

Epidemiology of Hepatitis B & C in Kentucky

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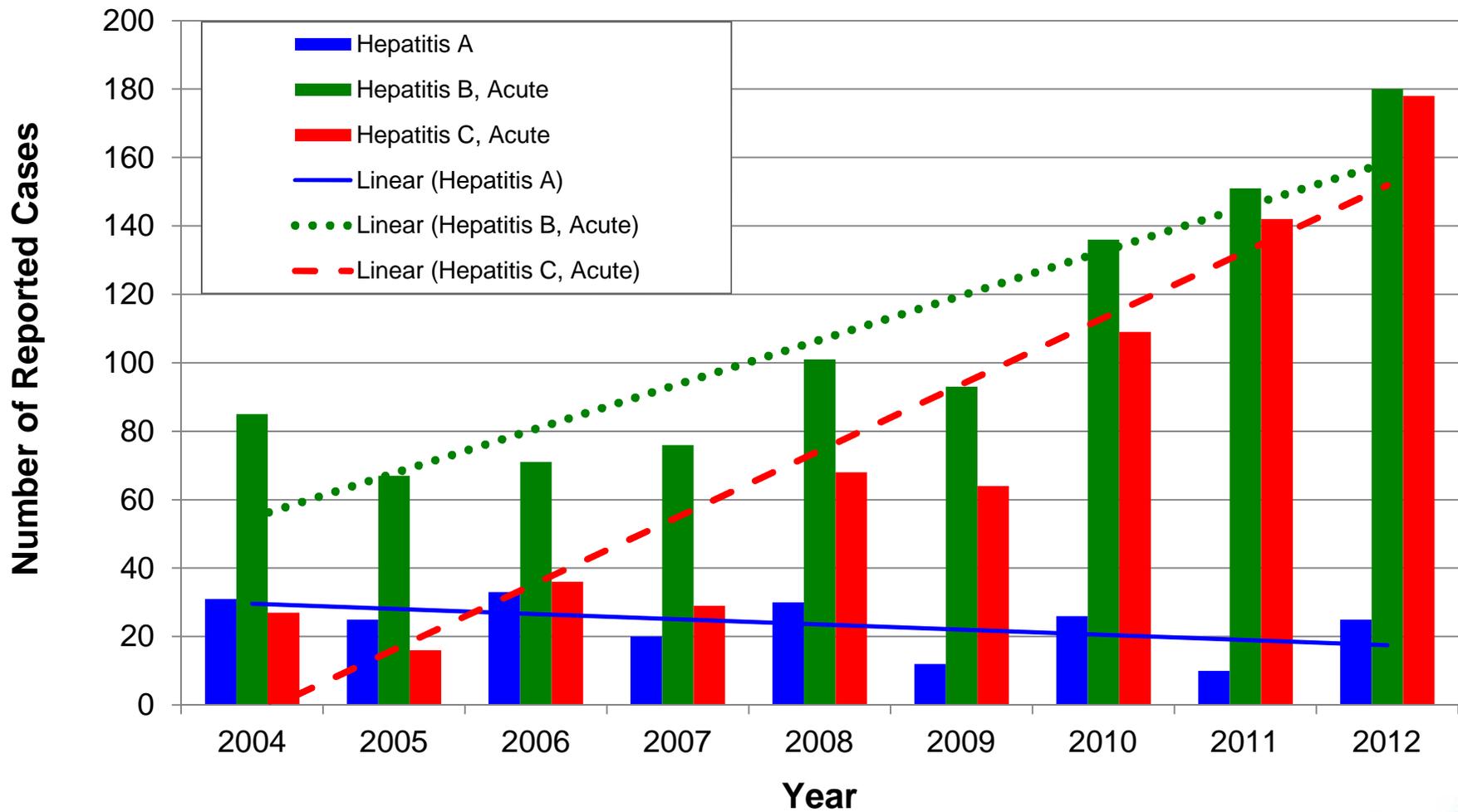
July 24, 2014



Hepatitis in General

- Hepatitis means inflammation of the liver
- Alcohol, chemicals, autoimmune disease, drugs and a number of viruses can lead to hepatitis
- 6 known hepatitis viruses: A, B, C, D, E & G
- Wide genetic diversity
- Different modes of transmission, effects on the body & treatments

