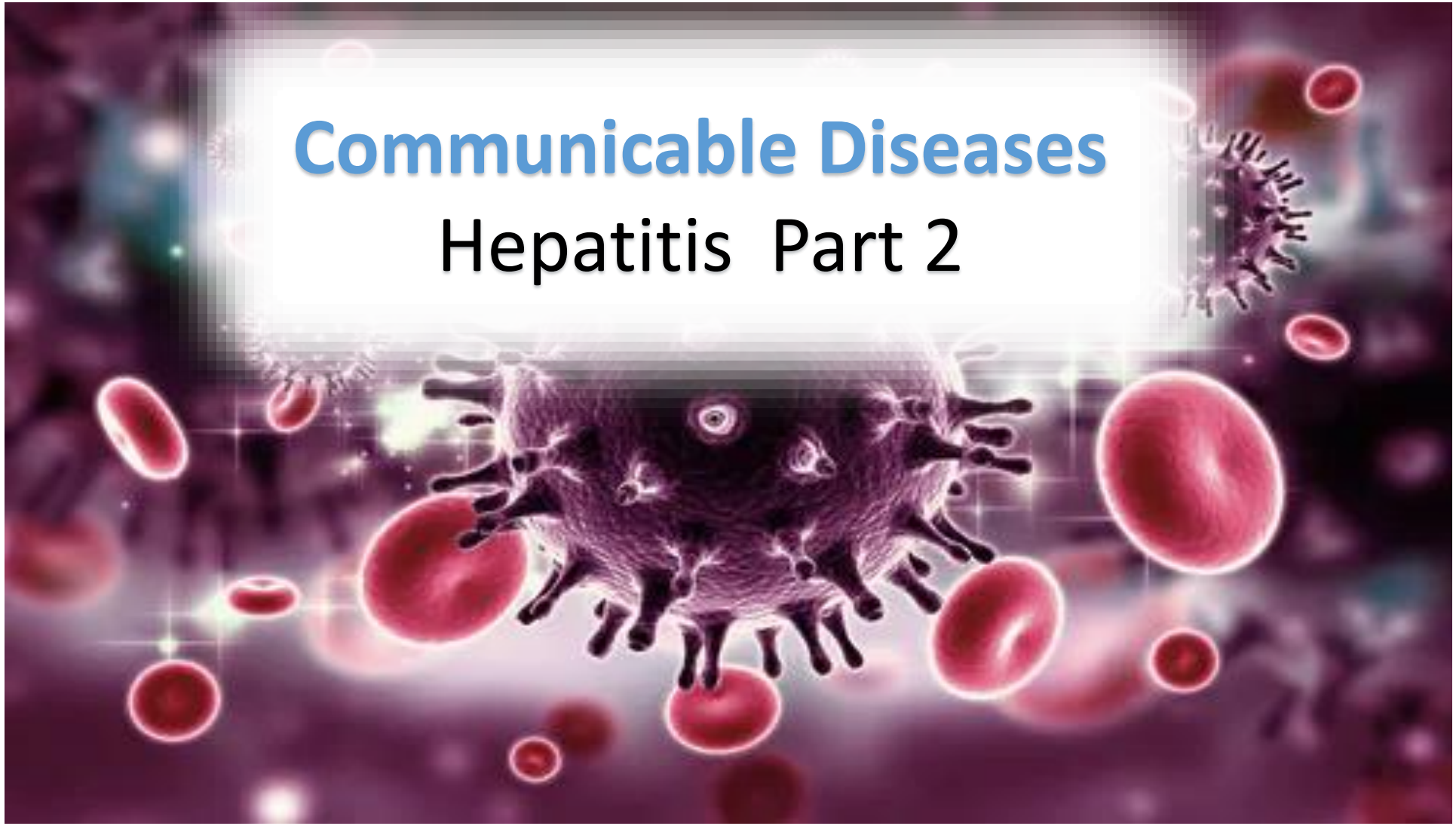

Communicable Diseases
Hepatitis Part 2

Housekeeping

- Questions
- info@drbryanhawley.com

- Hepatitis (2 CEs)
- Session 1
- Session 2
- 2 CEs NCBTMB approved provider #485

Hepatitis C (HCV)

Hepatitis C is an extremely slow-acting virus. Because the liver can easily compensate for lost function, several years or even decades can pass between exposure and the development of symptoms.

Hepatitis C appears to be most communicable by direct blood-to-blood contact.

This includes contaminated transfusions or organ transplants, shared needles, or contaminated tattoo or piercing equipment.

There is some controversy about whether hepatitis C can be spread through unprotected sex; this appears to be an efficient mechanism only when there is significant tearing of mucous membranes.

Blood tests for hepatitis C are accurate within a few months of exposure, so it can be diagnosed long before symptoms begin.

Why HCV? Why now?

- Hepatitis C virus (HCV) kills more Americans than the 60 other reportable infectious diseases, including HIV, combined
- Baby boomers (born between 1945 and 1965), especially African Americans, face high burdens of chronic HCV infection
- People who inject drugs face rapidly rising rates of acute HCV infection as a result of the growing opioid epidemic
- This is a pivotal moment in HCV treatment, because curative treatment regimens are now available
  - These treatments are significantly more effective, rapid, and tolerable than prior regimens
  - With curative treatment, eliminating HCV as a public health threat is a real possibility

1. Centers for Disease Control and Prevention (CDC). Hepatitis C FAQ for Health Professionals. http://www.cdc.gov/hepatitis/hcv/hcvfaq.htm#section1
2. CDC. Hepatitis C Kills More Americans than Any Other Infectious Disease. http://www.cdc.gov/media/releases/2016/p0504-hepc-mortality.html
3. National Academies of Sciences, Engineering, and Medicine. A National Strategy for the Elimination of Hepatitis B and C: Phase Two Report. http://www.nationalacademies.org/hmd/Reports/2017/national-strategy-for-the-elimination-of-hepatitis-b-and-c.aspx

