Hepatitis C (HCV)
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SLIDE 1
Hi. I'm Susan Thompson, CD Nurse Consultant and the Adult Viral Hepatitis Prevention Coordinator with the North Carolina Division of Public Health. There are many myths and misunderstandings about hepatitis C, not only among the general public, but among healthcare providers as well. For instance, it's a common misconception that only people who inject illegal drugs and share dirty needles can become infected with hepatitis C. But what about Rick? – a 50 year old salesman and respectable family man. Of course, he doesn't inject drugs! But he did once, back in 1974, when experimenting with drugs as a young adult. Now, over 30 years later, he's been diagnosed with hepatitis C. He had the infection all those years without knowing it. Did he spread it others? What information does he need to know now to fully understand his infection? Is his case of hepatitis C reportable to the state? For the next 30 minutes, we will discuss hepatitis C – how it's transmitted, who's at risk for exposure, how it's diagnosed and treated, what your responsibilities are to your clients with HCV, and, most importantly, how to investigate a physician-reported case of acute HCV.

SLIDE 2
After completing the unit, you will know the basics about hepatitis C. You'll know when and how to investigate a physician-reported case of acute hepatitis C, understand the laboratory tests used to detect infection, and learn the responsibilities you have as a CD nurse to your clients with hepatitis C.

SLIDE 3
In North Carolina, physician-reported cases of acute hepatitis C are reportable; cases of chronic hepatitis C are not. Being able to differentiate between the two is important. When investigating a reported case of acute hepatitis C, it is always important to find answers to the following 3 questions:

1. Did the client display signs and symptoms of acute hepatitis C infection?
2. Why was the client tested?
3. What laboratory tests were performed and what were the results of the tests?

With the answers you obtain, you then narrow the focus of your investigation. But to conduct a competent investigation, you need to know and understand the disease you're investigating. So, let's talk a little about hepatitis C infection and its effect on the body.

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Because hepatitis C is a viral infection that targets the liver, it's important to know and understand the role the liver plays in overall health. The liver is responsible for over 500 bodily functions. It plays a major role in metabolism, digestion, protein synthesis, and detoxification, to name just a few. A healthy liver is pictured at the top of this slide. Note its reddish brown color and smooth edges. A damaged liver, one with severe scarring or cirrhosis, is pictured below it. When damage to the liver is this extensive, it can no longer function effectively. The liver is known to be a non-complaining organ. It provides

no warning signals to the body when it is damaged…at least not until the damage is severe or even irreparable. Despite the damage it may sustain, the liver continues to function as best it can. That's why a person with liver damage may have no associated signs or symptoms of liver disease.

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After the discovery of hepatitis A in 1973 and hepatitis B in 1963, the remaining hepatitis viruses were lumped into the category of "non-A, non-B" (NANB). Any cases of acute or chronic hepatitis or cirrhosis without identifiable causes were referred to as Non-A, Non-B virus. In 1989, the hepatitis C virus was identified, which was, in effect, the Non-A, Non-B virus. The hepatitis C virus, which is 10 times more infectious than HIV, is transmitted through direct blood to blood contact. The hepatitis C virus is a RNA virus and it rapidly mutates. This ability of the virus to mutate probably explains why most people who are infected eventually progress to chronic disease. When HCV is being attacked by the body's immune system during the acute infection, the virus mutates. In this way, it outwits the body's attempt to get rid of it, allowing for progression into chronic disease. The ability of the virus to mutate probably accounts for why they've been unable to create a vaccine for the disease.

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Most patients who acquire hepatitis C infection are not aware that they have become infected. As a result, patients may have the infection for years before being identified. Most patients are identified during routine physical exam or blood donations. When abnormal liver function tests or a history of risk factors are identified, further testing is recommended. Chronic hepatitis C is an insidious process, progressing, if at all, at a slow rate without symptoms or physical signs in the majority of patients during the first two decades after infection. It is thought that 85% of patients infected with hepatitis C will develop some form of chronic inflammation of the liver. Of these patients, about 20 % will develop cirrhosis of the liver after about 20 years of infection. Of these, about 5% progress to end-stage liver disease and develop liver cancer or require a liver transplant.

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The CDC's Third National Health and Nutrition Examination Study (NHANESIII), was conducted from 1988 to 1994. This study estimated that 1.8% of the non-institutionalized US population, or 4 million people, have been infected with hepatitis C. Of these, about 2.7 million are chronically infected. (It's important to note that this number excludes those in the military, institutionalized, incarcerated, or homeless). In NC, the number estimated to have been infected with HCV is approximately 150,000. In the country and in our state, the number of people infected with HCV is about 5 times as many as those infected with HIV. Now, the interesting thing is everyone knows about HIV, but very few people are familiar or aware of hepatitis C. CDC estimates that only a small percentage (probably around 5%) of infected individuals are even aware that they harbor the virus. But, even though they are unaware of their infection, they can still transmit the virus. Since the 1980's the incidence of new hepatitis C infections in the US has decreased, and the overall number of chronically infected people (primarily Baby

Boomers born between 1946 and 1964) has stabilized. However, over the past 20 years, the prevalence of hepatitis C-associated advanced liver disease has risen dramatically. As the cohort of Baby Boomers with chronic hepatitis C grows older, the associated burden of morbidity, mortality, and health care costs are predicted to only increase.