Trends in Viral Hepatitis in Kentucky



Hepatitis B

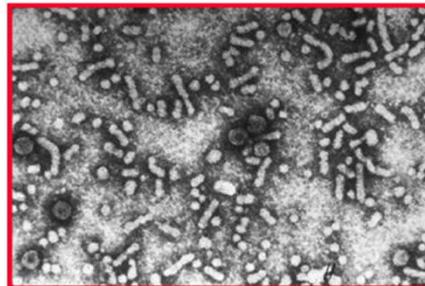


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Hepatitis B (HBV)

- DNA-containing virus
- Humans are the only known host
- HBV is relatively resilient and may retain infectivity for more than 7 days at room temperature
- Approximately 2 billion persons worldwide have been infected with HBV
 - More than 350 million have chronic infections
- Cause of 80% of hepatocellular carcinomas

Hepatitis B Virus



Acute Hepatitis B Clinical Features

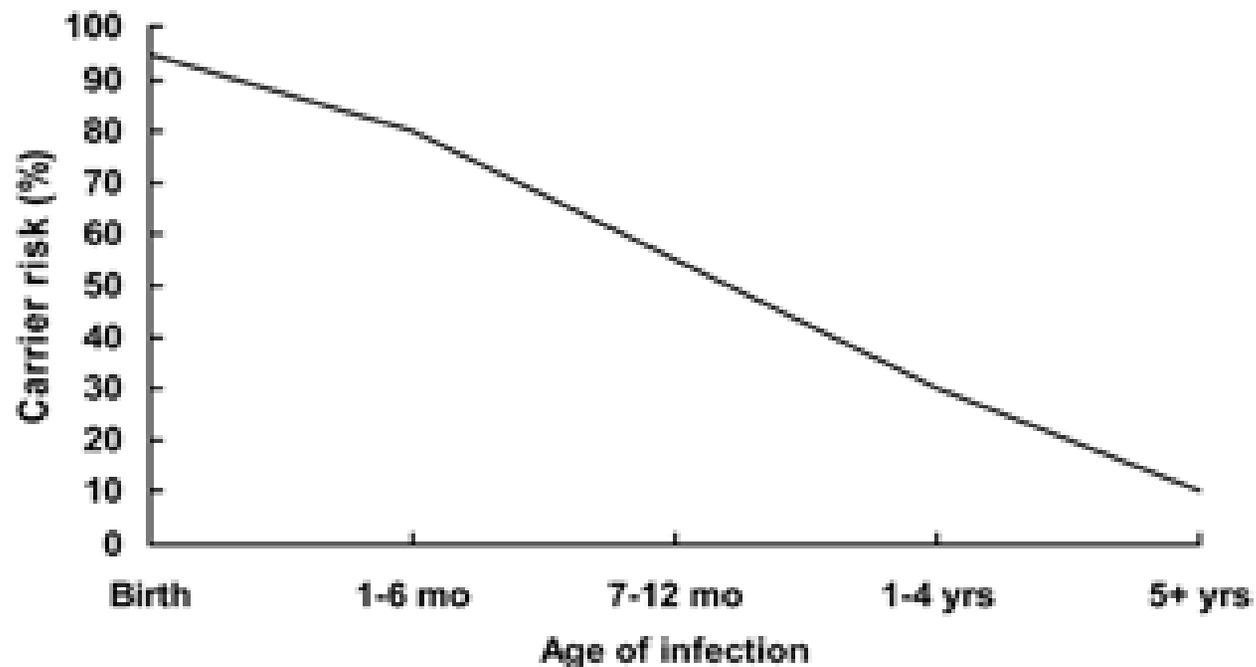
- Incubation period is 45-160 days with an average of 90 days
- Varied and sometimes vague signs and symptoms may include:
 - Anorexia
 - Nausea
 - Malaise
 - Right upper quadrant abdominal pain
 - Dark urine
 - Jaundice
- Illness is not specific for HBV
- At least 50% of adults with acute HBV infections are asymptomatic

Acute Hepatitis B Clinical Features

- **The likelihood of developing symptoms of acute hepatitis is age dependent:**
 - **<1% of infants younger than 1 year of age**
 - **5% to 15% of children ages 1 through 5 years**
 - **30% to 50% of people older than 5 years of age are symptomatic**
- **The risk of developing chronic infection is inversely associated with age**
 - **>90% of infants infected at birth or in their first year of life**
 - **25% to 50% of children ages 1 to 5 years**
 - **5% to 10% of older children and adults**