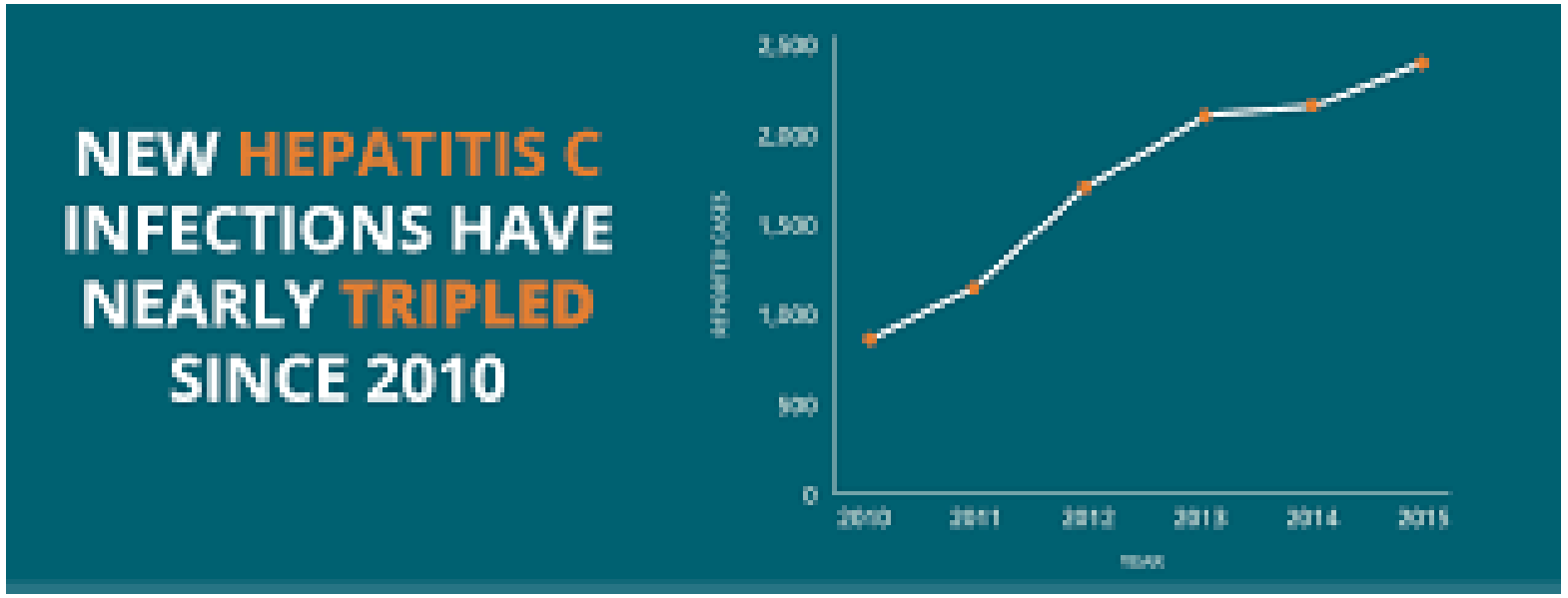
HCV is on the Rise

Viral hepatitis is the leading cause of liver cancer and the most common reason for liver transplantation

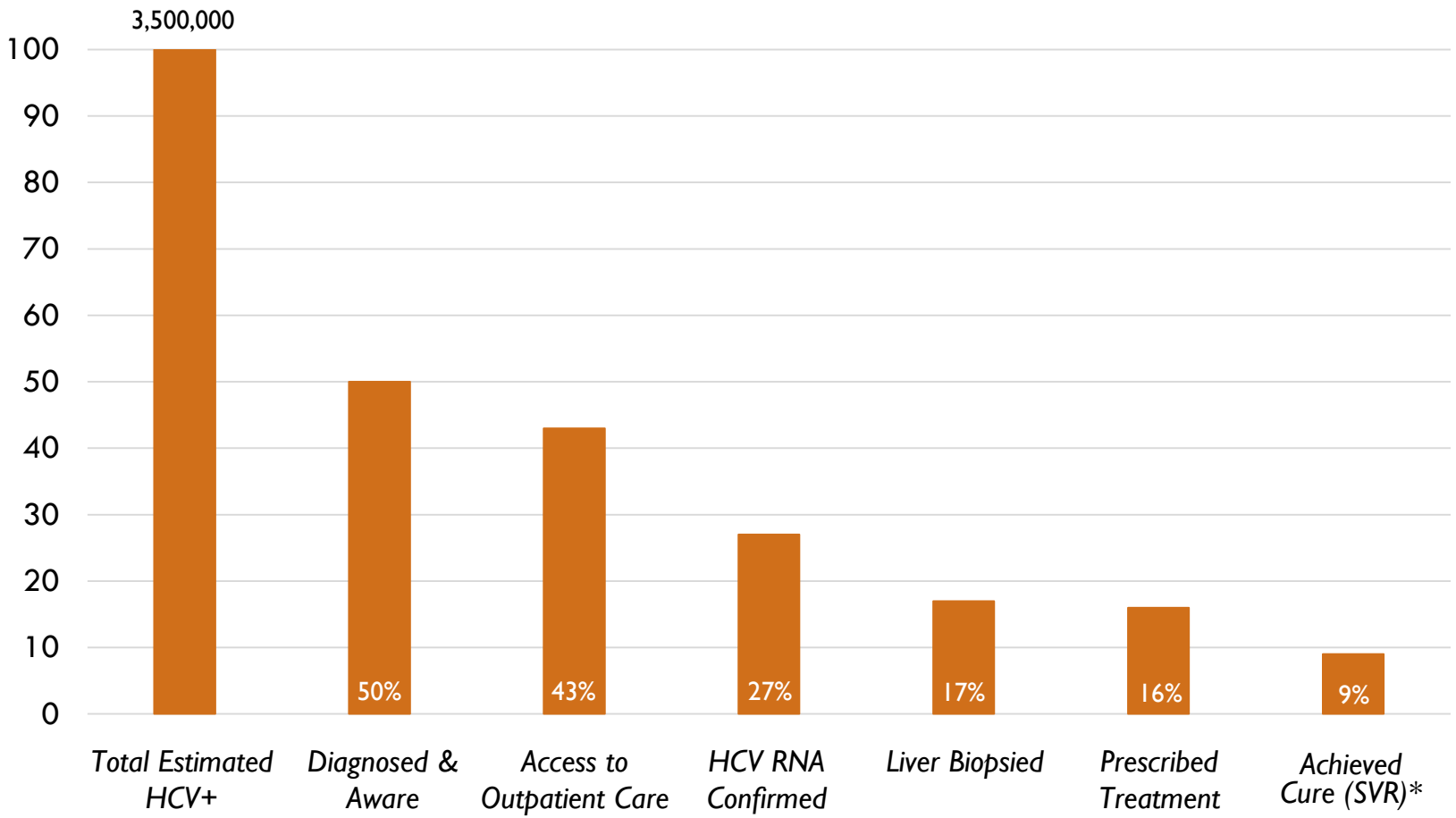
In the United States, an estimated 1.2 million Americans are living with chronic Hepatitis B and 3.2 are living with chronic Hepatitis C

- Many do not know they are infected

Each year an estimated 21,000 persons become infected with Hepatitis A; 35,000 with Hepatitis B, and 17,000 with Hepatitis C



Missed Opportunities Along the HCV Care Continuum

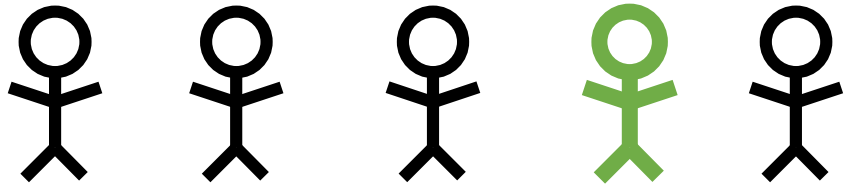


Yehia, B. The treatment cascade for chronic hepatitis C virus infection in the United States: A systematic review and meta analysis. PLoS One. 2014;9(7): e101554.
*Sustained virologic response (SVR) rates are based on data preceding the availability of curative direct-acting antivirals (DAAs).

