

Hepatitis C in North Carolina: Two Epidemics With One Public Health Response

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Hepatitis C virus (HCV) infection, the most common blood-borne infection in the United States, is most frequently transmitted through injection drug use [1]. Although HCV infection can be acute and self-limiting, approximately 75%–85% of infected persons will develop chronic illness. Of the estimated 3.5 million persons in the United States with chronic HCV infection, approximately 75% were born during the period 1945–1965 (ie, baby boomers) [1–3]. Chronic HCV infection has been referred to as a silent epidemic. Approximately 50% of those with chronic infection are unaware of their status and do not receive recommended medical care and treatment, increasing the possibility of progression to liver disease, cirrhosis, liver cancer, and death [1, 2].

Concurrent with the ongoing epidemic of chronic HCV infection, an emerging epidemic of acute HCV infection has been recognized among young persons who inject drugs and live in rural, resource-poor areas [4]. Opioid injection is on the rise in the United States, with a 200% increase in injection drug use fatalities since 2000 [5]. In North Carolina, opioid- and heroin-related hospitalizations and fatalities have increased 3-fold during the past 10 years [6]. New hot spots of acute HCV infection have been identified in central Appalachian states among persons who inject drugs who are aged 30 years and younger and from nonurban areas [4].

Acute cases of HCV infection are reportable by law to the North Carolina Department of Health and Human Services (NC DHHS) as part of statewide communicable disease surveillance [7]. Through public health investigations, reports that meet the clinical and laboratory requirements are designated as confirmed cases of acute HCV infection [8]. During 2010–2014, the number of reported cases of acute HCV infection in North Carolina increased

approximately 3-fold, from 39 cases in 2010 to 113 cases in 2014 [9]. Of the 113 acute HCV cases in 2014, a total of 54 (48%) were aged 30 years or younger. Of the 50 acute HCV cases in 2014 for which complete exposure risk category information was available, 42 (84%) indicated that injection drug use was the most likely exposure.

County-specific acute HCV infection incidence rates for the 5-year period 2010–2014 were highest in Western North Carolina followed by Southeast coastal North Carolina; the 3 highest 5-year county-specific incidence rates ranged from 33.1 cases per 100,000 persons to 85.5 cases per 100,000 persons [9, 10]. Considering the variability of symptomatic illness, lack of a specific diagnostic test for acute HCV, and the possibility of underreporting, the number of cases of acute HCV infection is likely underestimated [11]. In any year, the actual number of acute cases can be as high as 14 times the number of reported cases [12].

Chronic cases of HCV infection are not reportable by law in North Carolina; therefore, statewide surveillance data are not available for analysis. However, with a projected HCV infection prevalence of 1.1%, an estimated 110,000 North Carolinians are infected with HCV [1, 3, 13]. Chronic HCV infection is the leading cause of liver transplantation in the United States and one of several risk factors for liver cancer [14]. Incidentally, the statewide age-adjusted incidence rate for liver cancer has increased in North Carolina from 4.2 cases per 100,000 persons in 2003 to 8.0 cases per 100,000 persons in 2013 [15].

Public Health Response

NC DHHS is addressing HCV infection by establishing new partnerships with health care providers and other stakeholders from across the state and by focusing

on HCV screening, prevention education, and linkage to care and treatment. Initial activities will be implemented through local health departments, community-based organizations, substance use disorder treatment centers, and federally qualified health centers in the Western and Southeast coastal regions of the state. The goal is to eventually expand the program statewide.

NC DHHS will encourage increased HCV screening for groups at high risk as recommended by the Centers for Disease Control and Prevention, including 1-time screening of persons born during the period 1945–1965 and routine screening of persons who inject drugs [16]. HCV prevention education messages will be delivered at the time of screening. HCV-infected persons will receive post-test counseling through the testing site, including patient education regarding liver health (eg, abstinence from alcohol and avoidance of acetaminophen). NC DHHS will promote hepatitis A and hepatitis B vaccination for persons at high risk for vaccine-preventable viral hepatitis, regardless of their HCV infection status. Uninsured persons for whom hepatitis A and hepatitis B vaccination is recommended are eligible for free or reduced-fee services through their local health department.

With the advent of novel, highly effective, and well-tolerated direct-acting antiviral agents, the morbidity and mortality associated with chronic HCV infection can be mitigated [17]. However, well-documented barriers to HCV treatment exist, especially in rural areas; one specific barrier is limited access to specialists [17]. Improving primary care provider capacity to treat HCV infection is a possible solution. NC DHHS is conducting outreach to North Carolina health care providers, including physician extenders, who are interested in treating HCV-infected persons in their communities and is facilitating mentorship opportunities for these health care providers with specialists at partnering North Carolina academic medical centers.

Delays in linkage to care can result in negative health outcomes for HCV-infected persons [18]. Some of the

challenges HCV-infected persons can encounter in obtaining medical management and treatment include mental illness and substance use disorders, transportation concerns, the high cost of medications, and lack of health insurance. NC DHHS is pursuing the use of HCV bridge counselors to ensure linkage to care for HCV-infected persons, similar to the established North Carolina HIV bridge counselor program that links HIV-infected persons to medical care. HCV bridge counselors will connect HCV-infected persons with health care providers in their communities who manage and treat HCV; ensure that infected persons attend their first medical appointment; facilitate patients' participation in pharmaceutical company patient assistance programs; and refer infected persons to mental health, substance use disorder, and social services.