Hepatitis B

Risk of Chronic HBV Carriage by Age of Infection



HBV Epidemiology

- **HBV is transmitted through infected body fluids. Substances capable of transmitting HBV include:**
 - Blood and blood products
 - Saliva
 - Cerebrospinal fluid
 - Peritoneal, pericardial, and pleural fluids
 - Synovial, amniotic, seminal, and vaginal fluids
 - Other body fluids containing blood
 - Unfixed tissues and organs
- **Persons with chronic HBV infection are the primary reservoirs for infection**
- **HBV is vaccine-preventable**

Hepatitis B Risk Factors

Transmission is by parenteral or mucosal exposure to HBsAg-positive body fluids from persons who have acute or chronic HBV infection

- **Sharing or using nonsterilized needles, syringes or glucose monitoring equipment or devices**
- **Sexual contact with an infected person**
- **Perinatal exposure to an infected mother**
- **Household exposure to a person with chronic HBV infection (especially in areas with a high prevalence of HBV infection)**

- **Transmission by contaminated blood or blood products is rare in the US due to routine screening**

Acute Hepatitis B Case Definition

- **Clinical Description**

- An acute illness with a discrete onset of any sign or symptom* consistent with acute viral hepatitis (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, and abdominal pain), and either a) jaundice, or b) elevated serum alanine aminotransferase (ALT) levels > 100 IU/L.
- *a documented negative hepatitis B antigen (HBsAg) laboratory test result within 6 months prior to a positive test (either HBsAg, hepatitis B “e” antigen (HBeAg), or hepatitis B virus nucleic acid testing (HBV NAT) including genotype) result does not require an acute clinical presentation to meet the surveillance case definition.

- **Laboratory Criteria**

- HBsAg positive, AND
- Immunoglobulin M (IgM) antibody to hepatitis B core antigen (IgM anti-HBc) positive (if done)
- **AND patient not known to have chronic hepatitis B**

Reporting Hepatitis B

- KY DISEASE SURVEILLANCE REQUIRES A REPORT TO THE LHD OR STATE DPH WITHIN **ONE BUSINESS DAY** OF THE IDENTIFICATION OF A CASE OR SUSPECTED CASE

Perinatal Hepatitis B



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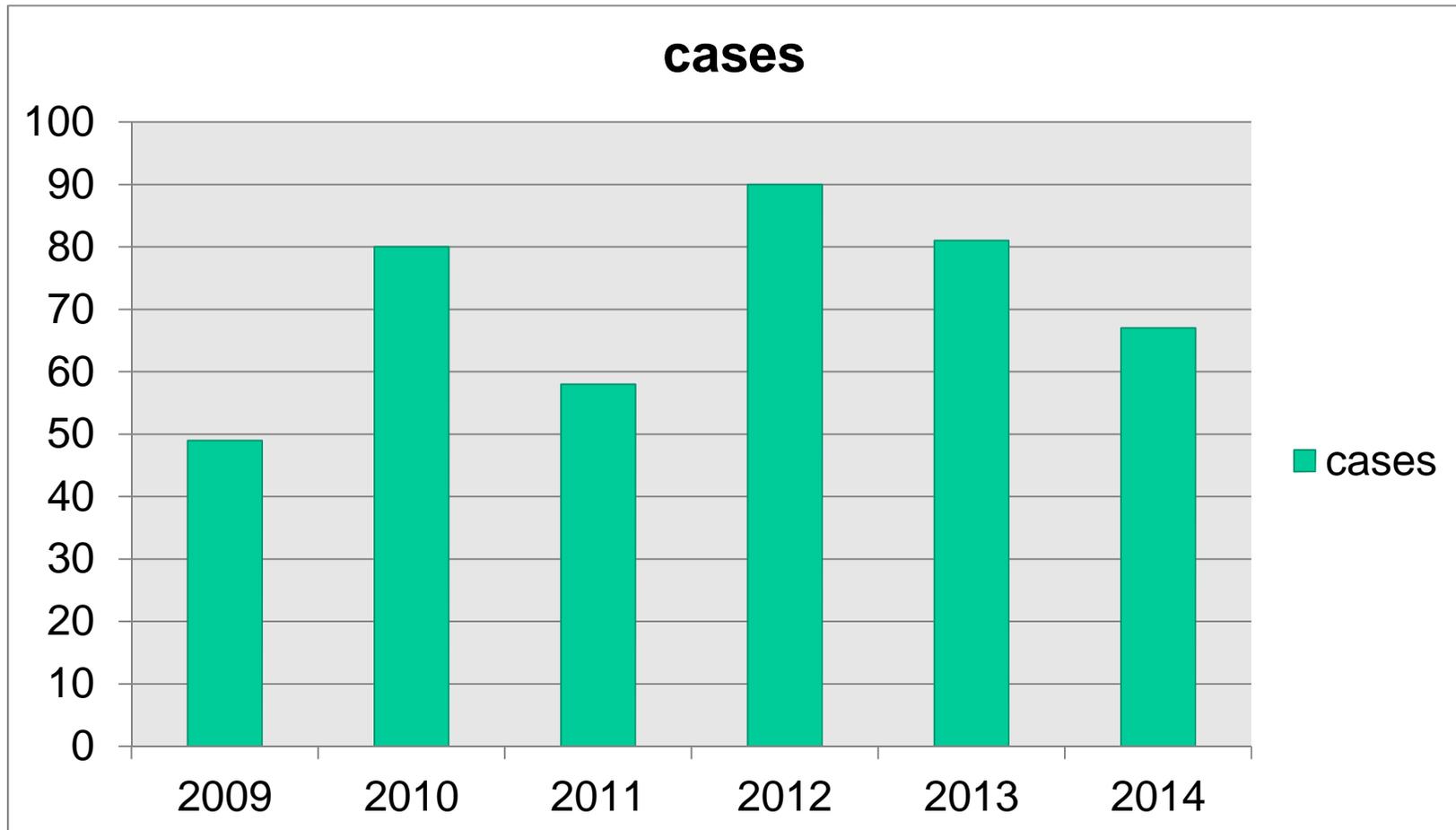
Perinatal Hepatitis B Prevention Program