Populations at Risk

- HIV-positive persons more likely to get HCV
  - HCV is not routinely transmitted sexually, but is more likely to be among those infected with HIV
  - HIV-positive men who have sex with men are at a higher risk for HCV infection than HIV-negative men who have sex with men
  - HCV infection can negatively impact progression and management of HIV infection
  - 25% of people with living with HIV in the US are coinfected with HCV
- Individuals with occupational exposure to HCV through accidental needle sticks
- Children born to HCV-positive mothers
  - Transmission occurs at birth, and no prophylaxis is available

1. CDC. Testing Recommendations for Hepatitis C Virus Infection. http://www.cdc.gov/hepatitis/hcv/guidelinesc.htm
2. Yaphe, et al. Incidence of acute hepatitis C virus infections among men who have sex with men with and without HIV infection: A systematic review. *Sexually Transmitted Infections*. 2012;88 (7):558-564.
3. CDC. Viral Hepatitis – CDC Recommendations for Specific Populations and Settings. http://www.cdc.gov/hepatitis/populations/hiv.htm
4. CDC. Hepatitis C FAQ for Health Professionals. http://www.cdc.gov/hepatitis/hcv/hcvfaq.htm#section1



- About 1 in 5 people infected with hepatitis C do not know they are infected and remain undiagnosed

- An estimated 550,000 people have viral hepatitis B or C, with many unaware of their status

Hepatitis C is treated with drugs that limit viral activity, specifically interferon, ribivarin, and some other medications that can improve the prognosis for this infection, but they carry a long list of side effects.

One of the most serious concerns with hepatitis C is that only about a quarter of the people who are infected can expect to recover without treatment.

In other words, 75 percent of people with hepatitis C are at risk for being communicable throughout their life, and for developing serious liver problems.

Hepatitis C

- Hepatitis C virus (HCV) infection is the most common blood-borne infection in the United States; approximately 3.2 million persons are chronically infected
- By contrast to Chronic HBV, patients with chronic hepatitis C almost always develop HCC in the presence of established cirrhosis
- The annual risk of HCC development in HCV patients with cirrhosis is in the range of 1–4%, and an estimated 1–3% of patients chronically infected with HCV will develop HCC after 30 years

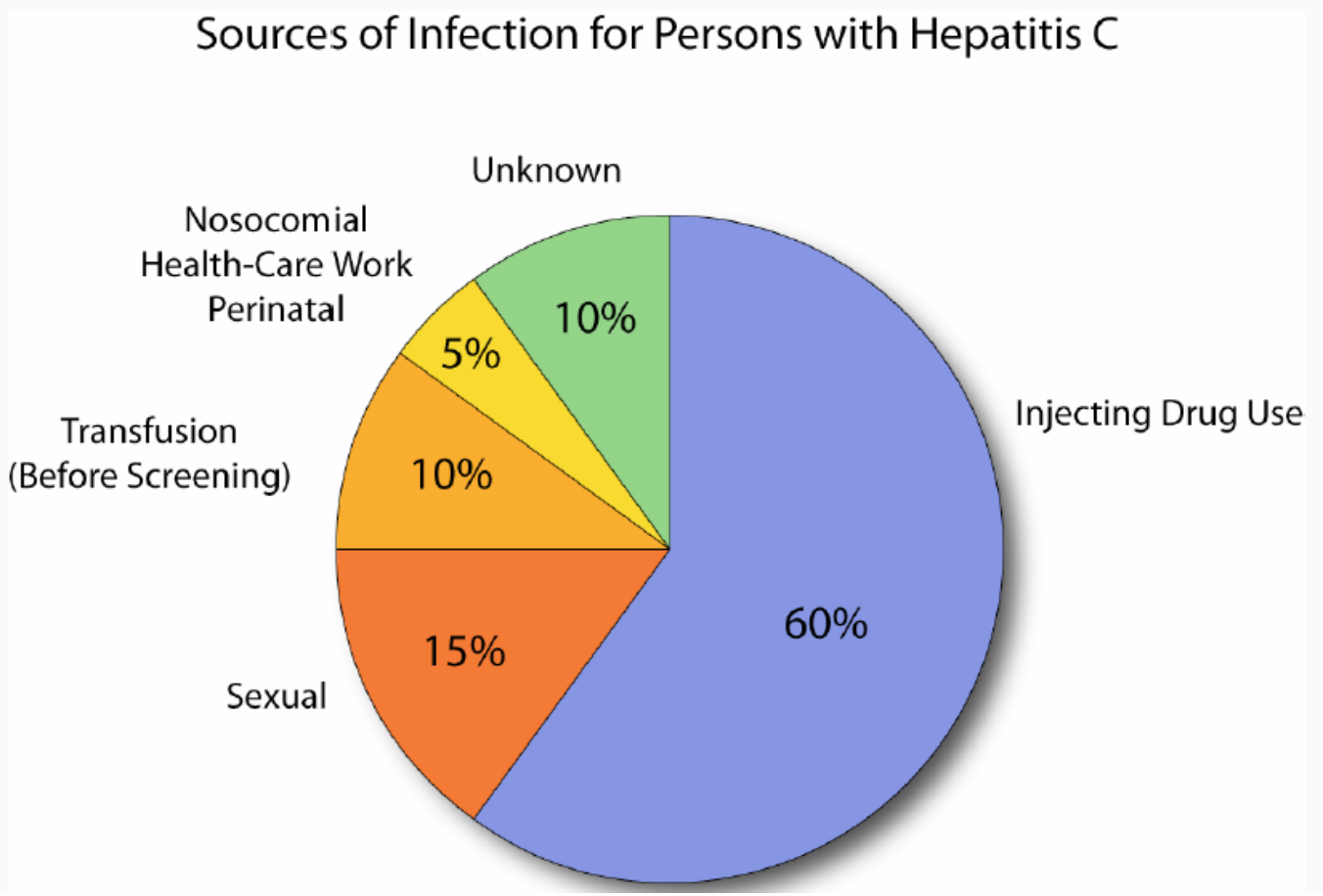
Hepatitis C Characterisitcs

- Flavivirus – small, enveloped, single-stranded RNA virus, six genotypes
- Replicates in liver cells, lymphocytes and monocytes
- *Replicates >1 trillion progeny per day*
- Mutates rapidly (error-prone RNA polymerase)
- *Down-regulates stimulatory receptors on NK cells*
- Increases inhibitory receptors on NK and CD8+ killer cells
- Produces TGF-beta, which blocks activation of T cells and inhibits production of IFN-gamma

Hepatitis C
Epidemiology

- The following persons are at known to be at increased risk for HCV infection:
  - Current or former injection drug users, including those who injected only once many years ago
  - Recipients of clotting factor concentrates made before 1987, when more advanced methods for manufacturing those products were developed
  - Recipients of blood transfusions or solid organ transplants before July 1992, when better testing of blood donors became available
  - Chronic hemodialysis patients
  - Persons with HIV infection
  - Children born to HCV-positive mothers