Collaborative efforts to increase HCV screening, disseminate prevention education, and foster linkage to care and treatment should be guided by robust, statewide HCV surveillance. NC DHHS is pursuing enhanced HCV surveillance through required laboratory reporting of all positive results from tests used to diagnosis HCV infection (ie, antibody tests, nucleic acid tests, antigen(s) tests, and genotypic tests). Analysis of this HCV surveillance data will help to direct limited resources and evaluate programs.

Conclusion

Through collaborative efforts, NC DHHS is addressing the epidemics of acute and chronic HCV infection in North Carolina. Measurable impacts of these efforts include increases in the number of persons at high risk who know their HCV infection status, the number of persons receiving HCV prevention education, the number of persons at high risk who are vaccinated against hepatitis A and hepatitis B, and the number of HCV-infected persons who are educated regarding liver health and linked to care and curative treatment. Through these efforts, a reduction in transmission and prevalence of HCV in North Carolina is possible. NCMJ

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References

1. Denniston MM, Jiles RB, Drobeniuc J, et al. Chronic hepatitis C virus infection in the United States, National Health and Nutrition Examination Survey 2003 to 2010. *Ann Intern Med.* 2014;160(5):293-300.
2. Smith BD, Morgan RL, Beckett GA, et al. Recommendations for the identification of chronic hepatitis C virus infection among persons born during 1945-1965. *MMWR Morb Mortal Wkly Rep.* 2012;61(RR-04):1-32.
3. Edlin BR, Eckhardt BJ, Shu MA, Holmberg SD, Swan T. Toward a more accurate estimate of the prevalence of hepatitis C in the United States. *Hepatology.* 2015;62(5):1353-1363.
4. Zibbell JE, Iqbal K, Patel RC, et al. Increases in hepatitis C virus infection related to injection drug use among persons aged ≤ 30 years—Kentucky, Tennessee, Virginia, and West Virginia, 2006-2012. *MMWR Morb Mortal Wkly Rep.* 2015;64(17):453-458.
5. Rudd RA, Aleshire N, Zibbell JE, Gladden RM. Increases in drug and opioid overdose deaths—United States, 2000-2014. *MMWR Morb Mortal Wkly Rep.* 2016;64(50-51):1378-1382.
6. Injury and Violence Prevention Branch. Poisoning data. North Carolina Department of Health and Human Services website. <http://www.injuryfreenc.ncdhhs.gov/DataSurveillance/Poisoning.htm>. Accessed January 21, 2016.
7. North Carolina General Statute (G.S.) 130A-134: Article 6. Communicable Diseases. Reportable diseases and conditions. <http://www.ncga.state.nc.us/enactedlegislation/statutes/pdf/byar> ticle/chapter_130a/article_6.pdf. Accessed January 15, 2016.
8. Centers for Disease Control and Prevention. Hepatitis C, acute, 2016 case definition. Centers for Disease Control and Prevention website. <http://wwwn.cdc.gov/nndss/conditions/hepatitis-c-acute/case-definition/2016/>. Accessed February 4, 2016.
9. Reported acute hepatitis C cases. In: North Carolina Electronic Disease Surveillance System (NCEDSS) [database]. North Carolina Department of Health and Human Services. <https://ncedss.ncpublichealth.com/login.do>. Updated July 23, 2015. Accessed July 24, 2015.
10. Centers for Disease Control and Prevention. Bridged-race post-censal population estimates, 2010-2013. Centers for Disease Control and Prevention website. http://www.cdc.gov/nchs/nvss/bridged_race.htm. Accessed July 24, 2015.
11. Onofrey S, Aneja J, Haney GA, et al. Underascertainment of acute hepatitis C virus infections in the U.S. surveillance system: a case series and chart review. *Ann Intern Med.* 2015;163(4):254-261.
12. Centers for Disease Control and Prevention. Viral hepatitis—statistics & surveillance. Centers for Disease Control and Prevention website. <http://www.cdc.gov/hepatitis/statistics/index.htm>. Accessed January 21, 2016.
13. United States Census Bureau. State and County Quick Facts—North Carolina. United States Census Bureau website. <http://quickfacts.census.gov/qfd/states/37000.html>. Accessed January 21, 2016.
14. Centers for Disease Control and Prevention. Hepatitis C FAQs for health professionals. Centers for Disease Control and Prevention website. <http://www.cdc.gov/hepatitis/hcv/hcvfaq.htm>. Accessed February 19, 2016.
15. North Carolina Department of Health and Human Services. Cancer incidence rates, North Carolina. North Carolina Department of Health and Human Services website. http://www.schs.state.nc.us/data/cancer/incidence_rates.htm. Accessed April 6, 2016.
16. Centers for Disease Control and Prevention. Viral hepatitis— hepatitis C information. Centers for Disease Control and Prevention website. <http://www.cdc.gov/hepatitis/hcv/guidelines.htm>. Accessed January 21, 2016.
17. Mitruka K, Thornton K, Cusick S, et al. Expanding primary care capacity to treat hepatitis C virus infection through an evidence-based care model—Arizona and Utah, 2012-2014. *MMWR Morb Mortal Wkly Rep.* 2014;63(18):393-398.
18. American Association for the Study of Liver Disease, Infectious Diseases Society of America. HCV Guidance: Recommendations for Testing, Managing, and Treating Hepatitis C. HCV Guidelines website. <http://www.hcvguidelines.org/full-report-view>. Accessed January 21, 2016.

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