- The goal of the KY Perinatal Hepatitis B Prevention Program is to reduce the incidence of perinatal hepatitis B infections in Kentucky.

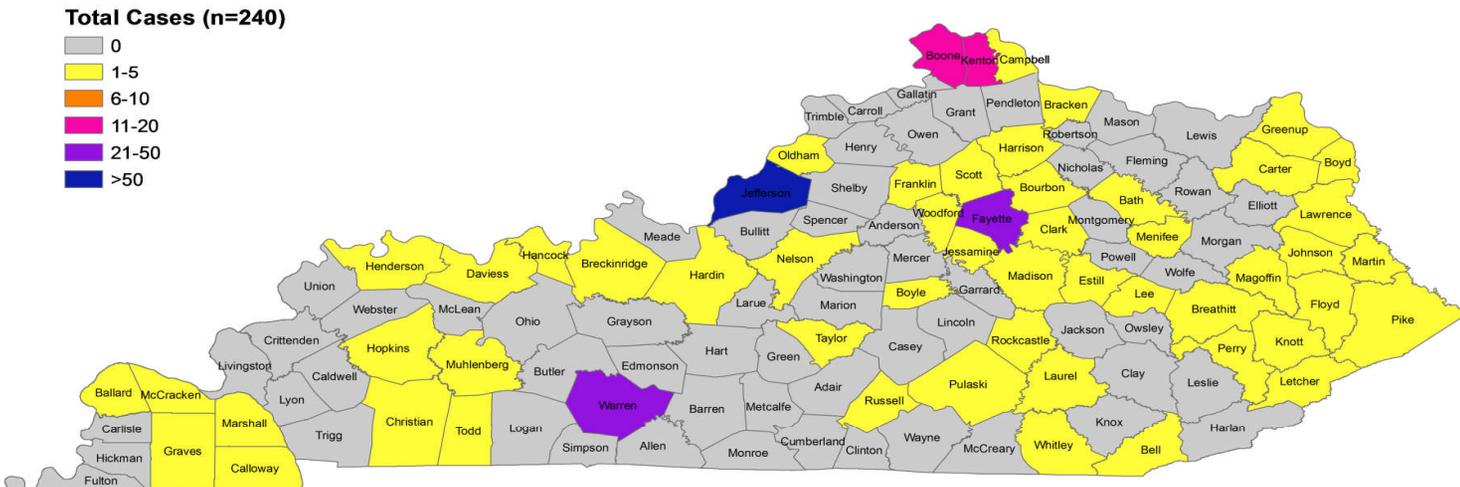
Case Classification

Hepatitis B surface antigen (HBsAg) positivity in any infant aged > 1-24 months who was born in the United States or in U.S. Territories to an HBsAg-positive mother

Perinatal Hepatitis B Prevention Cases in Kentucky



Perinatal Hepatitis B Prevention Cases*, 2010-2012



Cabinet for Health and Family Services
 Kentucky Immunization Program
 June 2014

*Note: The numbers reported may represent an underestimate of the true absolute number of active Perinatal Hepatitis B prevention cases in the state. Data are considered provisional and subject to change. The Cabinet for Health and Family Services is not responsible for any duplication or misrepresentation of surveillance data released in this report.