Hepatitis C Epidemiology



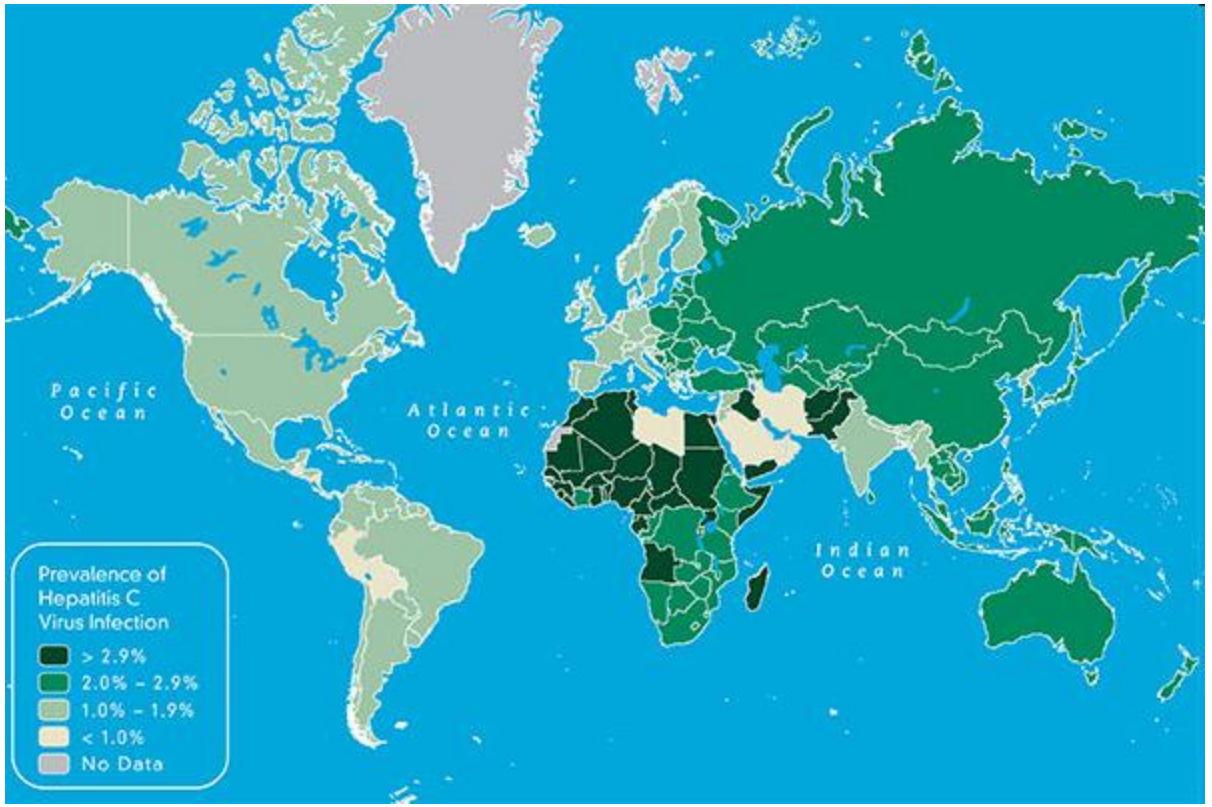
Source: CDC DVH

Hepatitis C

- Although only 850 cases of confirmed acute Hepatitis C were reported in the United States in 2010, CDC estimates that approximately 16,000 new HCV infections occurred that year, after adjusting for asymptomatic infection and underreporting.
- Persons newly infected with HCV are usually asymptomatic, so acute Hepatitis C is rarely identified or reported.

Hepatitis C

Prevalence of chronic infection with hepatitis C virus



Source: CDC YellowBook 2012

Hepatitis C Treatment

- Interferon-based therapy is currently the standard of care for patients with chronic HCV, and has been proven to be effective in eliminating HCV.
- Both conventional and pegylated interferon (IFN) therapy have been used widely, with the aim of achieving a sustained virological response (SVR).
- Unlike HBV, there is currently no vaccine for HCV.
- However, with the screening of HCV in blood transfusion services, transfusion-related HCV infection has been lowered to almost zero.

Hepatitis D

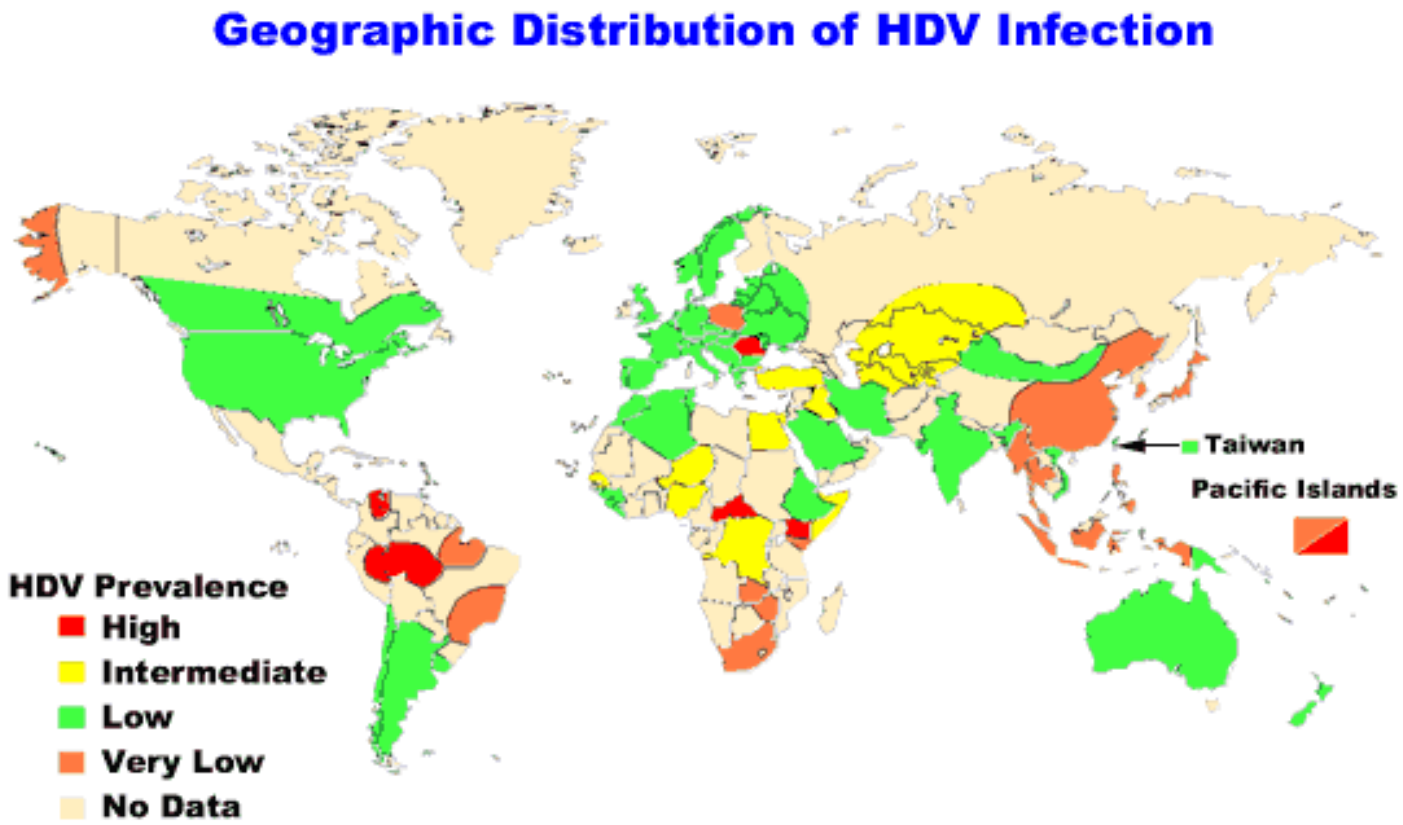
- HDV is an incomplete virus that requires the helper function of HBV to replicate and only occurs among people who are infected with the Hepatitis B virus (HBV).
- HDV is transmitted through percutaneous or mucosal contact with infectious blood and can be acquired either as a coinfection with HBV or as superinfection in persons with HBV infection.

