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Key Inforbits

- What is Hepatitis?
- Transmission of the Disease
- Who Should be Tested?
- Hepatitis C: 25 Years Since Discovery
- Vaccination Station
- New Treatments
- Living with Hepatitis

July 28 is World Hepatitis Day!

What Is Hepatitis?

Hepatitis is a viral infection that is either acute or chronic in nature.¹ Over 3 million suffer from chronic Hepatitis C. As of 2010, there were approximately 34,000 new infections of hepatitis A and C combined and approximately 38,000 new hepatitis B infections. Acute hepatitis is defined as “an illness with a discrete date of onset with jaundice or increased serum aminotransferase concentrations greater than 2.5 times the upper limit of normal.”² The acute form of hepatitis may last as long as 6 months. Chronic hepatitis is “an inflammatory condition of the liver that involves ongoing hepatocellular necrosis for 6 months or more beyond the onset of acute illness.” Symptoms are similar among the subtypes of hepatitis and include nausea, vomiting, loss of appetite, gray-colored bowel movements, jaundice, joint pain, and fatigue.¹

1. The ABCs of Hepatitis. U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. [Internet]. [Updated Aug 2012, Cited 2012 Jul 16]. Available from: <http://www.cdc.gov/hepatitis/resources/professionals/pdfs/abctable.pdf>.
2. Holt CD. Viral Hepatitis. In: Alldredge BK, Corelli RL, Ernst ME, Guglielmo BJ, Jacobson PA, Kradjan WA, Williams BR, editors. Koda-Kimble and Young applied therapeutics: the clinical use of drugs. 10th ed. Pennsylvania: Wolters Kluwer; c2013. p. 1790-1827.

Transmission of the Disease

Hepatitis A virus (HAV)	Hepatitis B virus (HBV)	Hepatitis C virus (HCV)
Oral-fecal route, even in microscopic amounts, from: <ul style="list-style-type: none"> • Close contact with an infected person • Sexual contact with infected person • Contaminated food/drinks 	Contact with infectious bodily fluids, mainly via: <ul style="list-style-type: none"> • Birth to infected mother • Sexual contact • Sharing needles/syringes • Needle sticks 	Contact with blood of an infected person mainly through: <ul style="list-style-type: none"> • Sharing needles Less commonly through: <ul style="list-style-type: none"> • Sexual contact • Birth to an infected mother • Needle sticks

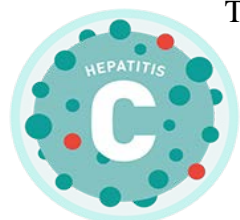
1. The ABCs of Hepatitis. U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. [Internet]. [Updated Aug 2012, Cited 2012 Jul 16]. Available from: <http://www.cdc.gov/hepatitis/resources/professionals/pdfs/abctable.pdf>.

Who is at Risk and Who Should be Tested?

Hepatitis A	Hepatitis B	Hepatitis C
<ul style="list-style-type: none"> • Travelers to regions where Hepatitis A is prevalent (i.e., developing countries with poor sanitation) • Men who have sex with men • Illicit drug users • Those with clotting-factor disorders 	<ul style="list-style-type: none"> • Infants born to infected mothers • Sexual promiscuity • Injection drug users • Household contacts of infected persons • Dialysis patients • Healthcare personnel • Residents and staff members of facilities for disabled persons 	<ul style="list-style-type: none"> • Current/former injection drug users • Clotting factor recipients <1987 • Blood transfusion recipients before July 1992 • Long-term dialysis patients • Healthcare personnel • HIV-positive patients • Infants born to infected mothers • Those born between the years of 1945 and 1965

1. The ABCs of Hepatitis. U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. [Internet]. [Updated Aug 2012, Cited 2014 Jul 16]. Available from: <http://www.cdc.gov/hepatitis/resources/professionals/pdfs/abctable.pdf>.
2. Sharapov UM, Teshale EH. Infectious diseases related to travel. U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. [Internet]. [Updated Aug 2013, Cited 2014 Jul 21]. Available from: <http://wwwnc.cdc.gov/travel/yellowbook/2014/chapter-3-infectious-diseases-related-to-travel/hepatitis-a#362>.