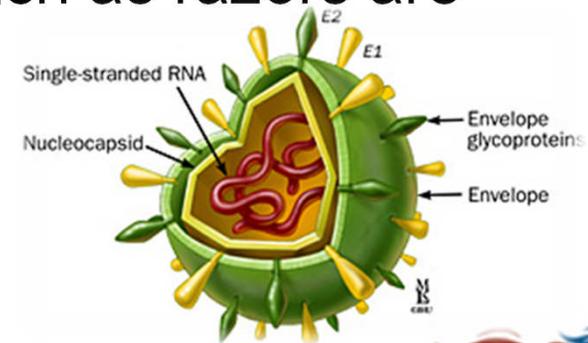
Hepatitis C



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Hepatitis C Virus

- Hepatitis C is a liver disease that results from infection with the hepatitis C virus (HCV), a single-stranded RNA virus
- HCV is a primarily blood borne pathogen
- Most are infected with HCV by sharing needles or other equipment to inject drugs
- Before 1992, HCV was commonly spread through blood transfusions and organ transplants
- Sex and sharing personal items such as razors are infrequent means of transmission
- *Not* vaccine-preventable



Acute or Chronic Hepatitis C (HCV) Infection

- HCV can either be acute or chronic
- Acute is a short-term illness (reportable in KY)
- Most acute HCV infection leads to chronic infection
- Eventually, damage to the liver occurs leading to severe liver disease, including cirrhosis and liver cancer



Prevalence of Hepatitis C Infection

- WHO estimates that >170 million are infected worldwide
- As many as 3.5 million Americans and over 56,000 Kentuckians may have chronic hepatitis C (HCV) infection. That's 1-2% of the population!
- 10,000-12,000 Americans die of complications from HCV infection each year
- According to CDC reports, Kentucky has the highest rates of HCV infection

“Hepatitis C has to be one of the most gravely miscalculated diseases by governments on the planet”

Michel Kazatchkine, UN Secretary General Envoy on HIV/ AIDS

Indolent Nature of HCV Infection

- Most patients with chronic HCV infection have not been diagnosed.
 - Only an estimated 30% have been diagnosed
- Most persons living with HCV infection have few symptoms of illness until 10 to 20 years after initial infection, when life threatening health complications can develop, including end stage liver disease and liver cancer.
- Most morbidity and mortality from HCV infection is caused by complications of decompensated cirrhosis.

Hepatitis C: Principles of Transmission

- Hepatitis C virus must **exit** the body
- Hepatitis C virus must **survive** in the environment in which it has been placed
- Sufficient **concentration** of virus (viral load) must be present to cause infection
- Hepatitis C virus must **enter** the bloodstream of another person

The Liver Remembers...



“You may not remember everything that happened in the '60s and '70s, but your liver does.”

*Dr. Thomas Frieden, CDC Director.
May 7, 2013*

HCV Transmission

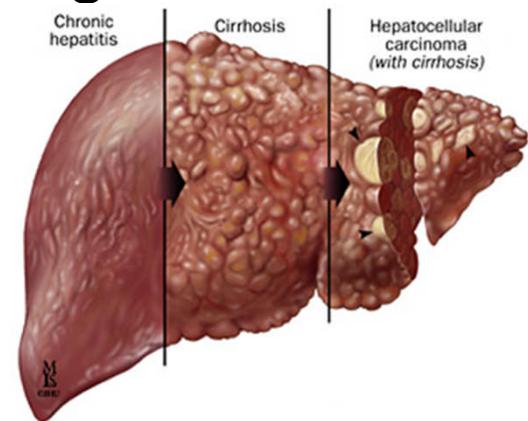
- Incubation period is 4-12 weeks (range: 2-24 weeks)
- Transmitted primarily through large or repeated percutaneous exposures to infectious blood, such as:
 - Injection drug use (currently the most common means of HCV transmission in the United States)
 - Receipt of donated blood, blood products, and organs prior to 1992
 - Needle stick injuries in health care settings
 - Birth to an HCV-infected mother(*during pregnancy or at birth - 5% - 8% risk)
 - Increased risk if hepatitis C contracted during pregnancy
 - HIV co-infection increases risk 4-fold