Hepatitis D virus (HDV)

•Hepatitis D is a virus that requires hepatitis B virus (HBV) for its replication. HDV infection occurs only simultaneously or as super-infection with HBV.
•The virus is transmitted through contact with the blood or other body fluids of an infected person.
•Vertical transmission from mother to child is rare.
•At least 5% of people with chronic HBV infection are co-infected with HDV, resulting in a total of 15 – 20 million persons infected with HDV worldwide. However, this is a broad global estimation since many countries do not report the prevalence of HDV.
•Worldwide, the overall number of HDV infection has decreased since 1980s. This trend is mainly due to a successful global HBV vaccination program.
•HDV-HBV co-infection is considered the most severe form of chronic viral hepatitis due to more rapid progression towards liver-related death and hepatocellular carcinoma.
•Currently, treatment success rates are generally low.
•Hepatitis D infection can be prevented by hepatitis B immunization.

Hepatitis D

- Hepatitis D (HDV), also known as "delta hepatitis," is a single-stranded circular RNA virus structurally unrelated to the Hepatitis A, B, or C viruses
- Hepatitis D, which can be acute or chronic, is uncommon in the United States



Hepatitis E virus (HEV) is mostly transmitted through consumption of contaminated water or food. HEV is a common cause of hepatitis outbreaks in developing parts of the world and is increasingly recognized as an important cause of disease in developed countries. Safe and effective vaccines to prevent HEV infection have been developed but are not widely available.

Hepatitis A and E are spread through contaminated food, water and human waste. Poor personal hygiene, poor sanitation and sexual or intimate contact facilitate viral transmission. Travel to areas with a high incidence of hepatitis A is the greatest risk factor for acquiring hepatitis A in the United States. Intravenous drug use is another risk factor. Developing countries commonly experience water- or food-borne epidemics. Ingestion of contaminated food (especially raw shellfish) and water may provide another route of transmission.

Like hepatitis A, hepatitis E is both endemic to underdeveloped countries and self-limiting. Recent studies suggest that exposure to hepatitis E is common in the United States, particularly in people who have pets and/or eat liver or other organ meats.

Of Organ Meats and Hepatitis E Virus: One Part of a Larger Puzzle Is Solved
Mark H. Kuniholm Kenrad E. Nelson
The Journal of Infectious Diseases, Volume 198, Issue 12, 15 December 2008, Pages 1727–1728, https://doi.org/10.1086/593212
Published:
15 December 2008

Hepatitis Complications

The consequences of viral attacks against the liver are related to progressive loss of function. Here is just a short list of complications:

• Jaundice. If the liver is impeded in making bile, bilirubin backs up through the body, staining the skin, and mucous membranes, yellow.

• Excessive bleeding. Clotting proteins cannot be produced by a damaged liver, so the potential for bruising or bleeding becomes a serious problem.

• Ascites. When the liver is clogged with scar tissue, fluid seeps from the major blood vessels into the abdominal cavity. Because this fluid is essentially stagnant, it becomes vulnerable to spontaneous infection and life-threatening peritonitis.

• Sexual dysfunction. When liver function is impaired, men may develop feminizing characteristics (enlarged breasts, atrophied genitals), and women may develop masculinizing characteristics (excessive body hair, loss of the menstrual cycle).

• Psychosis. Impaired liver function means that ammonia accumulates in the bloodstream, damages the blood-brain barrier, and leads to temporary or permanent brain damage.

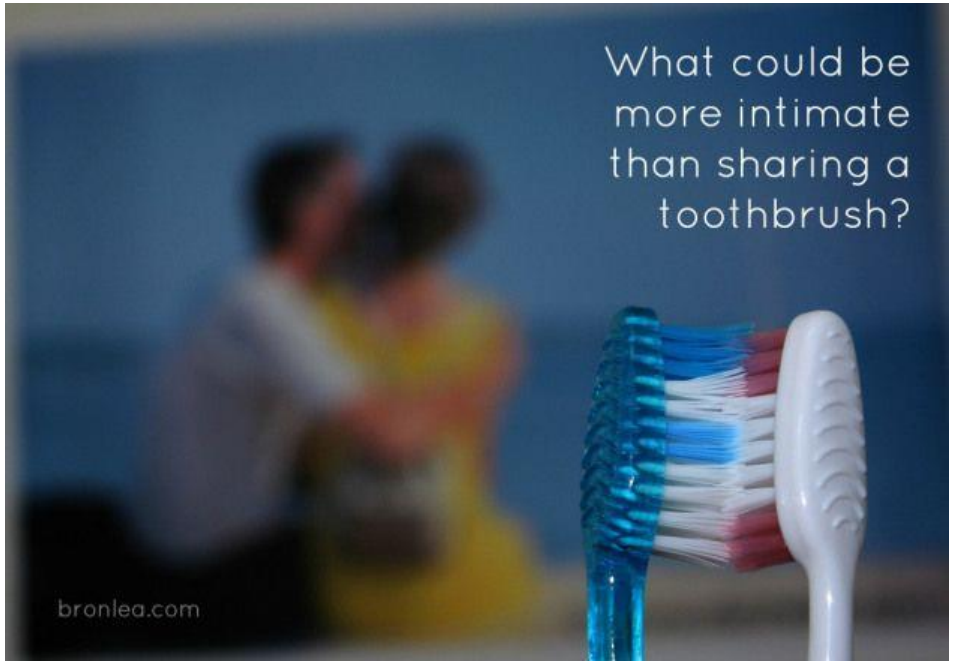
• End-stage liver disease. This includes cirrhosis, liver failure, or liver cancer. Hepatitis B and C kill about 15,000 people in this country every year.