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According to the CDC, people who inject drugs, even if they did so on only one occasion many years ago, are at the highest risk for infection. Hepatitis C infection is rapidly acquired following the start of injection drug use and occurs from the sharing of needles, syringes, and other paraphernalia associated with drug use. Of persons injecting for at least 5 years, it is estimated that 70-90% are infected with hepatitis C; again, most of whom aren't aware of their infection. Prior to the mid-1980's, there was a 10% risk of acquiring hepatitis C from a blood transfusion. In 1990, specific donor screening was started and by 1992, the risk of hepatitis C infection was reduced to one in 100,000. As of 2001, the risk was less than one per million transfused units. The risk of sexual transmission is low, (about 5%) and occurs most often in people who have multiple sexual partners, in commercial sex workers, and in those who practice "rough sex" in which blood may be present. Occupational exposures account for about 4% of cases. Exposures resulting from hemodialysis and birth to a hepatitis C-infected mother account for 1% of all cases. About 10% of people with hepatitis C infection have no recognized source for their infection and are unable to identify any risk factors.

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The symptoms of acute hepatitis C are the same as those resulting from acute hepatitis A or B. Usually these symptoms are nonspecific and may be mistaken for any number of other conditions, such as the flu. Symptoms include fatigue, decreased appetite, nausea, vomiting, and weakness. Occasionally, a person may have a skin rash, abdominal discomfort or pain, and muscle and joint aches. However, 8 out of 10 people with acute hepatitis C experience no symptoms and rarely experience jaundice. Usually, the physical exam of a person with acute hepatitis C appears normal. Diagnosis by a doctor during the acute stage of hepatitis C is a rare occurrence. Hepatitis C is often not recognized until asymptomatic persons are screened for blood donation or when elevated liver enzyme levels are detected during routine examinations. The majority of people with hepatitis C do not discover that they have the disease until years after exposure, if then.

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So, who should be tested? Testing should be offered to persons most likely to be infected with the hepatitis C virus. This would include injection drug users, even if drug use was only once years ago; persons who had a blood transfusion or transplant before 1992 (1992 was when they started screening the blood supply for hepatitis C); persons who used clotting factors produced before 1987; persons on long-term dialysis; children born to hepatitis C positive women; any healthcare or safety professional after a needlestick or other exposure to blood (although the risk for developing infection after a needle stick is only about 2%); persons with signs or symptoms of liver diseases, such

as elevated liver enzymes; and persons who are HIV positive. Routine hepatitis C testing is not recommended for healthcare workers, emergency medical or public safety workers, pregnant women, or household or non-sexual contacts of hepatitis C positive persons. The need for testing has not been determined for persons at potential or unknown risk for hepatitis C infection. This includes intranasal cocaine and other non-injecting drug users, persons with a history of body piercing or tattooing, persons with a history of sexually transmitted diseases or multiple sexual partners, and long-term steady partners of hepatitis C positive persons.

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The most commonly used initial blood test to screen for hepatitis C is the ELISA, or EIA. It tests for the presence of antibodies to the hepatitis C virus. In most cases, if the EIA is negative, it means that the person does not have antibodies to the hepatitis C virus and no further testing is needed. Although false-negative results are very rare with the EIA, they may sometimes occur in patients whose immune systems do not produce enough antibodies, such as people on hemodialysis and people with HIV/AIDS. If the EIA test is negative on a person who has a high risk for acquiring hepatitis C, the test should be repeated in 3-6 months. It can take up to 5 or more months for antibodies to form after exposure to the hepatitis C virus. A positive EIA result, reported as a high signal-to-cutoff ratio, generally indicates that there are antibodies against the hepatitis C virus in the blood. Positive EIA results with a low signal to cut-off ratio need to be confirmed with another test, generally the RIBA test, to rule out false positive EIA results. However, it's not clear from antibody testing alone if the hepatitis C infection is acute, chronic, or resolved. Now, that's important to note…that this test is not a diagnostic test. For this reason, additional confirmatory testing, preferably with a HCV RNA test, which detects actual virus in the blood, is needed to confirm the diagnosis of hepatitis C infection.