HCV Transmission (Cont'd)

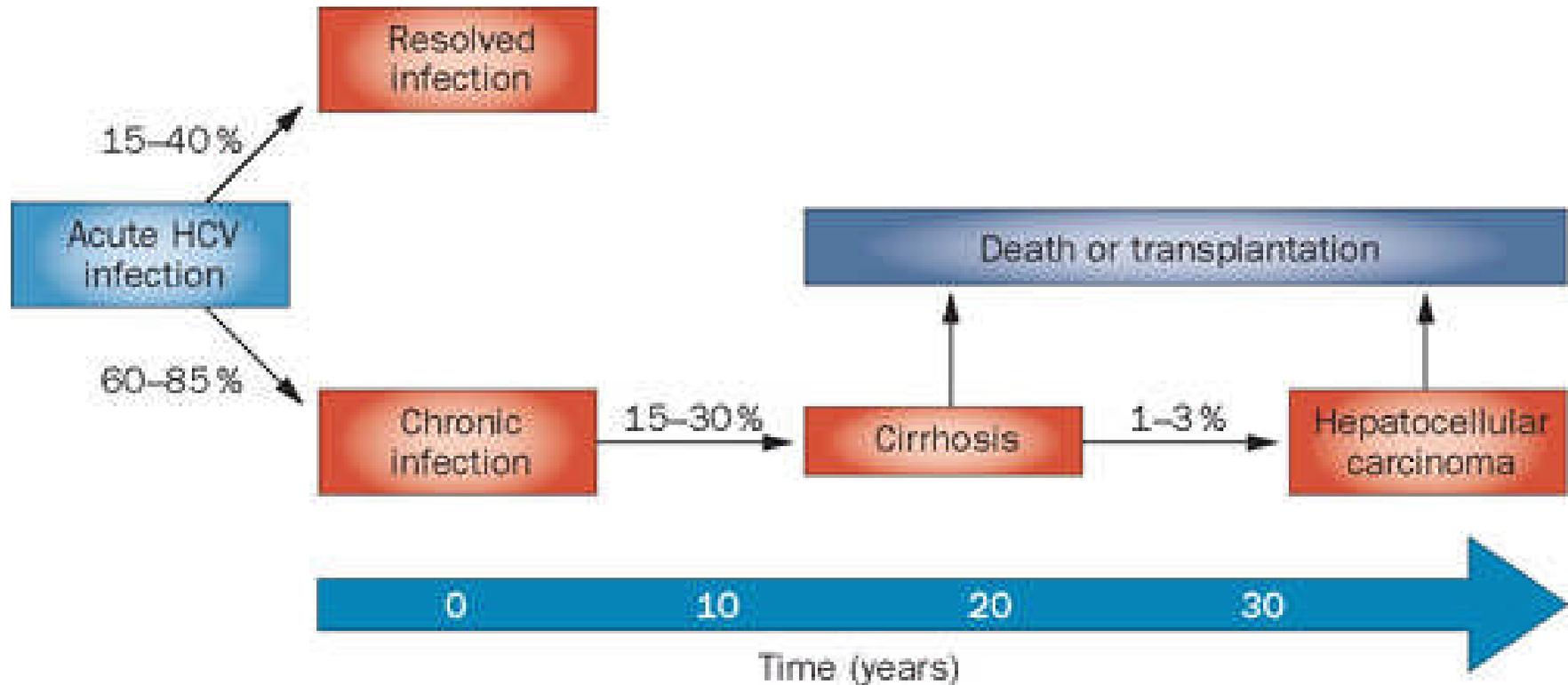
- HCV can also be spread infrequently through
 - Sex with an HCV-infected person
 - Sharing personal items contaminated with infectious blood, such as razors or toothbrushes (also inefficient vectors of transmission)
 - Other health care procedures that involve invasive procedures, such as injections (usually recognized in the context of outbreaks)
 - Intranasal cocaine use, tattooing, and body piercing

Natural History

- Identification is difficult as most patients are asymptomatic during acute infection.
- 60%-85% of people infected will develop chronic disease
- Most importance consequence is progressive liver fibrosis, which can lead to:
 - Cirrhosis
 - Liver failure
 - Hepatocellular carcinoma
- HCV infection is the most common reason for liver transplantation in the U.S. and Europe.