Prevention Tips

- Tattoos & Piercing
  - Considered a low/no risk in commercial setting
    - Make sure disposable needles and separate ink pot are used and that general safety precautions are followed
  - Considered a higher risk in other settings
    - Non-commercial settings such as in prison or on the streets

Shared Personal Items

- Household
  - Cover cuts or sores
  - Do not share personal hygiene items (toothbrushes, razors, etc.)
- Professional Personal Care Settings
  - Standard precautions
  - Disposable equipment
  - Bring own equipment



MASSAGE NOTE:

People with an advanced form of hepatitis B or C may be prone to bruising and bleeding. Skin rashes from systemic toxicity are common. Many people with hepatitis report general malaise (feeling just plain lousy); this may be due to the virus, or it may be connected to antiviral medications.

Massage may be able to help with this, as long as it's done with caution to avoid overtreatment.

What type of massage would be best in this case?

MASSAGE NOTE:

In massage therapy settings, we must practice good hygiene: we make sure that the surfaces our clients touch are regularly cleaned; we wash any fabrics that one client contacts before another client uses them; and we make sure that our own best defenses—our clean, intact skin and our good constitutional health—are in place before we see clients.

Ultimately, it doesn't matter whether our clients are positive for hepatitis B or C or D or A. When we use good hygienic practices, we are prepared for the possibility that any of our clients may have a blood-borne infection, and we protect ourselves and them from any risk of transfer.

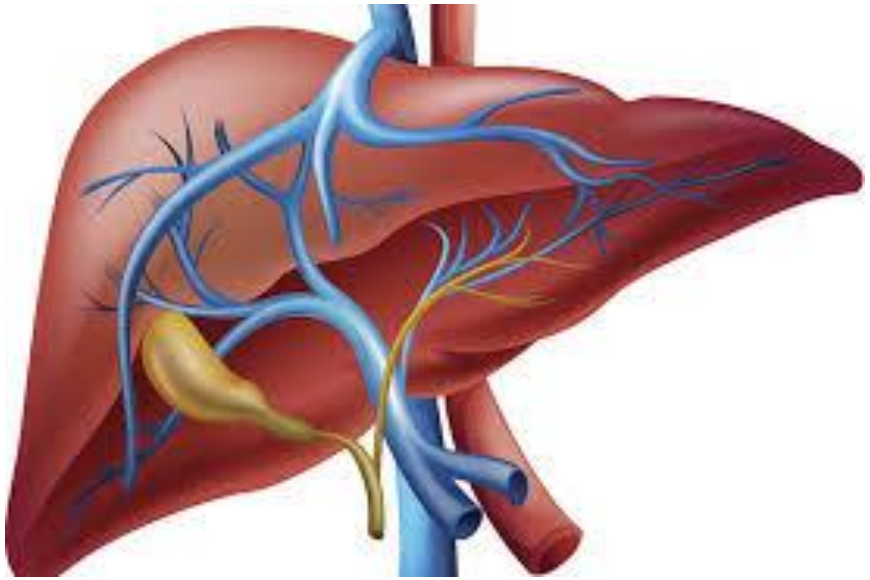
Massage Considerations for Hepatitis

Viruses that cause hepatitis cannot be eliminated; however, there are medicines that can slow viral replications and medications that can help to manage the symptoms.
Massage considerations depend on the patients symptoms. For example if the patient has a fever or jaundice, massage is contraindicated. *You should pick this up during the history/assessment*
If the patient has clearance to receive a massage, (I would get a letter from their doctor and put in their chart) you should

1. Avoid the abdomen,
2. Do not use deep pressure
3. Reduce treatment time to 30 minutes to avoid the client from becoming fatigued
4. Have water on hand for afterward
5. Make sure you are not sick
6. Make sure all areas of contact have been disinfected
7. All linens towels and sheets are clean

8. Let's talk about gloving for a moment

Let's talk a bit about the liver



The liver is a metabolically active organ responsible for many vital life functions. The primary functions of the liver are:

- Bile production and excretion, fat breakdown
- Excretion of bilirubin, cholesterol, hormones, and detox of drugs
- Metabolism of fats, proteins, and carbohydrates
- Enzyme activation
- Storage of glycogen, vitamins, and minerals
- Synthesis of plasma proteins, such as albumin, and clotting factors
- Blood detoxification and purification (alcohol and other toxins)

The Liver – A Chemical Factory

- Largest internal organ
- Size of a football
- Approximately 3 lbs in the average sized male

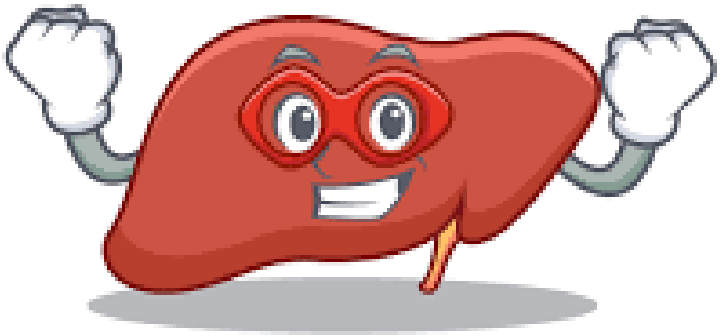
  1.5 quarts of blood flow through it every minute

A few of the Liver Functions

- Chemical Factory-
  >500 chemical functions
- Bile
- Immune System

And….Regenerates Itself!

- Detoxifies or Filters
- Clotting Factors
- Hormones



How long does it take for the liver to regenerate itself?

The liver is able to replace damaged tissue with new cells. It is known that as little as 25% of the original liver mass can regenerate back to its full size. Another words 75% can be damaged or suffer loss (1)(2).

Reversing liver damage. The **liver** is **one** of the only organs in the body that is able to replace **damaged** tissue with new cells rather than scar tissue. ... However, sometimes the **liver** gets overwhelmed and **can**'t repair itself completely, especially **if** it's still under attack from a virus, drug, or alcohol.

(1) Michalopoulos GK, DeFrances MC (April 1997). "Liver regeneration". *Science*. **276** (5309): 606. doi:10.1126/science.276.5309.60. PMC 2701258. PMID 9082986.

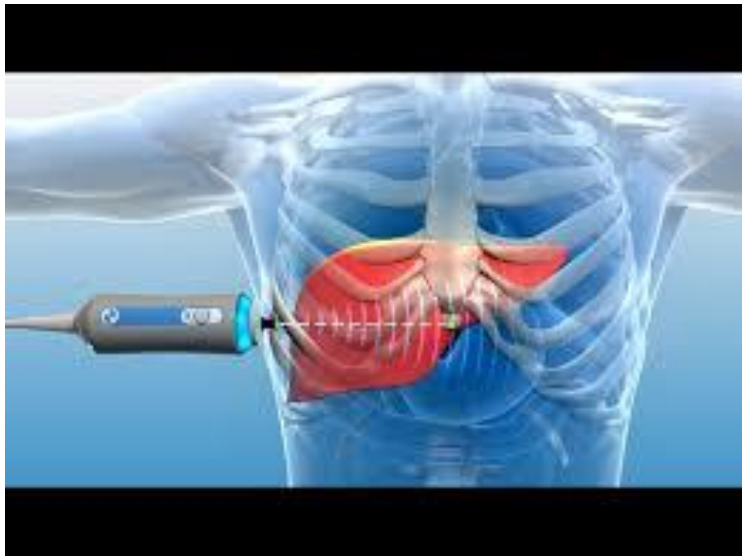
(2)*Fausto N, Campbell JS, Riehle KJ (February 2006). "Liver regeneration". Hepatology.* ***43*** *(2 Suppl 1): S4553. doi:10.1002/hep.20969. PMID 16447274.*

Keep the Liver Healthy!

