral hepatitis: updated 2014-2016*. Washington, DC; 2014 Feb. <https://www.aids.gov/pdf/viral-hepatitis-action-plan.pdf>.
- Atkinson W, et al., eds. *Epidemiology and prevention of vaccine-preventable diseases (The Pink Book)*. 12th ed., second printing. Washington, DC: Public Health Foundation; 2012.
- Westbrook RH, Dusheiko G. Natural history of hepatitis C. *J Hepatol* 2014;61(1 Suppl):S58-S68.
- Klevens RM, et al. Estimating acute viral hepatitis infections from nationally reported cases. *Am J Public Health* 2014; 104(3):482-7.
- McCaustland KA, et al. Survival of hepatitis A virus in feces after drying and storage for 1 month. *J Clin Microbiol* 1982; 16(5):957-8.
- Centers for Disease Control and Prevention. Prevention of hepatitis A through active or passive immunization: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep* 1999;48(RR-12):1-37.
- Fiore AE. Hepatitis A transmitted by food. *Clin Infect Dis* 2004;38(5):705-15.
- Centers for Disease Control and Prevention. Prevention of hepatitis A through active or passive immunization: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep* 2006;55(RR-7):1-23.
- Weinbaum CM, et al. Recommendations for identification and public health management of persons with chronic hepatitis B virus infection. *MMWR Recomm Rep* 2008;57(RR-8):1-20.
- Ko SC, et al. Estimated annual perinatal hepatitis B virus infections in the United States, 2000-2009. *J Pediatric Infect Dis Soc* 2014;3(4):1-8.
- World Health Organization. *Prevention and control of viral hepatitis infection: framework for global action*. Geneva, Switzerland; 2012. http://www.who.int/csr/disease/hepatitis/GHP_framework.pdf.
- Centers for Disease Control and Prevention. Hepatitis B virus: a comprehensive strategy for eliminating transmission in the United States through universal childhood vaccination. Recommendations of the Immunization Practices Advisory Committee (ACIP). *MMWR Recomm Rep* 1991;40(RR-13):1-25.
- Centers for Disease Control and Prevention. Use of hepatitis B vaccination for adults with diabetes mellitus: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Morb Mortal Wkly Rep* 2011;60(50):1709-11.
- Mast EE, et al. A comprehensive immunization strategy to eliminate transmission of hepatitis B virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices (ACIP) Part 1: Immunization of infants, children, and adolescents. *MMWR Recomm Rep* 2005;54(RR-16):1-31.
- Mast EE, et al. A comprehensive immunization strategy to eliminate transmission of hepatitis B virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices (ACIP) Part II: Immunization of adults. *MMWR Recomm Rep* 2006;55(RR-16):1-33.
- Workowski KA, et al. Sexually transmitted diseases treatment guidelines, 2010. *MMWR Recomm Rep* 2010;59(RR-12):1-110.
- Centers for Disease Control and Prevention. Sexual transmission of hepatitis C virus among HIV-infected men who have sex with men—New York City, 2005-2010. *MMWR Morb Mortal Wkly Rep* 2011;60(28):945-50.
- Centers for Disease Control and Prevention. World hepatitis day—July 28, 2011. *MMWR Morb Mortal Wkly Rep* 2011; 60(28):945.
- Volk JE, et al. Incident hepatitis C virus infections among users of HIV preexposure prophylaxis in a clinical practice setting. *Clin Infect Dis* 2015 Feb 18 [Epub ahead of print].
- Paintsil E, et al. Hepatitis C virus maintains infectivity for weeks after drying on inanimate surfaces at room temperature: implications for risks of transmission. *J Infect Dis* 2014; 209(8):1205-11.
- LeFevre ML, U.S. Preventive Services Task Force. Screening for hepatitis B virus infection in nonpregnant adolescents and adults: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med* 2014;161(1):58-66.
- Moyer VA, U.S. Preventive Services Task Force. Screening for hepatitis C virus infection in adults: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med* 2013;159(5):349-57.
- Smith EA, et al. The national perinatal hepatitis B prevention program, 1994-2008. *Pediatrics* 2012;129(4):609-16.
- Smith BD, et al. Recommendations for the identification of chronic hepatitis C virus infection among persons born during 1945-1965. *MMWR Recomm Rep* 2012;61(RR-4):1-32.
- Au JS, Pockros PJ. Novel therapeutic approaches for hepatitis C. *Clin Pharmacol Ther* 2014;95(1):78-88.
- American Association for the Study of Liver Diseases, Infectious Diseases Society of America, International Antiviral Society—USA. *Recommendations for testing, managing, and treating hepatitis C*. Alexandria, VA; 2014. <http://www.hcvguidelines.org>.
- Holmberg SD, et al. Hepatitis C in the United States. *N Engl J Med* 2013;368(20):1859-61.
- Moyer VA, Preventive Services Task Force. Screening and behavioral counseling interventions in primary care to reduce alcohol misuse: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med* 2013;159(3):210-8.
- Substance Abuse and Mental Health Services Administration (SAMHSA). *Systems-level implementation of screening, brief intervention, and referral to treatment (SBIRT)*. Rockville, MD: U.S. Department of Health and Human Services, Center for Substance Abuse Treatment; 2013 May. TAP 33. Technical assistance publication series; <http://store.samhsa.gov/product/TAP-33-Systems-Level-Implementation-of-Screening-Brief-Intervention-and-Referral-to-Treatment-SBIRT-SMA13-4741>.
- Ward JW. Hepatitis C virus: the 25-year journey from discovery to cure. *Hepatology* 2014;60(5):1479-82.
- Fried MW. Side effects of therapy of hepatitis C and their management. *Hepatology* 2002;36(5 Suppl 1):S237-S244.
- Zucker DM, et al. Hepatitis C screening and testing: a call for a national response. *Nurs Outlook* 2012;60(4):229-30.
- Darden PM, Jacobson RM. Impact of a physician recommendation. *Hum Vaccin Immunother* 2014;10(9):2632-5.
- Centers for Disease Control and Prevention. Testing for HCV infection: an update of guidance for clinicians and laboratories. *MMWR Morb Mortal Wkly Rep* 2013;62(18):362-5.