Natural History



Vassilopoulos, D. & Calabrese L. H. (2012) Management of rheumatic disease with comorbid HBV or HCV infection
Nat. Rev. Rheumatol. doi:10.1038/nrrheum.2012.63

Acute HCV Case Definition

- **Clinical description:**

- An acute illness with a discrete onset of any sign or symptom* consistent with acute viral hepatitis (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, and abdominal pain), and either a) jaundice, or b) elevated serum alanine aminotransferase (ALT) levels >400IU/L.

*A documented negative HCV antibody laboratory test result followed within 6 months by a positive test (as described in the laboratory criteria for diagnosis) result does not require an acute clinical presentation to meet the surveillance case definition.

Acute HCV Case Definition (Cont'd)

- **Laboratory criteria:**
 - One or more of the following:
 - Antibodies to hepatitis C virus (anti-HCV) screening-test-positive with a signal to cut-off ratio predictive of a true positive as determined for the particular assay as defined by CDC. (URL for the signal to cut-off ratios: <http://www.cdc.gov/hepatitis/HCV/LabTesting.htm>), OR
 - Hepatitis C Virus Recombinant Immunoblot Assay (HCV RIBA) positive, OR
 - Nucleic Acid Test (NAT) for HCV RNA positive (including qualitative, quantitative or genotype testing)

Hepatitis C -Related Hospital Charges in KY

Hepatitis C Discharge Billing in Kentucky Hospitals

Hospital Locations	2009 Charges (Jan-Dec)	2010 Charges (Jan-Dec)	2011 Charges (Jan-Dec)	2012 Charges (Jan-Dec)	*2013 Charges (Jan- June)
Inpatient	\$181,131,885 6,361 cases	\$215,534,935 7,055 cases	\$261,596,429 8,230 cases	\$348,355,755 10,306 cases	\$174,353,453* 5,387 cases*
Emergency Room	\$10,533,020 3,823 cases	\$13,493,218 4,277 cases	\$15,607,433 4,701 cases	\$23,053,204 6,175 cases	\$11,665,703* 3,069 cases*

HCV in Corrections

Kentucky Department of Corrections: Hepatitis C Screening and Initiation of Hepatitis C Treatment, by Year

Year	Number of Inmates Screened for HCV	Number of Inmates Confirmed HCV Positive	Number of Inmates that Started Hepatitis C Treatment
2010	835	300	47
2011	905	256	50
2012	1,248	306	35
2013*	736*	343*	43*
Total**	3,724**	1205**	175**

HCV in Corrections: Genotype

Corrections: Hepatitis C Treatment Number of Cases and Distribution by HCV Genotype (GT)							
Year	GT 1	GT 2	GT 3	GT 4	GT 5	GT 6	Total
* 2010	22 47%	11 23%	14 30%	0 0%	0 0%	0 0%	47
2011	16 32%	12 24%	22 44%	0 0%	0 0%	0 0%	50
2012	11 31%	13 37%	11 31%	0 0%	0 0%	0 0%	35
2013 *	15* 35%	10* 23%	18* 42%	0 0%	0 0%	0 0%	43*
Total	64**	46**	65**	0	0	0	175**

Pregnant Women and HCV

- Hepatitis C can be transmitted from mother to infant during delivery
- Post-exposure prophylaxis not available
- Breastfeeding is allowed unless nipples are cracked and/or bleeding

Pregnant Women and HCV

- Voluntary Perinatal HCV Reporting started January 2014 and continues:
- All pregnant women with history of Hepatitis C
- All newborns and children under the age of 5
- Fax forms to 502-564- 4760

325 cases of perinatal hepatitis C infection have been voluntarily reported so far this year

Take Home Points

- Hepatitis B and C infections are on the rise in Kentucky
- Though both can damage the liver, they are very different viruses genetically
- Both have chronic disease states
- Both have relatively long incubation periods
- Blood exchange is a mechanism of transmission for both viruses
- Hepatitis B is vaccine preventable; hepatitis C is not
- Perinatal hepatitis B cases are gradually trending upward, with larger numbers in metro areas