Hepatitis C: 25 years Since Discovery



This year marks the 25th anniversary of the discovery of the Hepatitis C virus.¹ According to the National Health and Nutrition Examination Survey involving data from 2003 to 2010, it is estimated 3 million people in the US had chronic Hepatitis C (approximately 1.3% of the US population) and remains the most common chronic blood borne infection.² There are approximately 135 million people worldwide who are currently living with chronic HCV with half a million deaths per year. Since its discovery in 1989, many public health and scientific advances have improved prevention programs and transformed treatment options.¹ By 1992, HCV was virtually eliminated from all blood banks in the US due to the routine blood supply testing. In less than 10 years after discovery, the annual rate of newly infected individuals has dropped more than 80% due to awareness, patient education, and new infection control practices. In 2007, the incidence of death due to HCV exceeds that of HIV despite decreased incidence of new cases. In 2011, the U.S. department of Health and Human Services issued the nation's first comprehensive action plan for the prevention, care, and treatment of viral hepatitis. Also in 2011, President Obama and the World Health Organization (WHO) declared July 28th the annual World Hepatitis Day. In the past several months, success in the development of new treatment regimens are promising, suggesting that in the future HCV can be low cost and easy to cure and even eradicated.³



1. Division of Viral Hepatitis, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. Hepatitis C: 25 Years of Discovery [Internet]. Atlanta (GA): Centers for Disease Control and Prevention; [updated 2014 Jun 3; cited 2014 May 28]. Available from: <http://www.cdc.gov/knowmorehepatitis/Timeline.htm>
2. Denniston MM, Jiles RB, Drobeniuc J, Klevens RM, Ward JW, McQuillan GM, Holmberg SD. Chronic hepatitis C virus infection in the United States, National Health and Nutrition Examination Survey 2003 to 2010. *Ann Intern Med.* 2014;160:293-300.
3. Only just the beginning of the end for hepatitis C [Internet]. *The Lancet* 2014 Jan 25;383(9914):281.

VACCINATION STATION

There are several vaccines that are currently available in the United States to help prevent the transmission of HAV and HBV; however, there is no vaccine to prevent HCV transmission.¹ *HAVRIX* and *VAQTA* are single antigen vaccines that can be safely administered in both pediatric and adult patients for HAV. *TWINRIX* is a combination vaccine including both HAV and HBV antigens, indicated for adult use. *Recombivax HB* and *Engerix-B* are the single antigen products that can safely be administered for pediatric and adult patients for HBV. The combination HBV products include *TWINRIX*, *Comvax*, and *Pediarix*. The aforementioned *TWINRIX* is only recommended for use in adults whereas *Comvax* and *Pediarix* are routinely administered in the pediatric population. *Comvax* and *Pediarix* also combine the HBV vaccine along with other common childhood vaccinations for ease of administration. Patients with risk factors for HAV and/or HBV should receive the vaccine according to the dosing schedule outlined by the Centers for Disease Control and Prevention summarized in the table below.



Dosing of HAV and HBV Vaccines^{1,2,3}			
Vaccine	Age	No. of Doses	Schedule
<i>HAVRIX</i> (HAV)	1-18 years	2	0, 6-12 months
	≥19 years	2	0, 6-12 months
<i>VAQTA</i> (HAV)	1-18 years	2	0, 6-18 months
	≥19 years	2	0, 6-18 months
<i>TWINRIX</i> (HAV and HBV)	≥18	3	0, 1, 6 months
	≥18 (accelerated schedule)	4	0, 7 days, 21-30 days, +12 months
<i>Recombivax HB</i> or <i>Engerix-B</i> (HBV)	0-19	3	0, 1, and 6 months
	≥20	3	0, 1, and 6 months
<i>Comvax</i> (HBV)	6 weeks to 15 months	3	0, 2, and 8-11 months
<i>Pediarix</i> (HBV)	6 weeks to <7 years	3	0, 2, and 4 months