- If you have HCV – Avoid Alcohol……. *OBVIOUSLY!*
- Avoid mixing drugs – prescription, over the counter, herbs/supplements and street drugs
- Eat a healthy, balanced diet based on the food that are easy on the liver and aid in anti inflammation

Measuring Liver Damage

- Liver Biopsy
- Fibroscan *a specialized ultrasound machine for your liver*
- Various Blood Tests, Liver Enzymes

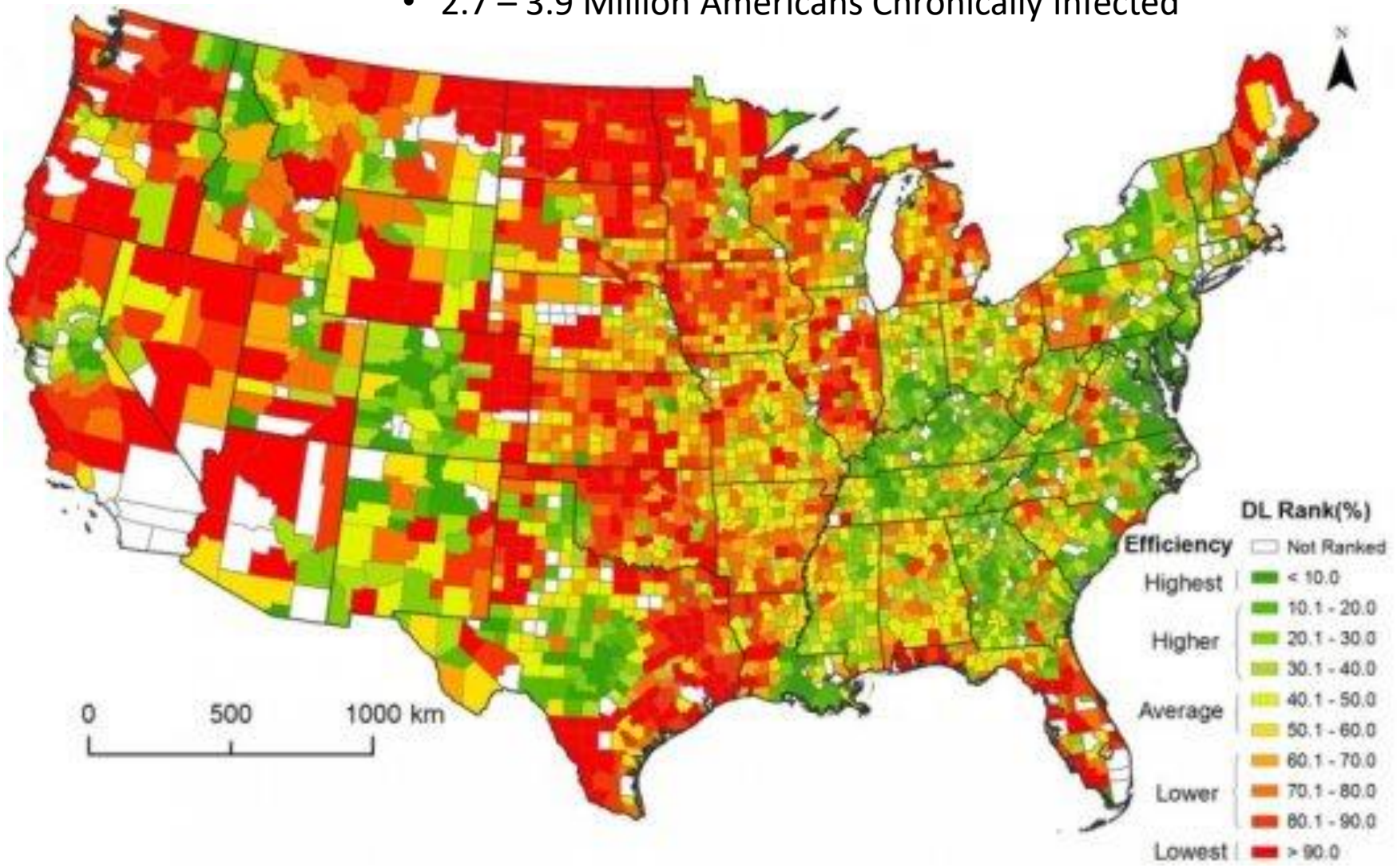


Hepatitis C
Diagnosis

- Sixty to 70% of persons newly infected with HCV typically are usually asymptomatic or have a mild clinical illness.
- HCV RNA can be detected in blood within 1–3 weeks after exposure.
- The average time from exposure to antibody to HCV (anti-HCV) seroconversion is 8–9 weeks, and anti-HCV can be detected in >97% of persons by 6 months after exposure.

Hepatitis C U.S. Statistics

- 2.7 – 3.9 Million Americans Chronically Infected



Hepatitis C
Chronic Illness

- 75-85% of those infected with HCV will develop chronic infection.
- 60-70% of those infected with HCV will develop chronic liver disease.
- 5-20% of those infected will develop cirrhosis over a period of 20-30 years
- 1-5% will die from the co
  infection (liver cancer or

HCV Antibody tests

- HCV Elisa II or III
  - Most common antibody test

- A positive antibody test indicates exposure

  - *It does not indicate current hepatitis C infection*

    - HCV viral load (HCV RNA) test performed to indicate <u>active</u> HCV infection

HCV CAN NOT BE SPREAD BY:

- BREASTFEEDING
- SNEEZING
- HUGGING
- COUGHING
- FOOD OR WATER
- SHARING EATING UTENSILS OR DRINKING GLASSES

Signs and Symptoms

- A few may have specific liver related symptoms initially:
  - Pale/chalky stool
  - Jaundice (yellowing of the skin or eyes)

Initial to mid onset Symptoms

- Individuals may have one or more of the following symptoms, while others experience no symptoms:

- Tiredness
- Nausea
- Muscle or joint pain
- Trouble sleeping
- Loss of appetite
- Weight loss
- Abdominal pain
- Itchiness
- Depression
- Dark urine

Chronic Symptoms

Fatigue – mild to severe
Flu-like symptoms (muscle/joint/fever)
Brain Fog
Liver pain
Loss of appetite
Headaches
Gastro problems

Treatment

Past

- Interferon-based
- Low efficacy against the most common HCV genotype (treatment often was not curative)
- Patients often experienced significant side effects

Present

- Direct-acting Antivirals (DAAs)
- Curative (95%) for most patients and most genotypes
- Provide improved patient quality of life: fewer side effects and shorter treatment duration (8-24 weeks)