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A variety of tests are used not only to diagnose hepatitis C infection, but to gauge progression of the infection. A liver biopsy is currently the diagnostic gold standard used to determine the extent of liver damage from infection. During the brief procedure (pictured on the slide), a small piece of liver is removed. Microscopic examination of the specimen is done to measure the extent of liver damage, including the extent of fibrosis (or scarring) and cirrhosis. In most cases, a liver biopsy is only done once. When liver cells are damaged, enzymes called aminotransferases may leak into the blood. Measuring alanine aminotransferase, or ALT, is a useful liver function test. Elevated levels of ALT may be the first sign of liver disease in people with hepatitis C. However, and again, this is important to note, ALT levels are not a foolproof indicator of the extent of liver damage. Some people may have normal ALT levels even when they have serious liver disease. As mentioned earlier, the hepatitis C virus mutates rapidly. Because of this, it has several different genotypes or strains. The majority of people in the US are infected with genotypes 1a and 1b, although genotypes 2 and 3 are also present. Genotype remains the same throughout the course of infection and disease progression. However, re-infection with a different genotype can occur if a person continues to engage in high risk behaviors and has continued exposures. Some people

think that after they're treated for hep C, they'll never get it again. But that, of course, is not the case.

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Hepatitis C infection can be treated. The standard protocol for treatment of hepatitis C uses two medications--pegylated interferon (in injectable form) and ribavirin (in pill form). Knowing the genotype can help predict the likelihood of treatment response and, in many cases, determine the duration of treatment. Patients with genotypes 2 and 3 are almost three times more likely than patients with genotype 1 to respond to therapy with pegylated interferon or the combination of pegylated interferon and ribavirin. For patients with genotypes 2 and 3, a 24-week course of combination treatment is adequate. For patients with genotype 1, the most common genotype found in the US, a 48-week course of treatment is recommended. Treatment is long, rigorous, and expensive. Costs associated with a 48-week course of therapy can often exceed $ 20,000- $40,000. However it's important to remember that generally, the majority of those infected with hepatitis C will have a stable course of the disease and will not require treatment.

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When an individual elects to undergo treatment, the primary goal of treatment is to reduce the hepatitis C virus to undetectable levels in the bloodstream. If the virus is still undetectable in the blood 24 weeks (6 months) after treatment with pegylated interferon and ribavirin, then the patient is considered "cured". Currently, the "cure" rate for hepatitis C patients with genotype 1 who undergo a 48-week regimen of treatment is approximately 50%. Positive response rates for patients with Genotypes 2 or 3 are higher at 60-80%. Even in the absence of a "cure", there are other benefits from treatment. The progression of liver disease associated with hepatitis C can be slowed or even halted after drug therapy. As a result, long-term complications, like liver cancer and even liver transplant, may be avoided.

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Unfortunately, side effects associated with pegylated interferon and ribavirin are common. Most people experience at least 1 side effect during their treatment. Most side effects are related to the flu-like symptoms associated with interferon, which occur in > 50% of treated patients, and to interferon-related psychiatric symptoms. An estimated 20-30% of patients or more will experience some degree of depression, irritability, and insomnia. These side effects can be treated with other medications. For instance, the depression can be treated with anti-depressants. Actually, HCV treatment response is very individualized. Some people experience few side effects; others have such debilitating side effects that they elect to stop treatment. The key to handling side effects is to insist on close monitoring by an experienced physician. Again, remember that generally, most of those infected with HCV do not require treatment.

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Now, we shift focus to the client diagnosed with hepatitis C. It is your responsibility as a CD nurse to know when and how to investigate a physician-reported case of acute

hepatitis C. But before we talk about case investigation, let's focus for a minute on client education. Don't forget that reinforcing and explaining control measures to the client is also an important part of your job.

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People are often frightened when they learn that they or someone they know has hepatitis C. The fear is usually due to a lack of understanding about the disease. This is why education of the client is so important. By law, physicians are required to provide control measures to anyone diagnosed with hepatitis C. However, it may fall to you to explain or reinforce control measures to the client. The NC Administrative Code addresses control measures for HIV and hepatitis B, and these are very specific, but the same isn't true for hepatitis C. Please note that hepatitis C positive persons are not required by law to disclose their status to employers or anyone else. They cannot be excluded from work, school, play, child-care settings, or elsewhere.