1. Deming P. Viral Hepatitis. In: Dipro JT, Talbert RL, Yee GC, Matzke GR, Wells BG, Posey LM, editors. *Pharmacotherapy: a pathophysiologic approach*: 9th ed. New York: McGraw-Hill; c2014. p.583-602.
2. Advisory Committee on Immunization Practices (ACIP) Centers for Disease Control and Prevention (CDC). Update: Prevention of hepatitis A after exposure to hepatitis A virus and in international travelers. Updated recommendations of the Advisory Committee on Immunization (ACIP). *Morb Mortal Wkly Rep* 2007;56(41):1080-1084
3. Recombivax HB, Engerix-B, Comvax, Pediarix. In: DRUGDEX® System (Micromedex) [AUHSOP Intranet]. Ann Arbor (MI): Truven Health Analytics Inc. [cited 2014 Jul 16]. Available from: <http://www.micromedexsolutions.com/micromedex2/librarian/>.

New treatments



Until a few years ago interferon and ribavirin were the only two drugs approved by the FDA to treat HCV, but response to interferon is variable and ribavirin cannot be used as monotherapy.¹ The side effect profile ranging from fatigue to mood disorders also limits the use in patients and can be difficult for those in which interferon is effective, but cannot tolerate it.

In the past few years there have been significant advances in the development of oral medications for HCV.² New treatment options include interferon-free and ribavirin optional regimens that are taken orally once daily. Simeprevir (*Olysio*) and sofosbuvir (*Sovaldi*) were approved by the FDA in late 2013 which is helping to lead the way to increasing cure rates to almost 100% and shortening treatment time to 12 weeks.³ However, cost is still an issue with prices simeprevir at \$66,000 and sofosbuvir at \$84,000 for one 12 week treatment which will put these options out of reach for many.^{2,4} Medicaid programs across the country could potentially pay more than \$55 billion for the breakthrough treatments for HCV.⁵ The treatment roughly costs \$1,200 even with the drug discounts for Medicaid plans. There is estimated to be over 750,000 patients covered under state health programs that currently suffer from HCV. Advocates claim that treatment with sofosbuvir to cure HCV will be cheaper long term than letting the disease progress to cirrhosis or liver cancer; the cost of a liver transplant will incur hundreds of thousands of dollars.



1. Sulkowski M. Exploring the possibility of an interferon-free treatment regimen for hepatitis C virus infection. *Gastroenterol Hepatol* 2011 Mar;7(3):185-7.
2. Only just the beginning of the end for hepatitis C [Internet]. *Lancet* 2014 Jan 25;383(9914):281.
3. Treatment: What Medications are Used to Treat Hepatitis C? [Internet]. New York (NY): American Liver Foundation. [cited 2014 Jul 16] Available from: <http://hepc.liverfoundation.org/treatment/the-basics-about-hepatitis-c-treatment/what-medications-are-used-to-treat-hepatitis-c/>
4. Garcia J. Hepatitis C: More Affordable Treatment Possible [Internet]. *Medscape*. 2014 Jan 13. Available from: <http://www.medscape.com/viewarticle/819086>
5. Bertha C. Costly drug becomes financial headache for states [Internet]. *MSN Money Partner* 2014. 2014 Jul 17. Available from: <http://money.msn.com/top-stocks/post--costly-drug-becomes-financial-headache-for-states>.

Do's and Don'ts of Hepatitis

Do	Don't
<ul style="list-style-type: none"> ✓ Practice healthy hygiene and safe sex ✓ Schedule regular doctors appointments ✓ Maintain a well-balanced diet and exercise regimen <div style="text-align: center;"></div>	<ul style="list-style-type: none"> ✓ Share razors or toothbrushes ✓ Keep it a secret from sexual partners ✓ Share nail clippers or needles ✓ Drink excessive alcohol ✓ Donate blood or organs <div style="text-align: center;"></div>

Hepatitis. In: Hepatitis Foundation International. [Internet]. Silver Spring (MD): 2014. [cited 2014 Jul 16]. Available from: <http://www.hepfi.org/HEPATITIS/Hepatitis-overview.html>.

The Last Dose

“Never go to a doctor whose office plants have died”

- Erma Bombeck (American humorist, 1927 to 1996)



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