Treatments are evolving with new medications, making it important to stay up-to-date with the latest guidelines

1. CDC. Hepatitis C FAQs for Health Professionals. http://www.cdc.gov/hepatitis/hcv/hcvfaq.htm
2. U.S. Food and Drug Administration (FDA). Harvoni (ledipasvir/sofosbuvir) Label Updated. http://content.govdelivery.com/accounts/USFDA/bulletins/125209b
3. FDA. FDA Hepatitis C Update – Approval of Zepatier for Treatment of Chronic Hepatitis C Genotypes 1 and 4. http://content.govdelivery.com/accounts/USFDA/bulletins/1333c51

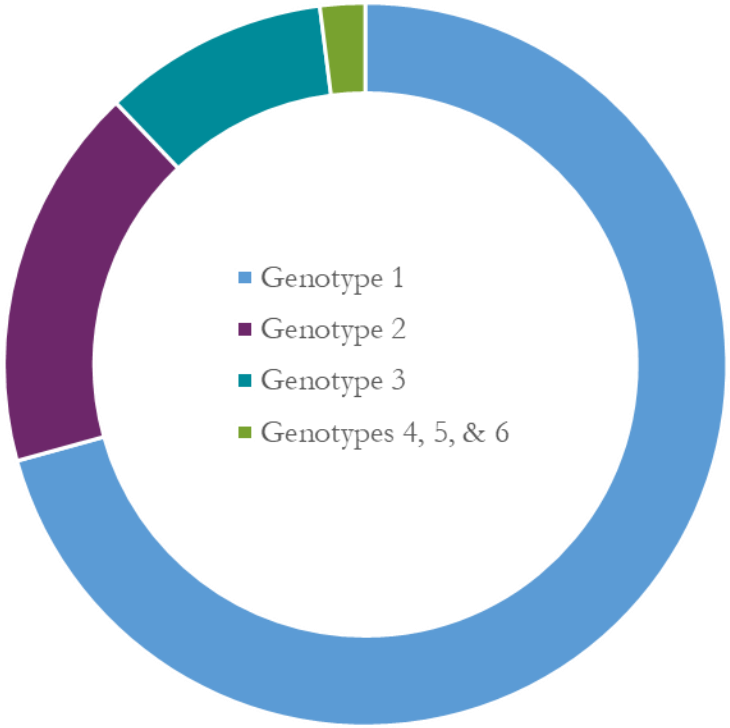
Treatments for HCV

- **What are direct-acting antivirals?**
  - Inhibit the hepatitis C Virus – protease, polymease and NS5A inhibitors from replicating
    - **Direct-acting antivirals** (DAAs) are a relatively new class of medication that acts to target specific steps in the HCV viral life cycle
- **How They Work**

- There's no one-size-fits-all option. There are many different types, or "genotypes," of hepatitis C. Type 1 is the most common. This is important to understand when you talk to your doctor. Not all meds work on all types. Which medicine is best for you also depends on how much liver scarring (cirrhosis) you have.
- Your doctor might call these new drugs direct-acting antivirals. They zoom in on the virus that's making you sick. Each drug works in a slightly different way. But in general, the medicine interferes with proteins that help the virus grow or spread.
- **Daclatasvir (Daklinza)**
- **Elbasvir and grazoprevir (Zepatier)**
- **Glecaprevir and pibrentasvir (Mavyret)**
- **Ledipasvir and sofosbuvir (Harvoni)**
- **Ombitasvir, paritaprevir, and ritonavir, with dasabuvir (Viekira Pak)**

Necessity of HCV Genotyping

- Genotypes of HCV are distinct groups of the virus that impact different populations and require specific treatment protocols
- Genotyping is often performed as part of RNA testing, **and is necessary to optimize treatment**



US Genotype Prevalence

1. U.S Department of Veterans Affairs. Hepatitis C Genotypes and Quasispecies. http://www.hepatitis.va.gov/provider/reviews/genotypes.asp#note2
2. University of Washington. Hepatitis C in the United States. http://www.hepatitisc.uw.edu/pdf/screening-diagnosis/epidemiology-us/core-concept/all

Approved Medications

Brand Name	Genotype(s)	Cure Rates
Epclusa	1-6	Up to 100%
Viekira Pak & XR	1	Up to 100%
Zepatier	1 & 4	Up to 100%
Technivie	4	Up to 100%
Daklinza (with sofosbuvir)	3	Up to 93%
Harvoni	1, 4, 5, 6	Up to 100%
Sovaldi / Olysio	1	Up to 92%

Visit http://hepatitiscmedications.hcvadvocate.org/ for information about current HCV medications

Benefits of Treatment vs Cure

- Curative treatment **reduces**:
  - Risk of liver cancer by 75%
  - Risk of all-cause mortality by 50%
- Curative treatment **improves**:
  - Cost-effectiveness compared to past treatment regimens
  - Cost-effectiveness compared to long-term treatment of HCV-associated conditions
  - Patient quality of life
  - Health outcomes for individuals co-infected with HIV
- Curative treatment **prevents** future transmission of HCV
  - Rates of reinfection among persons who inject drugs are relatively low, especially with behavioral support, and should not be a justification for withholding curative treatment

1. CDC. CDC Fact Sheet: Viral Hepatitis and Liver Cancer. http://www.cdc.gov/nchhstp/newsroom/docs/factsheets/viral-hep-liver-cancer.pdf
2. Saab, et al. Cost-effectiveness Analysis of Sofosbuvir Plus Peginterferon/ribavirin in the Treatment of Chronic Hepatitis C Virus Genotype 1 Infection. *Alimentary Pharmacology & Therapeutics.* 2014;40(6):657-675.
3. Alcorn, K. Reinfection after hepatitis C cure: Prevention may require long-term support for people who have injected drugs. 2015. http://www.aidsmap.com/Reinfection-after-hepatitis-C-cure-prevention-may-require-long-term-support-for-people-who-have-injected-drugs/page/2973522/

Complementary Medicine

- Herbs – milk thistle, licorice root, etc.
  - Always check with your doctor and herbalist – some herbs are unsafe especially with the hepatitis C drugs
- Acupuncture / Acupressure
- Traditional Chinese Medicine
- Massage therapy
  - If the patient has a fever or jaundice, massage is contraindicated. If the patient has clearance to receive a massage, avoid the abdomen, do not use deep pressure, and reduce treatment time to 30 minutes to avoid the client from becoming fatigued.

Lifestyle Changes That Help!

- **Alcohol** – Avoid or reduce
- Get vaccinated – Hep A & Hep B
- Healthy balanced diet
- Exercise
- Stress Reduction
- Support Groups

Keep on task

- Educate yourself
- Establish a good relationship with your doctor
- Bring an advocate for doctor's visits
- Ask questions
- Keep copies of all medical tests
- Keep a diary
- Keep an open mind

Final Housekeeping

- Questions
- info@drbryanhawley.com
- Email us the answers and how you want your name to appear on your certificate and with what credentials

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