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Newly diagnosed clients need to know and understand control measures. Because there is no vaccine for hepatitis C, (and a lot of people get confused about that). ..they will come in and tell you that they've been vaccinated against hepatitis C, but of course, they're confusing that with hepatitis A and B. It's important to reinforce and remind them that there's no vaccine for hepatitis C, so the best way to prevent transmission is to avoid blood exposures. Personal items that may have traces of infected blood on them…things like nail clippers, razors, and toothbrushes, must not be shared with others. Open cuts and sores should be covered to prevent the transmission of infected blood to others. Remember, hepatitis C is not spread by casual contact such as sneezing, hugging, holding hands, coughing, by sharing eating utensils or drinking glasses, or through food or water. People often confuse hepatitis A, B, and C, so make sure the client understands the difference. I spoke to a group of people one time and was explaining to them about hepatitis A, B, and C, and they were really concerned because they were aware that someone in their office had been diagnosed with hepatitis C. When the person brought food to a covered dish luncheon, they wouldn't eat the food because they were convinced they could get it from her because she had hepatitis C. So, I had to educate them about the different forms of hepatitis and how hepatitis C is spread through direct blood to blood contact, and tell them that they could, in fact, eat the fruit salad that she brought to the covered dish luncheon.

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Though infrequent, hepatitis C can be spread through unprotected sex with a HCV-infected person. The risk is low, but increases in the presence of HIV and with high risk sexual behaviors that involve blood.

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You may get questions from clients about pregnancy and hepatitis C. CDC provides the following recommendations in regard to pregnancy and hepatitis C infection. These recommendations can be shared with the client, but it's always best to refer her to her

health care provider for a more individualized discussion. Women with hepatitis C usually have uneventful pregnancies, provided that the liver disease is stable and the woman has not progressed to decompensated cirrhosis. Transmission of the hepatitis C virus to the newborn is uncommon, occurring less than 4% of the time. The likelihood of transmission is increased in the presence of HIV, and the risk goes up to about 15%. The risk of transmission may also be increased by the presence of very high hepatitis C viral loads at the time of childbirth. Hepatitis C antibodies will usually be present in the newborn up to 6 months or longer due to passive transfer from the mother. For this reason, testing of the newborn, if done, should not occur until 18 months of age. I sometimes get questions about breast feeding. Breast feeding has not been associated with the transmission of the virus and is considered safe, as long as nipples aren't cracked or bleeding. Treatment of pregnant women diagnosed with hepatitis C should be delayed until after delivery. This is because ribavirin, used in the treatment of hepatitis C, can cause serious birth defects.

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Testing positive for hepatitis C can be frightening to clients, and the first thing they think is, "I'm going to die", so it's important to provide them with information that will improve their peace of mind, health, and well-being. Because alcohol is extremely damaging to the liver, clients should be advised to stop or reduce alcohol intake as much as possible. Eating a healthy, low-fat, low-salt diet, drinking lots of water, and getting enough rest and exercise, is important in allowing the liver to do its job and in staying healthy. Hepatitis C positive persons should be vaccinated against hepatitis B if they have risk factors for the disease or have never been vaccinated. They should also be vaccinated against hepatitis A if risk factors are present. Twinrix®, a combination HAV and HBV vaccination, is used in many of our local health departments to vaccinate people who are positive for HCV. It's also important for the newly diagnosed client to find a support system—to talk and feel supported by others going through the same experience. Some join support groups, others connect with people through the internet. No matter the venue, talking openly with others who understand and can provide support will be crucial.

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Now, let's talk a little about case investigation of physician-reported cases of acute hepatitis C. You won't have many of these, but what should you do when you get one? It's important to know that only 20-30% of persons with acute HCV infections are actually diagnosed. This is because most people with acute hepatitis C are either asymptomatic or have very vague symptoms. There will be few people who meet the clinical criteria of the case definition you see here. In terms of laboratory criteria of the case definition, elevations in ALT usually occur 6 to 8 weeks after infection. As the disease progresses, the levels decrease. To meet the CDC case definition for acute infection, the ALT levels must be > 400 IU/L. In addition, specified tests for HBV and HAV must be negative. To confirm a diagnosis of acute hepatitis C, an antibody test for HCV must be positive by signal to cut-off ratio OR by confirmation of the antibody test by RIBA OR by HCV RNA testing. Patients who meet both the clinical and laboratory criteria of the case definition must be reported by the physician to the local health

department. All physician-reported HCV cases should be investigated, and remember to ask the 3 questions…was the patient symptomatic? why were they tested?, and review all the labs you receive from the physician. Once you answer those questions, and investigate thoroughly, then enter the case into NC EDSS, then assign to the State Disease Registrar for review.

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So let's go back to Rick, the middle-aged family man who was diagnosed with hepatitis C. If he were to show up at your health department, would you know how to help him? Could you educate him about hepatitis C, interpret his lab results, explain control measures, offer vaccination with Twinrix® if needed, and talk with him about ways to stay safe and healthy? As a CD nurse, you have a lot of responsibilities. One of the most important is to educate and inform people in your community, not only about hepatitis C, but about all communicable diseases. I hope that after completing the HCV unit, you'll know how to investigate a reported case of acute HCV and how to counsel clients who need or request information about the infection and… if not, just give me a call and I'm always happy to talk with you about your cases.! Thank you so much.

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Resources and References